Content

V-Control Quick Start

Concept

V-Control is designed to control devices. A device can be anything that has a control interface. Typical control interfaces are serial (RS232, RS422 and RS285), Network (TCP, UDP or HTTP), MIDI, DMX, dry contacts, wet contacts etc.

So, from small sensors up to large LED screens you can control anything with V-Control.

Devices

The philosophy is to have a virtual device in V-Control for each real device that is being controlled. The virtual device (in V-Control its the device driver) is a representation of the real device.

To control the device, a device driver has commands. A command can be a Play command for a player, or an input switch for a projector. V-Control has many device drivers build in, and if one uses one of those drivers, there is no need to know what exactly has to be send to the device to perform the command. The driver offers a command such as “Switch Input to DVI”, and it generates the necessary string and send it to the device.

New in V-Control 4

The (virtual) device driver requests the status of the controlled device and offers commands to control it. The status of a device is represented by device variables. A projector for example can have a variable for Power state, showing if the projector is switched on and of. And a second variable for Input, showing which input is currently selected. The number of device variables depends on the device itself and is not limited.

To act on variable changes we create event handlers. Event handlers are listed in the Event List. Here we create a condition, and if the condition is true, the task that is linked to the event is executed.

V-Control 4 and old Device Drivers

Some of the V-Control 3 drivers will not compile on V-Control 4 (All that make use of “NextCmd” and “Delay”). In our Driver Database, most of the drivers work in V-Control 4. We marked some drivers with a “_v3” or “_v4” extension.

- Drivers without extension work with Version 3 and 4, but do not benefit from V-Control 4 capabilities. They are used in the same way as in V-Control 3
- Drivers with “_v3” extension work only in V-Control 3 and need an update
- Drivers with “_v4” extension work only in V-Control 4

Channels

A channel is a physically present communication interface, such as RS232, TCP, UDP etc. A channel is the object that is used to talk to the device that is attached to the V-Control PC. A Device in V-Control doesn't care what kind of channel is used. You can send the same command via RS232 or TCP, it depends only which channel is assigned to the device. To configure channels for a project use the Channel Editor

Tasks

Tasks are a group of commands. The simplest type of task is a cuelist. A task should be only a part of the whole show. You can compare tasks with functions, methods or subs in other programming languages. A task is always running in its own thread.

Cuelists

V-Control knows three types of tasks. A cuelist is just a list of cues. If a cuelist is started it runs from top to bottom and executes the commands in the list. Cuelists only know a limited number of branch commands such as “Repeat”, “CallAsFunction” or “CallAsThread”. Because a cuelist is limited in flexibility, it is very easy to use, and most of the work can be done in cuelist.

Scripts

Scripts have all the power one may need for complex tasks. They are programmed in basic, but compile before running.

Timestrips

Timestrips are comparable to timelines, but the representation is a table.

Any type of task can call any type of task. In a cuelist task one can call a script task or a timestrip task and vice versa.

Installation

The installation is very easy on all supported platforms. Unpack the compressed file in any directory where the user has **write access** (**not** c.\Program Files or c:\Program Files (x86)) and launch the binary file. On Linux, it might be necessary to set the file permissions to allow execution.

Uninstallation: Delete the program directory, that's all.

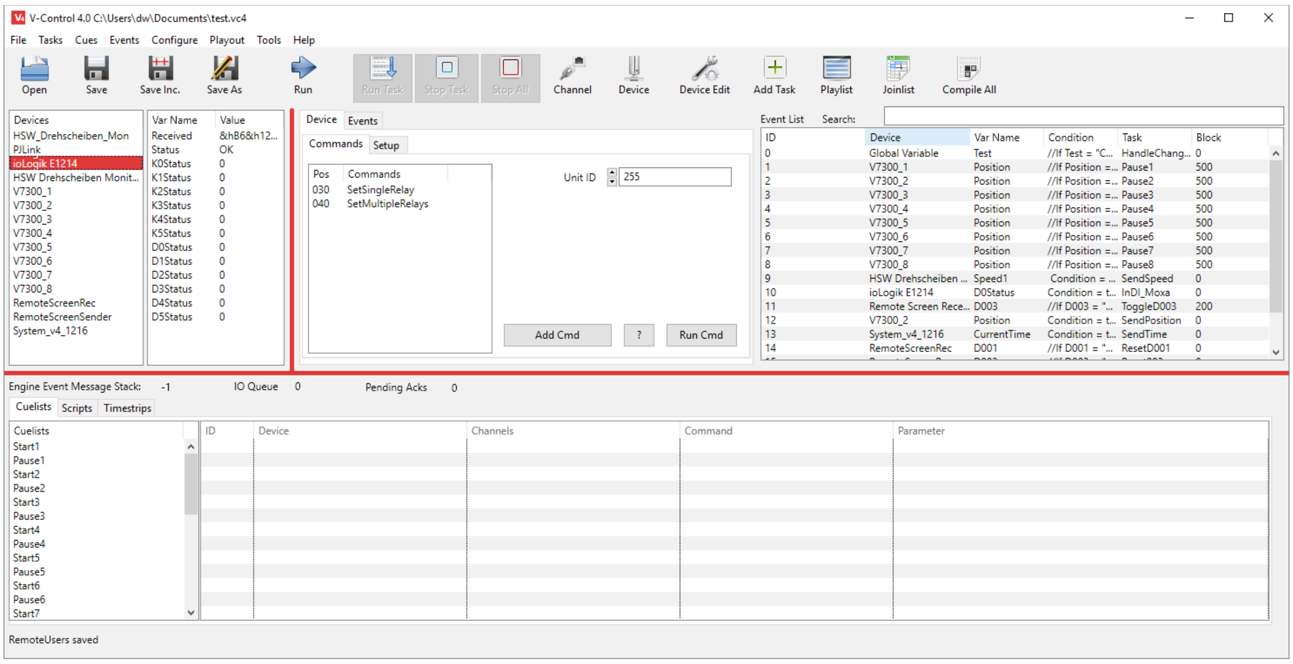
User Interface

Main Window

The V-Control user interface provides quick access to all configured devices, tasks and Events. All the three programming modes, as there are Cuelists, Scripts and Timestrips, are accessible within one user interface.

The selected kind of Task (Cuelist, Script or Timestrip) is determined by the tab bar in the lower half of the application window.

All three programming modes can be used together and mixed within one project.



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216

Var Name	Value
Received	&hB6&h12...
Status	OK
K0Status	0
K1Status	0
K2Status	0
K3Status	0
K4Status	0
K5Status	0
D0Status	0
D1Status	0
D2Status	0
D3Status	0
D4Status	0
D5Status	0

Pos	Commands
030	SetSingleRelay
040	SetMultipleRelays

Unit ID 255

ID	Device	Var Name	Condition	Task	Block
0	Global Variable	Test	//If Test = "C...	HandleChang...	0
1	V7300_1	Position	//If Position =...	Pause1	500
2	V7300_2	Position	//If Position =...	Pause2	500
3	V7300_3	Position	//If Position =...	Pause3	500
4	V7300_4	Position	//If Position =...	Pause4	500
5	V7300_5	Position	//If Position =...	Pause5	500
6	V7300_6	Position	//If Position =...	Pause6	500
7	V7300_7	Position	//If Position =...	Pause7	500
8	V7300_8	Position	//If Position =...	Pause8	500
9	HSW Drehscheiben ...	Speed1	Condition = ...	SendSpeed	0
10	ioLogik E1214	D0Status	Condition = t...	InDI_Moxa	0
11	Remote Screen Rece...	D003	//If D003 = "...	ToggleD003	200
12	V7300_2	Position	Condition = t...	SendPosition	0
13	System_v4_1216	CurrentTime	Condition = t...	SendTime	0
14	RemoteScreenRec	D001	//If D001 = "...	ResetD001	0

Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists
Start1
Pause1
Start2
Pause2
Start3
Pause3
Start4
Pause4
Start5
Pause5
Start6
Pause6
Start7

ID	Device	Channels	Command	Parameter

RemoteUsers saved

The red Lines

These lines are used to change the position and size of the GUI elements. Click and drag the lines to change the GUI.

Device List

A list of all available configured devices.

Device Variable List

Each device can have a set of variables. Variables are used to represent the state of the device. They are usually filled automatically from the device itself. If a variable change, this can trigger an action.

Command List

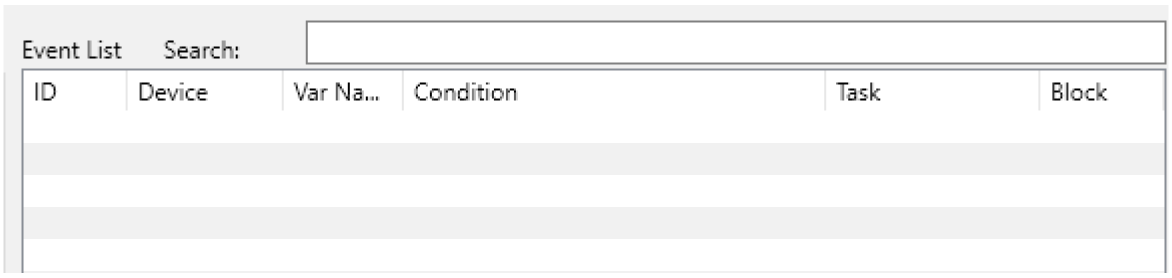
The command list contains all the available commands. If a command is selected it can show parameters for the command.

Command Parameter

Most devices and commands need parameters. A parameter can specify a device property (e.g. a bus address or name) or a command parameter such as *Input Channel* to change the input of a device. In V-Control, each command can have up to 6 parameter, two device parameters and four command parameters.

Event List

Here are all programmed events located. If a device variable change (that can be a new Timecode position during playback of a video player, an input change of a projector or a system time change) this event can be linked to a task. Each event that you want to handle is listed here.



Event List Search:

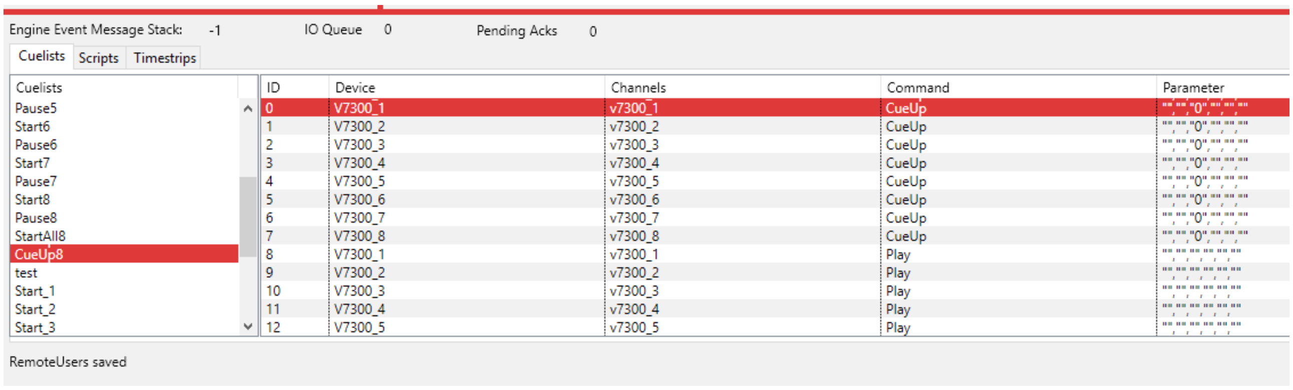
ID	Device	Var Na...	Condition	Task	Block

In complex project the eventlist can be quite long. To help finding events for debugging there is a search field. If text entered here matches any of a row content, then only these rows are diplayed.

Tasks

Task is a generic name for V-Control scripts. A task represents a program or subroutine. They contain the instructions for the attached devices (e.g. play a movie) and the program flow. V-Control knows three different types of tasks, Cuelists, Scripts and Timestrips (Timeline like). To access the tasks, select one of the tabs at the bottom

Cuelist Tasks



Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists
Pause5
Start6
Pause6
Start7
Pause7
Start8
Pause8
StartAll8
CueUp8
test
Start_1
Start_2
Start_3

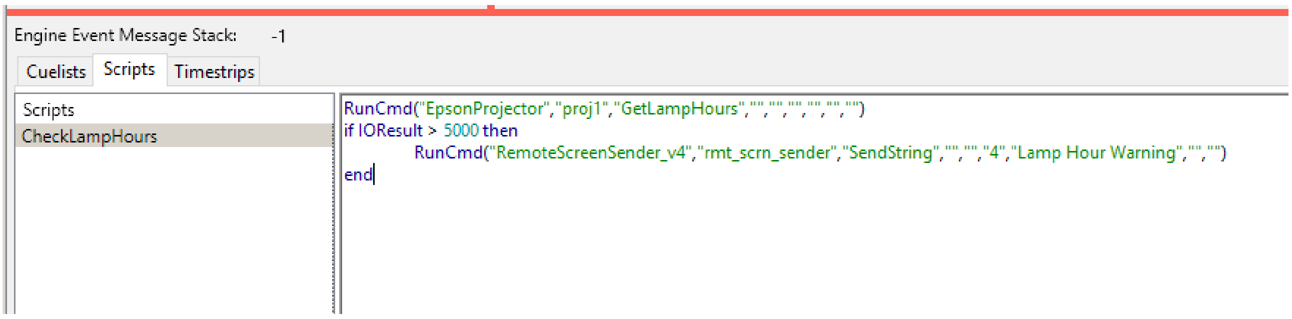
ID	Device	Channels	Command	Parameter
0	V7300_1	v7300_1	CueUp	"","","0","","",""
1	V7300_2	v7300_2	CueUp	"","","0","","",""
2	V7300_3	v7300_3	CueUp	"","","0","","",""
3	V7300_4	v7300_4	CueUp	"","","0","","",""
4	V7300_5	v7300_5	CueUp	"","","0","","",""
5	V7300_6	v7300_6	CueUp	"","","0","","",""
6	V7300_7	v7300_7	CueUp	"","","0","","",""
7	V7300_8	v7300_8	CueUp	"","","0","","",""
8	V7300_1	v7300_1	Play	"","","","","",""
9	V7300_2	v7300_2	Play	"","","","","",""
10	V7300_3	v7300_3	Play	"","","","","",""
11	V7300_4	v7300_4	Play	"","","","","",""
12	V7300_5	v7300_5	Play	"","","","","",""

RemoteUsers saved

These tasks are very easy to use but have some limitations. Every program step is written in a table, and the table is executed from top to bottom. Branching is possible if calling other tasks from that list (CallAsThread, CallAsFunction).Conditional branching is available in Scripts only. Also (nested) repeats are possible. The biggest advantage of Cuelists is, that programming skills are unnecessary to work with them. Also for people with (basic) programming skills, Cuelists lead to target very fast.

Script Tasks

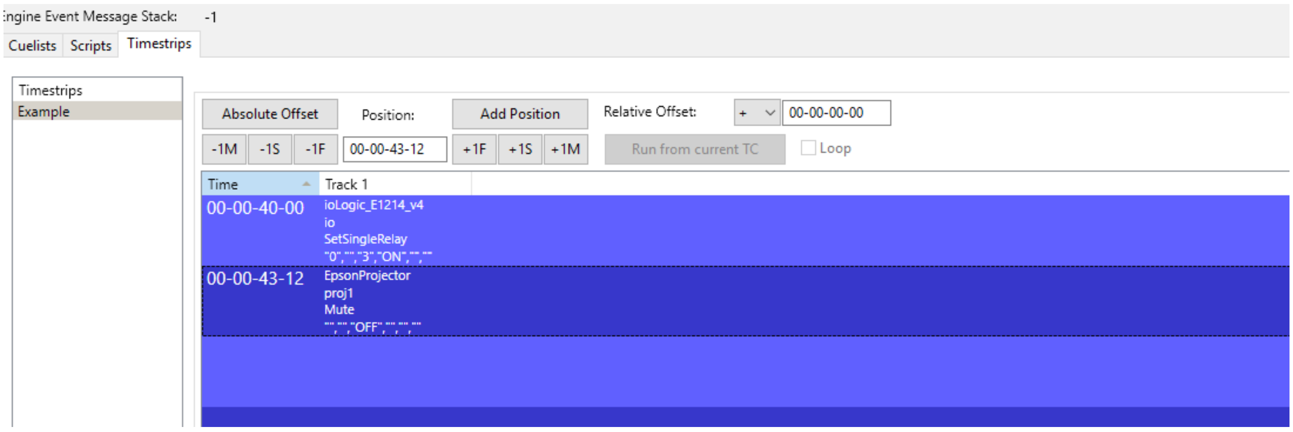
Scripts are real (and for the chosen platform native compiled) basic programs. In V-Control, the basic language is enhanced by commands giving access to the device drivers and channels.



```
RunCmd("EpsonProjector","proj1","GetLampHours","","","","","","")
if IOResult > 5000 then
        RunCmd("RemoteScreenSender_v4","rmt_scrn_sender","SendString","","","4","Lamp Hour Warning","","")
end
```

The screenshot below shows the Script GUI.

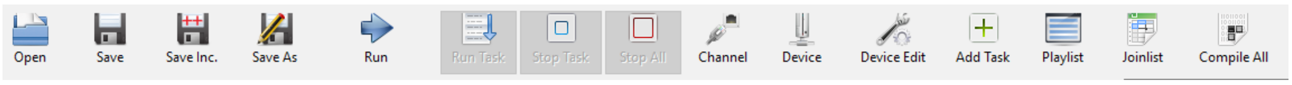
Timestrip Tasks



Time	Track 1
00-00-40-00	ioLogic_E1214_v4 io SetSingleRelay "0","","3","ON","",""
00-00-43-12	EpsonProjector proj1 Mute "","","OFF","","",""

Timestrips are used for a timeline like programming. The difference is that the representation of the task is not a timeline, but a table.

Toolbar



Open

Opens a Project

Save

Saves a Project. The saving process is running on it's own thread in the background. It is not possible to terminate V-Control while a saving process is running.

Save Inc.

Saves a Project with an incrementing number. If the project name is "myProject.vc4", then pressing this button saves "myProject_001.vc4". Pushing the button a second time saves "myProject_002.vc4" and so on. **Attention:** *Save Inc.* overwrites existing files without asking. To avoid this, make sure that you always open the project with the largest number after V-Control is launched.

Save as

Saves a Project under a new name

Run

This button toggles. If unpressed, V-Control does not send or receive any commands. If pressed, V-Control will perform all events and commands.

Run Task

Runs a selected task. *F5* key does the same (only available in Run mode).

Stop Task

Stops the selected task. *F6* key does the same (only available in Run mode). **Note:** This Action stops the selected task, but if the task is re-executed by an event, then it runs again.

Stop All

Stops all running tasks. *F7* key does the same (only available in Run mode). **Note:** This Action stops all tasks, but if a task is re-executed by an event, then it runs again.

Channel

Opens the Channel Editor

Device

Opens the device setup page. Here a device driver can be selected from the device database.

Device Editor

Opens the Device Editor

Add Task

Creates a new task. The type of task (Cuelist, Script or Timestrip) is determined by the task tab that is visible at that moment.

Playlist

Opens a playlist to drive a show.

Joinlist

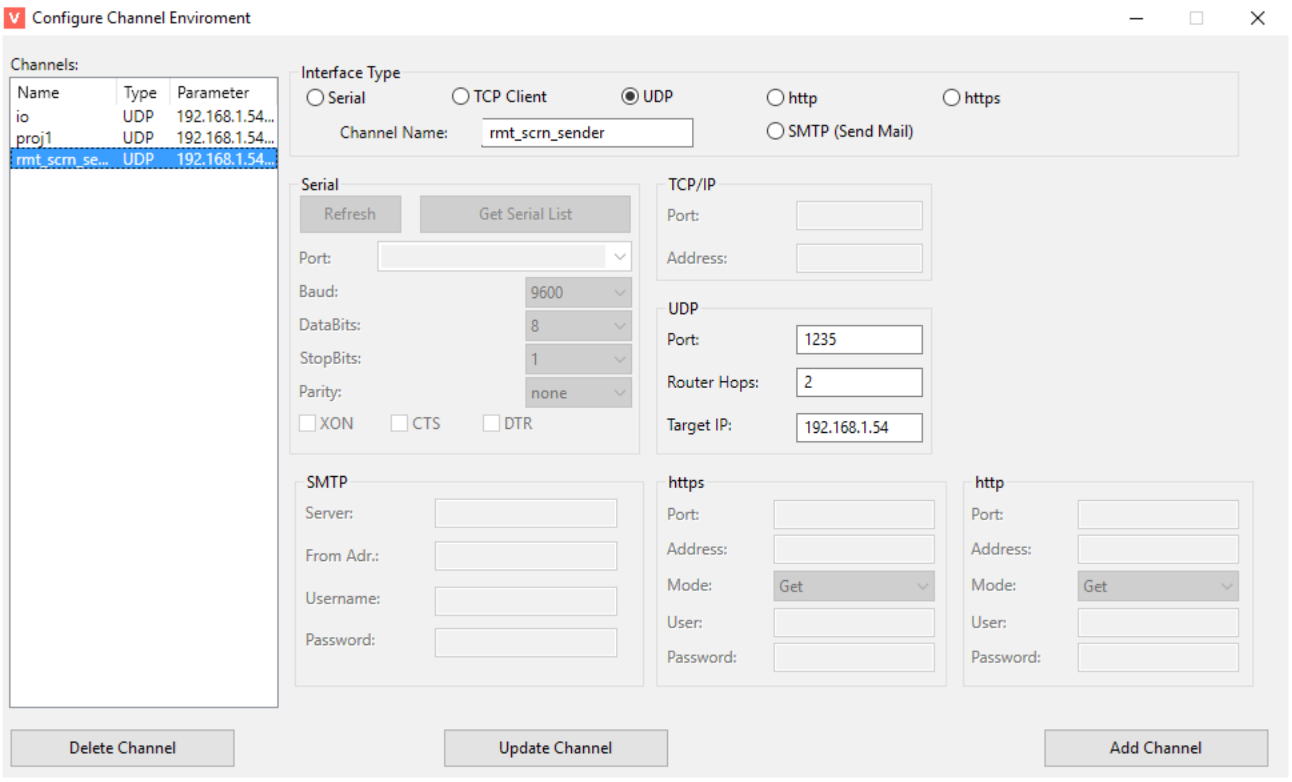
To receive button presses from external GUI's running on a tablet or PC, and to update GUI elements such as labels, buttons etc. V-Control uses Join Numbers to identify these widgets. In complex project there can be hundreds of widgets, and some widgets can have multiple join numbers. This list can help to keep the overview of all those numbers.

Compile All

V-Control scripts are compiled once automatically on their first start. This button does the same for all scripts before they run the first time.

Channel Editor

Basis for the communication with attached devices are the channels. A channel gives access to a physically interface - e.g. a RS232 port or a UDP port. The device drivers use these channels to communicate with the devices attached to the channels.


Configure Channel Enviroment

Channels:

Name	Type	Parameter
io	UDP	192.168.1.54...
proj1	UDP	192.168.1.54...
rmt_scrn_se...	UDP	192.168.1.54...

Interface Type: Serial, TCP Client, [✓ UDP], http, https, SMTP (Send Mail)

Channel Name: rmt_scrn_sender

Serial: Port: · Baud: 9600 · DataBits: 8 · StopBits: 1 · Parity: none · XON · CTS · DTR

TCP/IP: Port: · Address:

UDP: Port: 1235 · Router Hops: 2 · Target IP: 192.168.1.54

SMTP: Server: · From Adr.: · Username: · Password:

https: Port: · Address: · Mode: Get · User: · Password:

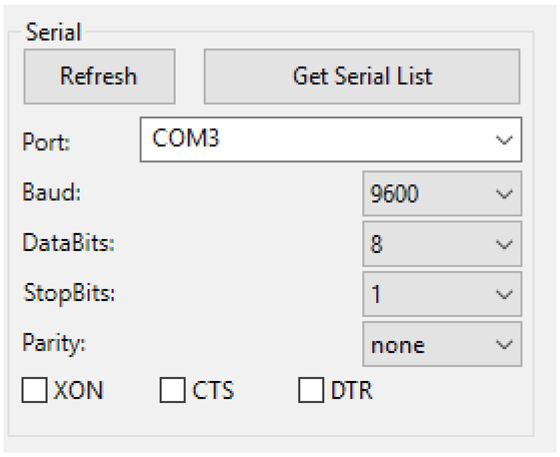
http: Port: · Address: · Mode: Get · User: · Password:

Via main menu *Configure - Channels* (or toolbar shortcut) the channel editor opens. Every channel is identified by its Channel Name. For that reason, not only interface parameters are needed to specify the channel, but also a unique channel name. The channel name should (but is not required) give a hint on how the channel is used. E.g. a channel used to control a Panasonic projector could have the name “proj1_left”, the channel for the second Projector is named “proj2_right” and so on. We recommend to name the channels in lower case letters, and the Devices with a leading upper case letter.

Before creating a new channel, it is necessary to specify its kind in the Interface Type area and enter a channel name as described above. To edit a channel, select its name in the left list and change its parameters. Then click Update Channel.

Serial Channel

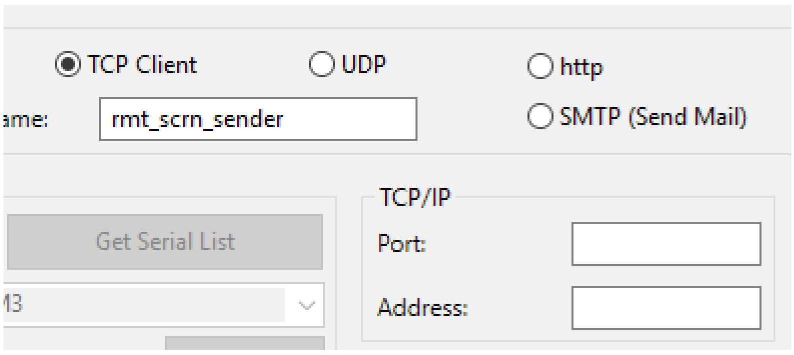
Serial channels are used for RS232/422 and 485 interfaces. Get Serial List loads all previously scanned ports in the Port: list. If new serial ports attached to the system, Refresh executes a new port scan. On systems with many serial interfaces this could take a while.



Port: COM3
Baud: 9600
DataBits: 8
StopBits: 1
Parity: none
☐ XON ☐ CTS ☐ DTR

TCP Channel

To control devices via TCP, the Port and IP Address is needed



● TCP Client ○ UDP ○ http ○ SMTP (Send Mail)

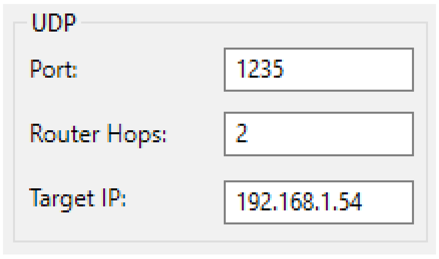
ame: rmt_scrn_sender

Port:

Address:

UDP Channel

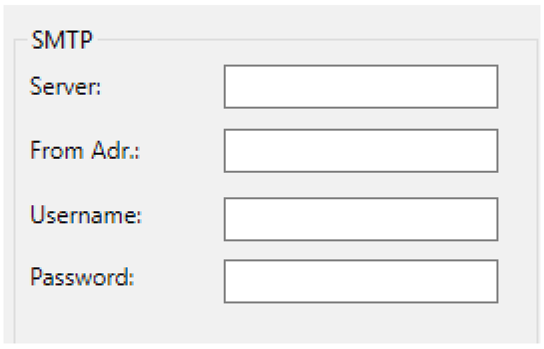
Router Hops determine how many routers the UDP packet is allowed to pass.



Port: 1235
Router Hops: 2
Target IP: 192.168.1.54

SMTP Channel

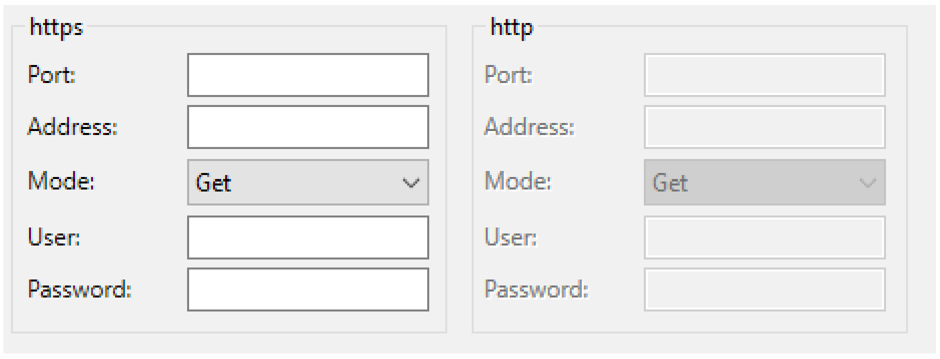
The SMTP channel specify's a mail server. This channel is used by the SMTPMailClient device to send emails.



SMTP	
Server:	
From Adr.:	
Username:	
Password:	

Server: The mail server (e.g. smtp.web.de) From Adr.: The sender address (me@myspace.com) Username: Username to log in Password: Mail server password

Http and Https Channel

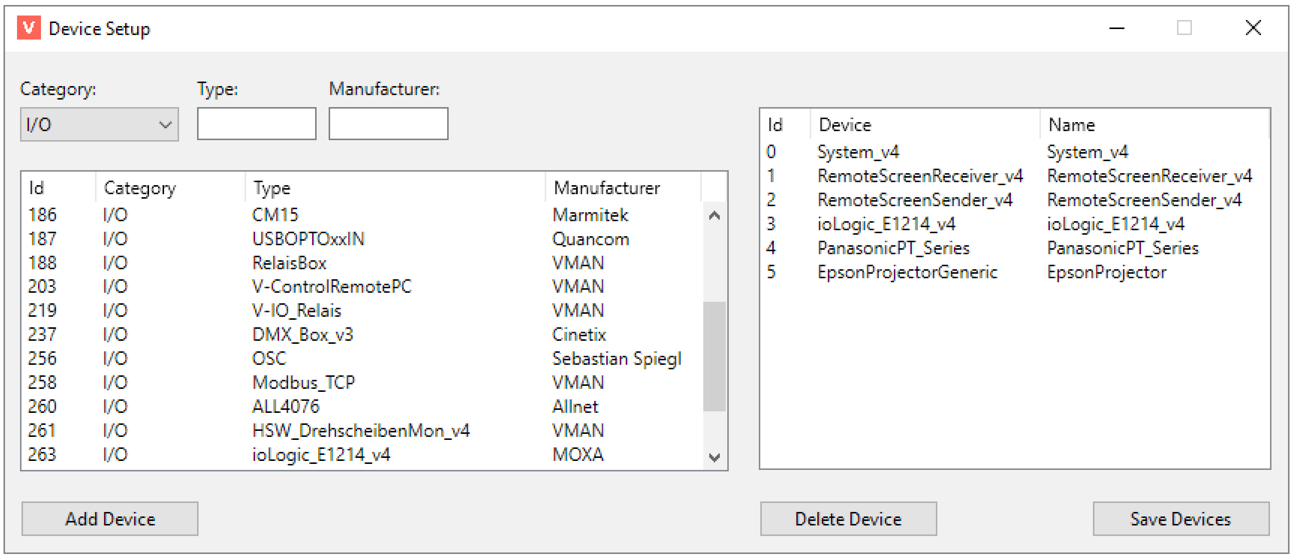


https		http	
Port:		Port:	
Address:		Address:	
Mode:	Get	Mode:	Get
User:		User:	
Password:		Password:	

HTTP and HTTPS channels can automatically log in if username and password is saved in the channel properties. They both can do http Get and Post requests.

Device Setup

To configure the devices select *Configure - Devices* in main menu (or *Device* shortcut in the toolbar) . The Device Setup window opens as shown below. The right table lists all devices currently available in the project. The left table list device templates, whose search criteria matches one of the fields Category, Type or Manufacturer.



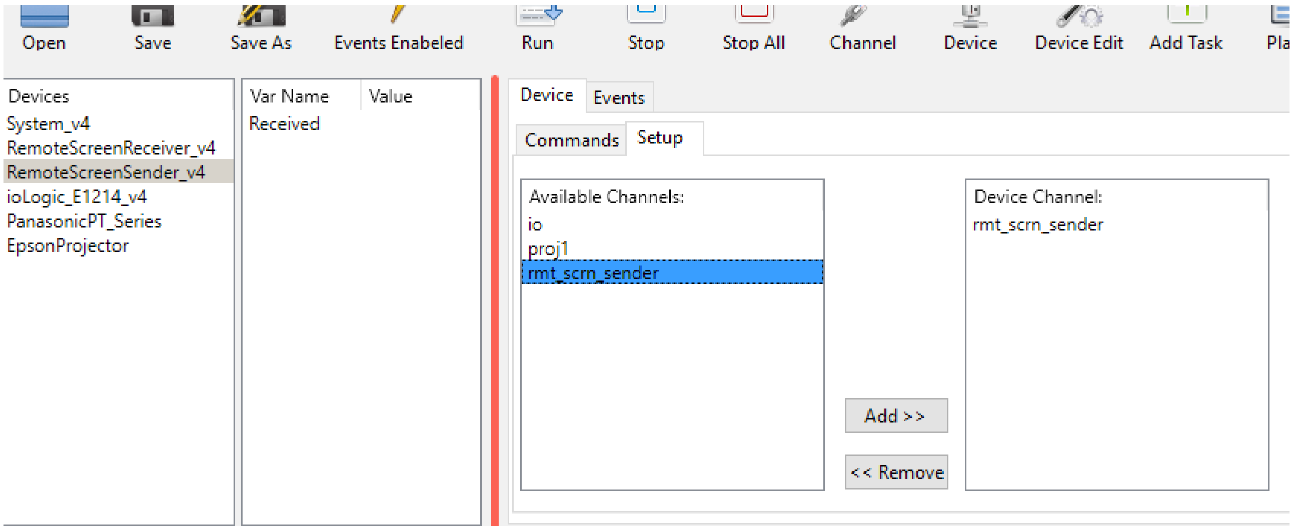
Category: I/O
Type:
Manufacturer:

Id	Category	Type	Manufacturer
186	I/O	CM15	Marmitek
187	I/O	USBOPTOxxIN	Quancom
188	I/O	RelaisBox	VMAN
203	I/O	V-ControlRemotePC	VMAN
219	I/O	V-IO_Relais	VMAN
237	I/O	DMX_Box_v3	Cinetix
256	I/O	OSC	Sebastian Spiegl
258	I/O	Modbus_TCP	VMAN
260	I/O	ALL4076	Allnet
261	I/O	HSW_DrehscheibenMon_v4	VMAN
263	I/O	ioLogic_E1214_v4	MOXA

Id	Device	Name
0	System_v4	System_v4
1	RemoteScreenReceiver_v4	RemoteScreenReceiver_v4
2	RemoteScreenSender_v4	RemoteScreenSender_v4
3	ioLogic_E1214_v4	ioLogic_E1214_v4
4	PanasonicPT_Series	PanasonicPT_Series
5	EpsonProjectorGeneric	EpsonProjector

If the desired driver appears in the left list, a double click or *Add Device* adds the device to the right list (project devices). *Save Devices* saves the right list and make the devices available.

Before the device is usable, it is necessary to assign at a Channel. To do that, follow the instructions in the screenshot below.



Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector

Var Name	Value
Received	

Available Channels:
io
proj1
rmt_scrn_sender

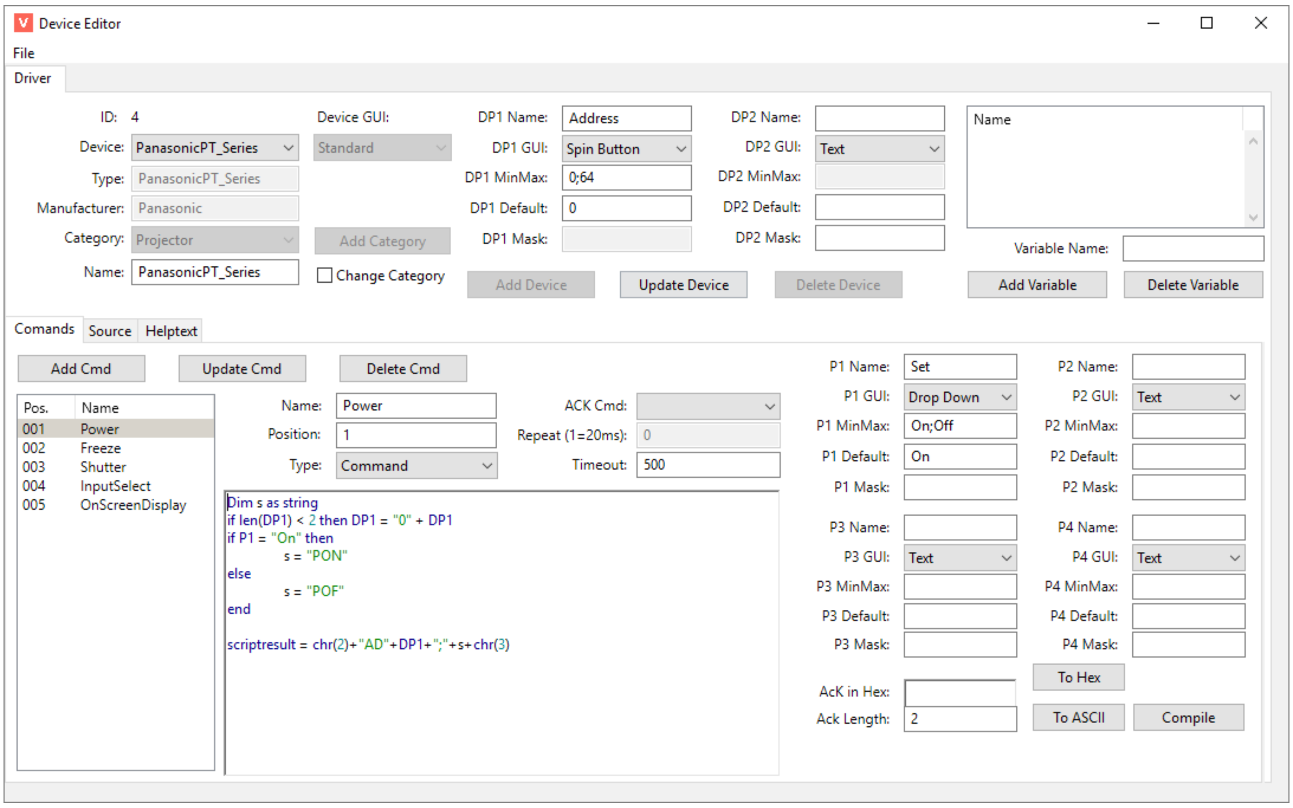
Device Channel:
rmt_scrn_sender

1. Select the device in main windows device list
2. press the setup tab (right from commands tab)
3. in the *Available Channels* list select the channel to assign to the selected device
4. press the *Add* button

Device Editor

It is possible to customize (if needed) the device drivers for a project. A complete description how to create and edit device drivers is found in the Device Editor chapter. In most cases it should be sufficient to change the device name. To do that, follow the instructions below.

The Device Editor is launched via *Device Edit* symbol in the toolbar or main menu *Configure -> Edit Devices...*



ID: 4
Device: PanasonicPT_Series
Type: PanasonicPT_Series
Manufacturer: Panasonic
Category: Projector
Name: PanasonicPT_Series
Device GUI: Standard
Change Category
DP1 Name: Address
DP1 GUI: Spin Button
DP1 MinMax: 0;64
DP1 Default: 0
DP1 Mask:
DP2 Name:
DP2 GUI: Text
DP2 MinMax:
DP2 Default:
DP2 Mask:
Name
Variable Name:

Pos.	Name
001	Power
002	Freeze
003	Shutter
004	InputSelect
005	OnScreenDisplay

Name: Power
Position: 1
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

```
Dim s as string
if len(DP1) < 2 then DP1 = "0" + DP1
if P1 = "On" then
        s = "PON"
else
        s = "POF"
end

scriptresult = chr(2)+"AD"+DP1+";"+s+chr(3)
```

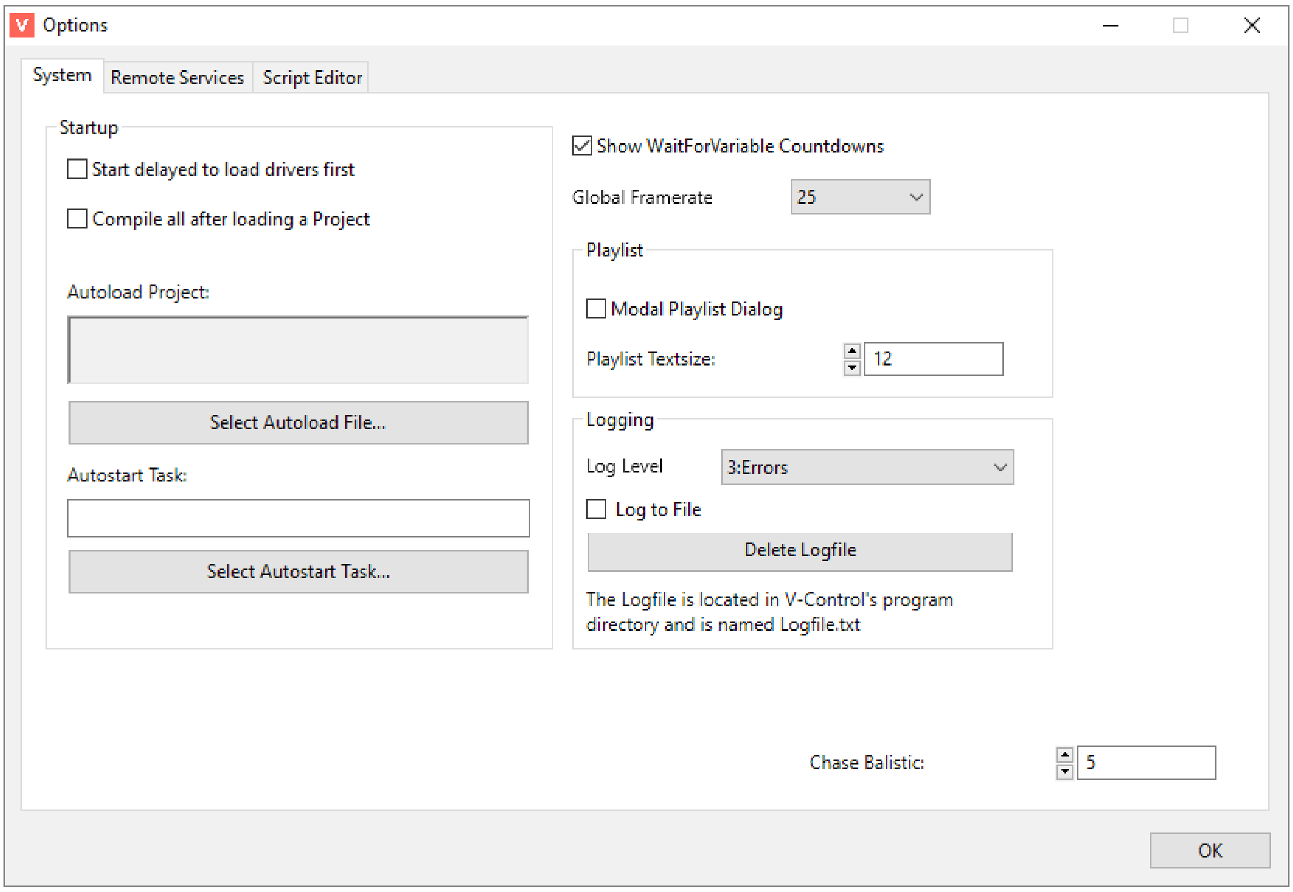
P1 Name: Set
P1 GUI: Drop Down
P1 MinMax: On;Off
P1 Default: On
P1 Mask:
P2 Name:
P2 GUI: Text
P2 MinMax:
P2 Default:
P2 Mask:
P3 Name:
P3 GUI: Text
P3 MinMax:
P3 Default:
P3 Mask:
P4 Name:
P4 GUI: Text
P4 MinMax:
P4 Default:
P4 Mask:
AcK in Hex:
Ack Length: 2

To change a device name enter / edit the name in the *Name* textfield. The device is selected in the Drop Down Box *Device:*. *Update Device* saves the new name in the current project.

The device Editor knows two modes. If launched via *Configure -> Edit Devices* or the *Device Edit* toolbar icon, all changes made in any driver stored in the project (*.vc4 file). The original driver template stay untouched. If launched via *Configure -> Edit Device Templates*, the templates is edited, and the project devices stay untouched. This is important to keep in mind if editing device drivers.

Options

Via main menu *Configure -> Options* the program preferences are available.


Options

System | Remote Services | Script Editor

Startup

☐ Start delayed to load drivers first

☐ Compile all after loading a Project

Autoload Project:

Select Autoload File...

Autostart Task:

Select Autostart Task...

☑ Show WaitForVariable Countdowns

Global Framerate: 25

Playlist

☐ Modal Playlist Dialog

Playlist Textsize: 12

Logging

Log Level: 3:Errors

☐ Log to File

Delete Logfile

The Logfile is located in V-Control's program directory and is named Logfile.txt

Chase Balistic: 5

OK

System

- *Start delayed to load drivers first*:If V-Control runs stand alone and is started at system start automatically, it could be that network drivers or drivers for serial cards are not loaded when V-Control is ready. With this option V-Control starts and the waits before loading a project file.
- *Select Autoload File*: selects a file that is load during startup.
- *Autostart Task*: launch the selected task if the Autostart File was loaded. **Note:** Only if an *Autostart Task* is selected, V-Control switches to Run Mode automatically. If you don't need a task running at startup, but want to enter Run Mode automatically, create a task that does nothing and select it here.
- *Show WautForFariable Contdowns*: If a WaitForVariable command waits for a numeric or time value, and the comparsion is >, >=, < or <=, then a window with a countdown appears.
- *Global Framerate*: This framerate is used in the Timeline. The framerate is also used in Timecode calculations.
- *Modal Playlist Dialog*: by default, the playlist is no modal dialog (means that you can access other V-Control elements while the playlist is open). If this is checked the playlist is modal. This is useful if keyboard shortcuts are mapped to playlist items and you don't want the playlist to lose its focus.
- *Playlist Textsize*: changes the font size of the Playlist.
- *Logging Level*: determines how many logg entrys are generated. Default is 3 (only errors). Level 2 is warnings (Timeouts), Level 1 is commands and level 0 is also all internal commands for device status acquisition.

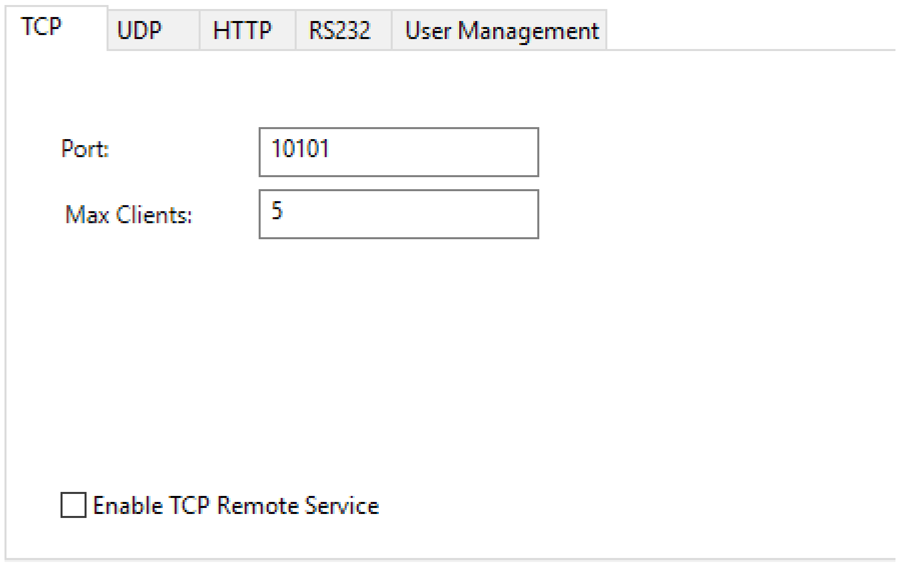
With loglevel 0 you'll get a rapidly filling list. The log window opens automatically if a new logmessage corresponding to the selected loglevel appears.
- *Log to File*:writes all messages to a textfile

Remote Services

Remote Services are used to make V-Control functions available for other applications. They can use Ethernet (TCP/UDP/HTTP) or RS232 to communicate with V-Control. The communication protocol is described in the Node Protocol chapter. To make Remote Services available via network, it might be necessary to configure the firewall of the System. All kind of remote services described below can be used at the same time.

TCP Remote

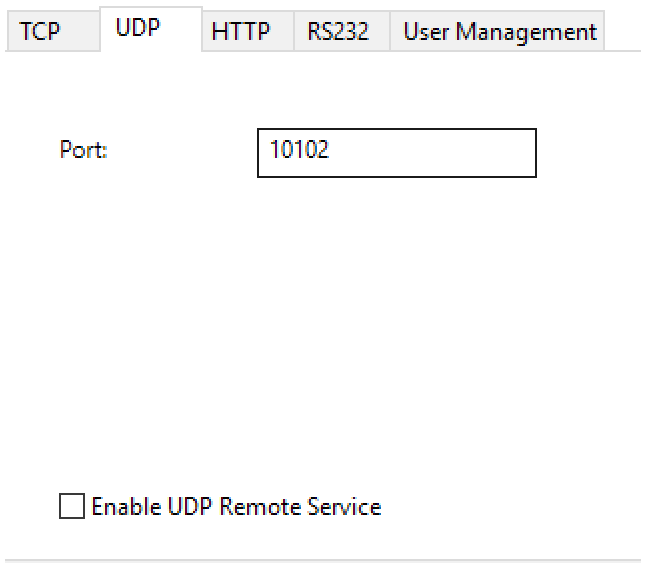
The TCP service can be used by any application that is capable to connect to a TCP Server and send the command strings as described in the Node Protocol chapter. The Port is 10101 by default an can be changed. Max Clients determines the maximum number of simultaneously connected clients. The check-box *Enable TCP Remote Service* starts the service.



Port: 10101
Max Clients: 5
☐ Enable TCP Remote Service

UDP Remote

The UDP Service uses the same protocol than the TCP Service. If both services used at the same time, it is necessary to use a different port. For that reason, the default UDP Port is 10102.

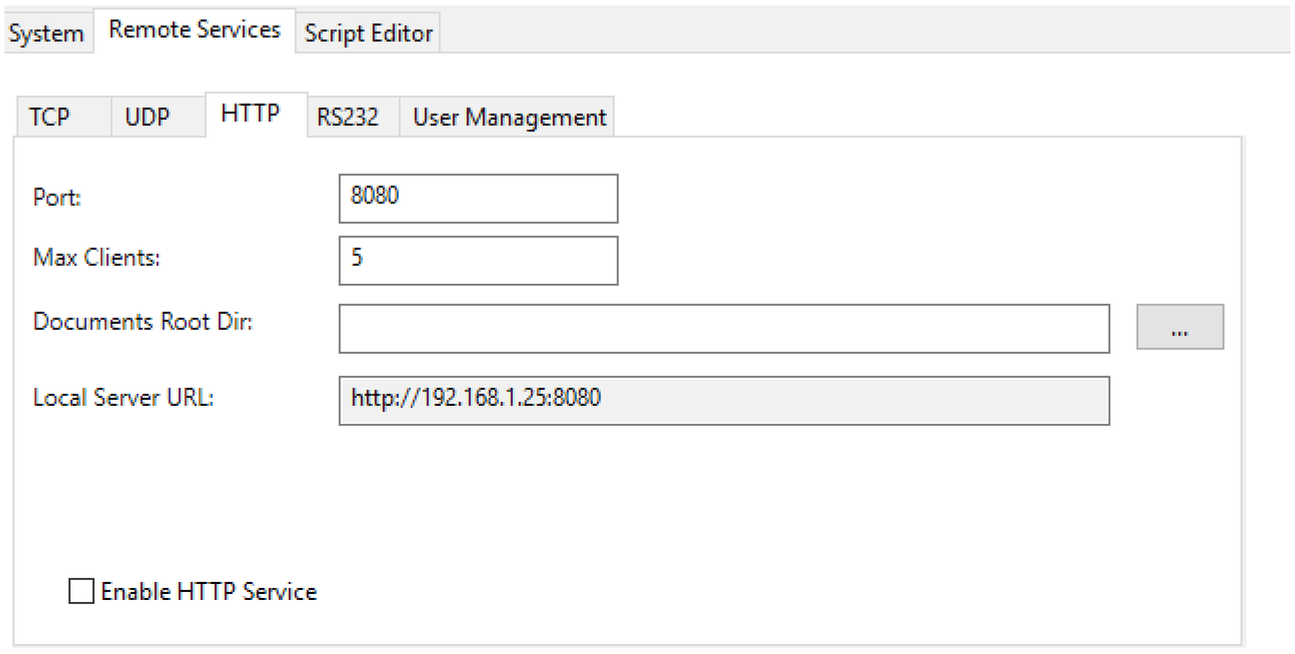

TCP | UDP | HTTP | RS232 | User Management

Port: 10102

☐ Enable UDP Remote Service

HTTP Remote (Webserver):

V-Control comes with a build in web server.


System | Remote Services | Script Editor

TCP | UDP | HTTP | RS232 | User Management

Port: 8080

Max Clients: 5

Documents Root Dir:

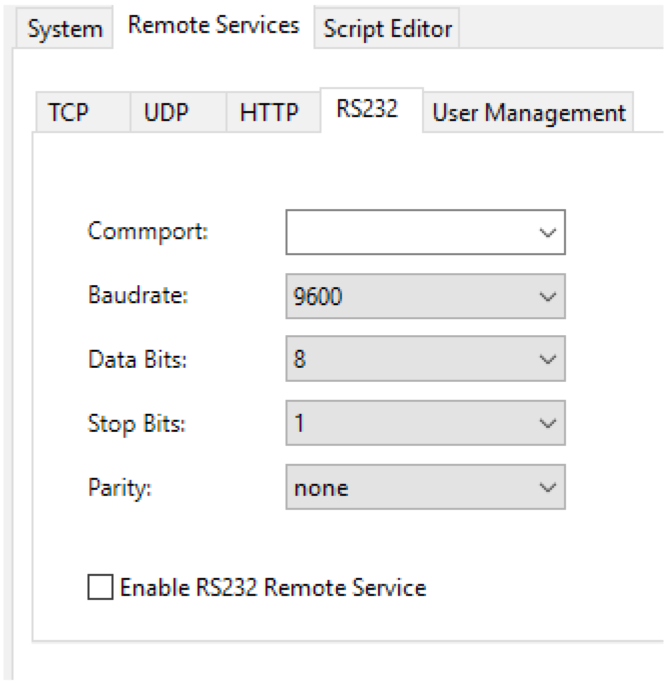
Local Server URL: http://192.168.1.25:8080

☐ Enable HTTP Service

The HTTP Port is 80 by default. In this case it is sufficient to enter the IP address of the V-Control system in the browsers address field. If the web service is not available, check the firewall configuration of the computer or try another port. If another port than 80 is used, the port number has to be added to the URL (e.g. http://192.168.1.5:8080) if Port 8080 is used alternatively. *Documents Dir* contain the path to the html documents directory.

RS232 Remote

If there is no network available, it is possible to use a RS232 connection. The RS232 service uses the same protocol than TCP or UDP services.


System | Remote Services | Script Editor

TCP | UDP | HTTP | RS232 | User Management

Commport:

Baudrate: 9600

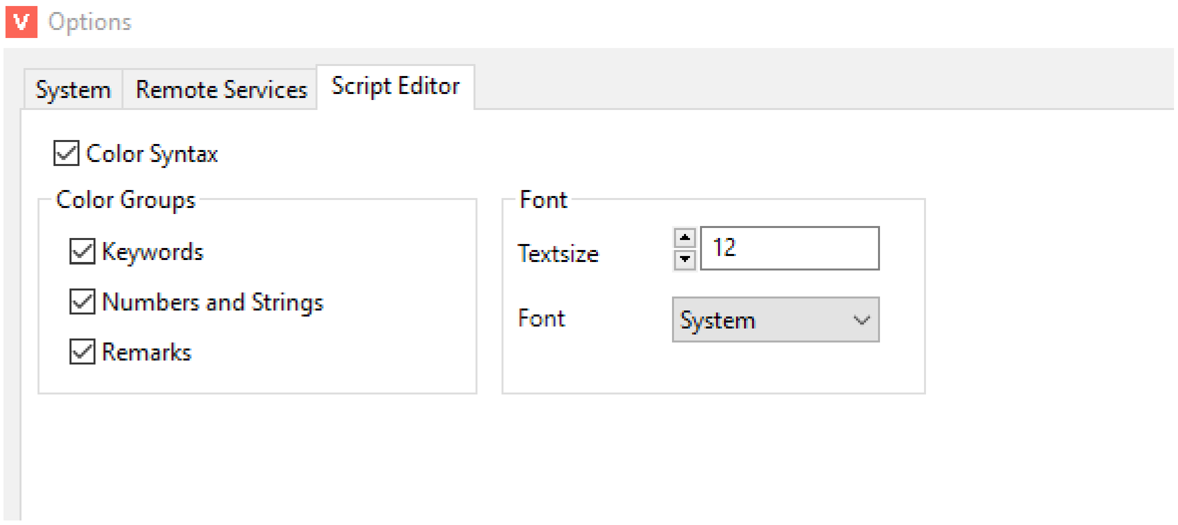
Data Bits: 8

Stop Bits: 1

Parity: none

☐ Enable RS232 Remote Service

The Script Editor Page


Options

System | Remote Services | Script Editor

☑ Color Syntax

Color Groups

☑ Keywords

☑ Numbers and Strings

☑ Remarks

Font

Textsize 12

Font System

This dialog is used to configure the Script Editor

- Color Syntax: Switch Color Syntax on / off
- Keywords: Basic keywords are marked blue
- Numbers and Strings: These values marked green.
- Remarks: Code lines containing *are marked red from the occurrence of the* letters
- Textsize: The size of the font
- **Font: The type of the font**

Cuelist Tasks

Tasks contain the instructions for the attached devices and the program flow. V-Control knows three types of tasks, Cuelists, Scripts and Timestrips. Cuelists are very easy to use without real programming. Scripts contain (native compiled) Basic scripts, which makes them very powerful for all kind of applications. Timestrips are a kind of timeline and can be useful in Show Control.

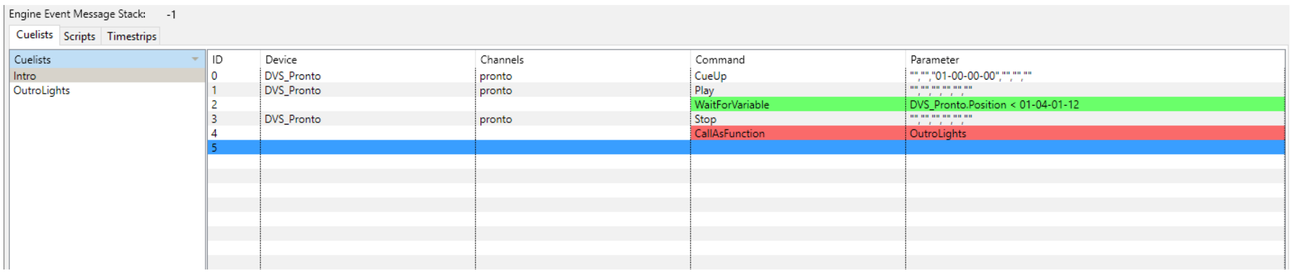
Multitasking and blocked Devices

V-Control can run many tasks at the same time. If multiple tasks running together, the programmer has to take care that not more then one task at a time is using the same resource. A resource is a channel or a device.

If one task is accessing a device, and another task wants to access the same device at the same time, the first task wins, the command of the second one is stored in a queue and performed if the device is free.

Cuelists

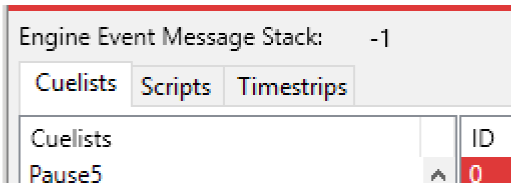
In Cuelists, the commands stored in a table that is processed from top to bottom. It is possible to branch to other tasks and call them as function or thread, but conditional branching is available in Scripts only.



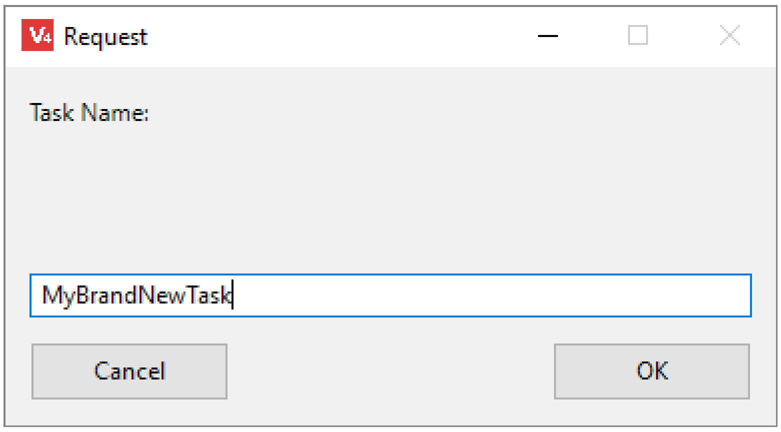
ID	Device	Channels	Command	Parameter
0	DVS_Pronto	pronto	CueUp	"","","01-00-00-00","","",""
1	DVS_Pronto	pronto	Play	"","","","","",""
2			WaitForVariable	DVS_Pronto.Position < 01-04-01-12
3	DVS_Pronto	pronto	Stop	"","","","","",""
4			CallAsFunction	OutroLights
5				

Create Cuelists

To Create a Cuelist, select Cuelists in the Task area.



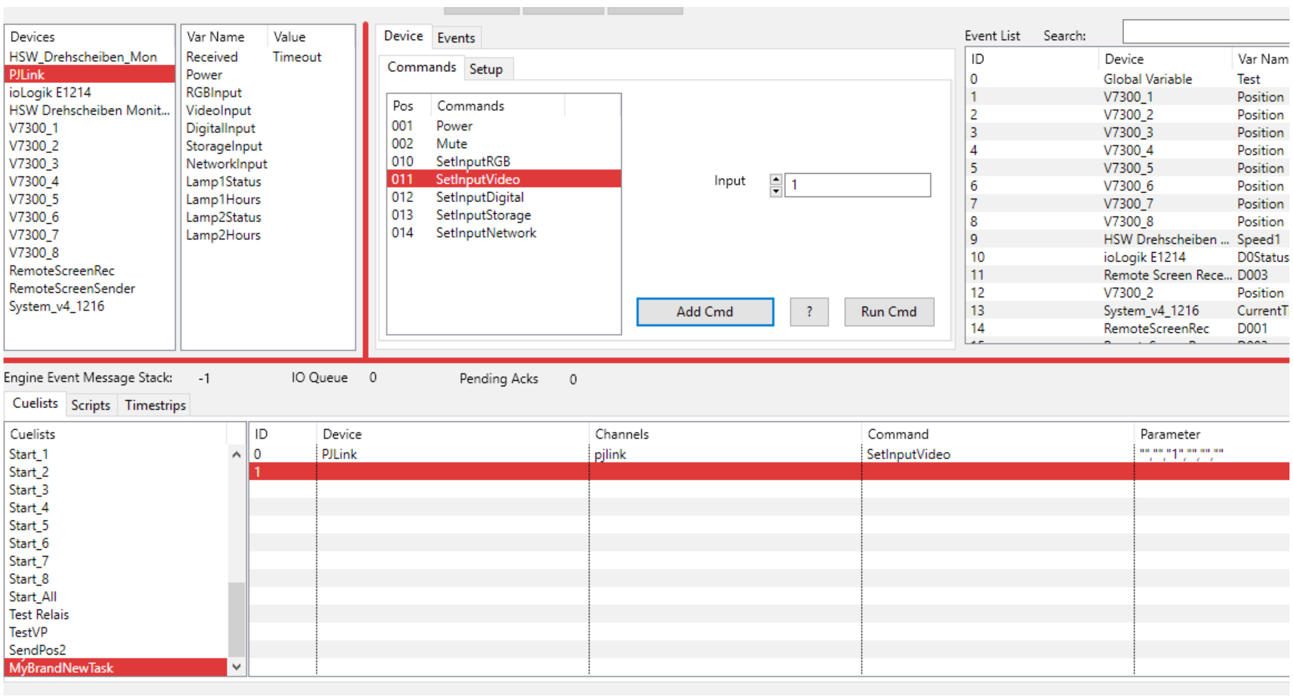
Then select *Tasks -> Add* in main menu or via Cuelist context menu (right click) select *Add Task*. Alternatively the *Add Task* tool button or Ctrl+A does the same job.



MyBrandNewTask

Each task needs a unique name that is entered in the dialog box as shown above. Then we have a new (Cuelist) task that is selectable and ready to take the instructions.

So lets add the first command. In the *Device List* select a device (PJLink in this case). Select a Command in the *Command List* (SetInputVideo here) and change the parameter to match your needs. Click the *Add Cmd* button to add the command in the list.



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216

Var Name	Value
Received	Timeout
Power	
RGBInput	
VideoInput	
DigitalInput	
StorageInput	
NetworkInput	
Lamp1Status	
Lamp1Hours	
Lamp2Status	
Lamp2Hours	

Pos	Commands
001	Power
002	Mute
010	SetInputRGB
011	SetInputVideo
012	SetInputDigital
013	SetInputStorage
014	SetInputNetwork

Input 1

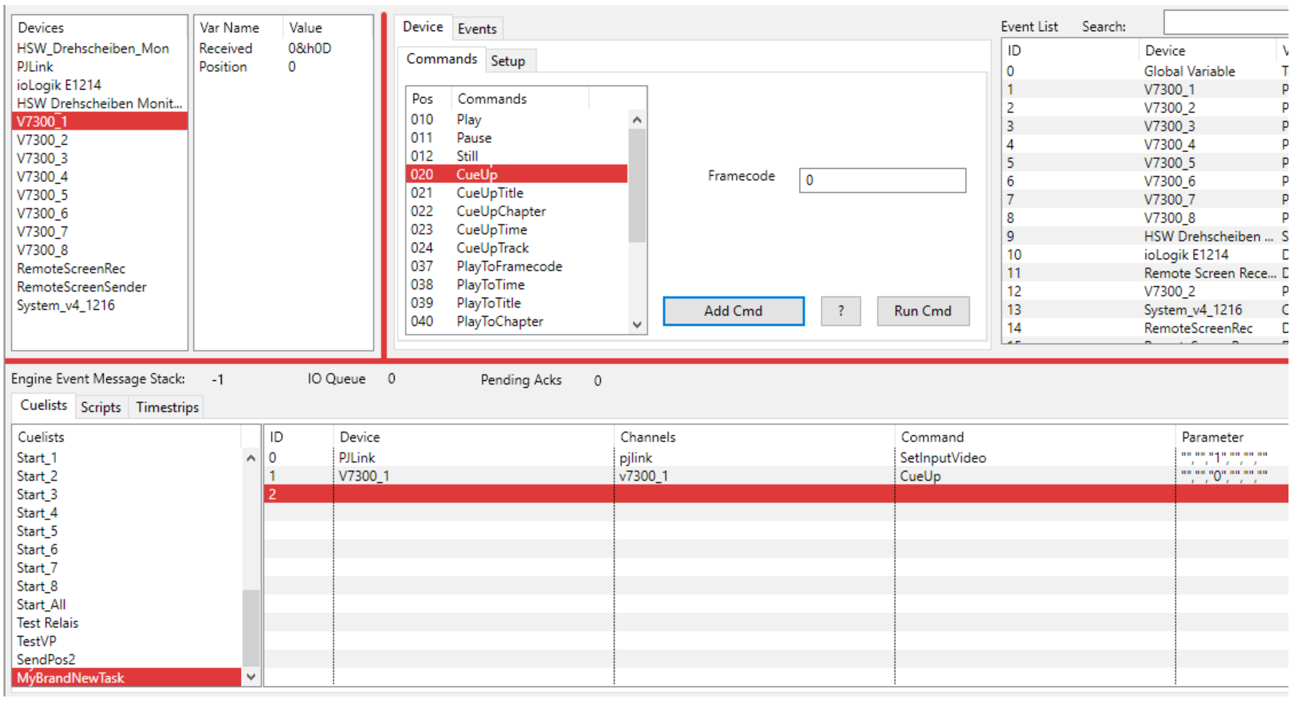
ID	Device	Var Nam
0	Global Variable	Test
1	V7300_1	Position
2	V7300_2	Position
3	V7300_3	Position
4	V7300_4	Position
5	V7300_5	Position
6	V7300_6	Position
7	V7300_7	Position
8	V7300_8	Position
9	HSW Drehscheiben ...	Speed1
10	ioLogik E1214	D0Status
11	Remote Screen Rece...	D003
12	V7300_2	Position
13	System_v4_1216	CurrentT
14	RemoteScreenRec	D001

Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists
Start_1
Start_2
Start_3
Start_4
Start_5
Start_6
Start_7
Start_8
Start_All
Test Relais
TestVP
SendPos2
MyBrandNewTask

ID	Device	Channels	Command	Parameter
0	PJLink	pjlink	SetInputVideo	"","","1","","",""
1				

The next command is a CueUp instruction for a Player. Same procedure here. Select the Device, select the command, enter a parameter and click *Add Cmd*.



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216

Var Name	Value
Received	0&h0D
Position	0

Device | Events

Commands | Setup

Pos	Commands
010	Play
011	Pause
012	Still
020	CueUp
021	CueUpTitle
022	CueUpChapter
023	CueUpTime
024	CueUpTrack
037	PlayToFramecode
038	PlayToTime
039	PlayToTitle
040	PlayToChapter

Framecode: 0

Add Cmd | ? | Run Cmd

Event List Search:

ID	Device	V
0	Global Variable	T
1	V7300_1	P
2	V7300_2	P
3	V7300_3	P
4	V7300_4	P
5	V7300_5	P
6	V7300_6	P
7	V7300_7	P
8	V7300_8	P
9	HSW Drehscheiben ...	S
10	ioLogik E1214	D
11	Remote Screen Rece...	D
12	V7300_2	P
13	System_v4_1216	C
14	RemoteScreenRec	D

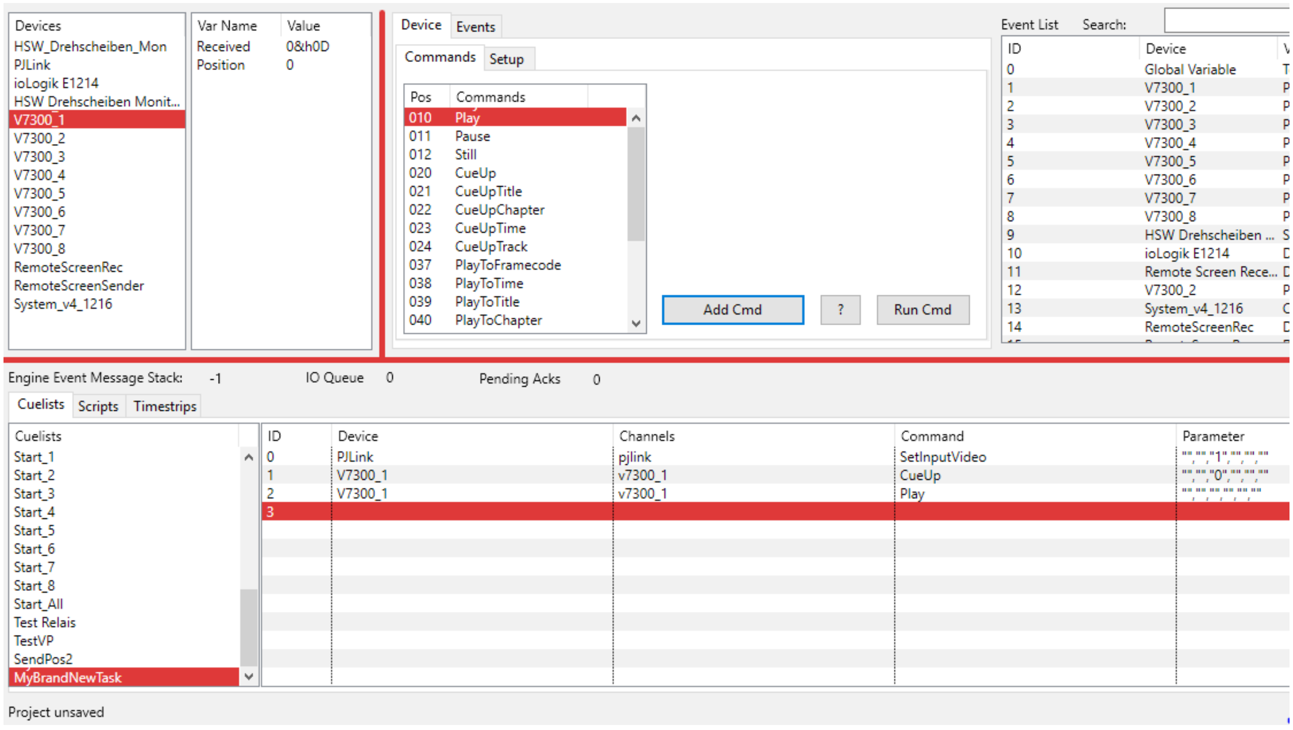
Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists | Scripts | Timestrips

Cuelists
Start_1
Start_2
Start_3
Start_4
Start_5
Start_6
Start_7
Start_8
Start_All
Test Relais
TestVP
SendPos2
MyBrandNewTask

ID	Device	Channels	Command	Parameter
0	PJLink	pjlink	SetInputVideo	"","","1","","",""
1	V7300_1	v7300_1	CueUp	"","","0","","",""
2				

Finally we need a Play command



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216

Var Name	Value
Received	0&h0D
Position	0

Device | Events

Commands | Setup

Pos	Commands
010	Play
011	Pause
012	Still
020	CueUp
021	CueUpTitle
022	CueUpChapter
023	CueUpTime
024	CueUpTrack
037	PlayToFramecode
038	PlayToTime
039	PlayToTitle
040	PlayToChapter

Add Cmd | ? | Run Cmd

Event List Search:

ID	Device	V
0	Global Variable	T
1	V7300_1	P
2	V7300_2	P
3	V7300_3	P
4	V7300_4	P
5	V7300_5	P
6	V7300_6	P
7	V7300_7	P
8	V7300_8	P
9	HSW Drehscheiben ...	S
10	ioLogik E1214	D
11	Remote Screen Rece...	D
12	V7300_2	P
13	System_v4_1216	C
14	RemoteScreenRec	D

Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists | Scripts | Timestrips

Cuelists
Start_1
Start_2
Start_3
Start_4
Start_5
Start_6
Start_7
Start_8
Start_All
Test Relais
TestVP
SendPos2
MyBrandNewTask

ID	Device	Channels	Command	Parameter
0	PJLink	pjlink	SetInputVideo	"","","1","","",""
1	V7300_1	v7300_1	CueUp	"","","0","","",""
2	V7300_1	v7300_1	Play	"","","","","",""
3				

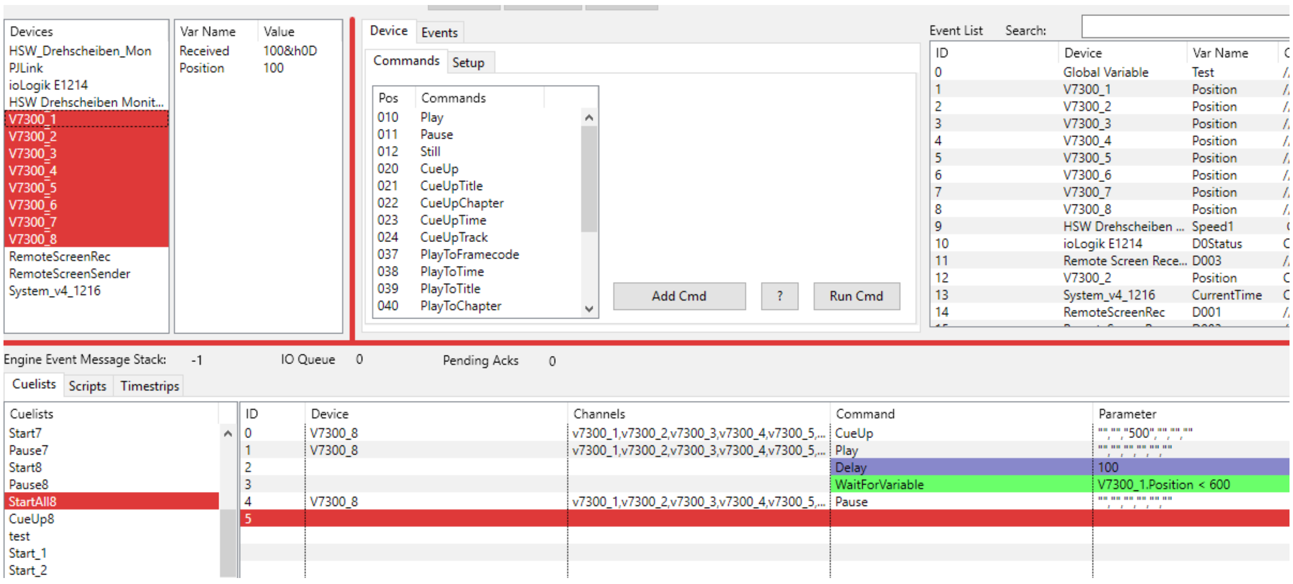
Project unsaved

Now the task is finished. The projector switches to a video input, and the player starts playing from the beginning.

To start this task switch to *Run* mode, select the task and click the *Run Task* button.

Send commands Synchronous to more then one Device

This is only possible if all the involved devices use the same driver. If you have a couple of players, all from the same type, then you can select some or all of them in the *Device List*. The Command that is send to the Players is generated by the last selected device.



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216

Var Name	Value
Received	100&h0D
Position	100

Pos	Commands
010	Play
011	Pause
012	Still
020	CueUp
021	CueUpTitle
022	CueUpChapter
023	CueUpTime
024	CueUpTrack
037	PlayToFramecode
038	PlayToTime
039	PlayToTitle
040	PlayToChapter

ID	Device	Var Name
0	Global Variable	Test
1	V7300_1	Position
2	V7300_2	Position
3	V7300_3	Position
4	V7300_4	Position
5	V7300_5	Position
6	V7300_6	Position
7	V7300_7	Position
8	V7300_8	Position
9	HSW Drehscheiben ...	Speed1
10	ioLogik E1214	D0Status
11	Remote Screen Rece...	D003
12	V7300_2	Position
13	System_v4_1216	CurrentTime
14	RemoteScreenRec	D001

Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

Cuelists
Start7
Pause7
Start8
Pause8
StartAll8
CueUp8
test
Start_1
Start_2

ID	Device	Channels	Command	Parameter
0	V7300_8	v7300_1,v7300_2,v7300_3,v7300_4,v7300_5,...	CueUp	"","","500","","",""
1	V7300_8	v7300_1,v7300_2,v7300_3,v7300_4,v7300_5,...	Play	"","","","","",""
2			Delay	100
3			WaitForVariable	V7300_1.Position < 600
4	V7300_8	v7300_1,v7300_2,v7300_3,v7300_4,v7300_5,...	Pause	"","","","","",""
5				

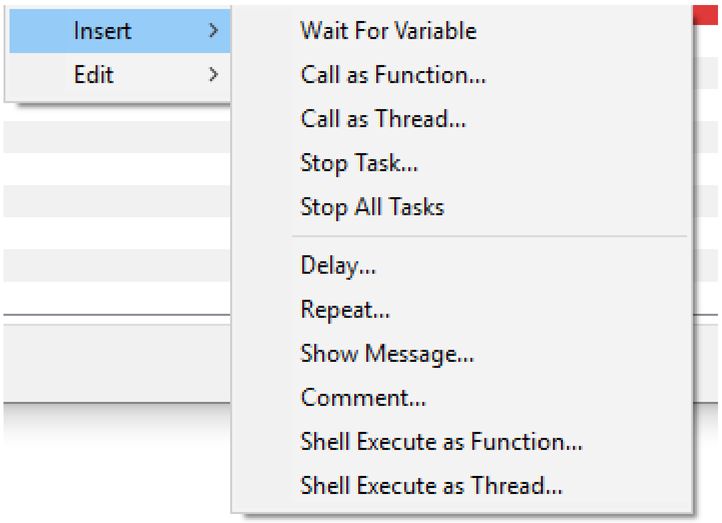
Notice that the Channel Parameter in the Cuelist now has all the channels of the involved devices. So the command string is generated by V7300_8, but send to all selected devices.

Edit a Cue

To edit a Cue, double click on it. If the Cue contains a control command for a device, the “Add Cmd” button changes to “Update”. You can now modify the command and press the “Update” button“

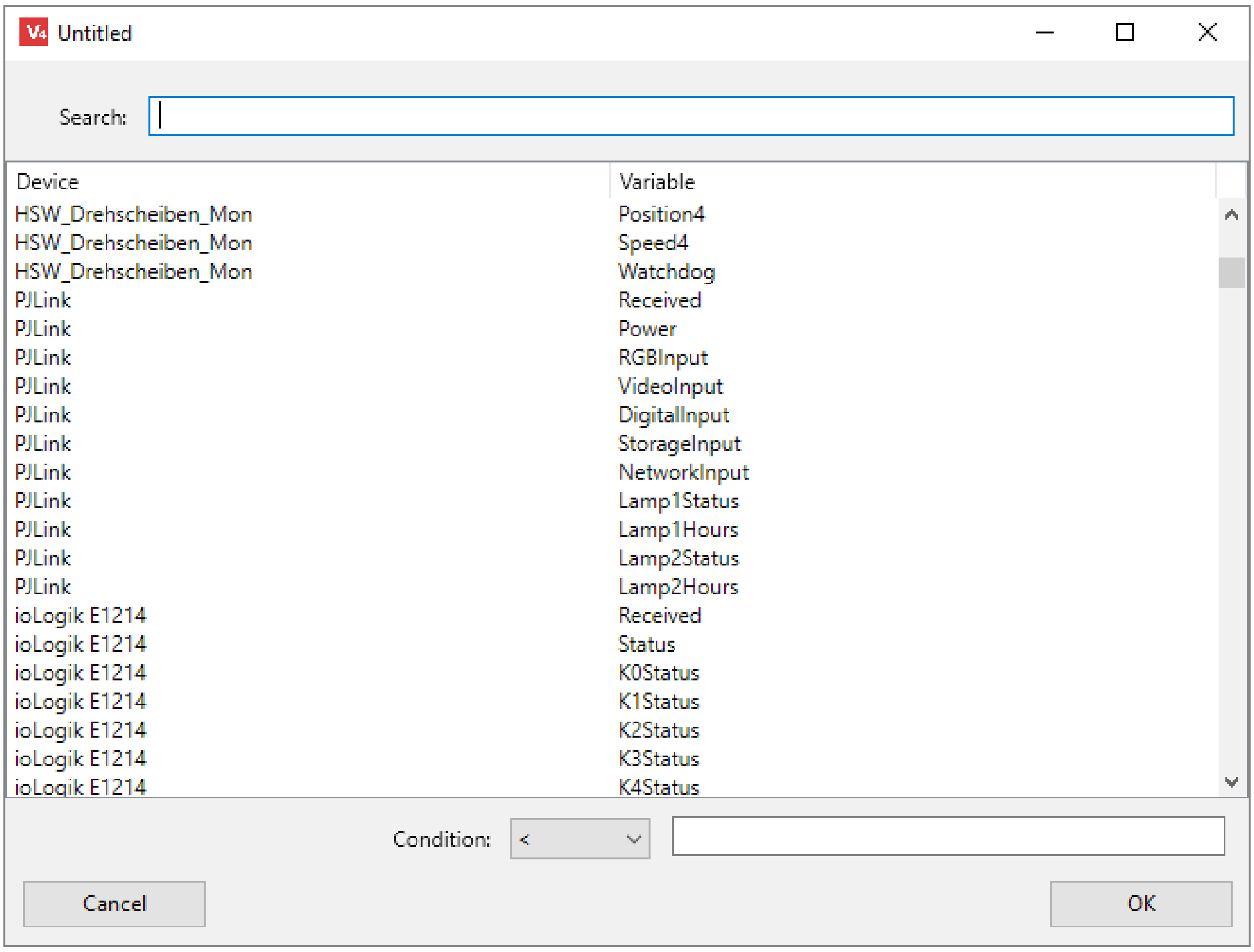
Non Device Commands

In the example above we saw how to add commands to a cuelist that concerns devices. But with only that, a cuelist is to limited. If you right-click into the cue list, you will get a context menu with further commands.



Wait For Variable

One option to control a cuelists flow is the WaitForVariable command. If inserted, a window pops up to select the variable to wait for.



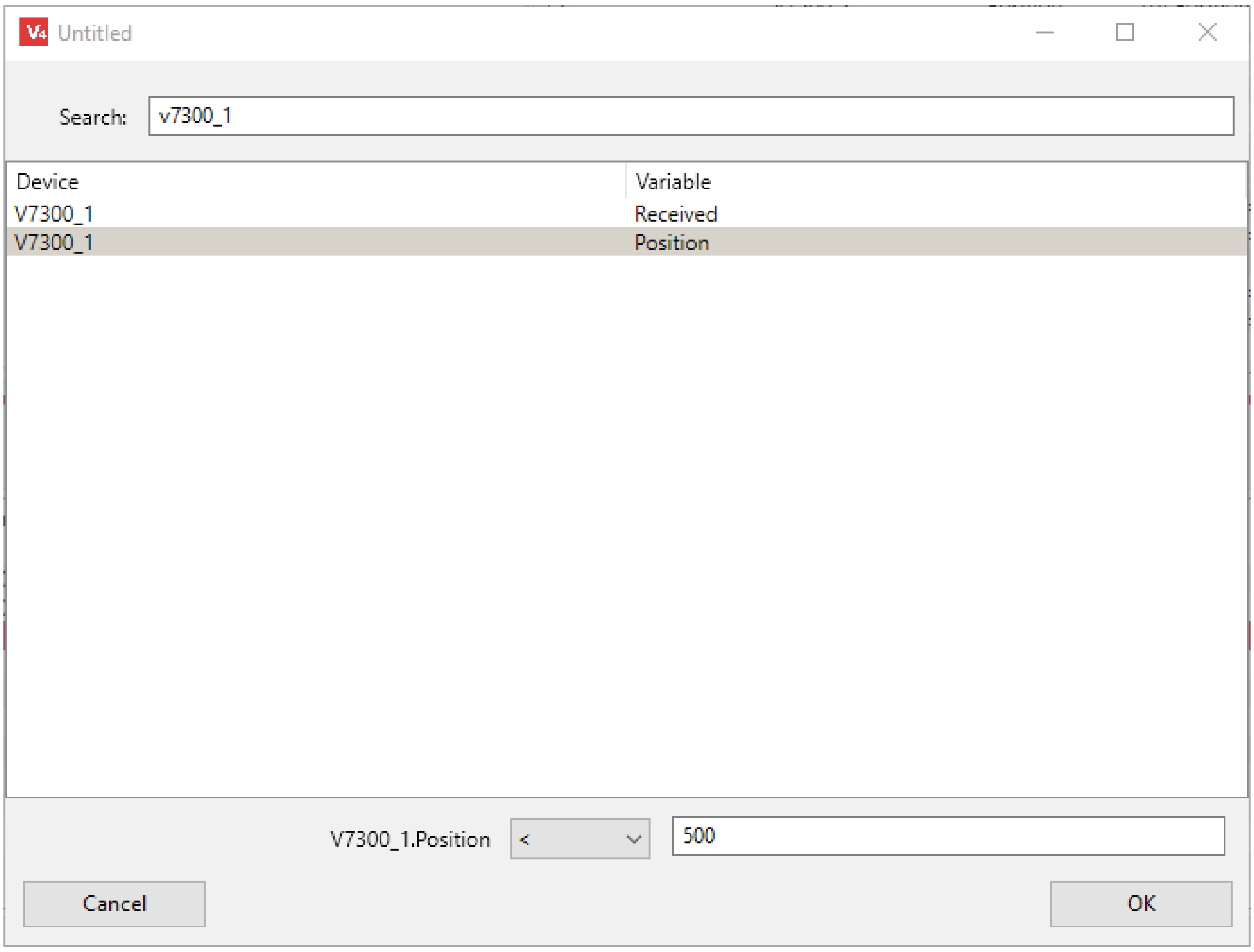
Device	Variable
HSW_Drehscheiben_Mon	Position4
HSW_Drehscheiben_Mon	Speed4
HSW_Drehscheiben_Mon	Watchdog
PJLink	Received
PJLink	Power
PJLink	RGBInput
PJLink	VideoInput
PJLink	DigitalInput
PJLink	StorageInput
PJLink	NetworkInput
PJLink	Lamp1Status
PJLink	Lamp1Hours
PJLink	Lamp2Status
PJLink	Lamp2Hours
ioLogik E1214	Received
ioLogik E1214	Status
ioLogik E1214	K0Status
ioLogik E1214	K1Status
ioLogik E1214	K2Status
ioLogik E1214	K3Status
ioLogik E1214	K4Status

Let's complete the example above with the “MyBrandNewTask” cuelist. Remember that we send the player a CueUp command and a Play command. What's missing is a condition to stop playback and switch back the projectors input to another source.

In the *Search* field type the device name (V7300_1). now only variables are shown that belong to this device. Select the variable *Position*. Next we need a condition how long to wait for this variable.

At the bottom of the window there is the selected variable (V7300_1.Position in this case) and a drop down box with comparing parameters.

- < : Wait while less the value right
- > : Wait while more the value right
- <= : Wait while less or equal the value right
- >= : Wait while bigger or equal the value right
- <> : Wait while not equal the value right
- = : Wait while equal the value right

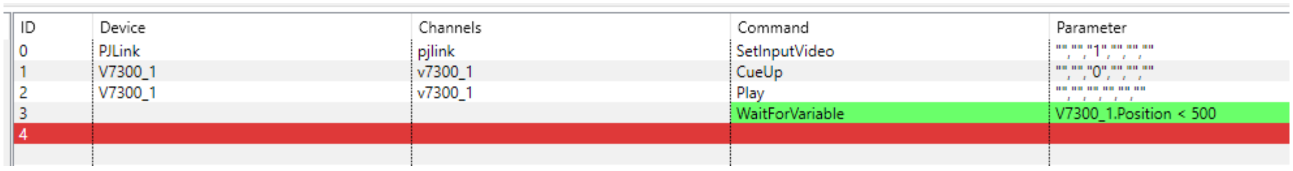


Search: v7300_1

Device	Variable
V7300_1	Received
V7300_1	Position

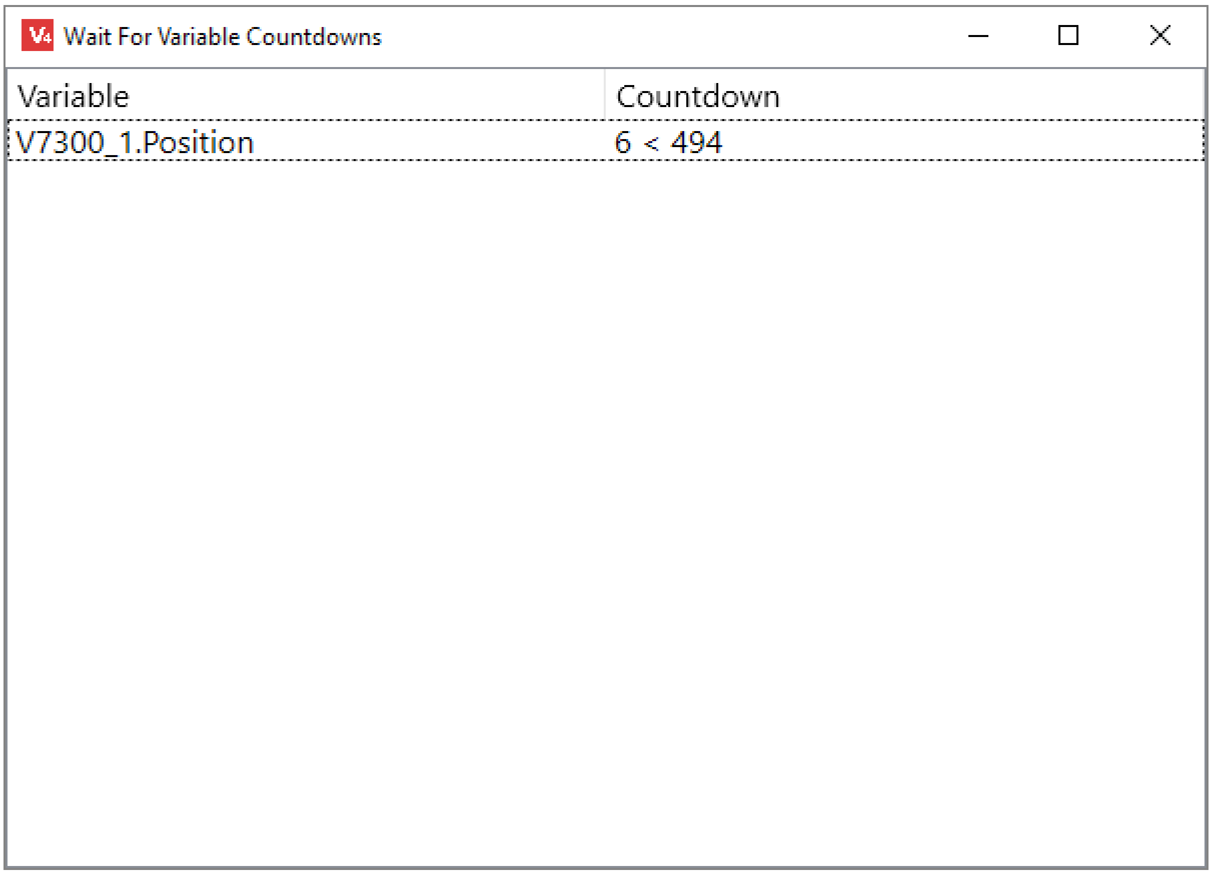
V7300_1.Position < 500

enter a value in the field right and click OK



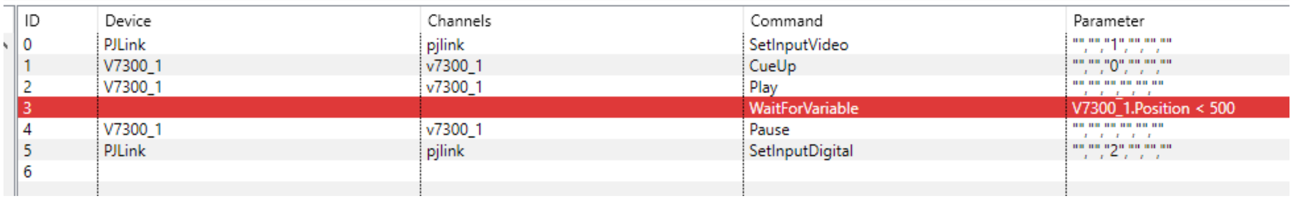
ID	Device	Channels	Command	Parameter
0	PJLink	pjlink	SetInputVideo	"","","1","","",""
1	V7300_1	v7300_1	CueUp	"","","0","","",""
2	V7300_1	v7300_1	Play	"","","","","",""
3			WaitForVariable	V7300_1.Position < 500
4				

If *Show WaitForVariable Countdowns* is set in the Options->System dialog, the a Countdown window appears showing how long the cue will wait.



Variable	Countdown
V7300_1.Position	6 < 494

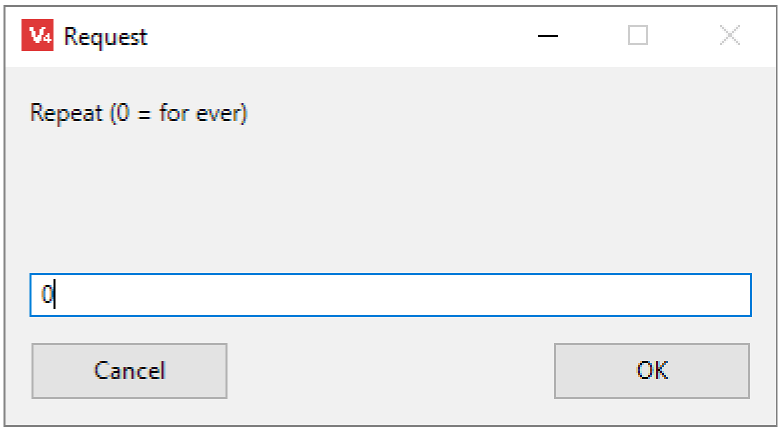
Now lets complete the task and stop the player and switch the input of the projector.



ID	Device	Channels	Command	Parameter
0	PJLink	pjlink	SetInputVideo	"","","1","","",""
1	V7300_1	v7300_1	CueUp	"","","0","","",""
2	V7300_1	v7300_1	Play	"","","","","",""
3			WaitForVariable	V7300_1.Position < 500
4	V7300_1	v7300_1	Pause	"","","","","",""
5	PJLink	pjlink	SetInputDigital	"","","2","","",""
6				

Repeat

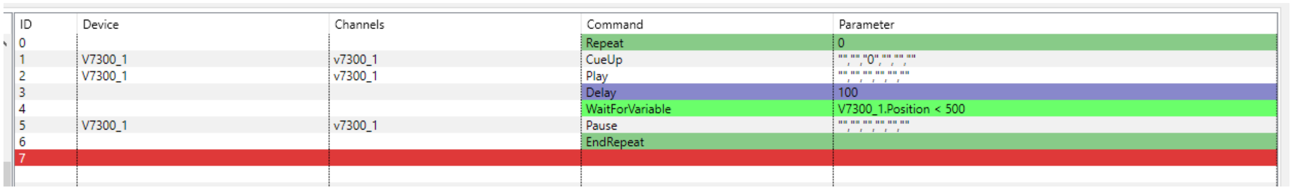
The Repeat command is used to build loops. The instructions between Repeat and EndRepeat are looped as many times as entered. The Repeat command is available via Cuelist context menu (right click -> *Insert* -> *Repeat*) or main menu (*Insert* -> *Repeat*). A dialog box asks for the number of repeats. To create endless loops, enter 0 as value.



Next, fill the part between Repeat and Endrepeat with instructions. It is possible to move the Repeat or EndRepeat command via Cut (*Ctrl+X*) and Paste (*Ctrl+V*).

In the example below we created an endless loop that plays a video from position 0 to position 500. The *Delay* between the *Play* command and the *WaitForVariable* command is necessary for the following reason: The player receives the two commands CueUp and Play. During this sequence, the device driver can not ask for the position, because the player is busy with the two commands. That means that the device variable *Position* still has the last value (500 or more). In that case the WaitForVariable Condition is true and the cue is skipped. One solution to avoid this is to set a small Delay, so the driver has time ti update the correct position. Another solution is to modify the driver. With the CueUp command we can set the Device Variable position to the value of the CueUp command. In this case we don't need the delay.

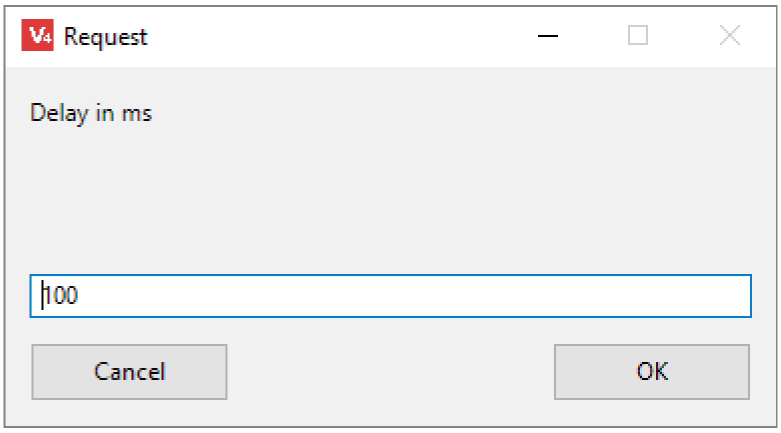
The loop sequence now looks like this:



ID	Device	Channels	Command	Parameter
0			Repeat	0
1	V7300_1	v7300_1	CueUp	"","","0","","",""
2	V7300_1	v7300_1	Play	"","","","","",""
3			Delay	100
4			WaitForVariable	V7300_1.Position < 500
5	V7300_1	v7300_1	Pause	"","","","","",""
6			EndRepeat	
7				

Delay

It might be necessary to have a Delay between two commands to pause the task for a given amount of time (see example above). In the main menu select *Insert -> Delay* or use the context menu. The Delay is specified by the value in milliseconds.



Request

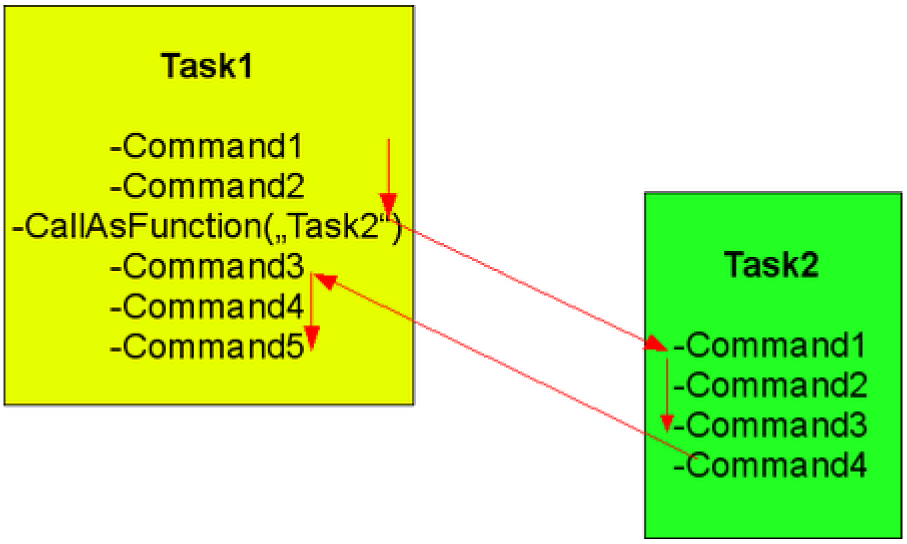
Delay in ms

100

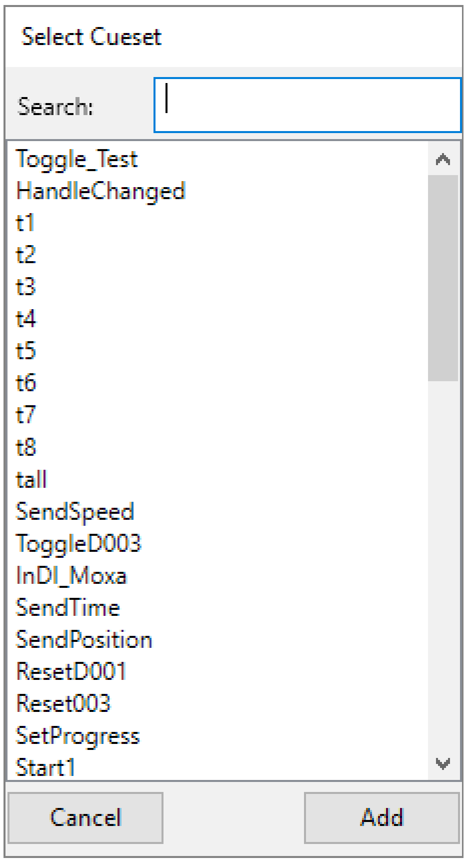
Delays displayed with a violet background in the list.

Call as Function

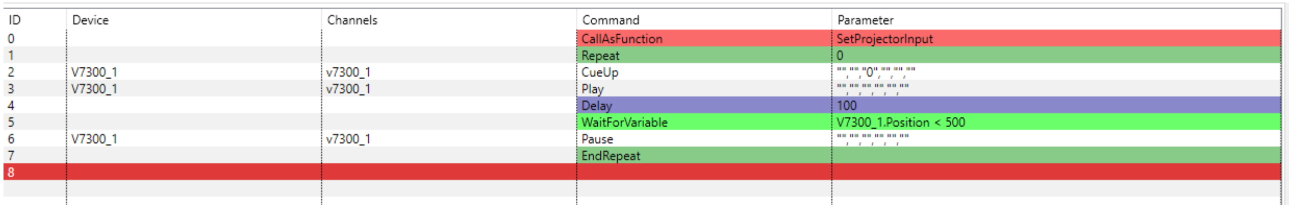
Even in complex projects it makes sense to split the whole project into several subroutines. This makes maintenance easier and gives a better overview over the projects structure. Every Task, whether a Cuelist or Script, can be a function. If a task is executed, it is usually processed from top to bottom. A *CallAsFunction* branches to the task specified, finishes the called task and returns to the next command in the calling task.



To call a task as function, select *Insert -> CallAsFunction* in main menu or Cuelist context menu (right click *Insert -> CallAsFunction*). That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be called.



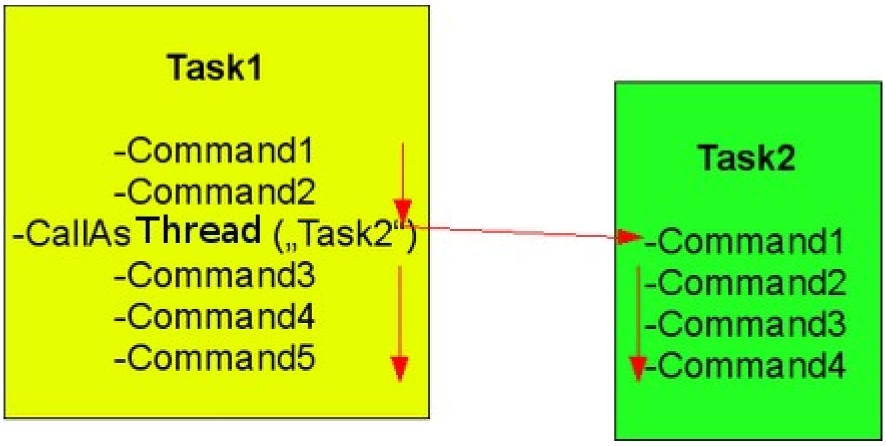
Finally, the new CallAsFunction command in´s inserted in the Cuelist.



ID	Device	Channels	Command	Parameter
0			CallAsFunction	SetProjectorInput
1			Repeat	0
2	V7300_1	v7300_1	CueUp	"","","0","","",""
3	V7300_1	v7300_1	Play	"","","","","",""
4			Delay	100
5			WaitForVariable	V7300_1.Position < 500
6	V7300_1	v7300_1	Pause	"","","","","",""
7			EndRepeat	
8				

Call as Thread

In contrast to CallAsFunction, a CallAsThread instruction launches the new task parallel to the calling task. The calling task is not paused during the time, the called task is executed. The programmer / operator has to take care that the two parallel running tasks don't use the same resources (devices / channels).

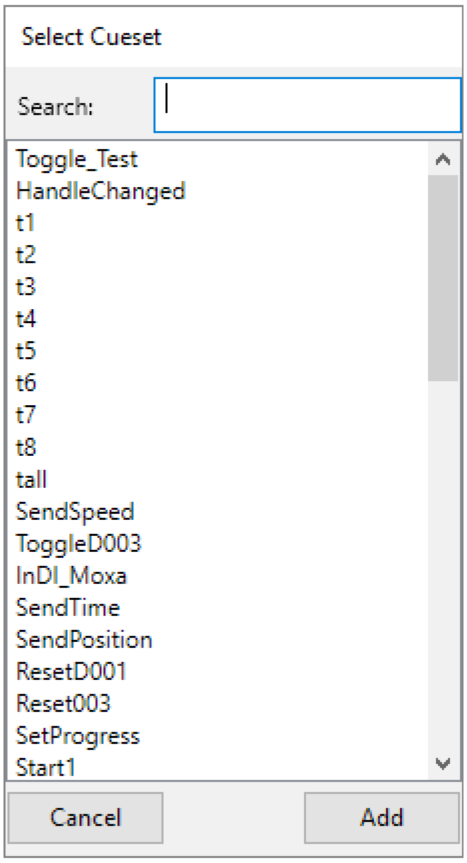


To create a CallAsThread instruction select *Insert -> CallAsThread* in main menu or use the Cuelists context menu (right click *Insert -> CallAsThread*). That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be called.

Stop Task

It might be necessary to stop a running task before it terminates regularly. This can be done manually via *Stop Task* tool button or as instruction from a running task. Assuming there is an endless loop working with two Players. Now the Players needed for some other action, but it is impossible to use them as long as the endless loop is running. With the StopTask command it is possible to terminate the endless loop and then use the Players in another task.

The command is available via main menu *Insert -> Stop Task* or the Cuelists context menu. That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be stoped.



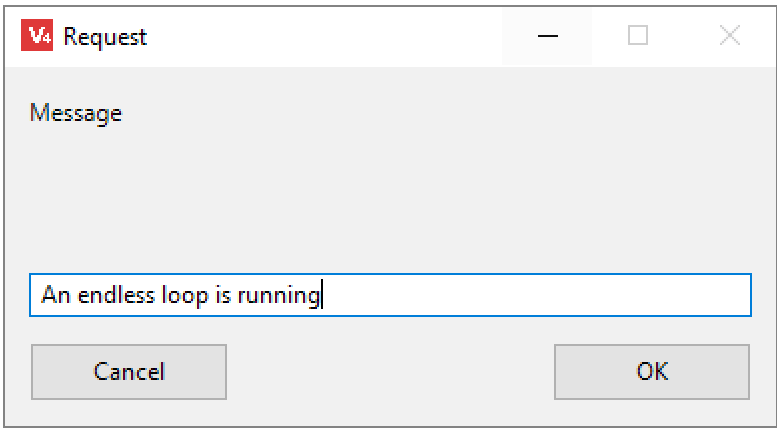
Toggle_Test
HandleChanged
t1
t2
t3
t4
t5
t6
t7
t8
tall
SendSpeed
ToggleD003
InDI_Moxa
SendTime
SendPosition
ResetD001
Reset003
SetProgress
Start1

Stop All Tasks

same as StopTask, but stops all tasks except the one that is calling this command.

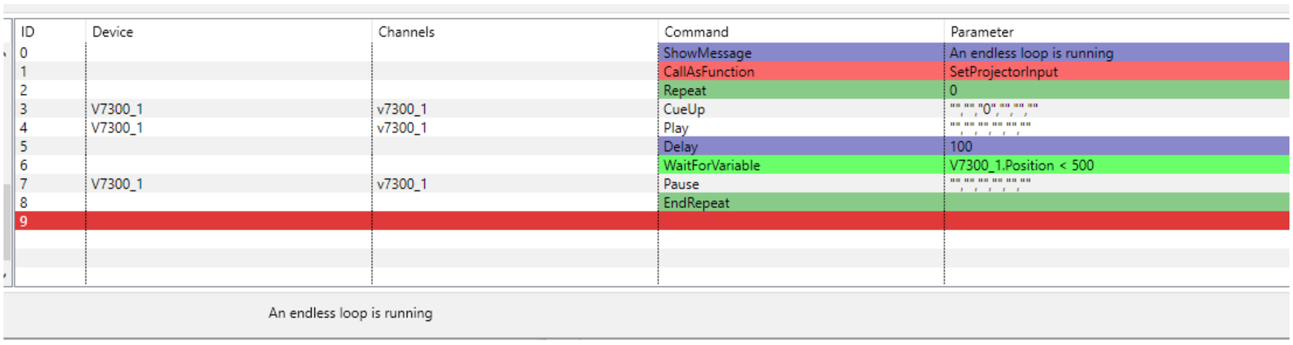
Show Message

The ShowMessage command is used to display a message in the status bar. Via main menu *Insert -> Show Message* or Cuelist context menu this command is available.



An endless loop is running

If the instruction is executed, the message appears in the status bar.

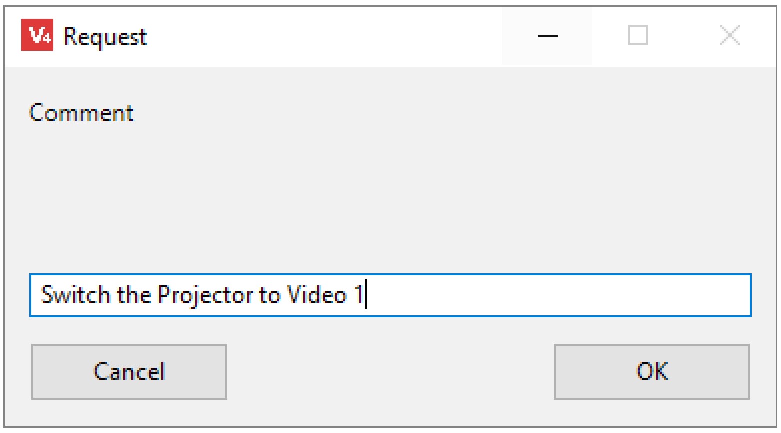


ID	Device	Channels	Command	Parameter
0			ShowMessage	An endless loop is running
1			CallAsFunction	SetProjectorInput
2			Repeat	0
3	V7300_1	v7300_1	CueUp	"","","0","","",""
4	V7300_1	v7300_1	Play	"","","","","",""
5			Delay	100
6			WaitForVariable	V7300_1.Position < 500
7	V7300_1	v7300_1	Pause	"","","","","",""
8			EndRepeat	
9				

An endless loop is running

Comment

Insert -> Comment allows to insert a comment to the list. A comment is only for documentation purpose and should describe what happens in this part of the Cuelist.

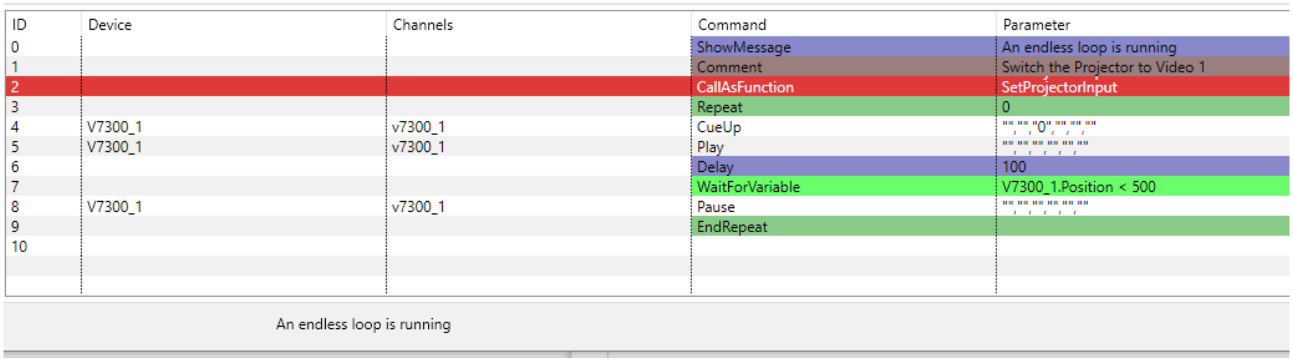


Request

Comment

Switch the Projector to Video 1

A comment appears in the Cuelist with a dark red background.



ID	Device	Channels	Command	Parameter
0			ShowMessage	An endless loop is running
1			Comment	Switch the Projector to Video 1
2			CallAsFunction	SetProjectorInput
3			Repeat	0
4	V7300_1	v7300_1	CueUp	"","","0","","",""
5	V7300_1	v7300_1	Play	"","","","","",""
6			Delay	100
7			WaitForVariable	V7300_1.Position < 500
8	V7300_1	v7300_1	Pause	"","","","","",""
9			EndRepeat	
10				

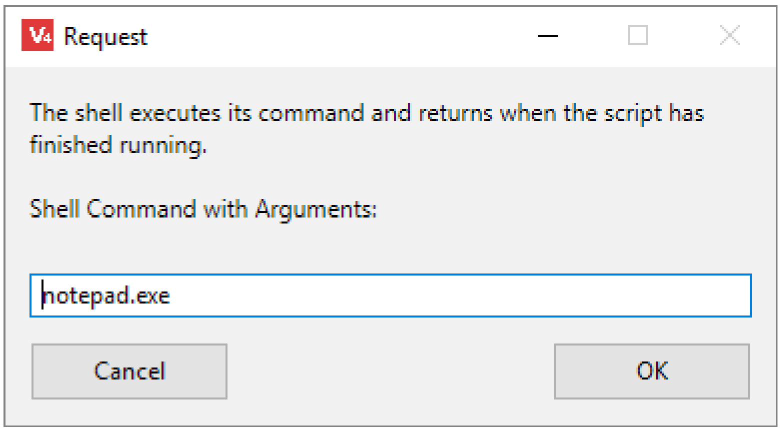
An endless loop is running

A comment has no functionality for the script. During task execution it is ignored. The only purpose is to make notes for the user to have a documentation for the script.

Shell Execute as Function

The ShellExecuteAsFunction command is used to launch shell commands / scripts. It works similar to CallAsFunction, and is available via main menu *Insert -> Shell Execute As Function* or the cuelist context menu.

A dialog asks for the shell command and optional parameters:


Request

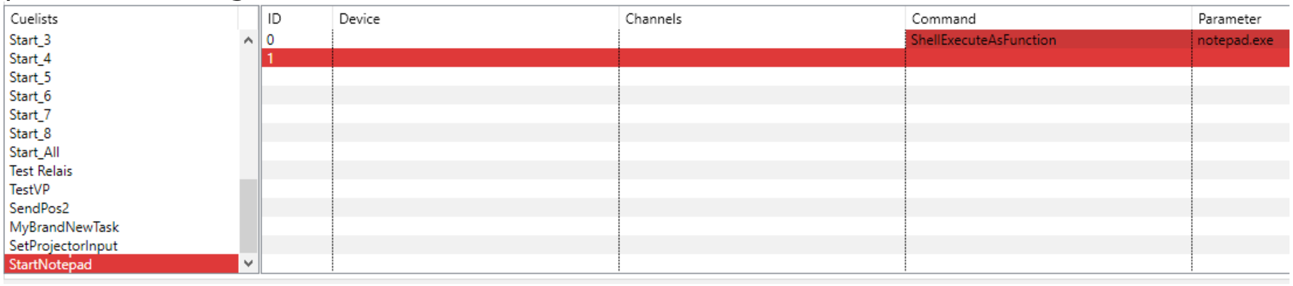
The shell executes its command and returns when the script has finished running.

Shell Command with Arguments:

notepad.exe

ShellExecute commands are displayed with red background in the cuelist.

In this example notepad.exe is called. If programs or scrips needs to be executed that are not in the operating systems path variable, the the complete path must be given here.


Cuelists: Start_3, Start_4, Start_5, Start_6, Start_7, Start_8, Start_All, Test Relais, TestVP, SendPos2, MyBrandNewTask, SetProjectorInput, StartNotepad

ID	Device	Channels	Command	Parameter
0			ShellExecuteAsFunction	notepad.exe
1				

Shell Execute as Thread

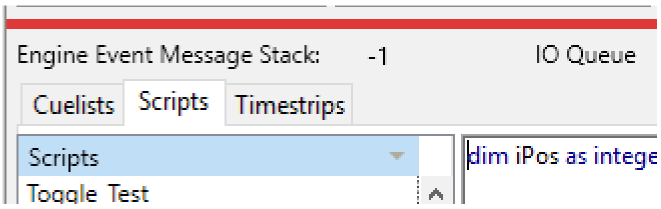
ShellExecuteAsThread launches programs / scripts as thread (see Shell Execute as Function). V-Control launch the shell command and returns immediately, without waiting for the shell command to finish.

Scripts

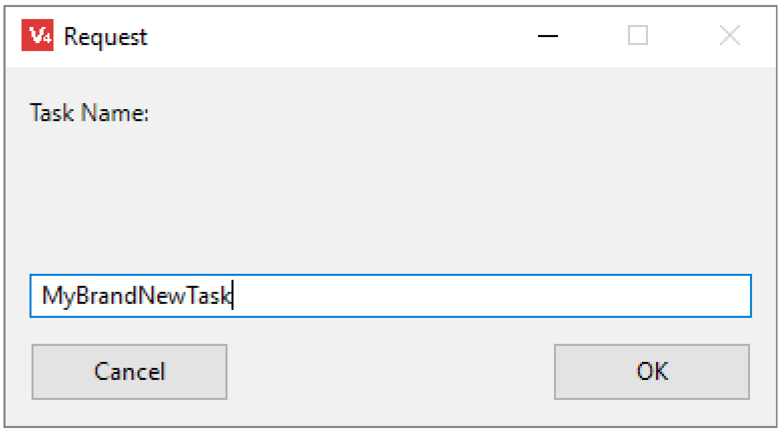
These kind of tasks are much more powerful than Cuelists. Scripts offer access to the integrated Basic language. The modern compiler compiles native code for every supported platform. V-Control Basic enhances the standard Basic by commands giving access to the Device Driver and Tasks as well as to globally shared variables. In the Compiler section, there is a list of all available commands and functions.

Create Scripts

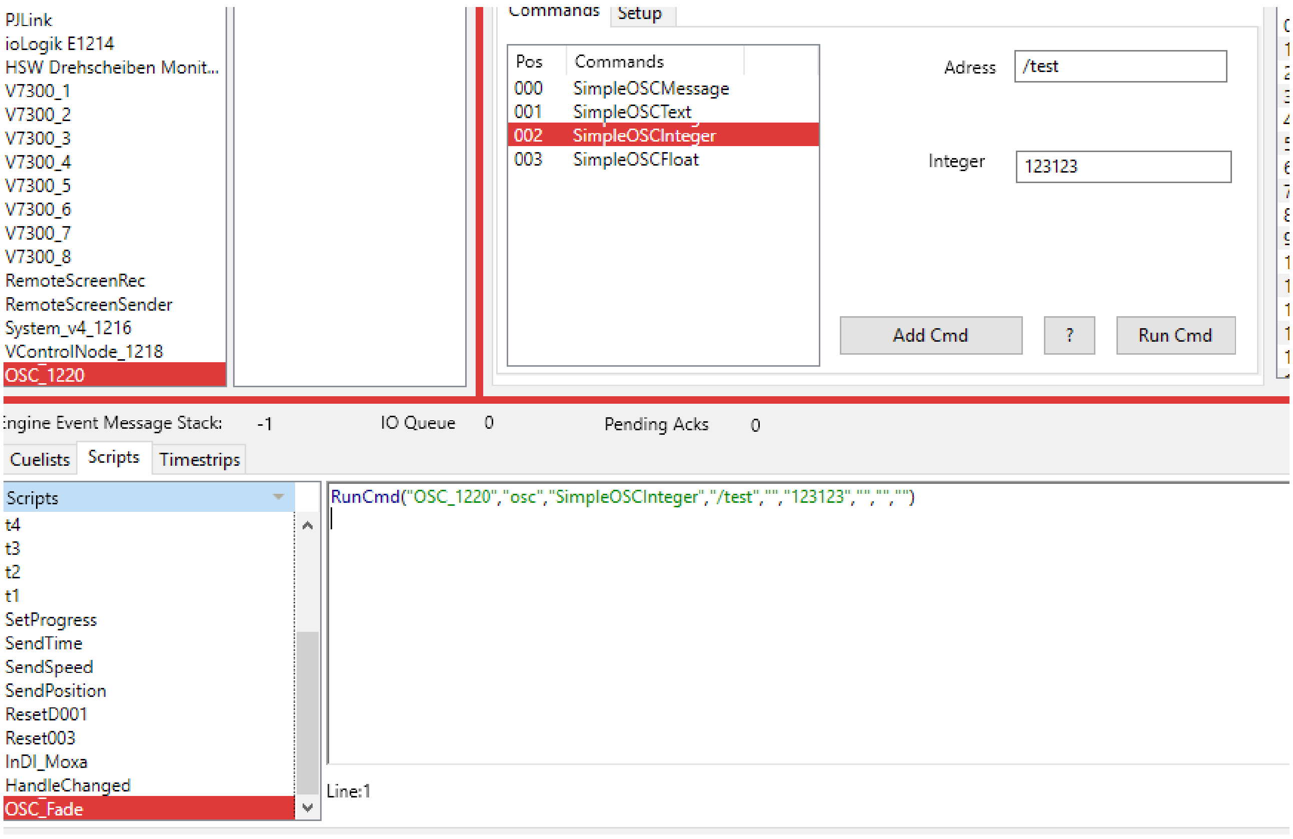
To create a Script switch to Script View.



Then select *Tasks -> Add* in main menu or via Cueset list context menu (right click) select Add Task. Alternatively the click the *Add Task* tool button.



Now the task has to be filled with instructions. Generally this is the same procedure than programming Cuelists. In the following example we send an OSC (Open Sound Control) message to a device. Select the device in the *Device List*, select the command in the *Command List* and enter the parameter. Then click the *Add Cmd* button.



Pos	Commands
000	SimpleOSCMessage
001	SimpleOSCText
002	SimpleOSCInteger
003	SimpleOSCFloat

Adress /test

Integer 123123

Engine Event Message Stack: -1 IO Queue 0 Pending Acks 0

```
RunCmd("OSC_1220","osc","SimpleOSCInteger","/test","","123123","","","")
```

Line:1

The command generated has this structure:

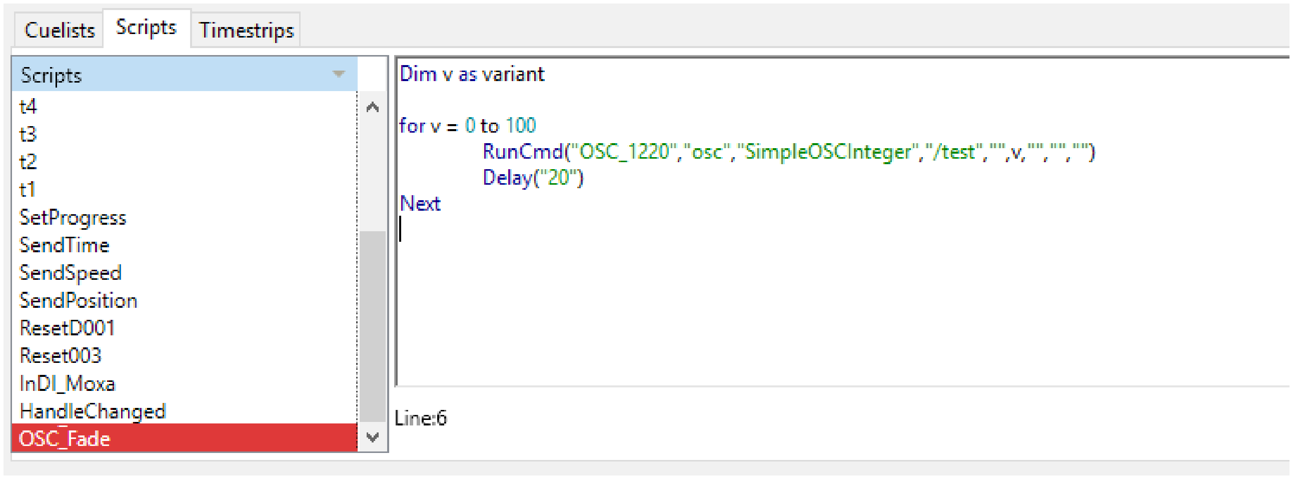
```
RunCmd("Device Name","Channel Name","Command Name","Device
Parameter 1","Device Parameter 2",
"Command Parameter 1","Command Parameter 2","Command Parameter
3","Command Parameter 4")
```

Parameters that are empty shown as “”

So the resulting entry is

```
RunCmd("OSC_1220","osc","SimpleOSCInteger","/test","","123123","",
"","")
```

Next step is to modify this command. Assume that the *SimpleOSCInteger* command controls a fader value, and the fader should move from 0 to 100 in 2 seconds. The script can be something like this:



```
Dim v as variant

for v = 0 to 100
        RunCmd("OSC_1220","osc","SimpleOSCInteger","/test","",v,"","","")
        Delay("20")
Next
```

Line:6

Dim v as Variant creates a local variable v. The type Variant is very flexible. It behaves as an integer if used so. But the content of the variable is converted to string if a string is needed. The **For** loop accepts only Integers as loop iterator, but the **RunCmd** Function accepts only string parameters. In both cases we can use a variant variable.

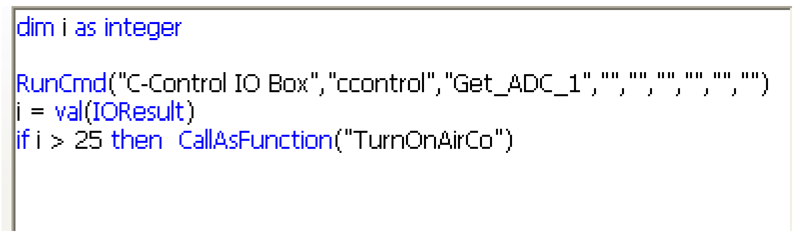
Here is an example with Integer and String Variables:

```
Dim i as Integer
Dim s as String

for i = 0 to 100
     s = str(i)

RunCmd("OSC_1220","osc","SimpleOSCInteger","/test","",s,"","","")
     Delay("20")
Next
```

The **str** Function converts an Integer to String

IOResult

Every RunCmd instruction changes the variable IOResult. IOResult does not have to be declared, it is a (string) variable that is part of every Script and contains the result of the last RunCmd instruction.

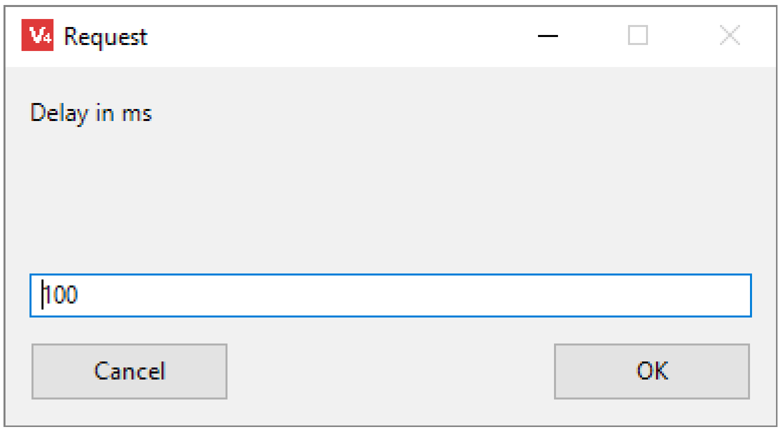


```
dim i as integer

RunCmd("C-Control IO Box","ccontrol","Get_ADC_1","","","","","","")
i = val(IOResult)
if i > 25 then  CallAsFunction("TurnOnAirCo")
```

In the example above a `Get_ADC_1` command is sent to a C-Control I/O interface. The result of the command is stored in the variable IOResult. The value of IOResult is (in this case) the measured value of analog digital converter (ADC) 1 of the C-Control interface. Because the type of IOResult is string, but the value is needed (for comparison) as integer, the line `i = Val(IOResult)` converts the string to an integer. If the measured value is bigger than 25, an air condition is switched on.

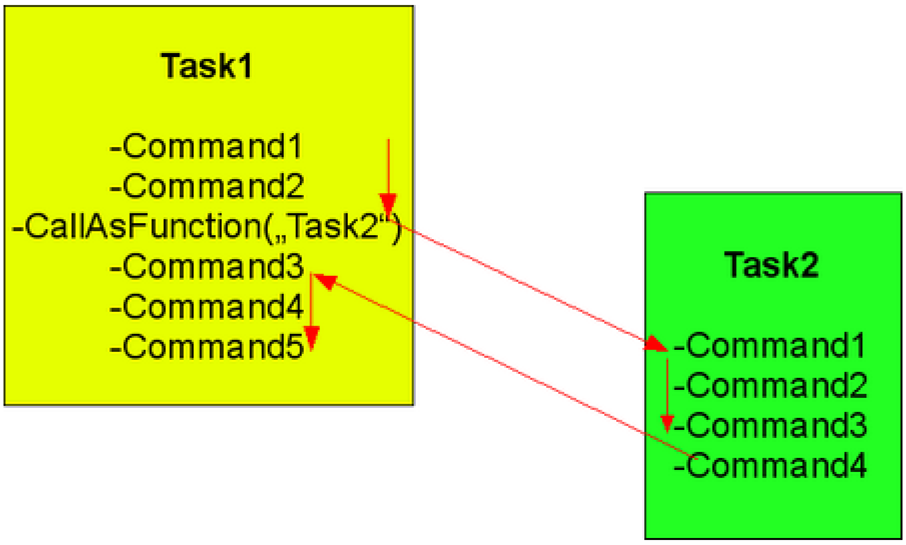
Delay

It might be necessary to have a Delay between two commands to pause the task for a given amount of time. In the main menu select *Insert -> Delay* or use the context menu. The Delay is specified by the value in milliseconds.

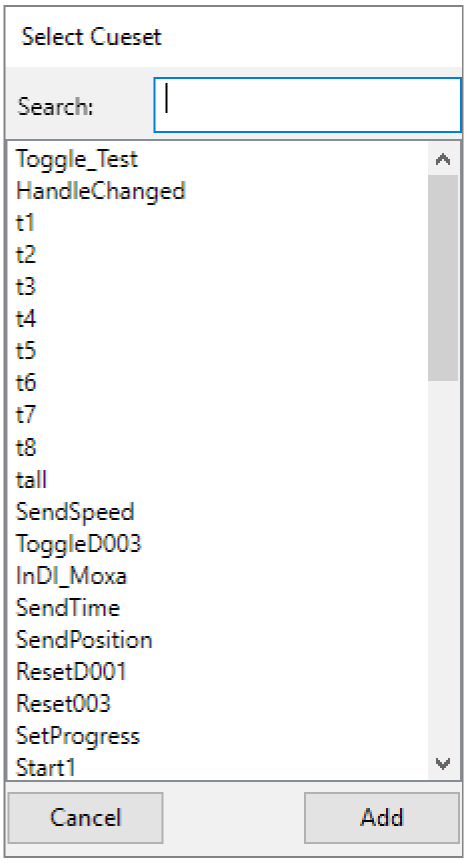


Call As Function

Even in complex projects it makes sense to split the whole project into several subroutines. This makes maintenance easier and gives a better overview over the projects structure. Every Task, whether a Cuelist or Script, can be a function. If a task is executed, it is usually processed from top to bottom. A CallAsFunction branches to the task specified, finishes the called task and returns to the next command in the calling task.



To call a task as function, select *Insert -> CallAsFunction* in main menu or Script Editor context menu (right click *Insert -> CallAsFunction*). That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be called.

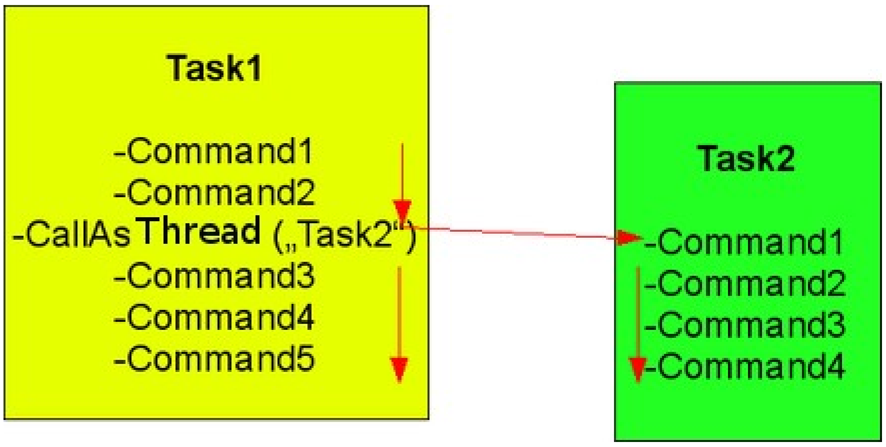

Select Cueset

Search:

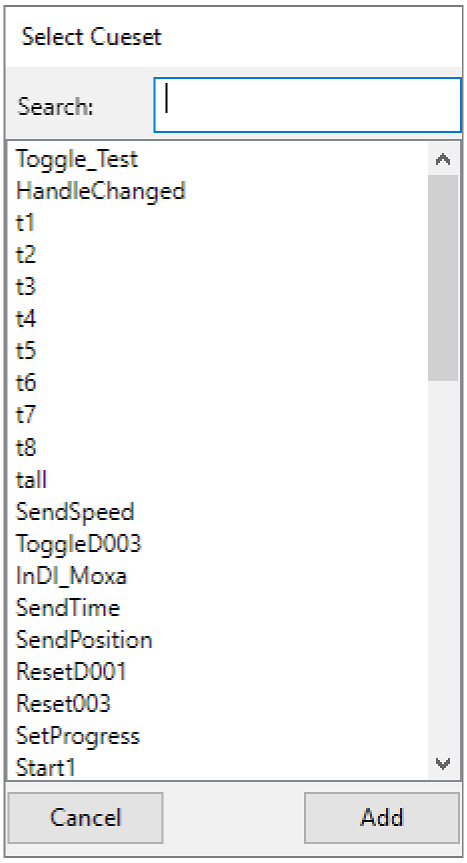
Toggle_Test
HandleChanged
t1
t2
t3
t4
t5
t6
t7
t8
tall
SendSpeed
ToggleD003
InDI_Moxa
SendTime
SendPosition
ResetD001
Reset003
SetProgress
Start1

Call As Thread

In contrast to CallAsFunction, a CallAsThread instruction launches the new task parallel to the calling task. The calling task is not paused during the time, the called task is executed. The programmer / operator has to take care that the two parallel running tasks don't use the same resources (devices / channels).



To create a CallAsThread instruction select *Insert -> CallAsThread* in main menu or use the Script Editor's context menu (right click *Insert -> CallAsThread*). That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be called.

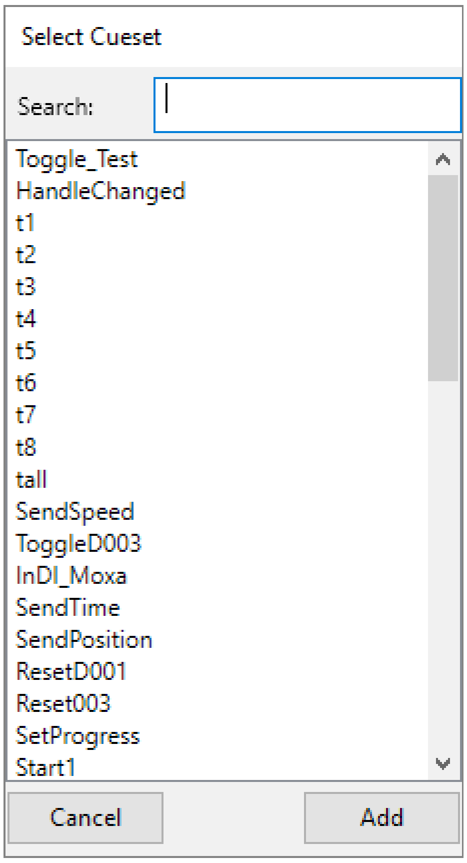


Toggle_Test
HandleChanged
t1
t2
t3
t4
t5
t6
t7
t8
tall
SendSpeed
ToggleD003
InDI_Moxa
SendTime
SendPosition
ResetD001
Reset003
SetProgress
Start1

Stop Task

It might be necessary to stop a running task before it terminates regularly. This can be done manually via Icon / Toolbar) or as instruction from a running task. Assuming there is an endless loop working with two DVD Players. Now the DVD Player are needed for some other action, but it is impossible to use them as long as the endless loop is running, because they are blocked. With the StopTask command it is possible to terminate the endless loop and then use the DVD Players in another task.

The command is available via main menu *Insert -> Stop Task* or the Script Editor's context menu. That opens the Task Selector presenting all tasks (Cuelists and Scripts). Choose the task that has to be stoped.



Toggle_Test
HandleChanged
t1
t2
t3
t4
t5
t6
t7
t8
tall
SendSpeed
ToggleD003
InDI_Moxa
SendTime
SendPosition
ResetD001
Reset003
SetProgress
Start1

Show Message

The ShowMessage command is used to display a message in the status bar. Via main menu *Insert -> Show Message* or Script Editor's context menu this command is available.

Local Variables

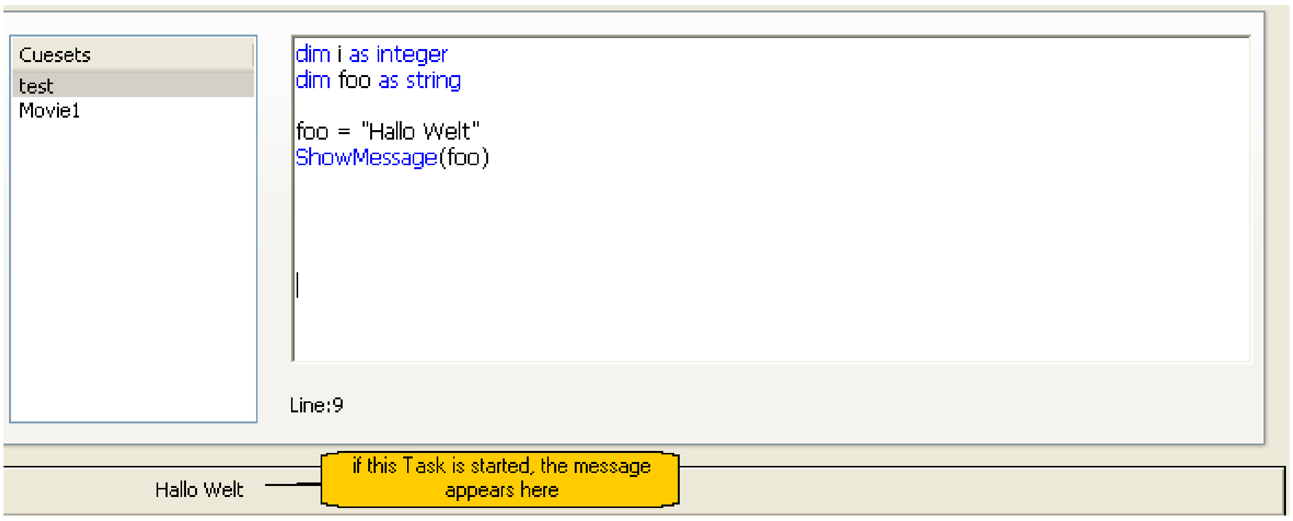
Local variables are only available in the task where they have been declared. While declaring a variable, its type is set. The following types are available:

- Integer (32 Bit)
- Single (16 Bit integer)
- Double (64 Bit Floating Point)
- Boolean (True or False)
- String (e.g. “Hello World”)
- Variant (any)

It is possible to build arrays from all those types.

A variable is declared by the Dim statement. Variable names must start with a letter and must not contain special characters. Here some examples:

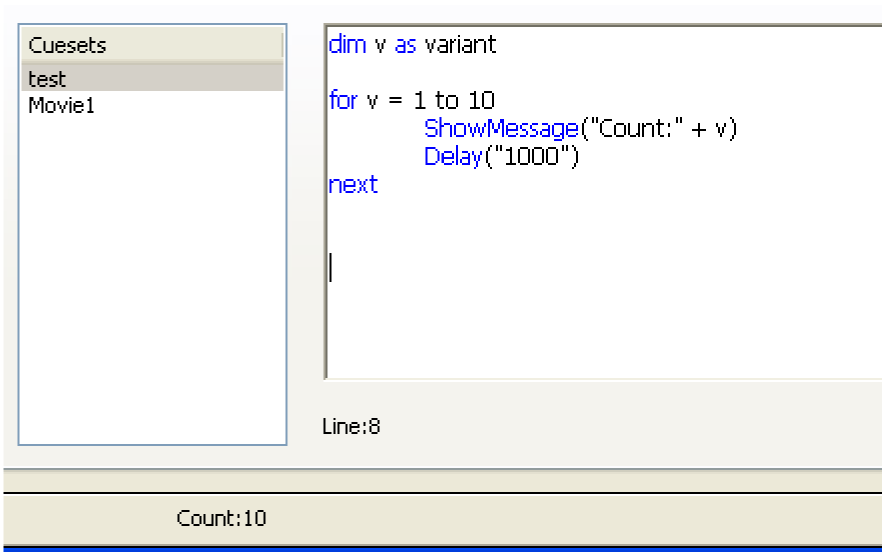
- `Dim A1 As Integer` correct
- `Dim Ä1 As Integer` incorrect
- `Dim 1A As Integer` incorrect
- `Dim A 1 As Integer` incorrect, space not allowed
- `Dim A_1 As Integer` correct



```
dim i as integer
dim foo as string

foo = "Hallo Welt"
ShowMessage(foo)
```

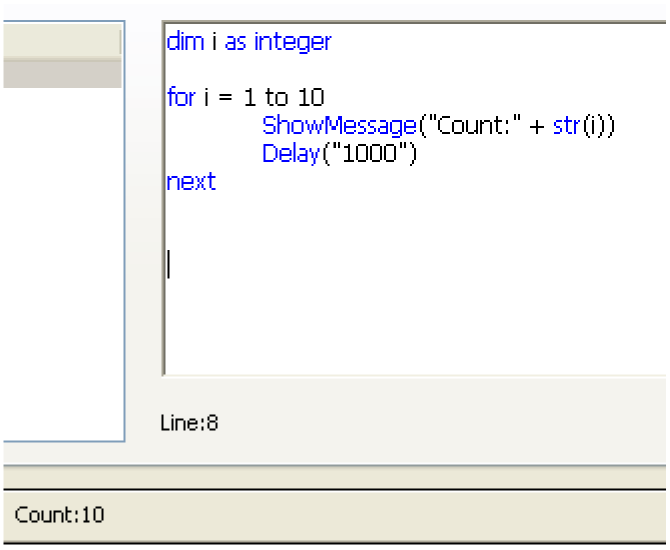
In the screenshot above, the Dim statement declares a String variable named foo. Then, the variable foo gets the value “Hallo Welt”. The content of foo is displayed by the ShowMessage command with foo as parameter. In this example, a line ShowMessage(“Hallo Welt”) would have the same result.

Variant variables are very special. Because they have no (or any) type, they are very flexible. A variant stores a value in different formats and “knows” which one is needed if there is an access to. In the example below a variant variable named v is declared:



```
dim v as variant

for v = 1 to 10
        ShowMessage("Count:" + v)
        Delay("1000")
next
```

In the `For..Next` loop, an integer value is assigned to v. As discussed above, the ShowMessage command need a string variable as parameter, but the line ShowMessage(“Count:” + v) is working correct, because v knows that only strings are valid and present its content as string. So v is used as integer and as string in the same subroutine. A more structured solution for the same job is the example below:



```
dim i as integer

for i = 1 to 10
        ShowMessage("Count:" + str(i))
        Delay("1000")
next
```

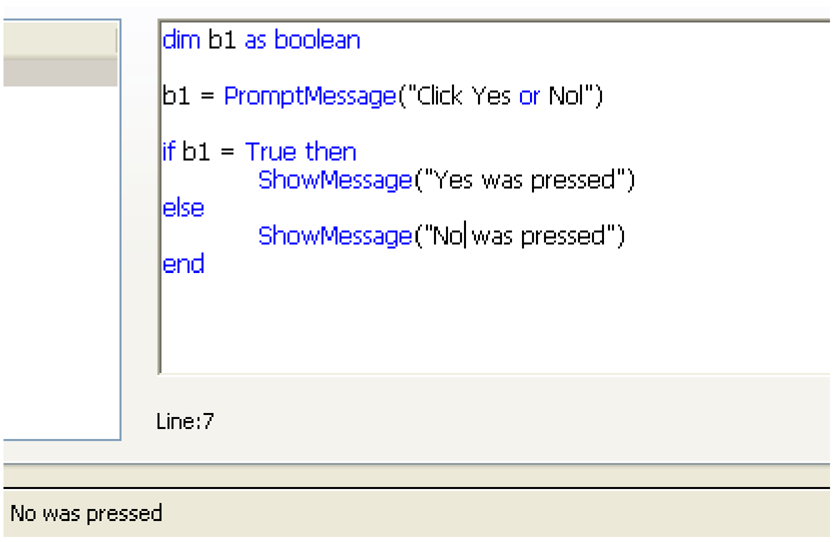
Line:8

Count:10

At first, an integer variable i is declared. The beginning of the `For..Next` loop is unchanged, because the For..Next instruction expect an integer variable anyway. The command `ShowMessage("Count:"+ i)` will not work, because it is impossible to add an integer to a string. But V-Control Basic knows a function that converts an integer to string, the `Str(i)` command. The result of str(i) is "10", if i has the value 10. The string "10" comprising from ASCII code 49 ("1") and ASCII code 48 ("0").

An Overview of available basic functions is available in the Basic Language Reference Chapter.

Another often used variable type is boolean. Boolean variables know to states, True or False (1/0).



```
dim b1 as boolean

b1 = PromptMessage("Click Yes or No!")

if b1 = True then
        ShowMessage("Yes was pressed")
else
        ShowMessage("No was pressed")
end
```

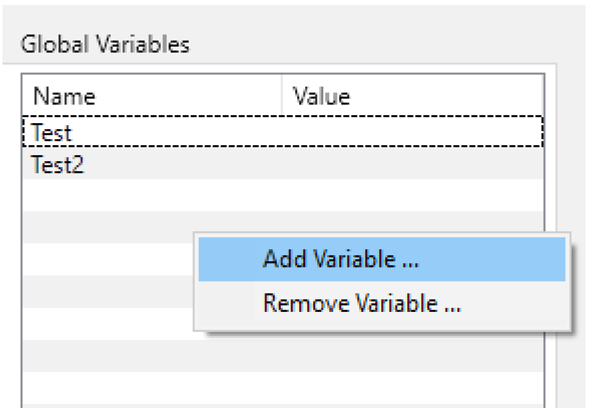
Line:7

No was pressed

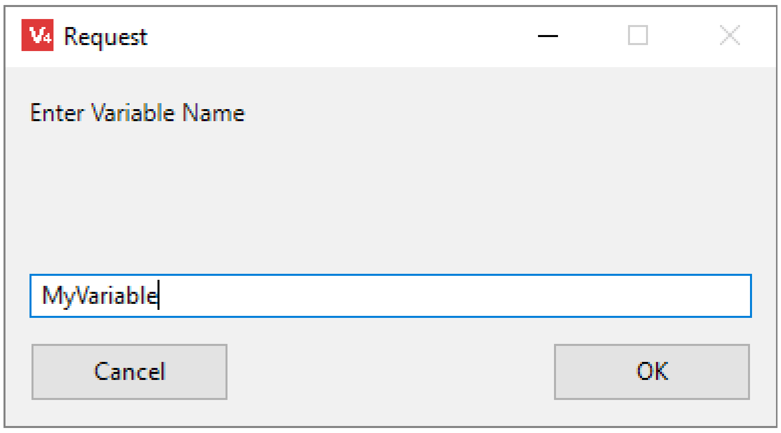
In this example, the variable b1 is declared as Boolean. The PromptMessage command need a boolean variable to return the result of the PromptMessage dialog. If the result is True, the OK button was pressed, if False, the user clicked the Cancel button. The if..then instruction check b1 and branch to the correct ShowMessage command.

Global Variables

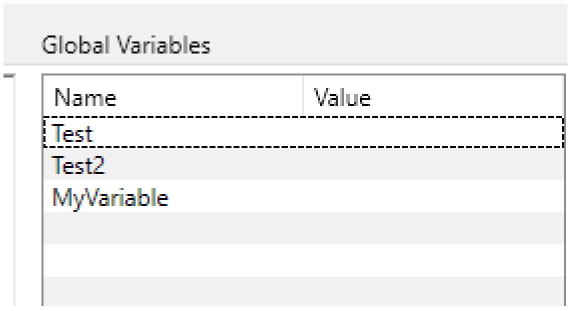
Global variables are accessible from every Script. It is possible e.g. to assign a global variable a value in task A, and check this value in task B. Global variables are from type string only. Because every Script has access to global variables, it is not declared in a Script. To declare a global variable, select *Cues -> Add Global Variable...* in the main menu or use the context menu of the Global Variables list.



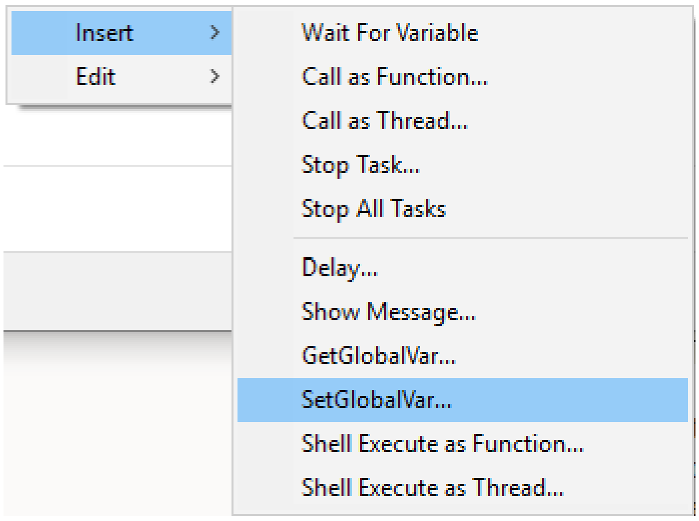
Enter the name of the variable in the dialog box:



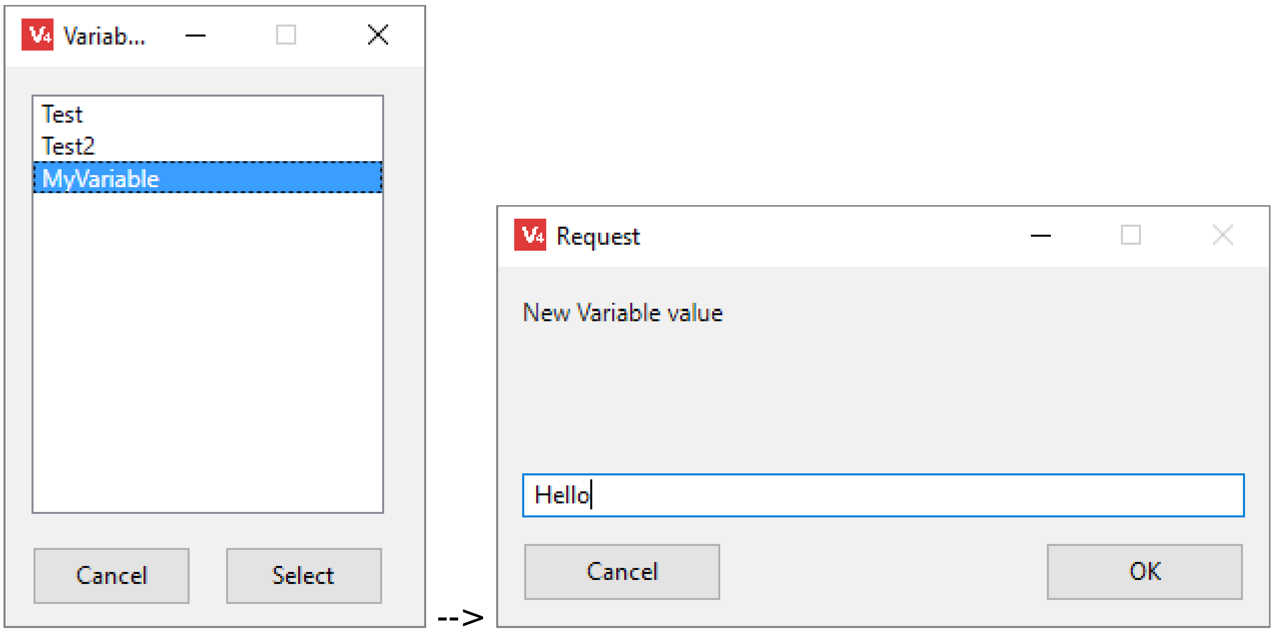
The new variable appears in the Global Variables list. At this point, the content of the new variable is an empty string “”.



To access the global variables, the commands *GetGlobalVar* and *SetGlobalVar* are used (available via main menu *Insert -> GetGlobalVar*, *Insert -> SetGlobalVar* or the Script Editor's context menu).



To assign a value to a global var, use the function *SetGlobalVar*. As shown in the picture above, it is available via Script Editor's context menu. In the following dialog (see below) select a variable from the list and enter a value for that variable:



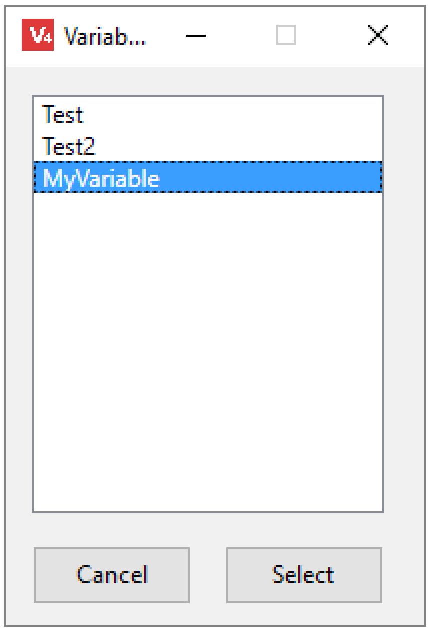
The result is `SetGlobalVar(“MyVariable”,“Hello”`

If this task is launched, the variable MyVariable gets the string “Hello” as content. To check this, run the task.

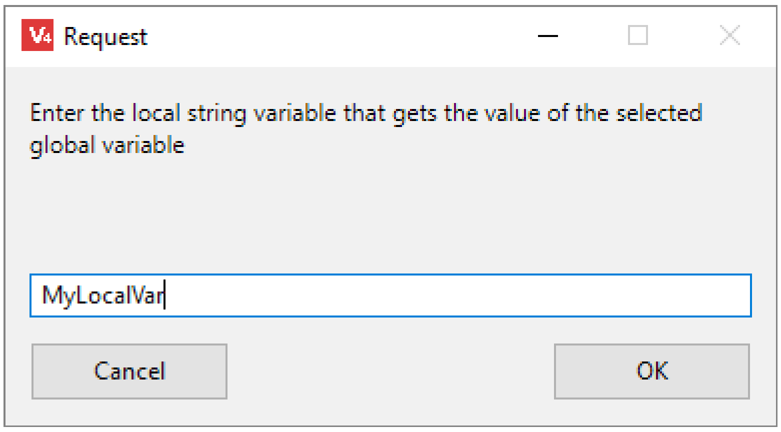
To read a global variable use *GetGlobalVar*. Instructions like “MyVariable” = “6” are invalid, because “MyVariable” is a string and not a variable. MyVariable = “6” is also invalid, because MyVariable is not declared in the Script and only (locally) declared variables are known. The solution is to declare a local variable of type string and assign the content of the global variable to that local one.

```
Dim MyLocalVar as string
```

Via main menu *Insert -> GetGlobalVar*, or the Script Editor's context menu a dialogue box with all available global variables pops up. If a variable is selected a new dialogue box asks for the local variable, that gets the content of the global one.



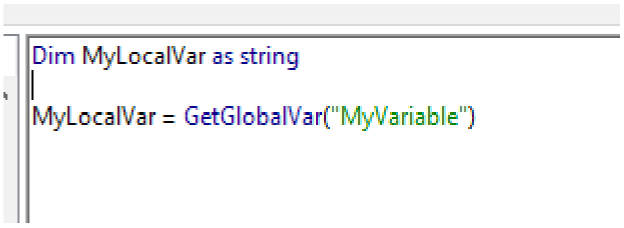
->



Enter the local string variable that gets the value of the selected global variable

MyLocalVar

The result looks like this:



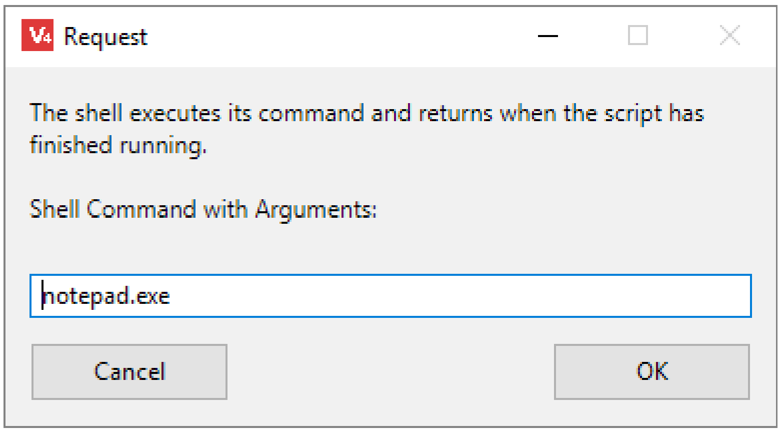
```
Dim MyLocalVar as string

MyLocalVar = GetGlobalVar("MyVariable")
```

now, the content of the global variable is available in the Script and we can work with it.

Shell Execute As Function

The ShellExecuteAsFunction command is used to launch shell commands / scripts. It works similar to CallAsFunction, and is available via main menu *Insert -> Shell Execute As Function* or the context menu.

A dialogue asks for the shell command and optional parameters:



The shell executes its command and returns when the script has finished running.

Shell Command with Arguments:

notepad.exe

Shell Execute As Thread

ShellExecuteAsThread launches programs / scripts as thread (Shell Execute as Function). V-Control launch the shell command and returns immediately, without waiting for the shell command to finish.

Compiler

Basic Language Reference

Abs

`Abs (Double) As Double`

Returns the absolute value of the number specified.

```
Dim d As Double

d=Abs(23.9) //returns 23.9
d=Abs(-23.9) //returns 23.9
```

Acos

`Acos (Double) As Double`

Returns the arccosine of the value specified. The arccosine is the angle whose cosine is value. The returned angle is given in radians.

```
Dim d As Double

Const PI=3.14159265358979323846264338327950
d=Acos(.5) //returns 1.0471976
d=Acos(.5)*180/PI //returns 60
```

Asc

`Asc (String) As Integer`

Returns as an Integer, the ASCII value for the first character of a String.

```
Dim a As Integer

a = Asc("@") //returns 64
```

The Asc function returns the code point for the first character in the String passed. Characters 0 through 127 are the standard ASCII set. They will be the same on practically every platform. Asc returns the code point for whatever encoding the string is in. If the string is in MacRoman, you get the code point specified by MacRoman, and so forth.

If you need to get the ASCII code of the first byte of the string rather than the first character, use the AscB function.

AscB

```
AscB (String) As Integer
```

Returns as an Integer, the value for the first byte of a String.

```
MsgBox Str(AscB("a")) //returns 97
MsgBox Str(AscB("A")) //returns 65
```

The AscB function returns the code for the first byte in the String passed. If you need to get the character code of the first character of the string rather than the first byte, use the Asc function.

AscB should be used instead of Asc when the string represents binary data or when your application will run on a one-byte character set (such as the US system) and you want case-sensitivity.

Asin

```
Asin (Double) As Double
```

Returns the arcsine of the value specified.

```
Dim d as Double

Const PI=3.14159265358979323846264338327950
d=Asin(.5) //returns 0.5235988
d=Asin(.5)*180/PI //returns 30
```

The arcsine is the angle whose sine is value. The Asin function returns the angle (in radians) of the sine passed to it. To express the arcsine in degrees, multiply the result by 180/PI.

Atan

```
Atan (Double) As Double
```

Returns the arctangent of the value specified. The arctangent is the angle whose tangent is value.

```
Dim d as Double

Const PI=3.14159265358979323846264338327950
d=Atan(1) //returns 0.785398 (PI/4 radians)
d=Atan(1)*180/PI // returns 45
```

Atan2

```
Atan2 (Double, Double) As Double
```

Returns the arctangent of the point whose coordinates are x and y. The arctangent is the angle from the x-axis to a line drawn through the origin (0,0) and a point with coordinates x, y.

```
Dim d as Double

Const PI=3.14159265358979323846264338327950
d=Atan2(1,0) //returns 1.57
d=Atan2(1,0)*180/PI //returns 90
```

BitAnd

The BitAnd method returns a UInt64 that is the result of comparing each bit of the two integers passed and assigning 1 to the bit position in the integer returned if both bits in the same position in the integer passed are 1. Otherwise, 0 is assigned to the bit position.

```
Dim i As Integer
i = BitAnd(5, 3) // returns 1
```

BitOr

The BitOr method returns a UInt64 that is the result of comparing each bit of the two integers passed and assigning 1 to the bit position in the integer returned if either of the bits in the same position in the integers passed are 1. Otherwise, 0 is assigned to the bit position.

```
Dim i As Integer
i = BitOr(5, 3) // returns 7
```

BitXor

The BitXor method returns a UInt64 that is the result of comparing each bit of the two integers passed and assigning 1 to the bit position in the integer returned if both bits in the same position in the integers passed are not equal. Otherwise, 0 is assigned to the bit position.

```
Dim i As Integer
i = BitXor(5, 3) // returns 6
```

BCDToTCString

Timecode from Devices with Sony 9-pin protocol and compatible usually comes in BCD format (4 Bytes FFSSMMHH). This function converts it to a string (HH-MM-SS-FF)

```
dim sTC, sBCD as string
//assign value to sBCD
//by reading the value from a device
sTC = BCDToTCString(sBCD)
```

Ceil

```
Ceil (Double) As Double
```

Returns the value specified rounded up to the nearest Integer.

```
Dim d as Double

d=Ceil(1.234) //returns 2
```

CheckSum8Bit

```
CheckSum8Bit(string) As Integer
```

Returns the Check-sum of a string. Each byte of the string is treated as binary value (not as ASCII code) and is added to the Check-sum. If the Check-sum exceed 256 in “roll over” to zero.

```
Dim c as integer

c = CheckSum8Bit("ABC")   // returns 198
c = CheckSum8Bit(chr(1)+chr(2)+chr(3)) // returns 6
```

CheckSumMod255

```
CheckSumMod255(string) As Integer
```

Returns the Check-sum of a string. Each byte of the string is treated as binary value (not as ASCII code) and is added to the Check-sum. The result is the Sum Mod 255.

---

checksumXOR

Returns the XOR Checksum od a given string

```
dim sXor as string
sXour = checksumXOR("My String to Checksum")
```

CRC16

Returns the CRC16 Checksum od a given string

```
dim sCrc as string
sCrc = CRC16("My String to Checksum")
```

Chr

```
Chr (Double) As String
```

Returns the character whose ASCII value is passed.

```
Dim Tab,CR,MyA as String

Tab=Chr(9) //returns a tab
CR=Chr(13) //returns carriage return
MyA = Chr(65) //returns "A"
```

The Chr function will return a single byte String when running on single byte systems and return a double byte string when running on double byte systems. If you need to get a single byte string regardless of whether the system software is single or double byte, use the ChrB function.

ChrB

```
ChrB (Double) As String
```

Returns a single byte String whose value is passed.

```
Dim s as String

s=ChrB(32) //returns a space
s=ChrB(13) //returns carriage return
```

The ChrB function returns a single byte string whose value is specified. ChrB should be used rather than Chr when value represents binary data.

If you need to get a single byte string when running on single byte system software and a double byte string when running on double byte system software, use the Chr function.

If you need to specify a code point above 127, use the Chr property of the TextEncoding class. With it, you specify both the encoding and the character code in that encoding.

Const

```
Const name = value
```

Declares a value as a local constant.

```
Const Pi=3.14159265358979323846264338327950
```

The Const statement can be used in place of the Dim statement followed by an assignment statement when you are sure that the value of the variable should not change within the method. Using Const instead of Dim provides a convenient way to manage such values.

A Const statement can be placed anywhere in a method, including inside a conditional structure, such as an If statement, or a looping structure. Constants declared in this manner are local to the method.

Cos

```
Cos (Double) As Double
```

Returns the cosine of the given angle.

```
Dim d as Double

Const PI=3.14159
d=Cos(45*PI/180) //returns 0.707
```

CountFields

```
CountFields (String, String) As Integer
```

Returns the number of values (fields) in the string passed that are separated by the separator string passed. If the source string is binary data or you require case-sensitivity, use CountFieldsB instead.

The example below returns 5.

```
Dim count as Integer
Dim s as String

s="Dan*Smith*11/22/69*5125554323*Male"
count=CountFields(s, "*")
```

The following example returns three because it counts the null “field” after the (unnecessary) final field delimiter.

```
Dim count as Integer
Dim s as String

s="Dan*Smith*"
count=CountFields(s, "*")
```

CRC16

Returns a CRC16 calculated checksum

Delay

```
Delay (String)
```

Waits the given number in ms. The given number must be a string.

```
Delay("1000")    //Wait 1 Second
```

```
Dim i as integer

i = 500
Delay(str(i))     //Wait 500 ms
```

Exit

```
Exit
```

The Exit statement causes control to exit a loop and jump to another line of code without the loop conditions being satisfied. The optional keywords enable you to control where execution will resume.

- If you use Exit without any optional keywords, V-Control exits whatever loop the Exit statement is in.
- If you use Exit with the Do keyword, V-Control exits the Do loop it is in, even if it is also inside another type of loop.
- If you use Exit with the While keyword, V-Control exits the While loop it is in, even if it is also inside another type of loop.
- If you use Exit with the For keyword without passing a parameter, it exits the innermost For loop it is in, even if it is also inside another loop.
- If you have nested For statements, you can pass the For keyword the variable that controls the loop you want to exit. For example, if you are testing all the elements of a two-dimensional array with nested For statements, you can use the loop variable for the outermost loop to exit at that point.

```
For i= 0 to 255
   For j= 0 to 255

     If myArray(i,j) = 23 then
       Exit For i
     End if
   Next
Next
```

Exp

```
Exp( Double) As Double
```

Returns “e” to the power of the value specified.

```
Dim d as Double

d=Exp(10) //returns 22026.4657948
```

FloatStringToStr

Converts a string representing a double i.e. “1.204”) to a four byte float string

This is the code behind the function call

```
Sub FloatStringToStr(fString as string) As String

//converts a string representing a float value ("1.2302")  to a
```

```
four byte float string

Dim mb As MemoryBlock = New MemoryBlock(4)
dim s,stmp as string
dim FloatVal as Single

FloatVal = CDbl(fString)
mb.SingleValue(0) = FloatVal
// automatic conversion between memoryblock and strings!!   =)
s = mb
stmp = mid(s,4,1)+mid(s,3,1)+mid(s,2,1)+mid(s,1,1)
return stmp
End Sub
```

Floor

`Floor( Double) As Double`

Returns the value specified rounded down to the nearest Integer.

```
Dim d as Double

d=Floor(1.234) //returns 1
```

For...Next

`For...Next`

Executes a series of statements a specified number of times. The For Each... Next statement is a variation that executes once for each element of a one-dimensional array.

The counter variable in a For statement can be declared inside the For statement rather than externally, as a local variable. For example, the code:

```
Dim i as Integer

For i=0 to 10
    //your code goes here
Next
```

The following example uses the DownTo keyword to decrement the counter:

```
Dim i as Integer

For i=5 DownTo 1 Step 1
   Beep
Next
```

Format

`Format (Double, String) As String`

Returns as a String a formatted version of the number passed based on the parameters specified. The Format function is similar to the way spreadsheet applications format numbers. Format will use the information based on the user's locale even if the user's locale is a Unicode-only locale.

Syntax

result = Format(number, formatSpec)

The formatSpec is a string made up of one or more special characters that control how the number will be formatted:

Character	Description
#	Placeholder that displays the digit from the value if it is present.If fewer placeholder characters are used than in the passed number, then the result is rounded.
0	Placeholder that displays the digit from the value if it is present.If no digit is present, 0 (zero) is displayed in its place.
.	Placeholder for the position of the decimal point.
,	Placeholder that indicates that the number should be formatted with thousands separators.
%	Displays the number multiplied by 100.
(	Displays an open paren.
)	Displays a closing paren.
+	Displays the plus sign to the left of the number if the number is positive or a minus sign if the number is negative.
-	Displays a minus sign to the left of the number if the number is negative. There is no effect for positive numbers.
E or e	Displays the number in scientific notation.
\character	Displays the character that follows the backslash.

The absolute value of the number is displayed. You must use the + or - signs if you want the sign displayed.

Although the special formatting characters are U.S. characters, the actual characters that will appear are based on the current operating system settings. For example, Windows uses the settings in the user's Regional and Language Options Control Panel. Formatting characters are specified in similar ways on other operating systems.

The formatSpec can be made up of up to three formats separated by semicolons. The first format is the format to be used for positive numbers. The second format is the format to be used for negative numbers and the third format is the format to be used for zero.

The following are several examples that use the various special formatting characters.

Format	Number	Formatted String
#.##	1.786	1.79
#.0000	1.3	1.3000
0000	5	0005
#%	0.25	25%
###,###.##	145678.5	145,678.5
#.##e	145678.5	1.46e+5
-#.##	-3.7	-3.7
+#.##	3.7	+3.7
#.##;(#.##);\z\e\r\o	3.7	3.7
#.##;(#.##);\z\e\r\o	-3.7	(3.7)
#.##;(#.##);\z\e\r\o		zero

The following example returns the number 3560.3 formatted as $3,560.30.

```
Dim s as String

s=Format(3560.3, "\$###,##0.00")
```

FramecodeToTimecode

returns a string that contains a Timecode in the format “hh-mm-ss-ff”. The function uses the Global Framerate (Main Menu -> Options) to determine the frames per second. The following example converts a framecode to a timecode.

```
dim tc as string
tc = FramecodeToTimecode(123456)
```

GetDayOfMonth

Returns the day of the current month (1..31)
Result integer

GetDayOfWeek

Result integer (Sunday=0, Monday = 1…)

GetDeviceVar

Gets the string value of a device variable.

In a Device Driver, the syntax is

```
dim s as string
s = GetDeviceVar("VariableName")
```

In a Task, the syntax is

```
dim s as string
s = GetDeviceVar("DeviceName","VariableName")
```

All Parameters are strings

GetGlobalVar

Gets the String Value of a Global variable

```
Dim s as String
s = GetGlobalVar("Test")
```

This Function call is not available in Device Drivers.

GetHour

Result integer

GetMinute

Result integer

GetMonth

Result integer

GetTime

Result string

This function returns a Timecode Time string. The format is HH:MM:SS:FF (FF = Frames). To determine the Timecode format, the function need a parameter for the framerate (fps)

```
Dim res as string
dim framerate as integer

framerate = 25
res = GetTime(framerate)
```

GetSeconds

Result integer

GetYear

Result integer

Hex

```
Hex (Integer) As String
```

Returns as a String the hexadecimal version of the number passed.

If the value is not a whole number, the decimal value will be truncated.

You can specify binary, hex, or octal numbers by preceding the number with the & symbol and the letter that indicates the number base. The letter b indicates binary, h indicates hex, and o indicates octal.

```
Dim hexVersion As String

hexVersion=Hex(5) //returns "5"
hexVersion=Hex(75) //returns "4B"
hexVersion=Hex(256) //returns "100"
```

HexToStr

```
HexToStr (String) As String
```

Returns as a String hexadecimal numbers converted to string

```
dim s as string

s = HexToStr("414243")
   // Returns "ABC", because "A" has ASCII code &h41 or 65
decimal,
   //         "B" has ASCII code &h42 or 66 decimal etc.
```

If...Then...Else

```
If...Then...Else
```

Conditionally executes a group of statements, depending on the value of a Boolean expression.

When executing an If statement, the condition is tested. If condition is True, the statements associated with the If statement following the Then statement are executed. If condition is False and an Else clause follows, its statements will be executed. If condition is False and there is no Else clause or it is preceded by an ElseIf statement, the condition following the ElseIf statement is tested.

After executing the statements following Then, ElseIf or Else execution continues with the statement that follows End If.

```
If error=-123 Then
 Beep
 MsgBox "Whoops! An error occured."
End If
```

```
Dim theNumber As Integer
Dim digits As Integer

theNumber=33
If theNumber<10 Then
   digits=1
ElseIf theNumber<100 Then
   digits=2
ElseIf theNumber<1000 Then
   digits=3
Else
   digits=4
End If
```

InStr

```
InStr (Integer, String, String) As Integer
```

Returns the position of the first occurrence of a String inside another String. The first character is numbered 1.

```
Dim first As Integer

first = InStr("This is a test", "t")     //returns 1
first = InStr("This is a test", "is")    //returns 3
first = InStr(4, "This is a test", "is") //returns 6
first = InStr("This is a test", "tester")//returns 0
```

InStrB

```
InStrB (Integer, String, String) As Integer
```

If the find string is not found within the source string, 0 (zero) is returned. InStrB is case-sensitive; it treats source as a series of raw bytes. It should be used instead of InStr when the string represents binary data or when your application will run in a one-byte character set (such as the US system) and you want case-sensitivity.

```
Dim first As Integer

first = InStrB("This is a test", "T")     //returns 1
first = InStrB("This is a test", "t")     //returns 11
first = InStrB("This is a test", "is")    //returns 3
first = InStrB(4, "This is a test", "is") //returns 6
first = InStrB("This is a test", "tester")//returns 0
first = InStrB("This Is a test", "Is")    //returns 6
```

Left

`Left (String, Integer) As String`

Returns the first n characters in a source String.

```
Dim s As String

s=Left("Hello World", 5) //returns "Hello"
s="Hello World"
s=s.Left(5) //returns "Hello"
```

LeftB

`LeftB (String, Integer) As String`

Returns the first n bytes in a source String.

The LeftB function returns bytes from the source string starting from the left side (as the name implies). If you need to read characters rather than bytes, use the Left function.

This example uses the LeftB function to return the first 5 bytes from a string.

```
Dim s As String
s=LeftB("Hello World", 5) //returns "Hello"

s="Hello World"
s=s.LeftB(5) //returns "Hello"
```

Len

`Len (String) As Integer`

Returns the number of characters in the specified String.

```
Dim n As Integer
n=Len("Hello world") //returns 11

Dim s as String
s="Hello World"
n=s.Len //returns 11
```

LenB

`LenB (String) As Integer`

Returns the number of characters in the specified String.

LenB treats string as a series of bytes, rather than a series of characters. It should be used when string represents binary data. If you need to know the number of characters in string rather than the number of bytes, use the Len function.

Log

`Log (Double) As Double`

Returns the natural logarithm of the value specified.

```
Dim d As Double
d=Log(10) //returns 2.3025851
```

Lowercase

`Lowercase (String) As String`

Converts all characters in a String to lowercase characters.

```
Dim s As String
s=Lowercase("tHe Quick fOX") //returns "the quick fox"
s=Lowercase("THE 5 LAZY DOGS") //returns "the 5 lazy dogs"

s="tHe Quick fOX"
s=s.Lowercase /returns "the quick fox"
```

LTrim

`LTrim (String) As String`

Returns the String passed with leading (left side) whitespaces removed.

```
Dim s as String
s=LTrim(" Hello World ")
//Returns "Hello World "
s=" Hello World "
s=s.LTrim //Returns "Hello World "
```

Max

`Max (Double, Double) As Double`

Returns the largest value passed to it.

```
Dim d As Double

d=Max(3.01, 4.05) //returns 4.05
d=Max(3.012, 3.011, 1.56) //returns 3.012
```

Microseconds

```
Microseconds As Double
```

Returns the number of microseconds (1,000,000th of a second) that have passed since the user's computer was started.

```
Dim minutes As Integer

minutes=Microseconds/1000000/60
MsgBox "Your computer has been on for "+ Str(minutes)+" minutes."
```

Because modern operating systems can stay running for so long, it's possible for the machine's internal counters to “roll over.” This means that if you are using this function to determine how much time has elapsed, you may encounter a case where this time is inaccurate.

Mid

```
Mid (String, Integer, Integer) As String
```

Returns a portion of a String. The first character is numbered 1.

```
Dim s As String

s = Mid("This is a test", 6) //returns "is a test"
s = Mid("This is a test", 11, 4) //returns "test"

s="This is a test"
s=s.Mid(11,4) //returns "test"
```

MidB

```
MidB (String, Integer, Integer) As String
```

Returns a portion of a String. The first character is numbered 1.

```
Dim s As String

s=MidB("This is a test", 6) //returns "is a test"
s=MidB("This is a test", 11, 4) //returns "test"

s="This is a test"
s=s.MidB(11,4) //returns "test"
```

MidB treats source as a series of bytes, rather than a series of characters. MidB should be used when source represents binary data. If you need to extract characters rather than bytes, use the Mid function. To determine the number of bytes in a String, use the LenB function.

Min

```
Min (Double, Double) As Double
```

Returns the smallest of the numbers passed.

```
Dim d As Double

d=Min(3.01, 4.05) //returns 3.01
d=Min(3.012, 3.011) //returns 3.011
```

---

msToTimecode

Convert Milliseconds to Timecode. Returns a string that contains a Timecode in the format “hh-mm-ss-ff”. The function uses the Global Framerate (Main Menu -> Options) to determine the frames per second. The following example converts a framecode to a timecode.

```
dim tc as string
tc = FramecodeToTimecode(123456)
```

Nil

```
Nil
```

Used to determine if an object is nil (no value).

NthField

```
NthField (String, String, Integer) As String
```

Returns a field from a row of data. The first field is numbered 1. If you need to parse binary data, use NthFieldB instead.

This example returns “Smith”

```
Dim field As String
field=NthField("Dan*Smith*11/22/69*5125554323*Male","*",2)
//Field = smith
```

In the example above, the * is a field delimiter. The string “Dan*Smith*11/22/69*5125554323*Male” has 5 fields if * is the delimiter.

1. “Dan”
2. “Smith”
3. “11/22/69”
4. “5125554323”
5. “Male”

If / is choosen as delimiter, then the string has 3 fields:

1. “Dan*Smith*11”
2. “22”
3. “69*5125554323*Male”

```
Result = NTHField(StringWithFields, Delimmiter, Position)
```

NthFieldB

Returns a field from a row of data. NthFieldB is identical to NthField except that it treats the source data as binary data. The first field is numbered 1.

This example returns “Smith”

```
Dim field As String
field = NthFieldB("Dan*Smith*11/22/69*5125554323*Male", "*", 2)
```

Using the second syntax:

```
Dim s, field As String
s = "Dan*Smith*11/22/69*5125554323*Male"
field = s.NthFieldB("*", 2)
```

Oct

```
Oct (Integer) As String
```

Returns as a String, the octal version of the number passed.

```
Dim OctVersion As String

OctVersion=Oct(5) //returns "5"
OctVersion=Oct(75) //returns "113"
OctVersion=Oct(256) //returns "400"
```

Pow

```
Pow (Double, Double) As Double
```

Returns the value specified raised to the power specified.

This example uses the Pow function to return four raised to the power of seven.

```
Dim d As Double
d=Pow(4,7) //returns 16384
```

Redim

```
Redim Array(x,y)
```

Resizes the passed array.

This example reduces the aNames array to 11 elements.

```
Redim aNames(10)
```

This example adds 10 elements to the aNames array

```
Redim aNames( Ubound(aNames)+10)
```

This example reduces the aPeople array to 11 elements for the first dimension and 6 elements for the second dimension

```
Redim aPeople(10,5)
```

The Redim method is used to increase or reduce the number of elements in the array specified. Arrays are zero-based (the first element is zero) so you resize the array using a number that is one less than the number of elements you actually want. The number of parameters passed is the number of dimensions of the array being resized.

Rem

```
Rem any comment
```

Used to add comments to your code.

Replace

```
Replace (String, String, String) As String
```

Replaces the first occurrence of a String with another String.

```
Dim result As String

result=Replace("The quick fox","fox","rabbit") //returns "The
quick rabbit"
result=Replace("The quick fox","f","b") //returns "The quick box"
result=Replace("The quick fox","quick","") //returns "The fox"
```

ReplaceB

```
ReplaceB (String, String, String) As String
```

Replaces the first occurrence of oldString in sourceString with newString. ReplaceB is the byte version of Replace.

- If newString is an empty string (“”), the ReplaceB function deletes the first occurrence of the oldString in the sourceString.
- If oldString is an empty string (“”), the ReplaceB function returns an unchanged copy of the sourceString.

ReplaceB is case-sensitive; it treats sourceString as a series of raw bytes. It should be used instead of Replace when the string represents a series of bytes or when your application will run in a one-byte character set (such as the US system) and you want case-sensitivity.

ReplaceAll

```
ReplaceAll (String, String, String) As String
```

Replaces all occurrences of a String with another String.

```
Dim result As String

result=ReplaceAll("xyxyxy","x","z") //returns "zyzyzy"
result=ReplaceAll("The quick fox"," ","") //returns "Thequickfox"

result="The Quick Fox"
result=result.ReplaceAll(" ",",") //returns "The,Quick,Fox"
```

ReplaceAllB

```
ReplaceAllB (String, String, String) As String
```

The ReplaceAllB function replaces all occurrences of oldString in sourceString with newString. ReplaceAllB is case-sensitive because it treats the source string as a series of raw bytes.

- If newString is an empty string (“”), the ReplaceAllB function deletes every occurrence of the oldString in the sourceString.
- If oldString is an empty string (“”), the ReplaceAllB function returns an unchanged copy of the sourceString.

ReplaceAllB is case-sensitive; it treats sourceString as a series of raw bytes. It should be used instead of ReplaceAll when the string represents a series of bytes or when your application will run in a one-byte character set (such as the US system) and you want case-sensitivity.

Right

```
Right (String, Integer) As String
```

Returns the last n characters from the String specified.

```
Dim s As String
s=Right("Hello World", 5) //returns "World"

s="Hello World"
s=s.Right(5) //returns "World"
```

RightB

```
RightB (String, Integer) As String
```

The RightB function returns bytes from the source string starting from the right side (as the name implies). RightB treats source as a series of bytes rather than a series of characters. It should be used when source represents binary data. If you need to read characters rather than bytes, use the Right function.

Rnd

```
Rnd As Double
```

Returns a randomly generated number in the range 0 <= Rnd < 1. The equivalent functionality is provided by the Random class as a special case. The Random class also provides additional options, such as a random number selected from a Normal distribution.

Round

```
Round (Double) As Double
```

Returns the value specified rounded to the nearest Integer.

```
Dim d as Double

d=Round(1.499) //returns 1
d=Round(1.500) //returns 2
```

RTrim

```
RTrim (String) As String
```

Returns the String data type passed with trailing (right side) whitespaces removed.

```
Dim s as String
s=RTrim(" Hello World ") //Returns " Hello World"

s=" Hello World "
s=s.RTrim //Returns " Hello World"
```

Rtrim uses the list of unicode “whitespace” characters at http://www.unicode.org/Public/UNIDATA/PropList.txt.

Select Case

```
Select Case
```

Executes one of several groups of statements, depending on the value of an expression.

The Select Case statement is useful when there are several possible conditions that must be checked. Unlike an If statement, the Select Case statement will exit as soon as it finds a matching Case expression and executes any statements that follow the Case expression up to the next Case expression. If there are no Case expressions that match, the elseStatements are executed. The expression Case Else can be used as a synonym for Else. The Case statement can accept several types of expressions. The expression can be a single value, a comma-delimited list of values, a function that returns a value, a range of values specified with the 'To“ keyword, or an expression that uses the “Is” keyword to do an equality or inequality test. You can combine types of expressions, separating them by commas Here are some examples:

```
Case 2, 4, 6, 8 //several values
Case 2 To 5 //range of values using To
Case 2 To 5, 7,9,11 //Both separate values and range
Case myFunction(x) // a Function
Case Is >= 42 // greater than/equal to operator
Case Is <19 //less than operator
```

```
Dim d as New MessageDialog //declare the MessageDialog object
Dim b as MessageDialogButton //for handling the result

d.icon= MessageDialog.GraphicCaution //display warning icon
d.ActionButton.Caption="Save"
d.CancelButton.Visible= True //show the Cancel button
d.CancelButton.Cancel= True//esc key works for Cancel
d.AlternateActionButton.Visible= True //show the "Don't Save"
button
d.Message="Save changes before closing?"
d.Explanation="If you don't save your changes, you will lose " _
+"all that important work you did since your last coffee break."
b=d.ShowModal //display the dialog
Select Case b //b is a MessageDialogButton
Case d.ActionButton //determine which button was pressed.
//user pressed Save
Case d.AlternateActionButton
//user pressed Don't Save
Case d.CancelButton
//user pressed Cancel
End Select
```

SetDeviceVar

Sets a Device Variable to a new Value.

In a Device Driver, the syntax is

`SetDeviceVar(VarName,NewValue)`

In a Script, the syntax is

`SetDeviceVar(DeviceName,VarName,NewValue)`

All Parameters are Strings

SetGlobalVar

```
// All Parameters are Strings
SetGlobalVar(VarName,NewValue)
```

This Function call is not available in Device Drivers and Event Condition scripts, only in Tasks

---

Sin

```
Sin (Double) As Double
```

Returns the sine of the value specified.

```
Dim d As Double
Const PI=3.14159265358979323846264338327950
d=Sin(0.5) //returns 0.4794255
d=Sin(30*PI/180) //returns .5
```

SingleToStr

Converts a Single to a four byte single string

This is the code behind the function call

```
Sub SingleToStr(FloatVal as single) as String

//converts a single (i.e. 0.023) to a four byte float string

Dim mb As MemoryBlock = New MemoryBlock(4)
dim s,stmp as string

mb.SingleValue(0) = FloatVal
// automatic conversion between memoryblock and strings!!   =)
s = mb
stmp = mid(s,4,1)+mid(s,3,1)+mid(s,2,1)+mid(s,1,1)
return stmp

End Sub
```

Sqrt

```
Sqrt (Double) As Double
```

Returns the square root of the value specified.

```
Dim d As Double
d=Sqrt(16) //returns 4
```

Str

```
Str (Double) As String
```

Returns the String form of the value passed.

```
Dim s As String

s=Str(123) //returns "123"
s=Str(-123.44) //returns "-123.44"
s=Str(123.0045) //returns "123.0045"
Const Pi=3.14159265358979323846264338327950
s= Str(pi) // returns "3.141593"
s= Str(3141592653589012345) // returns "3141592653589012345"
```

StrComp

```
StrComp (String, String, Integer) As Integer
```

Makes a binary (case-sensitive) or text (lexicographic) comparison of the two strings passed and returns the result.

The following example returns -1 because the two strings are the same in every way except in case.

```
StrComp(“Spam”, “spam”, 1)
```

The following example returns -1 because in a text comparison of the two strings, string2 is greater than string1. The ASCII value of “s” is greater than the ASCII value of “S”.

```
StrComp(“Spam”, “spam”, 0)
```

StrToHex

```
StrToHex (String) As String
```

Returns a String of hexadecimal numbers

```
dim s as string

s = HexToStr("ABC")
// Returns "414243", because "A" has ASCII code &h41 or 65
decimal,
//         "B" has ASCII code &h42 or 66 decimal etc.
```

Tan

```
Tan (Double) As Double
```

Returns the tangent of the angle specified.

```
Dim d As Double
Const PI=3.14159265358979323846264338327950
```

```
d=Tan(45*PI/180) //returns 1.0
```

Ticks

```
Ticks as Integer
```

Returns the number of ticks (60th of a second) that have passed since the user's computer was started.

```
Dim minutes As Integer
minutes=Ticks/60/60
MsgBox "Your computer has been on for"+ Str(minutes)+" minutes."
```

Because modern operating systems can stay running for so long, it's possible for the machine's internal counters to “roll over.” This means that if you are using this function to determine how much time has elapsed between two events, you may encounter a case where it appears that the stop time is prior to the start time.

TimecodeToFramecode

returns a integer that contains the number of frames in a given timecode. The function uses the Global Framerate (Main Menu -> Options) to determine the frames per second. The following example converts a timecodeto a framecode.

```
dim fc as integer
fc = TimecodeToFramecode("10-05-12-21")
```

Titlecase

```
Titlecase (String) As String
```

Returns the String passed to it with all alphabetic characters in Titlecase.

```
Dim s As String
s=Titlecase("tHe Quick fOX") //returns "The Quick Fox"
s=Titlecase("THE LAZY DOG") //returns "The Lazy Dog"
```

Trim

```
Trim (String) As String
```

Returns the String passed with leading and trailing whitespaces removed.

```
Dim s as String
s=Trim(" Hello World ") //Returns "Hello World"
```

Ubound

```
Ubound (array) As Integer
```

Returns the index of the last element in an array.

The Ubound function can be used to determine the last element of an array, but it can also be used to determine the size of an array. It may appear at first that the last element number and the size of the array are the same but in fact they are not. All arrays have a zero element. In some cases element zero is used and in other cases it is not. You will need to keep this in mind when using the Ubound function to determine the number of values you have in the array. If the array is zero-based, then element zero is used to store a value and you will have to add one to the value returned by the Ubound function to make up for it.

This example replaces each occurrence of X in an array with Y.

```
Dim i As Integer
For i=0 to Ubound(Names)
 If Names(i)="X" Then
    Names(i)="Y"
 End If
Next
```

Uppercase

```
Uppercase (String) As String
```

Converts all characters in a String to uppercase characters.

```
Dim s As String
s=Uppercase("tHe Quick fOX") //returns "THE QUICK FOX"
s=Uppercase("the 5 lazy dogs") //returns "THE 5 LAZY DOGS"
```

Val

```
Val (String) As Double
```

Returns the numeric form of a String.

```
Dim n As Integer
n = Val("12345") //returns 12345
n = Val(" 12345") //returns 12345
n = Val("123 45") //returns 123
n = Val(" &hFFF") //returns 4095
n = Val(" &b1111") //returns 15
```

The Val function stops reading the String at the first character it doesn't recognize as part of a number. All other characters are automatically stripped. It does recognize prefixes &o (octal), &b (binary), and &h (hexadecimal). However, spaces are not allowed in front of the ampersand. That is, ” &hFF“ returns 0, but ” &hFF“ returns 255. The CDbl function is the same as the Val function but is used when you need to pass a String that uses a character other than the period (.) as the decimal separator. It uses the decimal character specified by the operating system. For example, on Windows XP, it is set in the Regional and Language Options Control Panel. Val should generally be used to convert internal data, but not data entered by the user. Val is not international-savvy, but CDbl is. The CStr function is the same as the Str function but is used when you need to pass a number that uses a character other than the period (.) as the decimal separator. It uses the decimal character specified by the operating system. Val returns zero if string contains no numbers.

Compiler Errors

Error Codes Compiler error numbers returned in errorNumber are shown below:

Error Number	Description
1	Syntax does not make sense.
2	Type mismatch.
3	Select Case does not support that type of expression.
4	The compiler is not implemented (obsolete).
5	The parser's internal stack has overflowed.
6	Too many parameters for this function.
7	Not enough parameters for this function call.
8	Wrong number of parameters for this function call.
9	Parameters are incompatible with this function.
10	Assignment of an incompatible data type.
11	Undefined identifier.
12	Undefined operator.
13	Logic operations require Boolean operands.
14	Array bounds must be integers.
15	Can't call a non-function.
16	Can't get an element from something that isn't an array.
17	Not enough subscripts for this array's dimensions.
18	Too many subscripts for this array's dimensions.
19	Can't assign an entire array.
20	Can't use an entire array in an expression.
21	Can't pass an expression as a ByRef

	parameter.
22	Duplicate identifier.
23	The backend code generator failed.
24	Ambiguous call to overloaded method.
25	Multiple inheritance is not allowed.
26	Cannot create an instance of an interface.
27	Cannot implement a class as though it were an interface.
28	Cannot inherit from something that is not a class.
29	This class does not fully implement the specified interface.
30	Event handlers cannot live outside of a class.
31	It is not legal to ignore the result of a function call.
32	Can't use “Self” keyword outside of a class.
33	Can't use “Me” keyword outside of a class.
34	Can't return a value from a Sub.
35	An exception object required here.
36-39	Obsolete.
40	Destructors can't have parameters.
41	Can't use “Super” keyword outside of a class.
42	Can't use “Super” keyword in a class that has no parent.

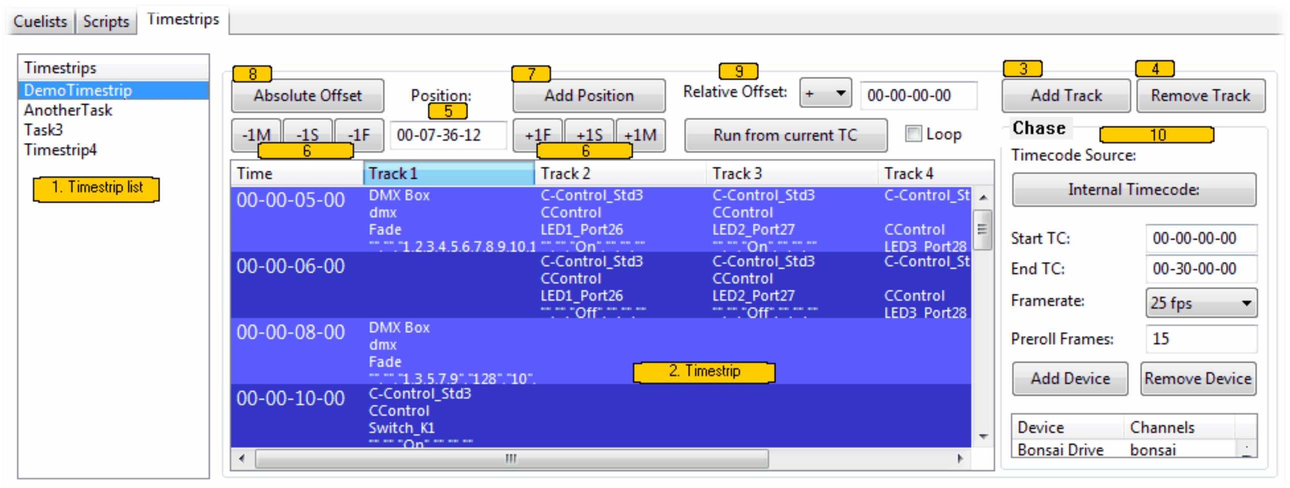
Timestrips

Timestrips are a kind of Timeline. The main difference is, that a Timestrip is vertical arranged.For us, this seems to be more practical for programming. It is possible to run more than one Timestrip at a time.

Timestrips are controlled by external timecode. (If no external timecode is available, the internal timecode can be used). To tell the system were to get the timecode from, a Timecode Source device has to be configured. Usually, this is a timecode reader such as Alpermann+Velte TC 60.

Timestrips can use Chase Devices. That are devices that are automatically locket to the external timecode.

To add a cue to a Timestrip, click *Add Position* to create a new row in the Timestrip.



Timestrips
DemoTimestrip
AnotherTask
Task3
Timestrip4

Position: 00-07-36-12
Relative Offset: + 00-00-00-00

Time	Track 1	Track 2	Track 3	Track 4
00-00-05-00	DMX Box dmx Fade "","","1.2.3.4.5.6.7.8.9.10.1	C-Control_Std3 CControl LED1_Port26 "","","On","","",""	C-Control_Std3 CControl LED2_Port27 "","","On","","",""	C-Control_St CControl LED3_Port28
00-00-06-00		C-Control_Std3 CControl LED1_Port26 "","","Off","","",""	C-Control_Std3 CControl LED2_Port27 "","","Off","","",""	C-Control_St CControl LED3_Port28
00-00-08-00	DMX Box dmx Fade "","","1.3.5.7.9","128","10",			
00-00-10-00	C-Control_Std3 CControl Switch_K1 "","","On","","",""			

Timecode Source:
Start TC: 00-00-00-00
End TC: 00-30-00-00
Framerate: 25 fps
Preroll Frames: 15

Device	Channels
Bonsai Drive	bonsai

Timestrip user interface

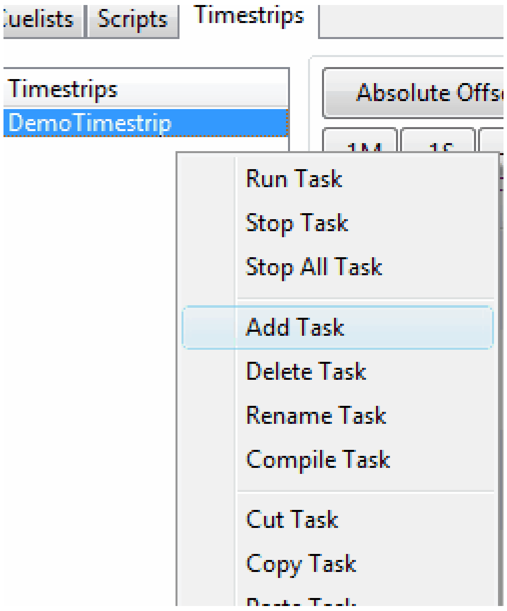
1. Timestrip list: lists all avalable Timestrips.
2. Timestrip view: This is the visual representation of the Timestrip. The first column hold the timecode for a cue. A cue can consist of up to 48 tracks, each track representing an individual command. A track is not linked to a device, so having commands from different devices within one track is OK. To edit a timecode double click on it. To edit a cue, double click on the cues row and column.
3. Add Track adds one more track to the timestrip.
4. Remove Track removes the last track.
5. The Position field changes the current position in the Timestrip. By entering a value here and pressing the Enter / Return key, all Chase Devices will locate to this position. The timecode entered in the Position field is also used for the Add Position button (see 7. Add Position).
6. These buttons change the Position value.
7. The Add Position button creates a new row in the Timestrip table. The content of the Position field is used as new timecode value.
8. Absolute Offset moves the Timestrip to another position. If, for example, an absolute offset of one hour is stet, all the timecode values are

changing and one hour is added to them.
9. Relative Offset leaves the timecode in the table unchanged. It means that firing a cue is delayed (if offset is positive) or ahead (if offset is negative)
10. The Chase Mode area determines the Chase Devices and Timecode Master source

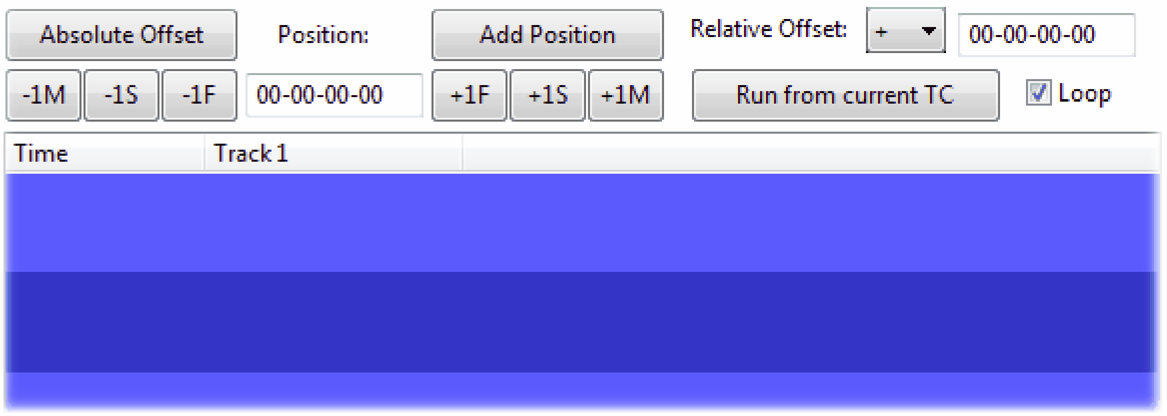
Create Timestrip

A new Timestrip can be created by the Timestrips list context menu.

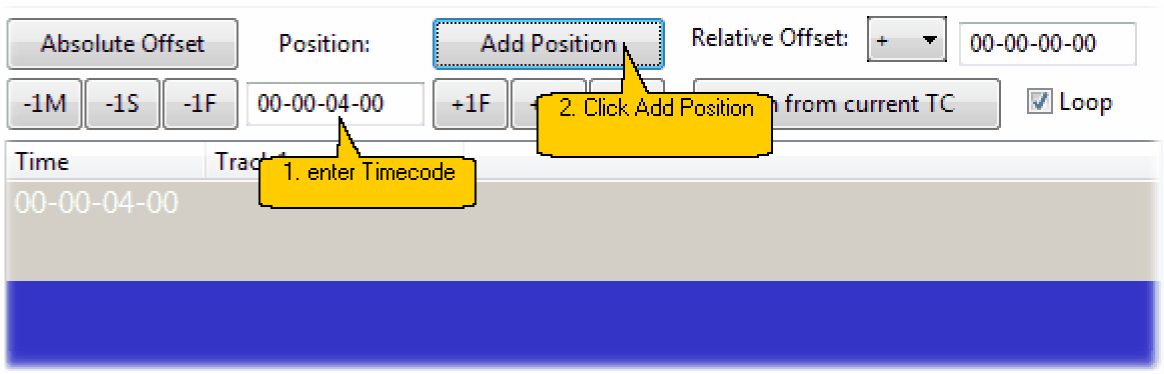
Alternatively use the Icon to do this.



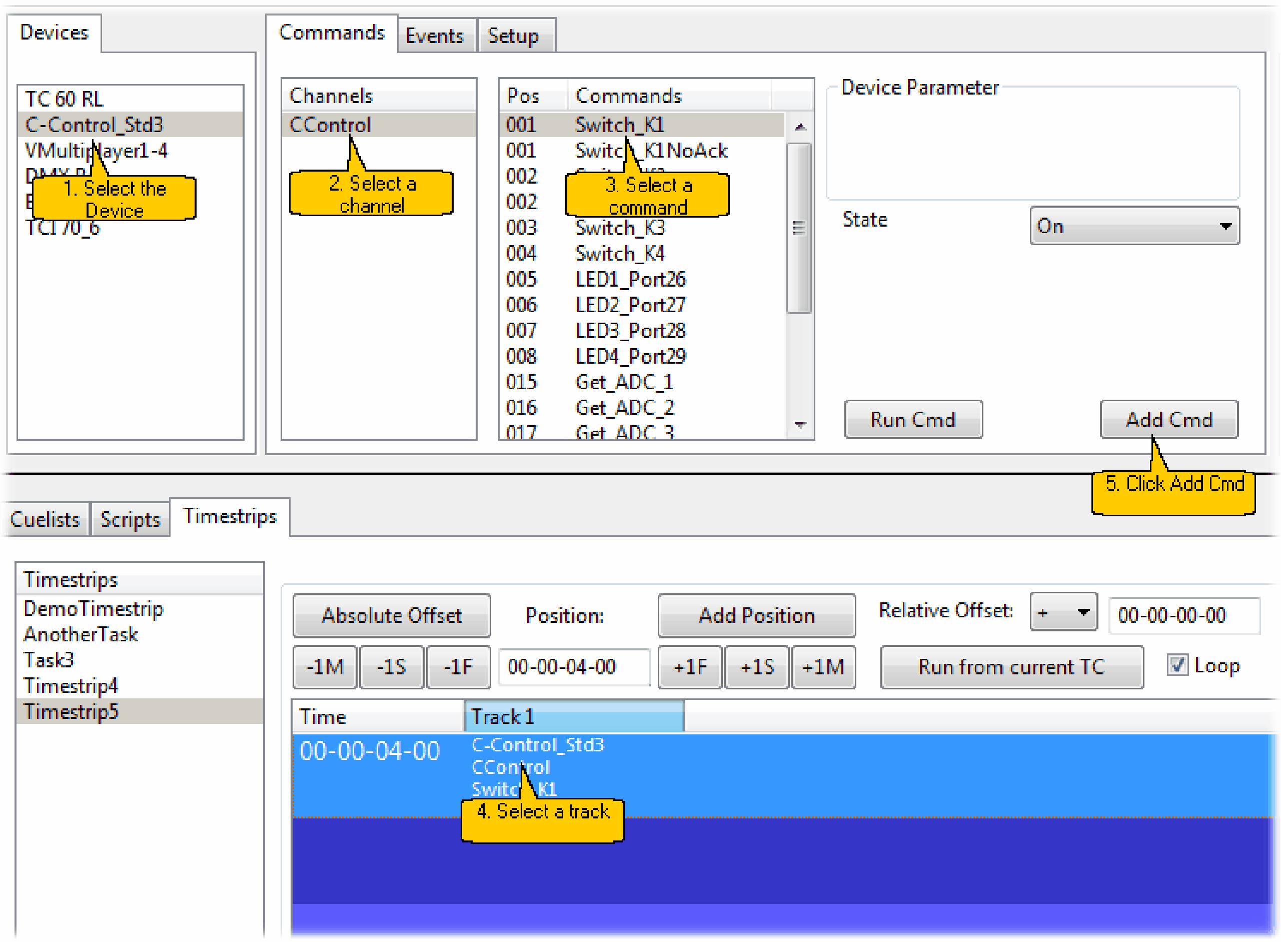
The Position field holds the timecode value for a new cue. Add Position creates a new row in the timestrip table.



empty Timestrip

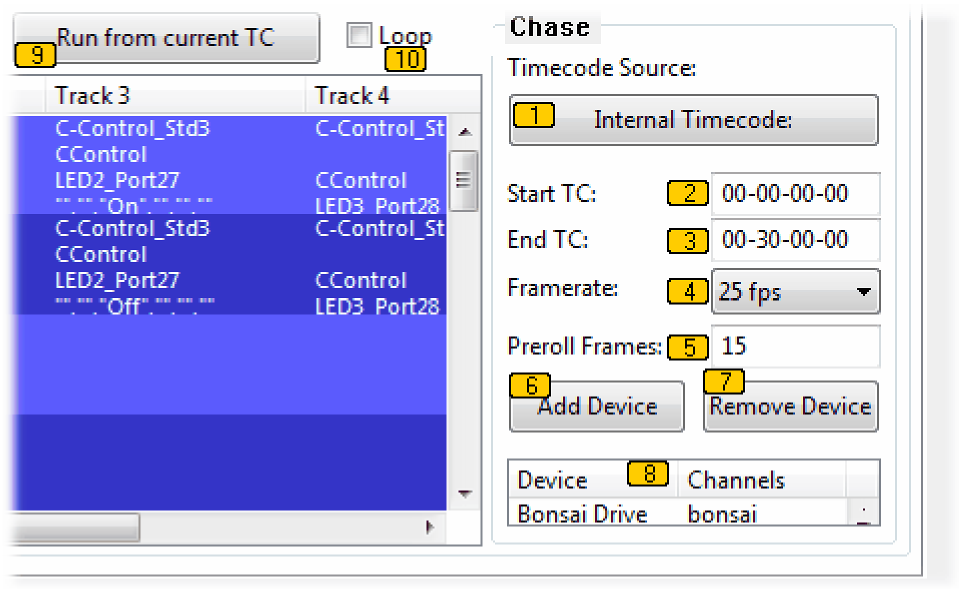


To add a cue, select a command and press the Add Cmd button.



Chase Devices

The Chase area determines the chase devices and the master timecode. Chase devices follow the external (or internal) timecode automatically, as far as the timestrip is running. To configure this feature, the following steps have to be carried out.



Start TC: 00-00-00-00

End TC: 00-30-00-00

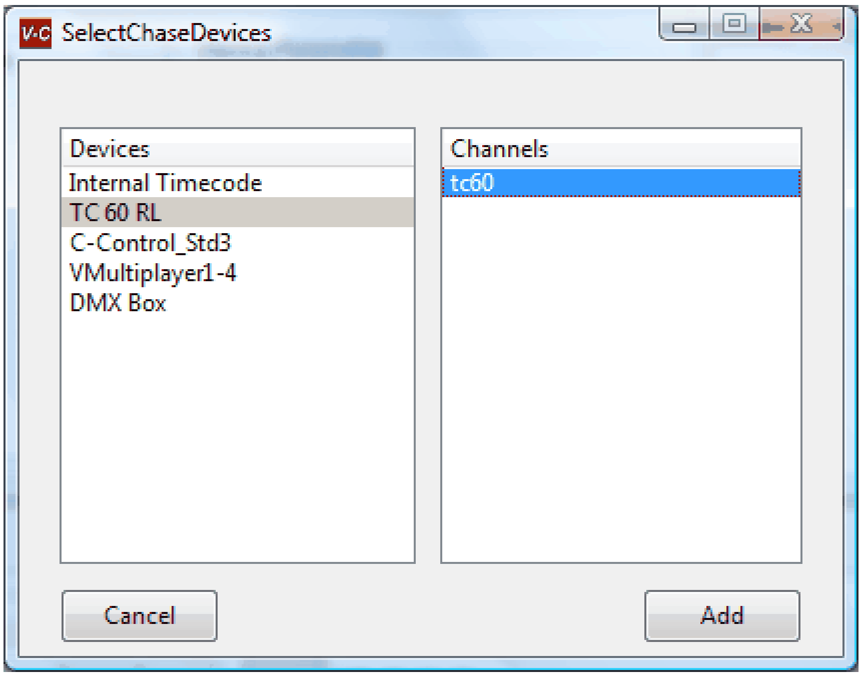
Framerate: 25 fps

Preroll Frames: 15

Device	Channels
Bonsai Drive	bonsai

1. Determine the Timecode Master

Via *Timecode Source button*, a dialogue is opening, allowing to select a device as timecode master.



In this case, we use a timecode reader interface (Alpermann + Velte TC60 RL Timecode Reader). To complete the selection, don't forget to choose a channel for the device as well (tc60 in this example). If there is no external timecode reader available, one can choose Internal Timecode as timecode source.

2. Start TC (only with Internal Timecode)

Determines the start value of the internal timer. This is were the Timestrip starts.

3. Set End TC (only with Internal Timecode)

Determines the end value of the internal timer. This is were the Timestrip ends.

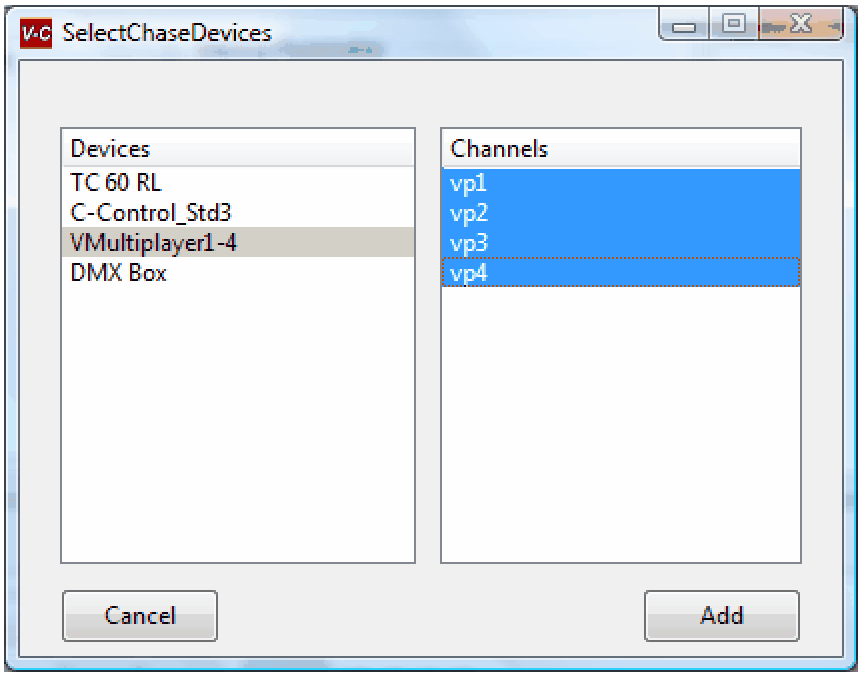
4. Framerate of the Timecode

5. Preroll Frames

Preroll Frames determine the time, the system needs for synchronization. They depend on the device that is used as chase device. The quicker the chase device can locate a new position, the less Preroll Frames can be necessary. For today's harddisk players, a value between 5 and 15 Frames should be sufficient.

6. Select the Chase Devices

Add Device opens a dialogue to choose the chase devices.



To select a chase device, select the device and the channels.

7. Remove the selected chase device

8. Chase Device List

A list with all configured chase devices

9. Run from Current TC (only with Internal Timecode)

The timestrip start from the position entered in the Position field.

10. Loop (only with Internal Timecode)

Play endless. If you are using an external timecode, the timecode source has to do the loop if you want one.

Events

An event in V-Control works as a trigger. If the event occurs, a defined task is executed as event handler. All events are triggered by a variable change. This could be a device variable, a system variable or a global variable.

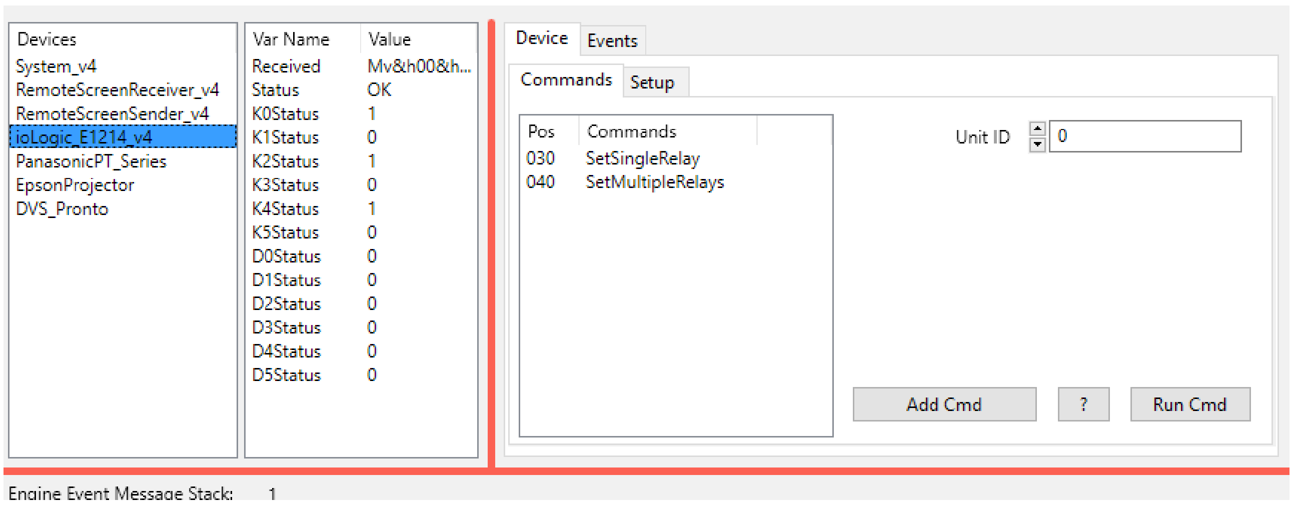
The device drivers collect information about the connected device and represent the status of the device in device variables. Each time a variable changes an event is fired. If there is an event handler for this event then the task that handles the event is fired. Device Events allow V-Control to respond on external events triggered by a connected device. If, for example, a temperature sensor send a message that a limit is reached, or a motion sensor detects a person and notify this, or a players position has changed, V-Control can launch a task and react on this event.

To trigger an event, a condition script determines if the event handling task is fired or not. Lets say we have a temperature sensor and we want to start a fan if the temperature is over 35°C. The fan should stop if the temperature is less then 30°C. So we have two conditions to check and determine which task to start.

Condition 1 is: if Temperature > 35 then start fan Condition 2 is: if Temperature < 30 then stop fan

Device Variable Change Events

These events initiated by the external attached devices, e.g. a liquid level sensor reports a new level or a light barrier detects a break. The sensor send a message via the channel (or the device driver requests the status periodically), and V-Control looks if there is an event handler. If an event handler is found, it checks the condition and fire the task if the condition is true.



Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector
DVS_Pronto

Var Name	Value
Received	Mv&h00&h...
Status	OK
K0Status	1
K1Status	0
K2Status	1
K3Status	0
K4Status	1
K5Status	0
D0Status	0
D1Status	0
D2Status	0
D3Status	0
D4Status	0
D5Status	0

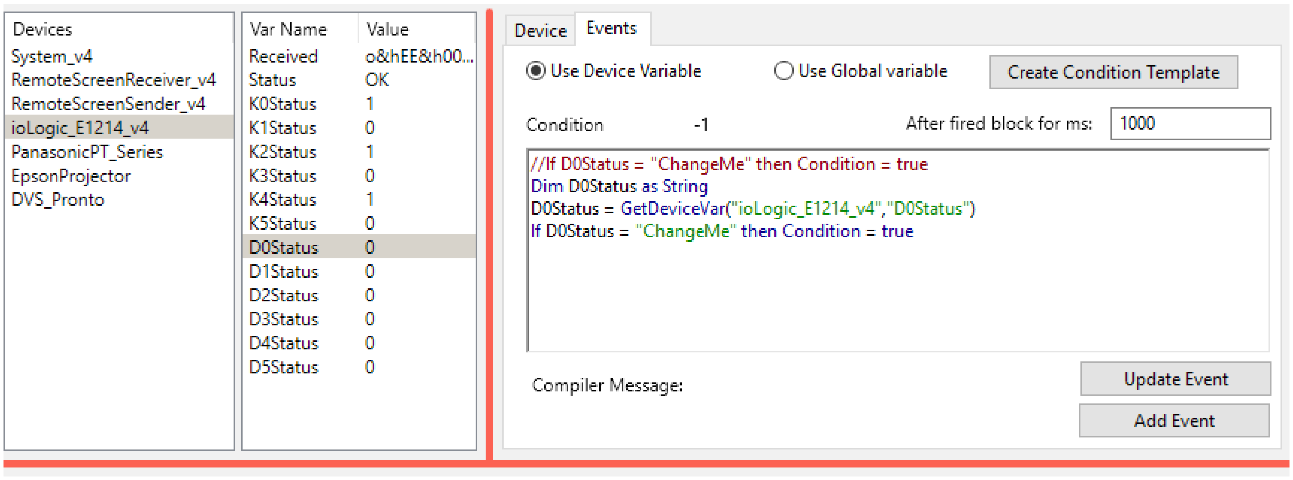
Pos	Commands
030	SetSingleRelay
040	SetMultipleRelays

Unit ID 0

Engine Event Message Stack: 1

Lets do an example:

The ioLogic E1214 is a TCP controlled box from Moxa. It uses the Modbus TCP protocol. It has 6 Relays and 6 digital inputs.Now we want to run a task if digital input 1 gets High. Select the device and the device variable D0Status. Then click the *Create Condition Template* button. V-Control creates a condition script that has to be edited so that the condition is true if D0Status = 1.



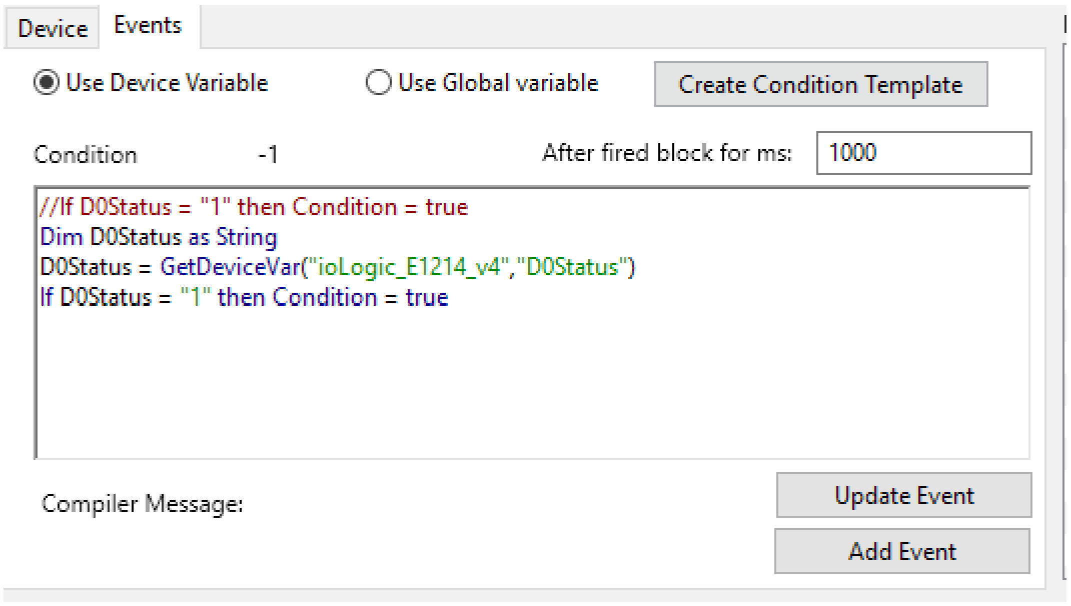
Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector
DVS_Pronto

Var Name	Value
Received	o&hEE&h00...
Status	OK
K0Status	1
K1Status	0
K2Status	1
K3Status	0
K4Status	1
K5Status	0
D0Status	0
D1Status	0
D2Status	0
D3Status	0
D4Status	0
D5Status	0

Condition -1 After fired block for ms: 1000

```
//If D0Status = "ChangeMe" then Condition = true
Dim D0Status as String
D0Status = GetDeviceVar("ioLogic_E1214_v4","D0Status")
If D0Status = "ChangeMe" then Condition = true
```

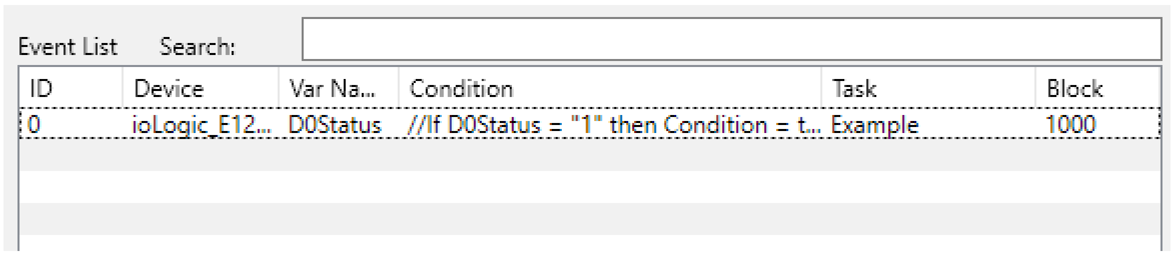
The first line of the condition script is a comment. It is shown in the *Eventlist* and is used as a hint for the programmer. Change the condition script as shown below.



Condition -1 After fired block for ms: 1000

```
//If D0Status = "1" then Condition = true
Dim D0Status as String
D0Status = GetDeviceVar("ioLogic_E1214_v4","D0Status")
If D0Status = "1" then Condition = true
```

Click the *Add Event* button. Now there is a new entry in the Eventlist. The next step is to assign a task to this event. In the context menu (click right) of the event list select Assign Task. The list now looks like this:



ID	Device	Var Na...	Condition	Task	Block
0	ioLogic_E12...	D0Status	//If D0Status = "1" then Condition = t...	Example	1000

Now, if the variable D0Status of the device changes from 0 to 1, the task assigned to the event is fired.

The Condition Script

The first row of the condition script is a comment and shown in the Eventlist. Write whatever is helpful to have a good hint what the script is doing.

The second row

```
Dim D0Status as String
```

creates the local variable D0Status. This is necessary because we don't have direct access to a device variable.

in

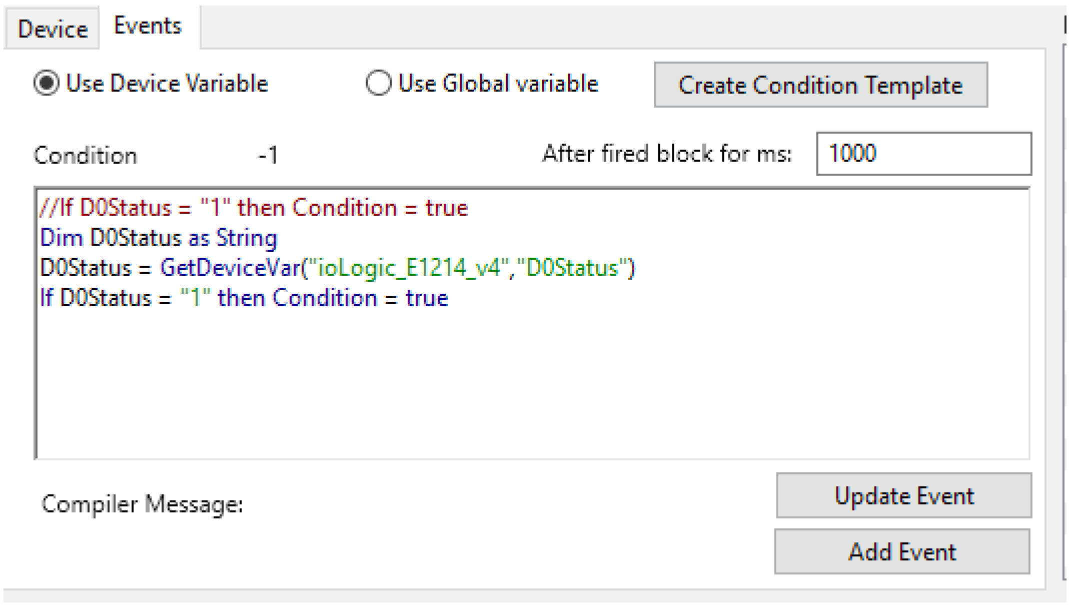
```
D0Status = GetDeviceVar("ioLogic_E1214_v4","D0Status")
```

the content of the device variable D0Status is assigned to the local variable D0Status. The GetDeviceVar function accept only strings as parameters, so the device name and the variable name have to be surrounded by “.

The last row checks if the condition is true. The condition is always false by default and changes only to true if explicit set.

```
If D0Status = "1" then Condition = true
```

The Condition Editor



(● Use Device Variable) ○ Use Global variable

Condition -1

After fired block for ms: 1000

```
//If D0Status = "1" then Condition = true
Dim D0Status as String
D0Status = GetDeviceVar("ioLogic_E1214_v4","D0Status")
If D0Status = "1" then Condition = true
```

Compiler Message:

The Condition Editor tries to support the programmer in creating the script. As explained above, the *Create Condition Template* button creates a script that is used as first step.

Variable change events can occur from device variables and global variables. If then *Use Device Variable* option is set, a device variable is used. For global variables use the *Use Global Variable* option.

Device variables can change very frequently. A variable containing a timecode changes every 33 ms (30 fps). If you have a condition such as

```
Dim Positionas string
Dim iPosition,iTarget as Integer
```

```
Position = GetDeviceVar("DVS_Pronto","Position"

iTarget = TimecodeToFramecode("10-12-21-10")
iPosition = TimecodeToFramecode(Position)
if (iPosition >= iTarget) and (iPosition < Target +10) then
Condition = true
```

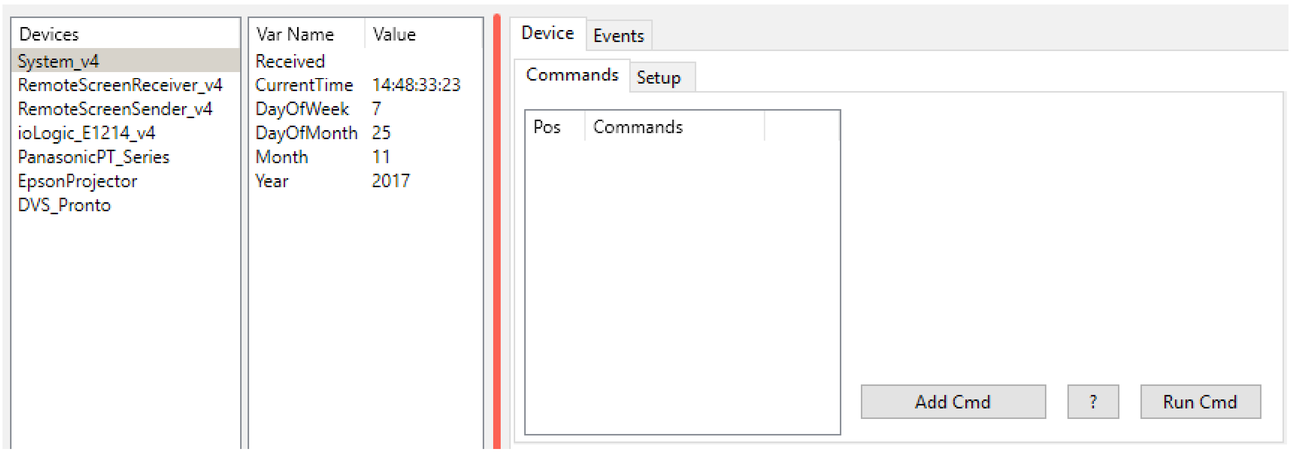
This script returns true if the Position is between 10-12-21-10 and 10-12-21-20. It might be that V-Control does not detect all of the 10 valid variable changes, but for sure more then one. In this case the Task that is linked to the event is fired frequently during this period. It could happen that V-Control tries to fire the task again while it is still running. For that reason we have the *After fired block for ms*. Here you can enter the time in ms the event should not fire again. After the time it will fire again. This value is 1000ms (1 Second) by default.

If your script causes compile errors the line with the error is marked in the script and an error message is shown (*Compiler Message*).

A double click in the eventlist loads the event again. To change the event click the *Update Event* button, to create a new click the *Add Event* button.

Calendar Events

To create events that depend on a Date, Time or Time interval the System device is used. To add a System device open the *Device Setup* dialog by clicking the *Device* button in the toolbar. Search for System_v4.



Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector
DVS_Pronto

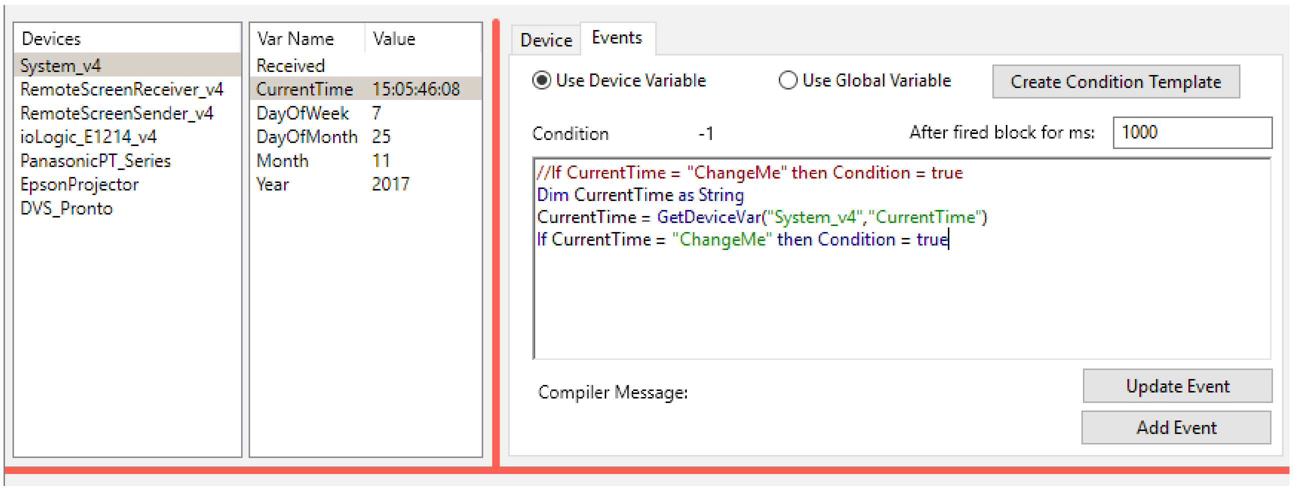
Var Name	Value
Received	
CurrentTime	14:48:33:23
DayOfWeek	7
DayOfMonth	25
Month	11
Year	2017

The System Device is the only device that does not need a channel. It has no commands, only status variables representing Date and Time. The Time is in the format HH:MM:SS:FF (FF = Frames). The framerate is determined in the Options Dialog System page.

DayOfWeek is the current weekday (1=Sunday..7=Saturday)

To create an event that fires weekdays at 9:00 AM we have to check the current Time and the DayOfWeek. Because the DayOfWeekVariable changes only every 24 hours, we use the *CurrentTime* variable as trigger.

Select the *CurrentTime* variable, select the *Events* tab and pres the *Create Condition Template* button.



Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector
DVS_Pronto

Var Name	Value
Received	
CurrentTime	15:05:46:08
DayOfWeek	7
DayOfMonth	25
Month	11
Year	2017

(● Use Device Variable) ○ Use Global Variable

Condition -1

After fired block for ms: 1000

```
//If CurrentTime = "ChangeMe" then Condition = true
Dim CurrentTime as String
CurrentTime = GetDeviceVar("System_v4","CurrentTime")
If CurrentTime = "ChangeMe" then Condition = true
```

Compiler Message:

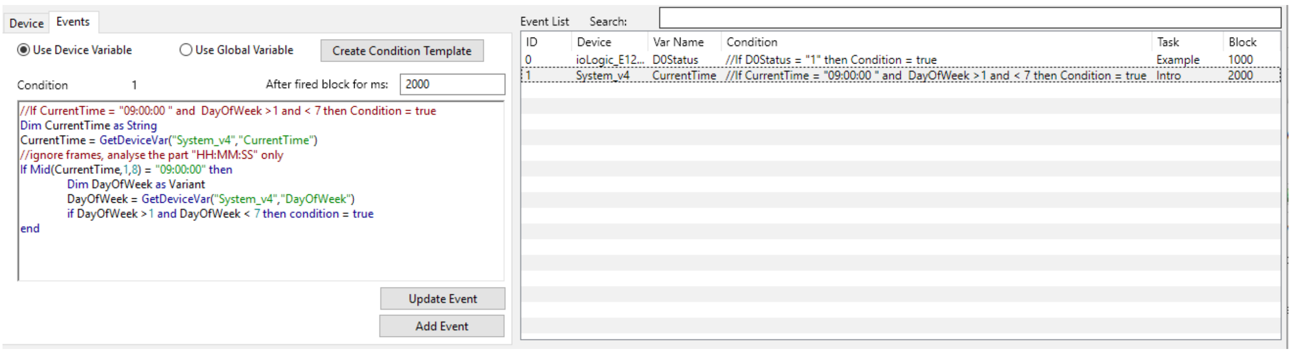
Change the Template to

```
//If CurrentTime = "09:00:00 " and  DayOfWeek >1 and < 7 then
Condition = true
Dim CurrentTime as String
CurrentTime = GetDeviceVar("System_v4","CurrentTime")
//ignore frames, analyse the part "HH:MM:SS" only
If Mid(CurrentTime,1,8) = "09:00:00" then
     Dim DayOfWeek as Variant
     DayOfWeek = GetDeviceVar("System_v4","DayOfWeek")
     if DayOfWeek >1 and DayOfWeek < 7 then condition = true
end
```

Maybe one is wondering about *Dim DayOfWeek as Variant*. If DayOfWeek was declared as string, then an operation such as *if DayOfWeek > 1* would couse a compile error, because a string cannot be compared with an integer. A variant behaves as string if the content is a string, or as integer if the content can be converted to integer. So the string “1” can be converted to the integer 1. This happens automatically.

Now the event is fired 25 Times (from “09:00:00:00” - “09:00:00:24” at 25 fps). Because we want to ensure that the event is only fired ocne, set the *After fired block for ms* to 2000 ms. Now press the *Add Event* Button

Finally, after assigning a task to the event, the result is



(● Use Device Variable) ○ Use Global Variable

Condition 1

After fired block for ms: 2000

```
//If CurrentTime = "09:00:00 " and  DayOfWeek >1 and < 7 then Condition = true
Dim CurrentTime as String
CurrentTime = GetDeviceVar("System_v4","CurrentTime")
//ignore frames, analyse the part "HH:MM:SS" only
If Mid(CurrentTime,1,8) = "09:00:00" then
          Dim DayOfWeek as Variant
          DayOfWeek = GetDeviceVar("System_v4","DayOfWeek")
          if DayOfWeek >1 and DayOfWeek < 7 then condition = true
end
```

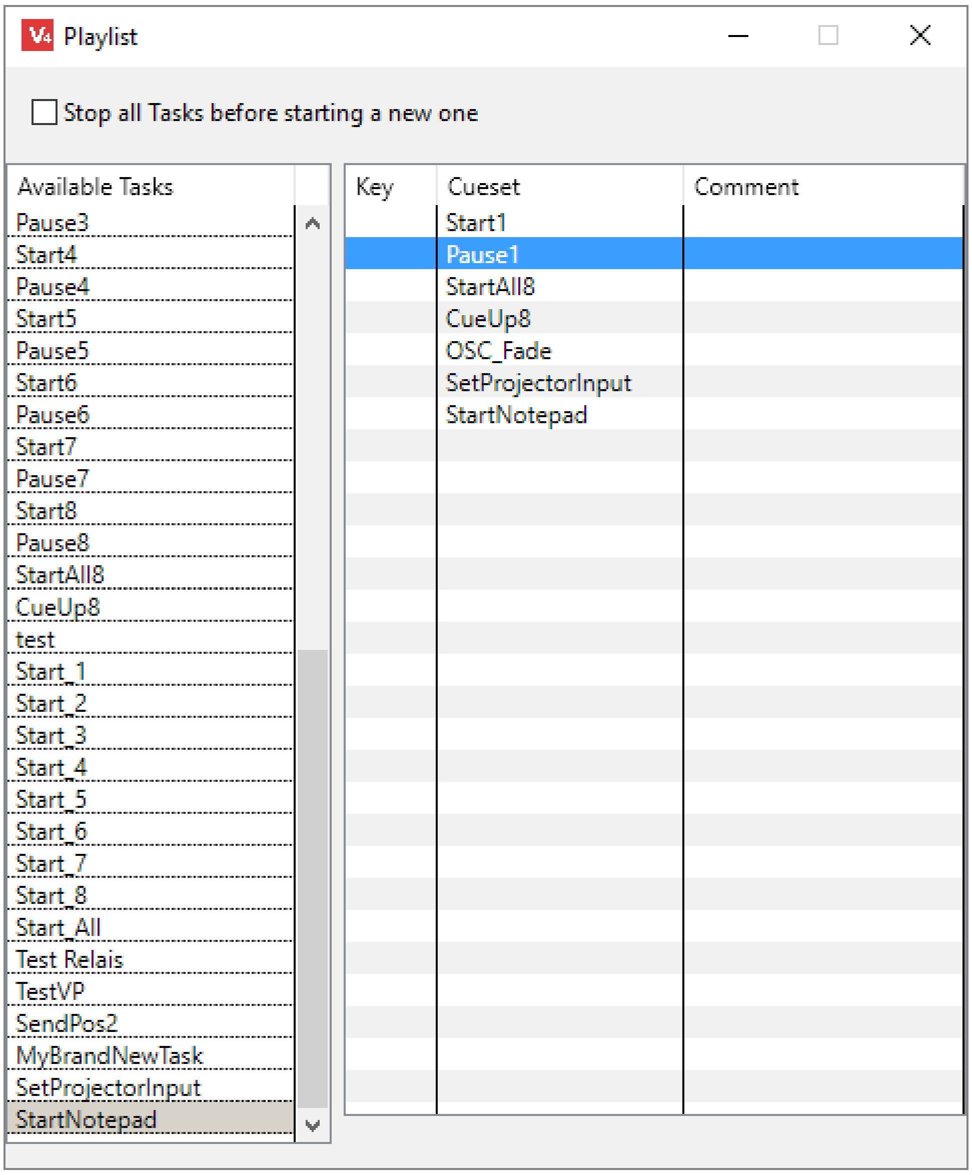
Event List Search:

ID	Device	Var Name	Condition	Task	Block
0	ioLogic_E12...	D0Status	//If D0Status = "1" then Condition = true	Example	1000
1	System_v4	CurrentTime	//If CurrentTime = "09:00:00 " and DayOfWeek >1 and < 7 then Condition = true	Intro	2000

Simple GUI

Playlist

Via *Playlist* tool button or main menu *Playout -> Playlist* the Playlist window pops up.



Playlist

Stop all Tasks before starting a new one

Available Tasks
Pause3
Start4
Pause4
Start5
Pause5
Start6
Pause6
Start7
Pause7
Start8
Pause8
StartAll8
CueUp8
test
Start_1
Start_2
Start_3
Start_4
Start_5
Start_6
Start_7
Start_8
Start_All
Test Relais
TestVP
SendPos2
MyBrandNewTask
SetProjectorInput
StartNotepad

Key	Cueset	Comment
	Start1	
	Pause1	
	StartAll8	
	CueUp8	
	OSC_Fade	
	SetProjectorInput	
	StartNotepad	

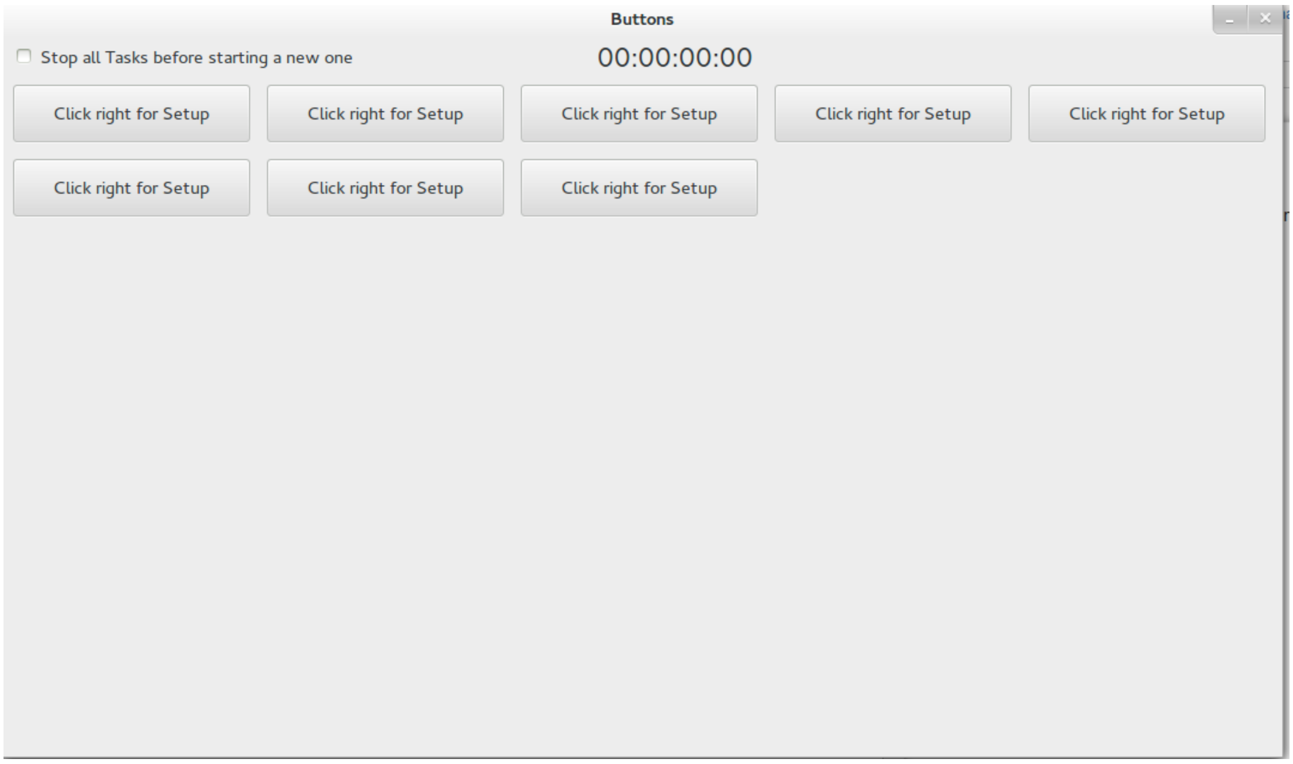
The left table lists all available tasks (Scripts, Cuelists and Timestrips). To fill the Playlist (right table) move the tasks in the left list via drag and drop to the right table. To launch a task, double click on it. Alternatively, a selected task can be launched by pressing the space bar. A shortcut key is assignable via playlist context menu as well as a comment.

If the button Stop all Tasks before playing a new one is pressed, then all running tasks are stoped before the new one launches.

CallButtons

CallButtons provide another way to have a GUI for end users. Click *Playout-*

>*CallButtons* to open the CallButton window.



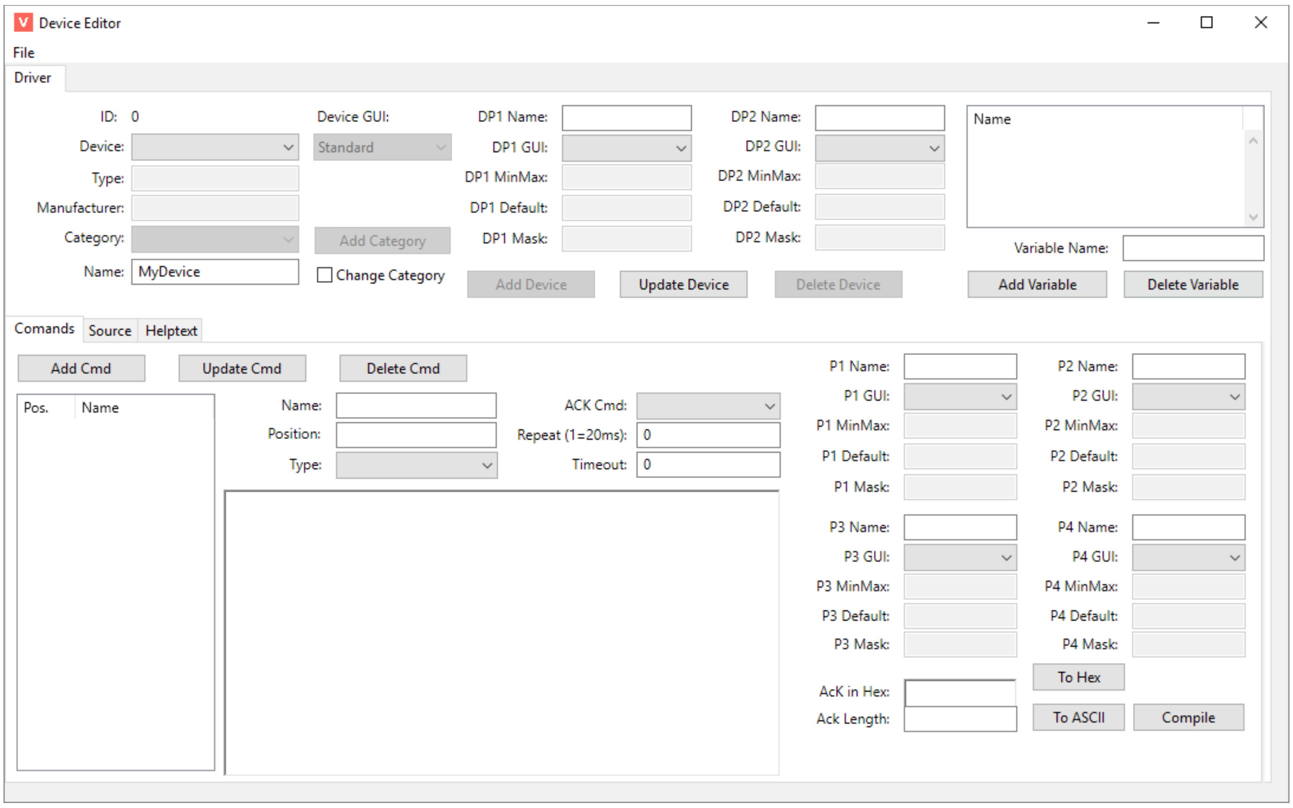
To add a new button click right on a free space and select the *Add Button* context menu. Each time the *Add Button* menu is clicked a new button occurs on the CallButton surface.

To assign a task to a button right click on the button and select the context menu *Select Task*. **This opens a window with all available tasks. Select one and click** *Add*. **By default, the taskname is used as caption for the button. If you want another caption then the taskname you can click right on the button and select** *Change Caption*

Device Editor

Device Drivers are very flexible, and for that reason they are also very complex. In fact, creating device drivers is the most complex part in V-Control.

All available device drivers are stored as a template in a database (Devices.rsd). Once they're added to a project, a copy is stored in the project file (*.vc4) too. The Device Editor is used to modify / create these drivers. To modify a driver in an existing project file, the Device Editor is launched via *Configure -> Edit Devices* or the *Device Edit* toolbar button. Now only devices in the current project are available for editing. This means also that all changes to the device driver concern only the current project. The device database with the templates stays untouched. To edit the device templates, the device editor is launched via *Configure -> Edit Device Templates*. In this case, the drivers in the current project stay untouched.



ID: 0
Device GUI: Standard
Name: MyDevice
Repeat (1=20ms): 0
Timeout: 0

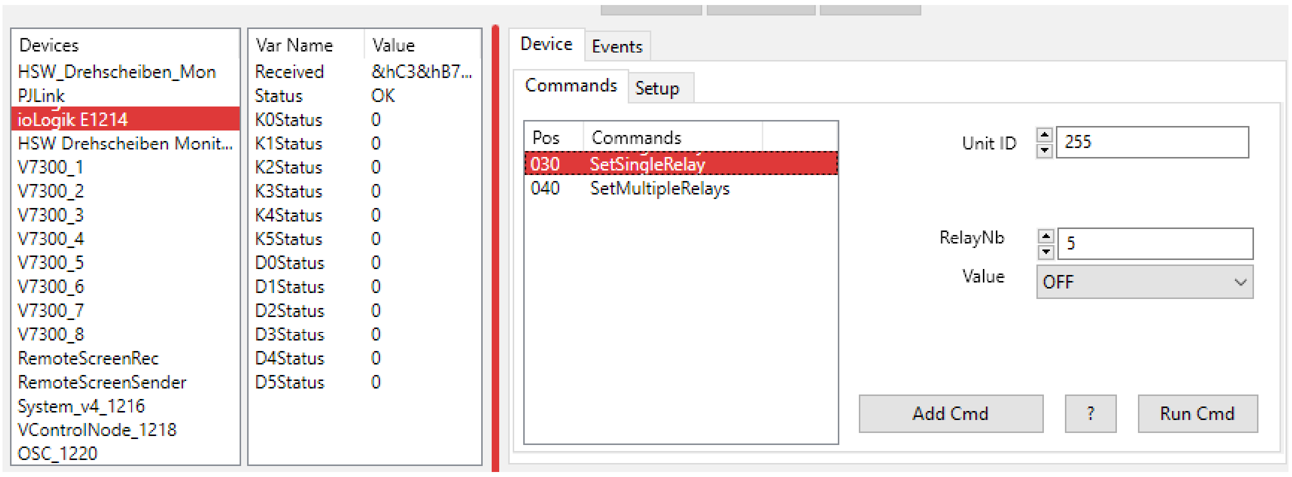
The Device Editor is split into two main sections. The upper part concerns all Device properties, the lower part contains all commands of a device. The image shows the Device Editor for editing devices that are part of the project, not the Device Templates.

Parameter

Many commands sent to a device need parameter(s) to make sense. E.g. a CueUp command for a Player need a Timecode to tell the player where to go. An example for a parameter less command is the Play command. This instruction contains all the information that is needed for the driver, simply turn the device in play mode. As these examples show, it is necessary to refer parameters to a command.

In V-Control, up to six parameters for each command are available. We distinguish between device parameters (DP1 and DP2) and command parameters (P1 - P4). Both parameter types are equivalent and used in the same way. Device parameters concerning more the device itself. For example, some projectors can daisy chain the serial signal so that many projectors can use the same serial port. In this case all projectors in that chain get the same serial commands, so each projector need a unique address. This address is, from V-Control 's point of view, a parameter. Because this parameter concerns the device and not the command, we use it as device parameter. If an InputSelect command is sent to one of those projectors in the chain, two parameters are needed, one that addresses the device, and one that say the addressed device which input should be selected.

Another example for a device parameter is the Modbus TCP protocol. Some devices require their own Unit ID, even if they are only accessible under a specific IP address.



Devices
HSW_Drehscheiben_Mon
PJLink
ioLogik E1214
HSW Drehscheiben Monit...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216
VControlNode_1218
OSC_1220

Var Name	Value
Received	&hC3&hB7...
Status	OK
K0Status	0
K1Status	0
K2Status	0
K3Status	0
K4Status	0
K5Status	0
D0Status	0
D1Status	0
D2Status	0
D3Status	0
D4Status	0
D5Status	0

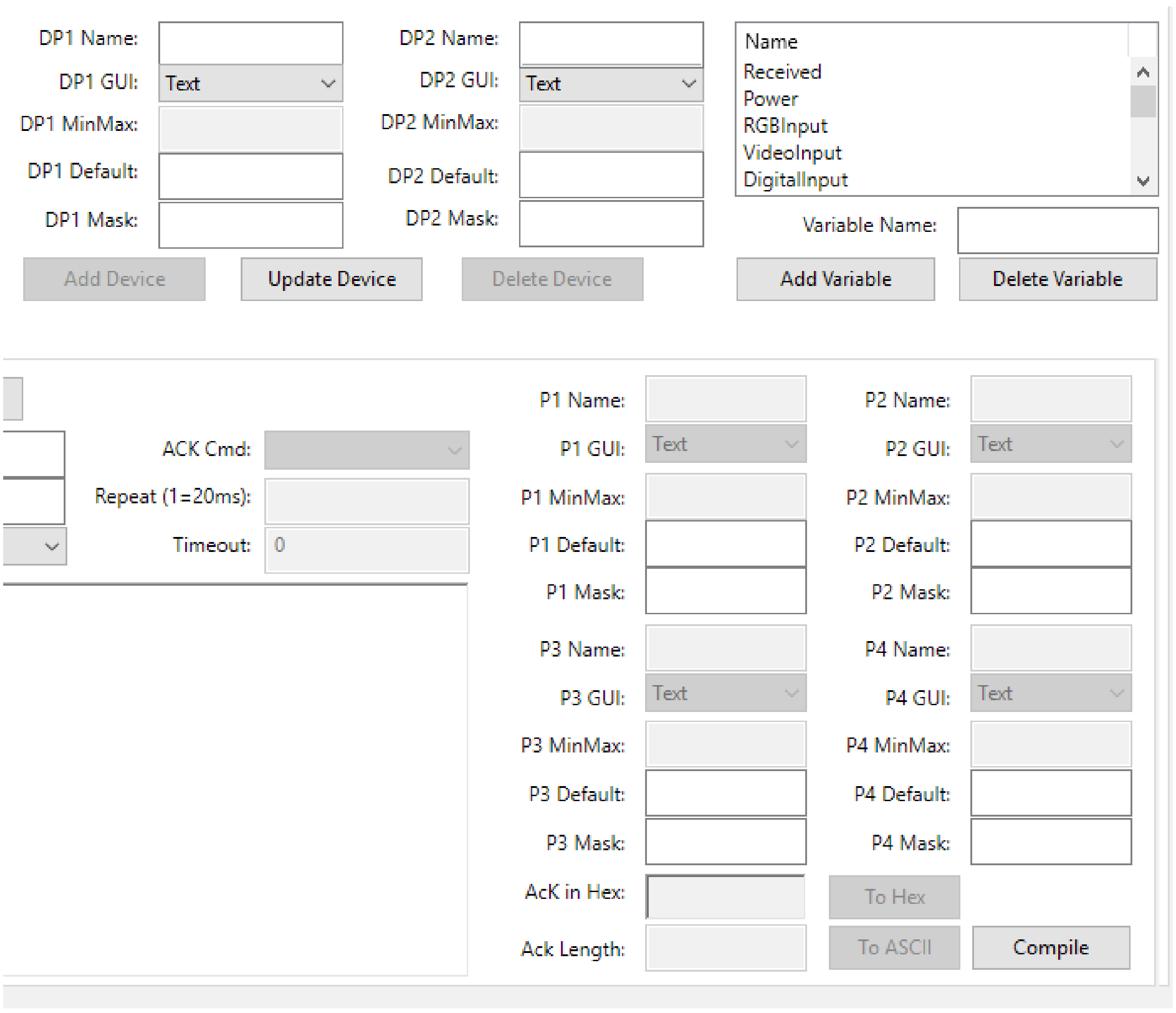
Pos	Commands
030	SetSingleRelay
040	SetMultipleRelays

Unit ID: 255

RelayNb: 5

Value: OFF

To enter a parameter, an parameter input field is needed. This could be a text field, a spin button or a drop down box. In the example above a spin button is used to enter the Unit ID (Unit ID is a Device Parameter in this case) and the RelayNb. A drop down box determines whether the relay should be switched on or off. The parameter input field is defined by five controls in the device editor. These are the same for Device Parameter and Command Parameter.



DP1 GUI: Text
DP2 GUI: Text
Timeout: 0
P1 GUI: Text
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text

1. Name: The name of the parameter. This is just a label that tells the user what kind of parameter is needed.
2. GUI: The type of the input field. Three types are available.

- Spin Button: A field for numeric values
- Drop Down Box: A list of predefined values
- Textfeld: An input field for all kind of parameters

3. MinMax:

- If the GUI type is spin button, then this field contains the minimum and maximum value, separated by a semicolon. If the youser should enter a value between 1 and 19, then 1;19 is entered here.
- If the GUI type is drop down box, then this field contain a semicolon separated list of all possible values. E.G. if the projector has a RGB, a Video and a S-Video input, the content of this field could be “RGB;VIDEO;S-VIDEO”.
- If the GUI type is text field, then this field is inactive.

4. Default:

- If the GUI type is spin button, then this field optionally contains the default numeric value that is used for the parameter. The default value must be in the range defined with the MinMax value.
- If the GUI type is drop down box, this field contains the list item selected by default. The value MUST be one of the semicolon separated values defined in the MinMax field.
- If the GUI type is text field, then this field contains the default value for the text field.

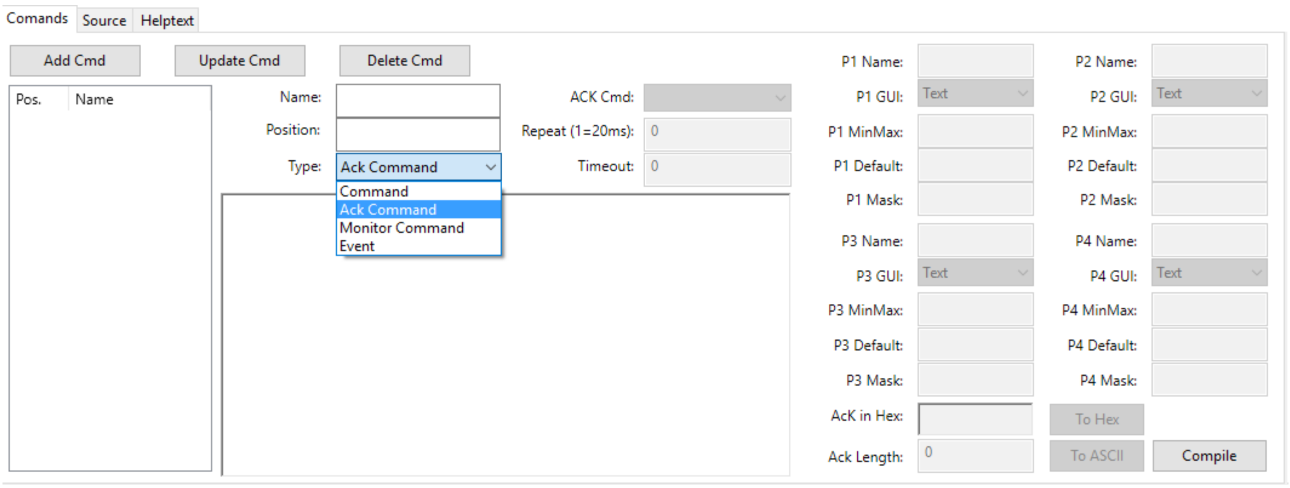
5. Mask:

- Inactive if GUI type is spin button
- Inactive if GUI type is drop down box
- If the GUI type is text field, an optional mask for the field is defined here.

Mask Character	Description
#	Any single digit placeholder. The user can type only a digit character in this position.
.	Decimal placeholder. The decimal placeholder that is actually used is specified in the user's International settings. The character is treated as a literal (formatting) character for masking purposes.
,	Thousands separator. The thousands separator that is actually used is specified in the user's International settings. The character is treated as a literal (formatting) character for masking purposes.
:	Time separator. The time separator that is actually used is specified in the user's International settings. The character is treated as a literal (formatting) character for masking purposes.
/	Date separator. The date separator that is actually used is specified in the user's International settings. The character is treated as a literal (formatting) character for masking purposes.
\	Mask escape character. Treat the next character in the mask as a literal. The escape character enables you to use the '#', '&', 'A', '?' (an so on) characters in the mask. The escaped character is treated as a literal

	(formatting) character.
&	Character placeholder. Valid values are the ASCII characters 32-126 and the non-ASCII characters 128-255.
>	Convert all the characters that follow to uppercase. Uppercasing works beyond the ASCII range where appropriate, e.g., ü becomes Ü.
<	Convert all the characters that follow to lowercase. Lowercasing works beyond the ASCII range where appropriate, e.g., Ü becomes ü.
A	Alphanumeric character placeholder, where entry is mandatory. For example, the spec “AAA” specifies three alphabetic characters.
a	Alphanumeric character placeholder, where entry is optional.
9	Digit placeholder where entry is optional.
C	Character or space placeholder, where entry is optional. It operates like the '&' placeholder.
?	Alphabetic placeholder.
Any literal	All other symbols are displayed as literals for formatting purposes.
~	Reserved for future use. If you use “~” it will trigger an exception error. Use \~ instead.

Command Types



Type: Ack Command
Repeat (1=20ms): 0
Timeout: 0
P1 GUI: Text
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
Ack Length: 0

A device driver as 4 different types of commands:

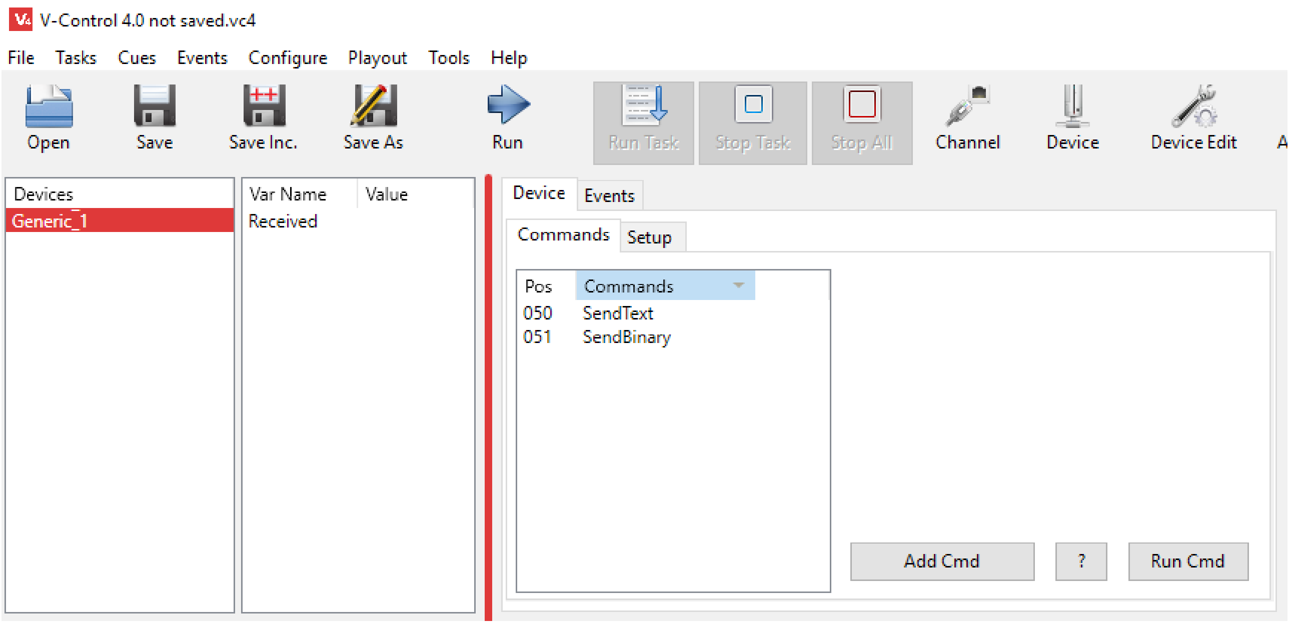
1. **Command**: This is a command that appears in the command list. These

are the commands that the user uses to control the device.
2. **Ack Command**: An Ack(nowledge) command is a command that is executed after a command or timer command was send. These commands are used to process the data returned from the device.
3. **Monitor Command**: This is a command that is executed periodically. It is used to request the status of a device. An Ack Command is used to process the result and fill device variables with information.
4. **Event**: To be exact, an event is not a command. An event occurs if a device send information to a driver without being requested before. This Data is handled here in a very similar way then in Ack Commands.

Create New Driver

In the following example, we create a new driver for the Adtec SOLOIST 2 MPEG player. I use this old fashioned device because we see all aspects of device drivers here. To start this job, it is necessary to have the protocol provided by the manufacturer and study it. The protocol describes the RS232 settings (baudrate, start bits, stop bits, parity) and the control cable pin assignment as well as the commands the device understand. The default RS232 parameters are 38400 baud, 8 data bits, 1 stop bit and no parity, so we need to create a channel with these parameters. In this example we call it “soloist”.

There is no device using a protocol that is similar to Adtec's SOLOIST 2, so we load the Generic Device from the I/O category (see Device Setup) and assign the channel “soloist” to this device. Then the project is saved as e.g. soloist_test.vc4.

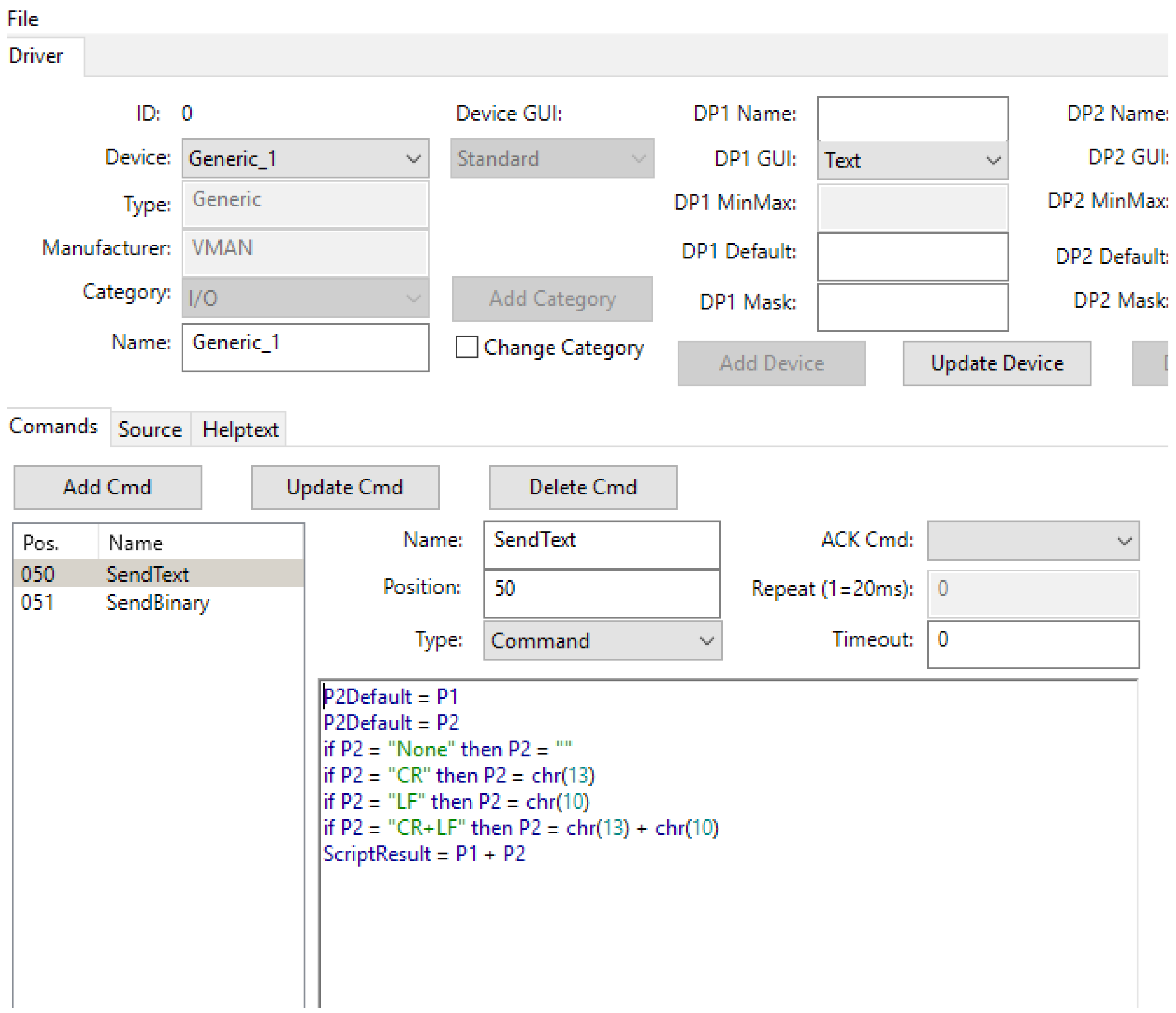


Pos	Commands
050	SendText
051	SendBinary

Simple Commands

To start we need to launch the device editor via main menu *Configure -> Edit Devices* and select the device *GenericDevice_1*.

The two commands OnData and SendString are not used and can be deleted. To do that click on the command and then click on *Delete Cmd* (see screenshot)



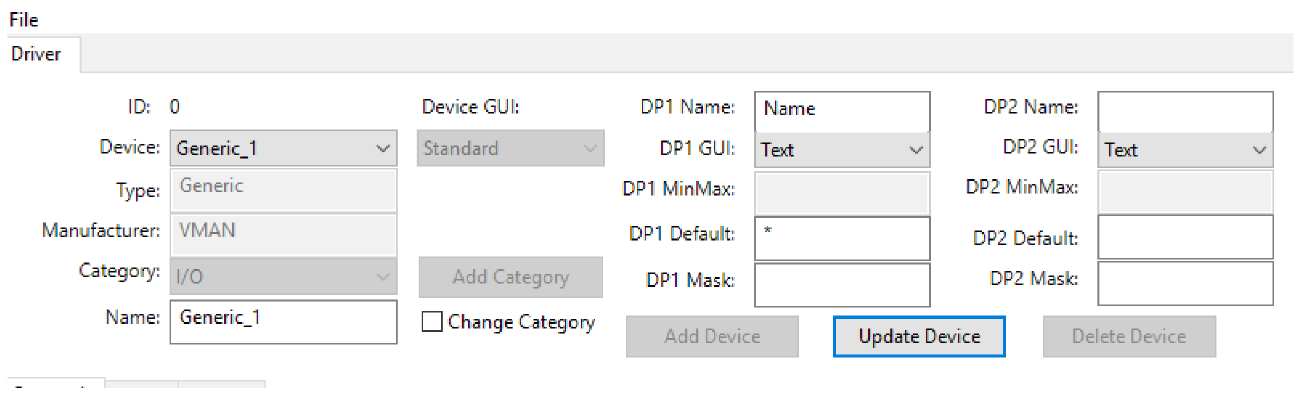
ID: 0
Device: Generic_1
Type: Generic
Manufacturer: VMAN
Category: I/O
Name: Generic_1
Device GUI: Standard
☐ Change Category
DP1 Name:
DP1 GUI: Text
DP1 MinMax:
DP1 Default:
DP1 Mask:
DP2 Name:
DP2 GUI:
DP2 MinMax:
DP2 Default:
DP2 Mask:

Pos.	Name
050	SendText
051	SendBinary

Name: SendText
Position: 50
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 0

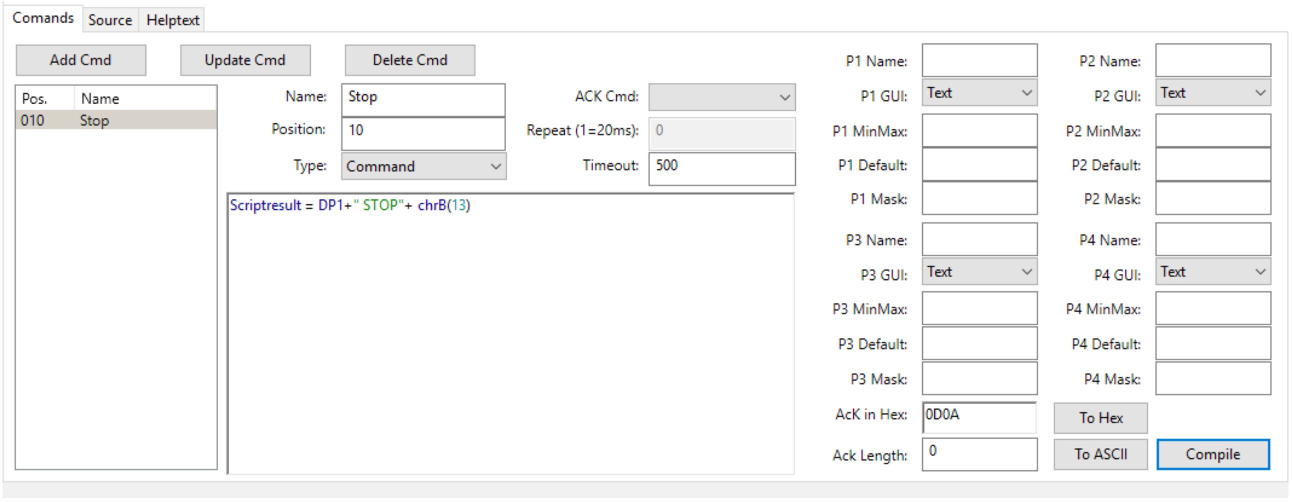
```
P2Default = P1
P2Default = P2
if P2 = "None" then P2 = ""
if P2 = "CR" then P2 = chr(13)
if P2 = "LF" then P2 = chr(10)
if P2 = "CR+LF" then P2 = chr(13) + chr(10)
ScriptResult = P1 + P2
```

Each command for the SOLOIST 2 player need at least one parameter - the name of the device. The “*” character is used as a universal name and every SOLOIST accept this sign as his name. Because the SOLOIST name concern the device and not the command it is implemented as device parameter. In the field *DP1 Name* enter “Name” as identifier and “*” in the field *DP1 Default*. To add this parameter to the device click *Update Device*.



ID: 0
Device: Generic_1
Type: Generic
Manufacturer: VMAN
Category: I/O
Name: Generic_1
Device GUI: Standard
☐ Change Category
DP1 Name: Name
DP1 GUI: Text
DP1 MinMax:
DP1 Default: *
DP1 Mask:
DP2 Name:
DP2 GUI: Text
DP2 MinMax:
DP2 Default:
DP2 Mask:

The first command we implement is the STOP command. The command string looks like this: “* STOP” + Chr(13). As feedback (Acknowledge) the SOLOIST 2 send “OK”+ CR+LF+CR+LF. CR means Carriage Return and LF Line Feed. CR is the ASCII Coder 13, or 0D in hexadecimal. LF is 10 or 0A in hexadecimal.



Pos.	Name
010	Stop

Name: Stop
Position: 10
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

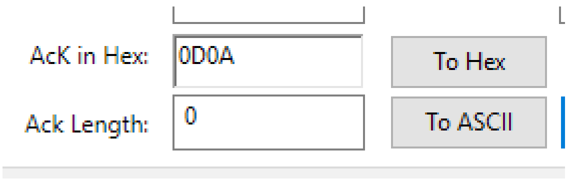
```
Scriptresult = DP1+" STOP"+ chrB(13)
```

P1 Name:		P2 Name:	
P1 GUI:	Text	P2 GUI:	Text
P1 MinMax:		P2 MinMax:	
P1 Default:		P2 Default:	
P1 Mask:		P2 Mask:	
P3 Name:		P4 Name:	
P3 GUI:	Text	P4 GUI:	Text
P3 MinMax:		P4 MinMax:	
P3 Default:		P4 Default:	
P3 Mask:		P4 Mask:	
AcK in Hex:	0D0A		
Ack Length:	0		

To implement the command follow the instructions in the screenshot.

- Command Name: Because the command is a Stop command the name is obvious. In V-Control command names are used as function calls. Therefore names like GoTo, Exit or Sub are illegal, because they are Basic functions respectively reserved keywords. If one of those reserved words is used, the compiler generates a compiler error while compiling the script.
- The number in the *Position* field serves as sort criterion in the command list.
- The Type determines the type of command (see **Command Types**)
- The source code of the command. The variable ScriptResult has a special job. It contains the command string, that is sent via channel to the device. This means that the variable ScriptResult must contain a string that causes a Stop command for the Adtec player. The line `ScriptResult = DP1 + “ STOP” + ChrB(13)` assigns parameter DP1 to ScriptResult. DP1 is the first of two available device parameter and contains in this case the name of the SOLOIST. Totally up to six parameter (DP1,DP2,P1,P2,P3,P4) are available, but this time we use only DP1. Then a space character followed by STOP (“ STOP”) is added. The ChrB function converts an Integer value to ASCII code. The SOLOIST 2 expect a Carriage Return (ASCII code 13) as terminating character which is added by the ChrB function. Now the command string is complete.
- The command timeout in milliseconds. If there is no response (Acknowledge) within this time, a Timeout message is created.

The Timeout leads to the question, how V-Control knows if, respectively when, an Acknowledge is present. That tells the field Ack in Hex: Here the expected response is entered. The screenshot below shows that the 0D0A is expected.



AcK in Hex: 0D0A
Ack Length: 0

As Ack String, only Hex code is accepted. So you need to convert everything to Hex. If you enter text in the *Ack in Hex* field and press the button *To Hex*, the text converts ASCII String to hex code.

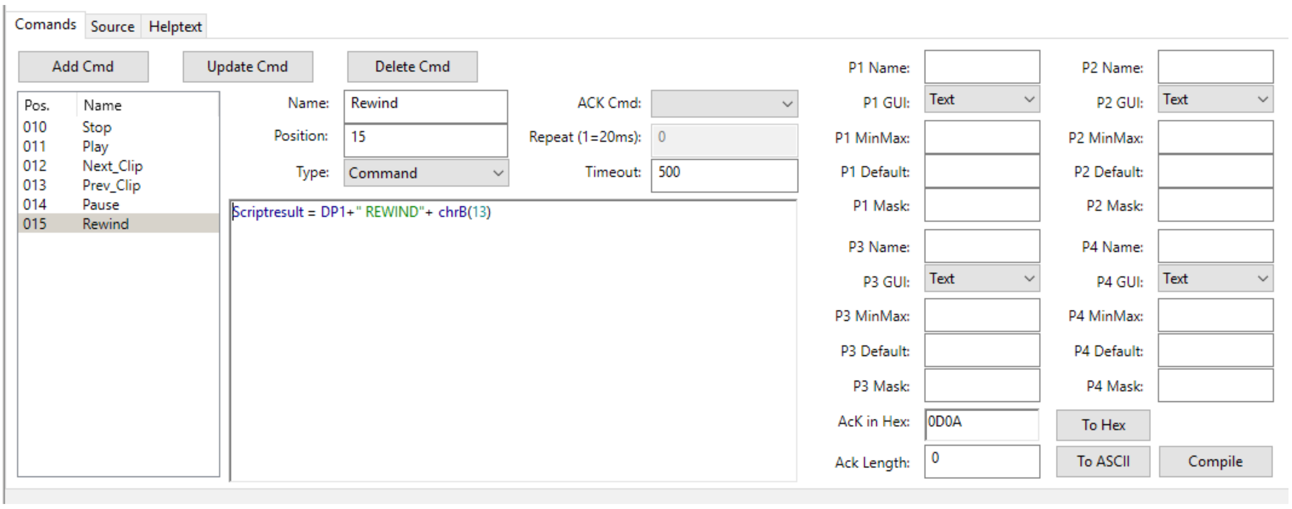
But the SOLOIST 2 not only send 0D0A as Acknowledge. The complete string is OK0D0A0D0A. Well, we don't care about that. If we received 0A0D then we know that the message was received and processed by the Soloist.

The first command is complete. A click on the button *Add Cmd* saves the command. Because V-Control compiles the script, we have to click the *Compile* button. If there is an error, the compiler posts a compiler error, otherwise the device is usable now. To do that, close the Device Editor and select the Device GenericDevice_1 again (see screenshot below). The Stop command now appears in the command list. The device parameter Name has the “*” character as default value. Alternatively we can use the real SOLOIST 2 name, e.g. “SOLOIST”.

If the command is working it is recommended to save the project. Until now, the driver exists only in the project file (“soloist_test.vc4” in this example), and this file contains all the work we did. If the driver is complete, we will export it and then import it to the device database. To complete the driver we start the Device Editor via main menu Configure -> Edit Devices again. The table below shows the remaining simple commands for the SOLOIST 2 player. Proceed in the same way as we did with the Stop command.

Name	Position	Type	Timeout	Script	Ack in Hex
Play	11	Comands	500	Scriptresult = DP1 + “ PLAY” + chrB(13)	0D0A
Next_Clip	20	Comands	500	Scriptresult = DP1 + “ NEXT” + chrB(13)	0D0A
Prev_Clip	21	Comands	500	Scriptresult = DP1 + “ PREVIOUS” + chrB(13)	0D0A
Still	22	Comands	500	Scriptresult = DP1 + “ PAUSE” + chrB(13)	0D0A
Rewind	23	Comands	500	Scriptresult = DP1 + “ REWIND” + chrB(13)	0D0A

The result should look like this:



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind

Name: Rewind
Position: 15
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

```
Scriptresult = DP1+" REWIND"+ chrB(13)
```

P1 GUI: Text
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
AcK in Hex: 0D0A
Ack Length: 0

Finally click the *Compile* button and test the driver.

Now the general conditions to control the device are created. As pointed out in the SOLOIST 2 protocol, the general command format for the device is:

<NAME><SEP><COMMAND><SEP>[ARGUMENT(S)][SEP]<CR>

Parameters in angle brackets <> are mandatory Parameters in square bracket [] are optional

- NAME: SOLOIST Name, up to 20 characters. The SOLOIST 2 is capable to daisy chain the RS232 signal to other SOLOIST players. Thus it is necessary to have a unique ID for each device which is represented by the name. The “*” symbol addresses all player, whatever the name of the device is.
- SEP: Separator character, SPACE (“ ”), comma(“,”) or semicolon (“;”)
- COMMAND: ASCII string for the command, e.g. “PLAY”, “STOP” or “PLAYSPOT”
- ARGUMENTS: some commands need arguments (parameter) to make sense. E.g. the PLAYSPOT command need the clip that has to be played as parameter.
- CR: Carriage Return (Enter Key, ASCII Code 13)

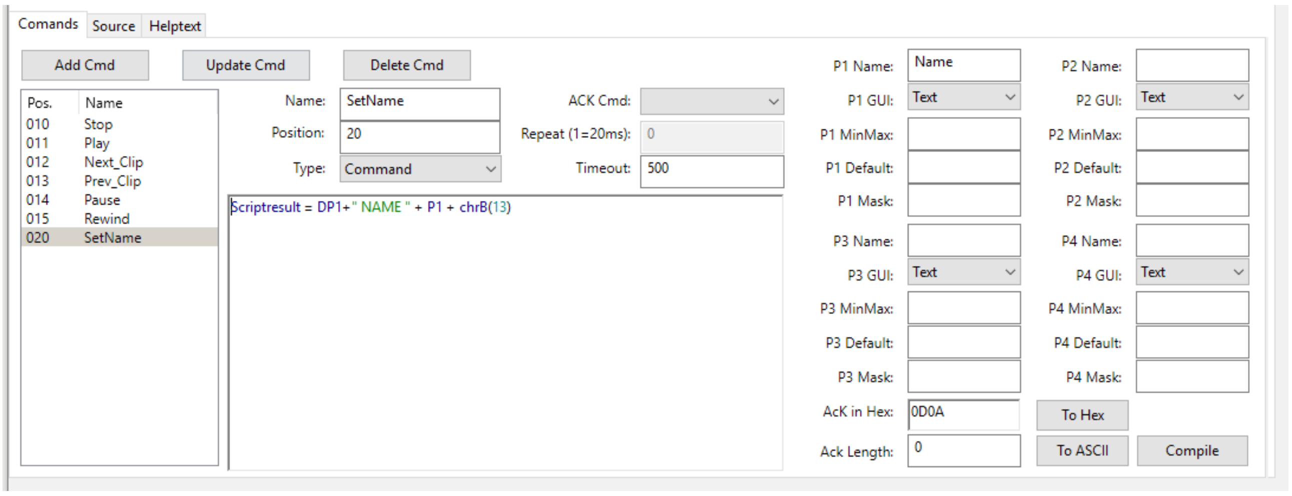
Respecting the above instructions, the command string for a simple PLAY command sent to a device named “SOLOIST” looks like this:

```
“SOLOIST PLAY” + chr(13)
```

Complex Commands

In this chapter the SOLOIST 2 driver is enhanced with a couple of more complex commands. These commands need one or more parameters. In the chapter before, we used the Device Parameter 1 (DP1) to address the SOLOIST (DP1 contain the name of the SOLOIST). The following four commands use more then one parameter. Additionally the three types of input fields (Text Field, Spin Button and Drop Down Box) are introduced.

The first new command is the “SetName” command. With this command we can change the SOLOIST's ID. Start the Device Editor again (menu *Configure -> Edit Device...*) and select the device GenericDevice_1.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName

Name: SetName
Position: 20
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

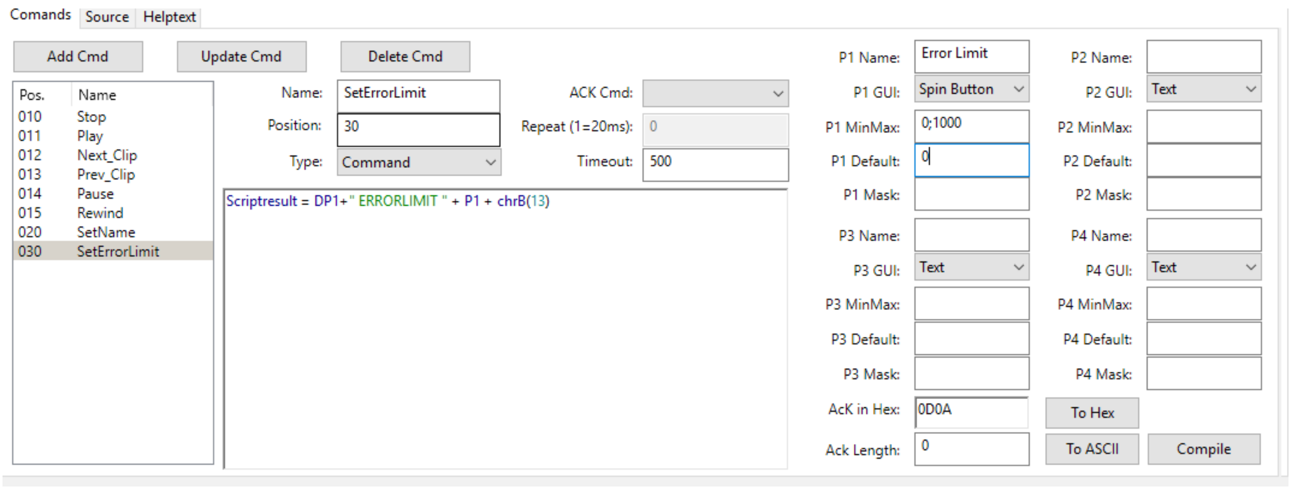
```
Scriptresult = DP1+" NAME " + P1 + chrB(13)
```

P1 Name: Name
P1 GUI: Text
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
AcK in Hex: 0D0A
Ack Length: 0

The creation of this command is very similar to the commands described in the chapter before. The difference is that we use one more parameter (P1). The field *P1Name* shows the parameters name. Because the command shall change the name we call the parameter “SetName”. *P1 GUI* stays at Text, because it makes sense to use a text field to enter a new name. In difference to DP1 we don't use a default value.

Crucially again is the line `Scriptresult = DP1+“ NAME ” + P1 + chrB(13)`. As before, DP1 contains the current ID (name) of the SOLOIST player. Then the command string “ NAME ”, with leading and succeeding space character is added. P1 contains the new name for the SOLOIST and ChrB(13) is for the carriage return (ASCII code 13) termination character. To save the new command click *Add Cmd* or *Update Cmd* (if the command was edited) followed by *Compile*.

The next command is SetErrorLimit, which determines how often the player try to read from hard disk, before playing interrupts. Valid parameter is a number between 0 and 1000. To enter this parameter we want to use a Spin Button. The Device Editor now looks like this:



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit

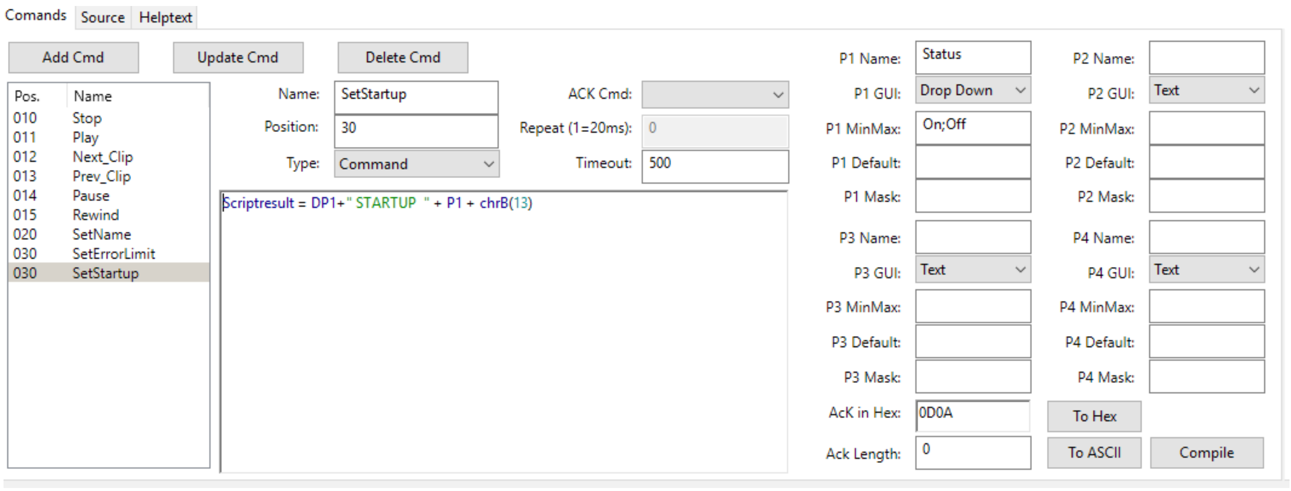
Name: SetErrorLimit
Position: 30
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

```
Scriptresult = DP1+" ERRORLIMIT " + P1 + chrB(13)
```

P1 Name: Error Limit
P1 GUI: Spin Button
P1 MinMax: 0;1000
P1 Default: 0
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
AcK in Hex: 0D0A
Ack Length: 0

P1 Name contains the designation of the parameter as usual (“Error Limit”), but *P1 GUI* is set to Spin Button. *P1 MinMax* contain, separated by semicolon, the minimum and maximum numeric value that P1 might have. As default value 0 is selected, because usually there should be no reading error. Comparing to the previous command, the script is the same except that we replace “ NAME ” by “ ERRORLIMIT ”. Don't forget to click *Add Cmd* or *Update Cmd* followed by Compile.

The StartUp command determines how the SOLOIST player behaves on Power On. If StartUp = On, the player starts playing after power on, if StartUp = Off the player do nothing. There are only two possible values as parameter, “On” and “Off”, so we use a Drop Down Box as input field.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup

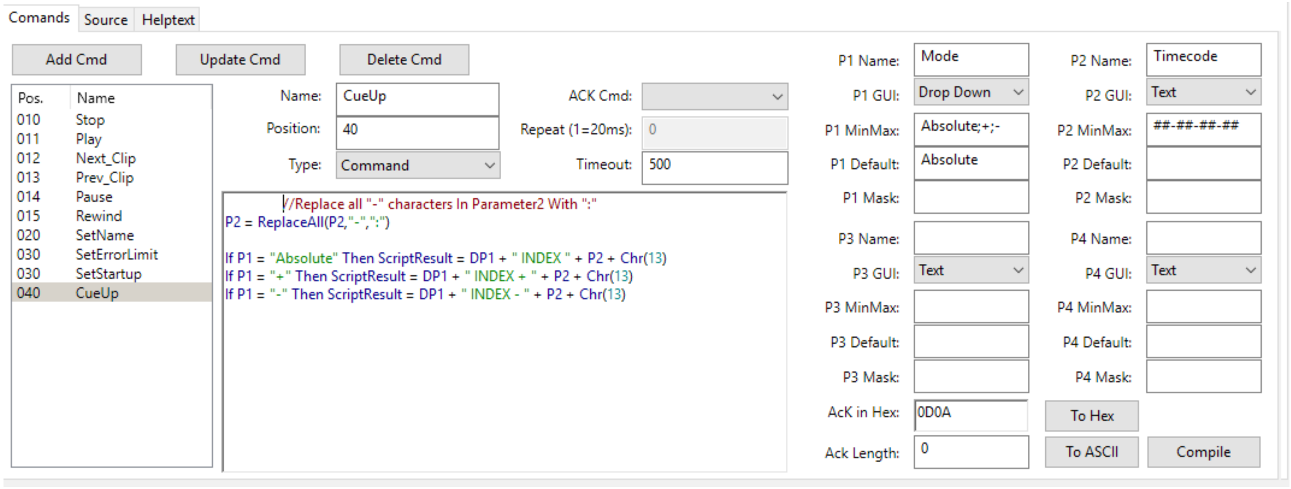
Name:	SetStartup
Position:	30
Type:	Command
ACK Cmd:	
Repeat (1=20ms):	0
Timeout:	500

```
Scriptresult = DP1+" STARTUP " + P1 + chrB(13)
```

P1 Name:	Status	P2 Name:	
P1 GUI:	Drop Down	P2 GUI:	Text
P1 MinMax:	On;Off	P2 MinMax:	
P1 Default:		P2 Default:	
P1 Mask:		P2 Mask:	
P3 Name:		P4 Name:	
P3 GUI:	Text	P4 GUI:	Text
P3 MinMax:		P4 MinMax:	
P3 Default:		P4 Default:	
P3 Mask:		P4 Mask:	
AcK in Hex:	0D0A		
Ack Length:	0		

P1 Name contains the designation of the parameter as usual (“Startup”), but *P1 GUI* is set to Drop Down. *P1 MinMax* contain, separated by semicolon, the possible values, that P1 might have. Comparing to the previous command, the script is the same except that we replace “ ERRORLIMIT ” by “ STARTUP ”. Don't forget to click Add Cmd or Update Cmd followed by Compile.

The last command is the CueUp command. This command lets the SOLOIST jump to a position in the currently loaded clip. The position is entered as timecode (HH-MM-SS-FF) which addresses an absolute position in the clip. But the SOLOIST also knows relative positions. E.g. “+ 00-01-02-00” jumps forward one minute and two seconds from the current position. “- 00-01-02-00” jumps one minute and two seconds back. So we need three parameters (Soloist Name, absolute or relative position and the position as time code.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp

Name:	CueUp
Position:	40
Type:	Command
ACK Cmd:	
Repeat (1=20ms):	0
Timeout:	500

```
//Replace all "-" characters In Parameter2 With ":"
P2 = ReplaceAll(P2,"-",":")

If P1 = "Absolute" Then ScriptResult = DP1 + " INDEX " + P2 + Chr(13)
If P1 = "+" Then ScriptResult = DP1 + " INDEX + " + P2 + Chr(13)
If P1 = "-" Then ScriptResult = DP1 + " INDEX - " + P2 + Chr(13)
```

P1 Name:	Mode	P2 Name:	Timecode
P1 GUI:	Drop Down	P2 GUI:	Text
P1 MinMax:	Absolute;+;-	P2 MinMax:	##-##-##-##
P1 Default:	Absolute	P2 Default:	
P1 Mask:		P2 Mask:	
P3 Name:		P4 Name:	
P3 GUI:	Text	P4 GUI:	Text
P3 MinMax:		P4 MinMax:	
P3 Default:		P4 Default:	
P3 Mask:		P4 Mask:	
AcK in Hex:	0D0A		
Ack Length:	0		

The parameter *P1* determines the mode (absolute, relative +, relative -), and is implemented as Drop Down Box. The default value is “Absolute”, because this is the most often wanted mode. *P2* is the parameter for the time code and implemented as text field. *P2 Mask* set the input mask for this parameter. In this case, only numeric values are accepted, separated by “-” character. We can not use the “:” as separator in a mask, because it is used for time formats (HH:MM:SS) and not for Time code (HH-MM-FF-SS).

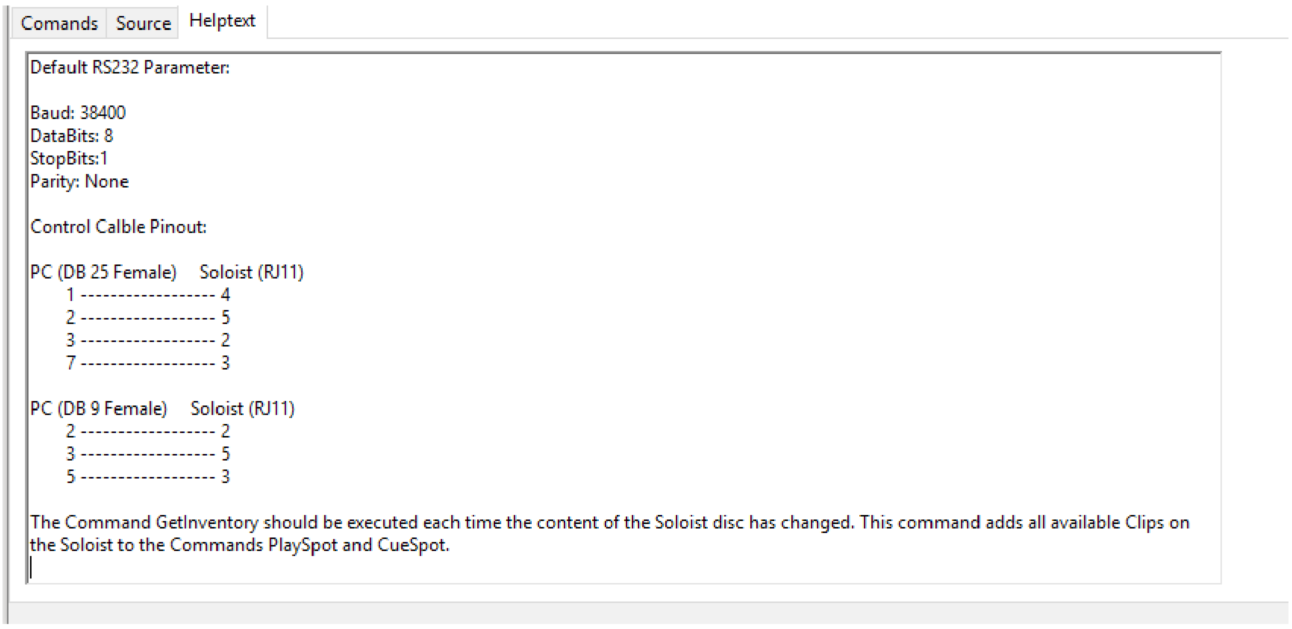
This time, the script is a little more complex:

```
//Replace all "-" characters In Parameter2 With ":"
P2 = ReplaceAll(P2,"-",":")

If P1 = "Absolute" Then ScriptResult = DP1 + " INDEX " + P2 +
Chr(13)
If P1 = "+" Then ScriptResult = DP1 + " INDEX + " + P2 + Chr(13)
If P1 = "-" Then ScriptResult = DP1 + " INDEX - " + P2 + Chr(13)
```

The SOLOIST expects the time code in the format “HH:MM:SS:FF”, with “:” as separator and not “-”. P2 uses “-” as separator, so we have to replace any “-” sign by a “:”. This is what `P2 = ReplaceAll(P2,“-”,“:”)` does. Then we compare the value of P1 with “Absolute”. It true (P1 = “Absolute”) then no “+” or “-” sign is leading the time code and for the SOLOIST this is an absolute value. Don't forget to click *Add Cmd* or *Update Cmd* followed by Compile.

Hep Text

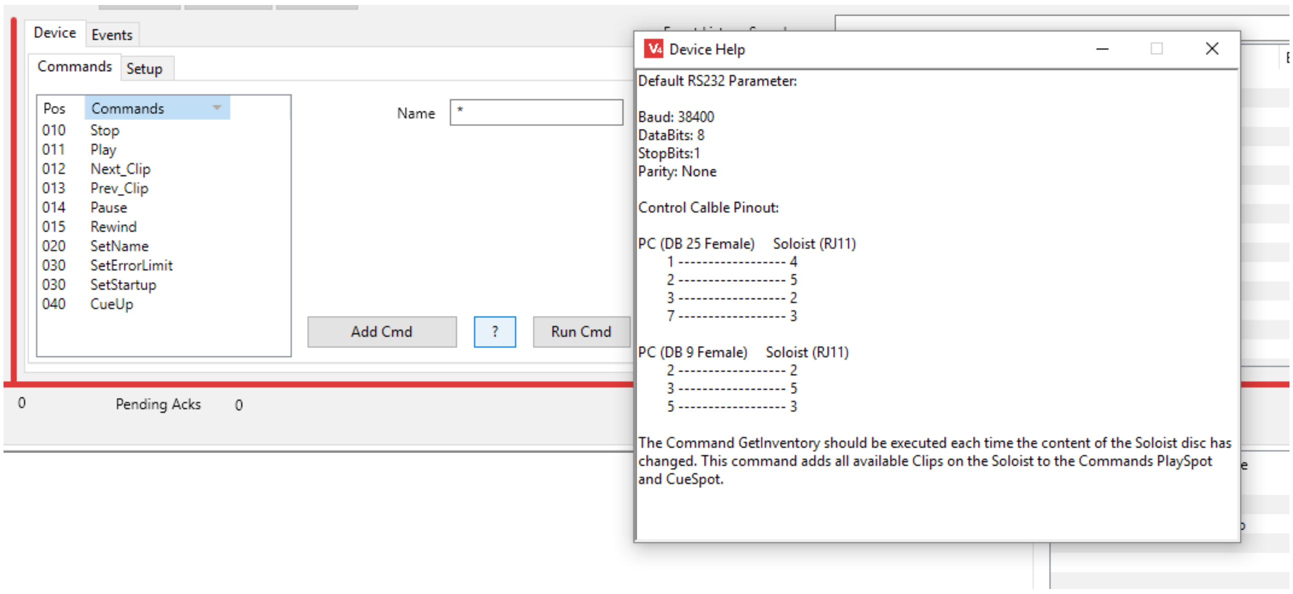
Every device driver can have a help text. The text is for the user to give him some hints or necessary information to use the driver and / or the device. It is often used to describe the RS232 properties like baud rate, data bits, parity etc. or the pin assignment for the control cable.



```
Default RS232 Parameter:

Baud: 38400
DataBits: 8
StopBits:1
Parity: None

Control Calble Pinout:

PC (DB 25 Female)    Soloist (RJ11)
      1 ------------------ 4
      2 ------------------ 5
      3 ------------------ 2
      7 ------------------ 3

PC (DB 9 Female)    Soloist (RJ11)
      2 ------------------ 2
      3 ------------------ 5
      5 ------------------ 3
```

The Command GetInventory should be executed each time the content of the Soloist disc has changed. This command adds all available Clips on the Soloist to the Commands PlaySpot and CueSpot.

If the help text is complete, the button Update Device saves the text in the database. In the Device GUI it is now retrievable via Help button *?*.



Pos	Commands
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp

Name: *

0 Pending Acks 0

```
Default RS232 Parameter:

Baud: 38400
DataBits: 8
StopBits:1
Parity: None

Control Calble Pinout:

PC (DB 25 Female)    Soloist (RJ11)
     1 ------------------ 4
     2 ------------------ 5
     3 ------------------ 2
     7 ------------------ 3

PC (DB 9 Female)    Soloist (RJ11)
     2 ------------------ 2
     3 ------------------ 5
     5 ------------------ 3
```

The Command GetInventory should be executed each time the content of the Soloist disc has changed. This command adds all available Clips on the Soloist to the Commands PlaySpot and CueSpot.

Monitor and Acknowledge Comands

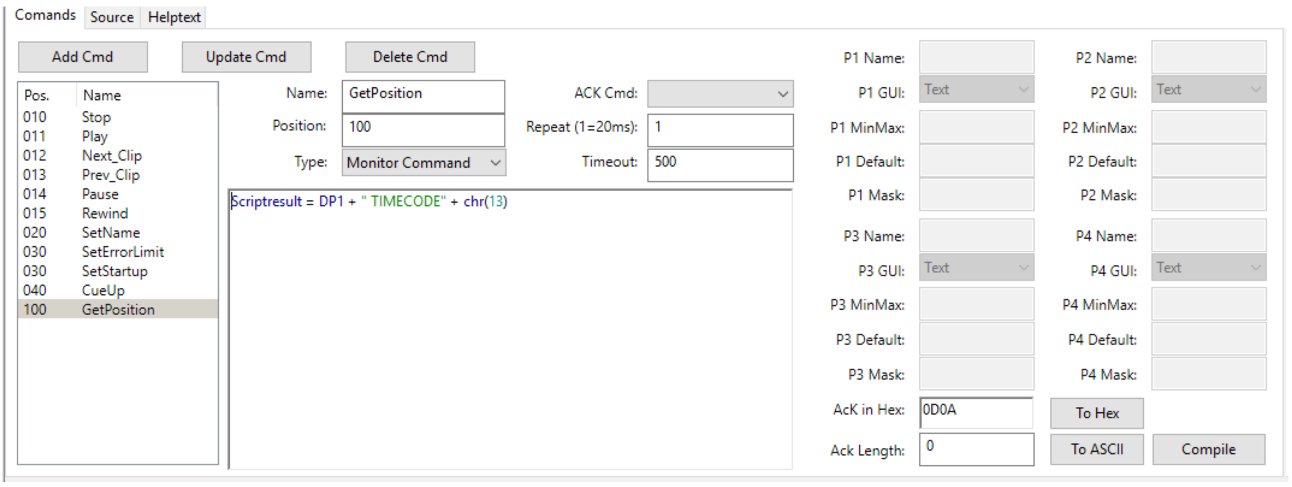
In all our examples we used the ACK string (ACK in Hex:). If the attached device send this string as response, we know that the command was understood and executed (usually, some devices send two acknowledges, one if the command was valid and one when execution is finished). If the expected string is not received in the time determined by Timeout, a Timeout error occurs. But there are acknowledges that need to be processed further.

For a player, V-Control should always know the playback position. The Soloist has a command “TIMECODE”, which returns the current position as timecode. We want to have this useful information in a device variable. We need a combination of Monitor command and Ack command to do this.

Monitor Commands

A monitor command is a command that is executed periodically. It is used to request the status of a device. This can be a projectors lamp hours or power status, or in the following example the timcode position of a player.

To create a *Monitor Command* select it in the commands type field (drop down box).



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
100	GetPosition

Name: GetPosition
Position: 100
Type: Monitor Command
ACK Cmd:
Repeat (1=20ms): 1
Timeout: 500

```
Scriptresult = DP1 + " TIMECODE" + chr(13)
```

P1 Name:
P1 GUI: Text
P1 MinMax:
P1 Default:
P1 Mask:
P2 Name:
P2 GUI: Text
P2 MinMax:
P2 Default:
P2 Mask:
P3 Name:
P3 GUI: Text
P3 MinMax:
P3 Default:
P3 Mask:
P4 Name:
P4 GUI: Text
P4 MinMax:
P4 Default:
P4 Mask:
AcK in Hex: 0D0A
Ack Length: 0

The fields *Timeout* and *Ack in Hex* are used in the same way then before. Two things are new:

1. All command parameters are disabled. This is because this command is started by a timer. There is no user interaction when this command executes, so there is no chance to modify any parameters. But we can use the device parameters default values. In this case this is necessary, because we need the Soloist name for the command string.
2. A new field *Repeat* is enabled. Here we determine how often this command is executed. Values entered here can be between 1 and 3000. To determine how often this command executes multiply this value with 20ms. So 1 means this command is executed every 20ms (Milliseconds), 5 means every 100 ms.

It is important to know that there is only one timer per device. If you have two Monitor Commands, both using 1 as Repeat value, they are not fired every 20ms. In this case they are fired every 40ms (first 20ms slot command 1, second 20 ms slot command 2).

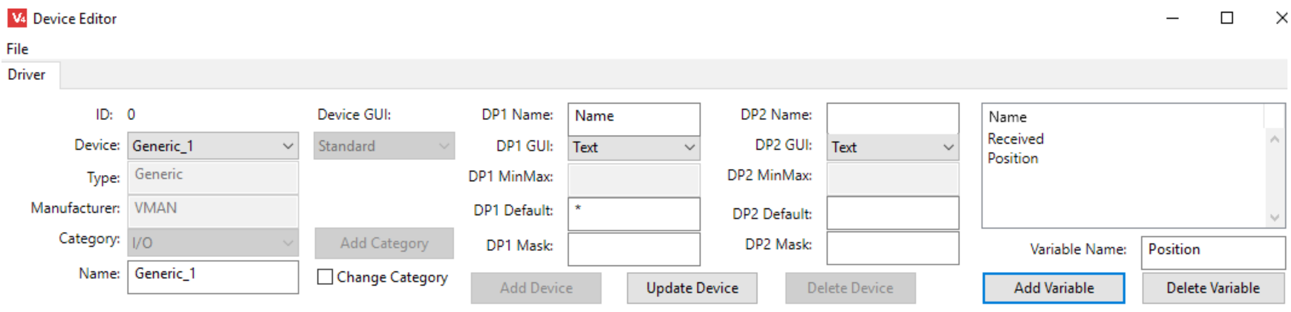
If you want to monitor i.e. a projectors lamp hours, input channel and power state, it does not make sense to fire these request very fast. Usually approx. 1 second is enough. One Second means a Repeat value of 50.

For the timecode position it makes sense to request it very fast, so we use 1 as repeat value here.

The command is complete, whats missing is processing the result and store it in a device variable. This is done by an *Ack Command*. The Ack Command is selected in the *Ack Cmd* drop down box. Because we do not have the command right now we need to create it and assign the Ack command to the GetPosition command later.

Ack(nowledge) Commands

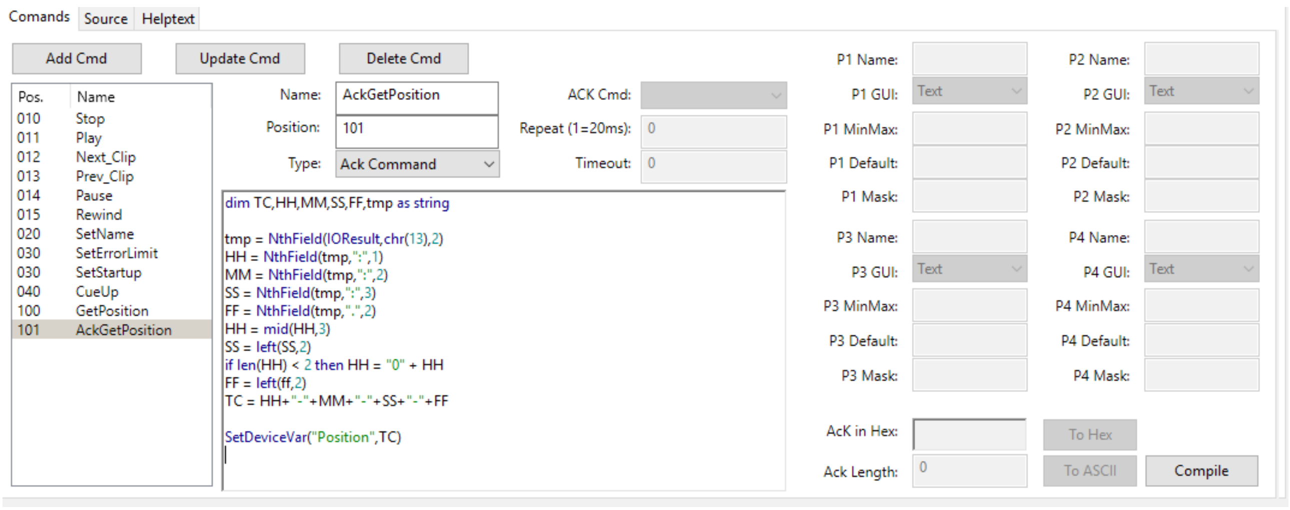
The result of the GetPosition command has do be stored in a device variable. So the first step is to create one.



ID: 0
Device: Generic_1
Type: Generic
Manufacturer: VMAN
Category: I/O
Name: Generic_1
Device GUI: Standard
DP1 Name: Name
DP1 GUI: Text
DP1 MinMax:
DP1 Default: *
DP1 Mask:
DP2 Name:
DP2 GUI: Text
DP2 MinMax:
DP2 Default:
DP2 Mask:
Name
Received
Position
Variable Name: Position

Enter the variable name in the *Variable Name* field and click the *Add Variable* button.

Next, create a new command as shown below.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
100	GetPosition
101	AckGetPosition

Name: AckGetPosition
Position: 101
Type: Ack Command
Repeat (1=20ms): 0
Timeout: 0
Ack Length: 0

```
dim TC,HH,MM,SS,FF,tmp as string

tmp = NthField(IOResult,chr(13),2)
HH = NthField(tmp,":",1)
MM = NthField(tmp,":",2)
SS = NthField(tmp,":",3)
FF = NthField(tmp,".",2)
HH = mid(HH,3)
SS = left(SS,2)
if len(HH) < 2 then HH = "0" + HH
FF = left(ff,2)
TC = HH+"-"+MM+"-"+SS+"-"+FF

SetDeviceVar("Position",TC)
```

Here we have a quite complex script to fetch the timecode from the Soloist returning message. This is because the soloist returns the timecode in the format `OK<CR><0A> H:MM:SS.FF<CR><0A>`, but we need `HH-MM-SS-FF`

OK, lets go through the lines:

Here wie declare variables we need, all of type string in this case.

```
dim TC,HH,MM,SS,FF,tmp as string
```

The variable IOResult is permanently available and does not have to be declared. The Answer from the Soloist is stored here. If you don't know how `NthField` works please read the NthField documentation in the Compiler section.

The content of IOResult is `OK<CR><0A> H:MM:SS.FF<CR><0A>`, so we fetch the right part of the first <CR>

```
tmp = NthField(IOResult,chr(13),2)
```

now tmp has the content `<0A> H:MM:SS.FF`. Next we grab the Hours

```
HH = NthField(tmp,":",1)
```

HH is now `<0A> H`

then we grab Minutes and Seconds

```
MM = NthField(tmp,":",2)
SS = NthField(tmp,":",3)
```

Because the Frame delimiter is “.”, we grab the frames by

```
FF = NthField(tmp,".",2)
```

Now get the Hours

```
HH = mid(HH,3)
```

HH = H now (one digit hours)

Make HH as two digit with preceding “0”

```
if len(HH) < 2 then HH = "0" + HH
```

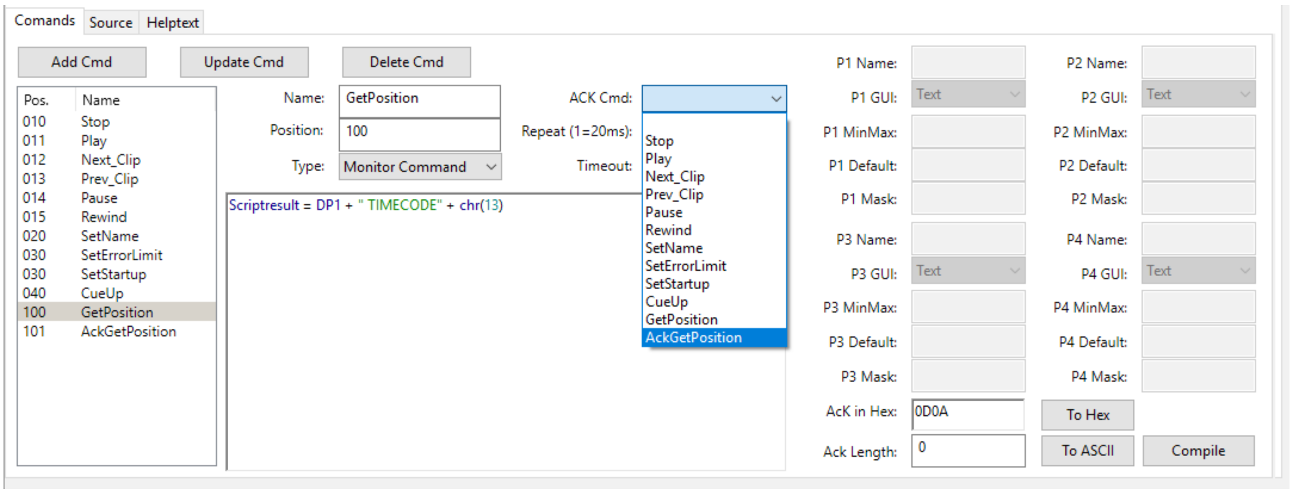
Build the Timecode String

```
TC = HH+"-"+MM+"-"+SS+"-"+FF
```

Set the Device Variable

```
SetDeviceVar("Position",TC)
```

Now we assign this Command as Ack Command for the GetPosition command. Select the GetPosition command, and use the drop down box *Ack Cmd* to select AckGetPosition.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
100	GetPosition
101	AckGetPosition

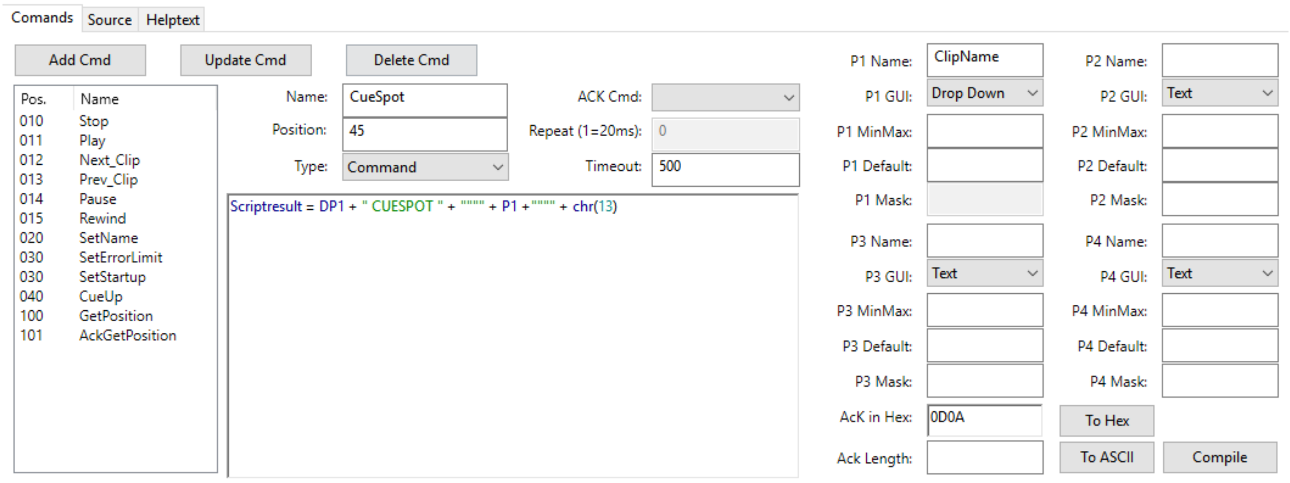
Name: GetPosition
Position: 100
Type: Monitor Command
ACK Cmd: (drop down list: Stop, Play, Next_Clip, Prev_Clip, Pause, Rewind, SetName, SetErrorLimit, SetStartup, CueUp, GetPosition, AckGetPosition)
Repeat (1=20ms):
Timeout:
P1 GUI: Text
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
AcK in Hex: 0D0A
Ack Length: 0

```
Scriptresult = DP1 + " TIMECODE" + chr(13)
```

Automatic Parameters

This example shows how to automatic set the MinMax range of parameters. The SOLOIST knows the commands CUESPOT and PLAYSPOT, both need the name of the spot (clip) as parameter. It is of course possible to proceed in the same way than e.g. with the SetName command, and implement a text field that contains the clip name. But the SOLOIST also knows the command INVENTORY, which returns a list of all available clips on the machine. This leads to a more comfortable way to select a clip. We use the INVENTORY command to get all available clips, and then we put this list in the MinMax definition of the CUESPOT and PLAYSPOT command. This presents the end user a picklist, and there is no need to type the clip names (and make mistakes).

To start with the example we create the CUESPOT command as shown below:



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
100	GetPosition
101	AckGetPosition

Name: CueSpot
Position: 45
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500
P1 Name: ClipName
P1 GUI: Drop Down
P2 GUI: Text
P3 GUI: Text
P4 GUI: Text
AcK in Hex: 0D0A

```
Scriptresult = DP1 + " CUESPOT " + """" + P1 + """" + chr(13)
```

The script is only one line:

```
ScriptResult = DP1 + " CUESPOT " + """" + P1 + """" + Chr(13)
```

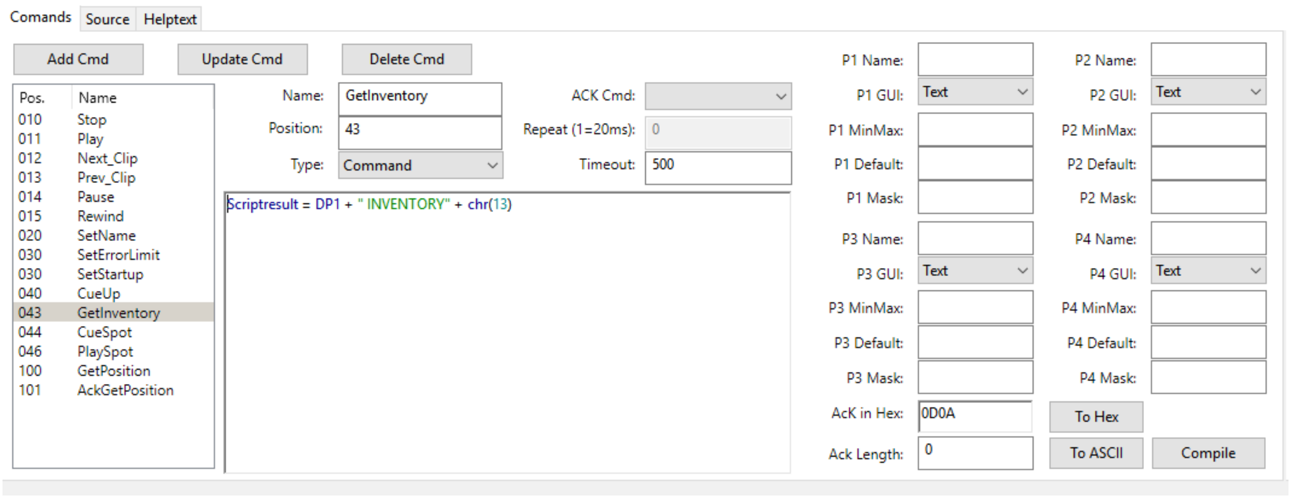
Respecting the SOLOIST protocol, the spot name has to be in quotation marks. The four quotation marks (“"“”) before and after P1 do this job. P1 GUI is a Drop Down list that contains a list of available clips. But at this time we don't know how many clips are present on the SOLOIST player, so it stays empty.

Then we create the command PLAYSPOT in the same way

```
ScriptResult = DP1 + " PLAYSPOT " + """" + P1 + """" + Chr(13)
```

Now we have two new commands, but until now they are not useful because we can't select a clip name as parameter.

To get all available clips we create the command “GetInventory”. His job is to receive the clip list and fill the MinMax definition of PlaySpot and CueSpot commands. The GetInventory command is looks like this:



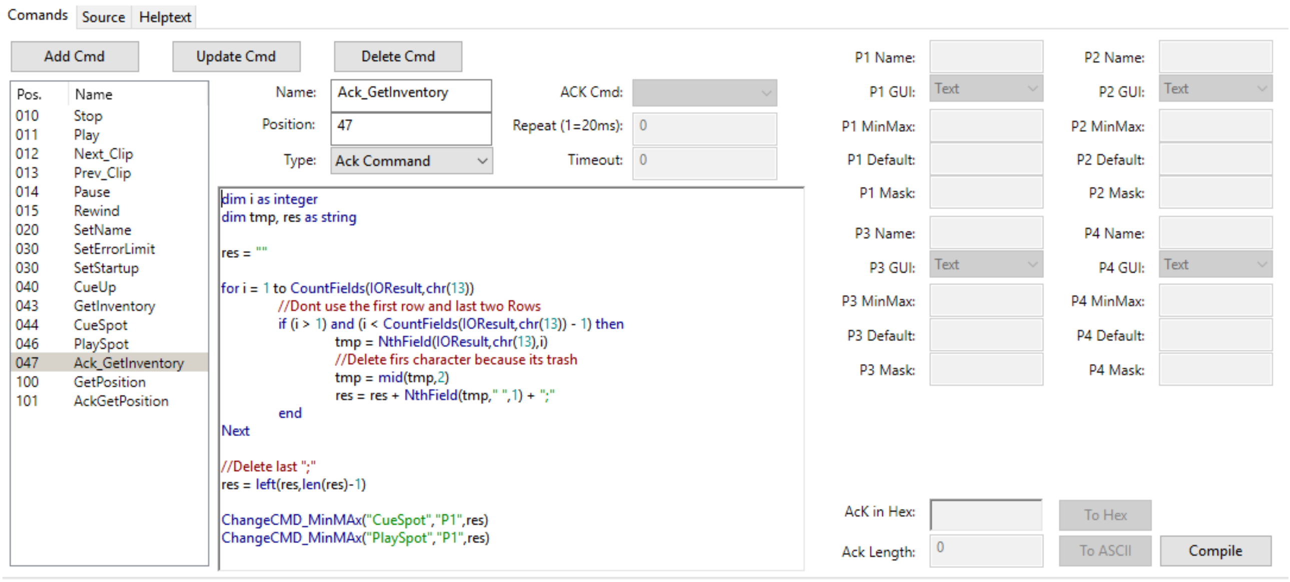
Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
043	GetInventory
044	CueSpot
046	PlaySpot
100	GetPosition
101	AckGetPosition

Name: GetInventory
Position: 43
Type: Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 500

```
Scriptresult = DP1 + " INVENTORY" + chr(13)
```

P1 Name: P1 GUI: Text P1 MinMax: P1 Default: P1 Mask:
P2 Name: P2 GUI: Text P2 MinMax: P2 Default: P2 Mask:
P3 Name: P3 GUI: Text P3 MinMax: P3 Default: P3 Mask:
P4 Name: P4 GUI: Text P4 MinMax: P4 Default: P4 Mask:
AcK in Hex: 0D0A
Ack Length: 0

The GetInventory command does not fill the MinMax definitions. The command only tells the SOLOIST that the inventory list is requested. To read the list and fill the MinMax definitions, we use an acknowledge command, in this case ACK_GetInventory.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
043	GetInventory
044	CueSpot
046	PlaySpot
047	Ack_GetInventory
100	GetPosition
101	AckGetPosition

Name: Ack_GetInventory
Position: 47
Type: Ack Command
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 0

```
dim i as integer
dim tmp, res as string

res = ""

for i = 1 to CountFields(IOResult,chr(13))
        //Dont use the first row and last two Rows
        if (i > 1) and (i < CountFields(IOResult,chr(13)) - 1) then
                tmp = NthField(IOResult,chr(13),i)
                //Delete firs character because its trash
                tmp = mid(tmp,2)
                res = res + NthField(tmp," ",1) + ";"
        end
Next

//Delete last ";"
res = left(res,len(res)-1)

ChangeCMD_MinMAx("CueSpot","P1",res)
ChangeCMD_MinMAx("PlaySpot","P1",res)
```

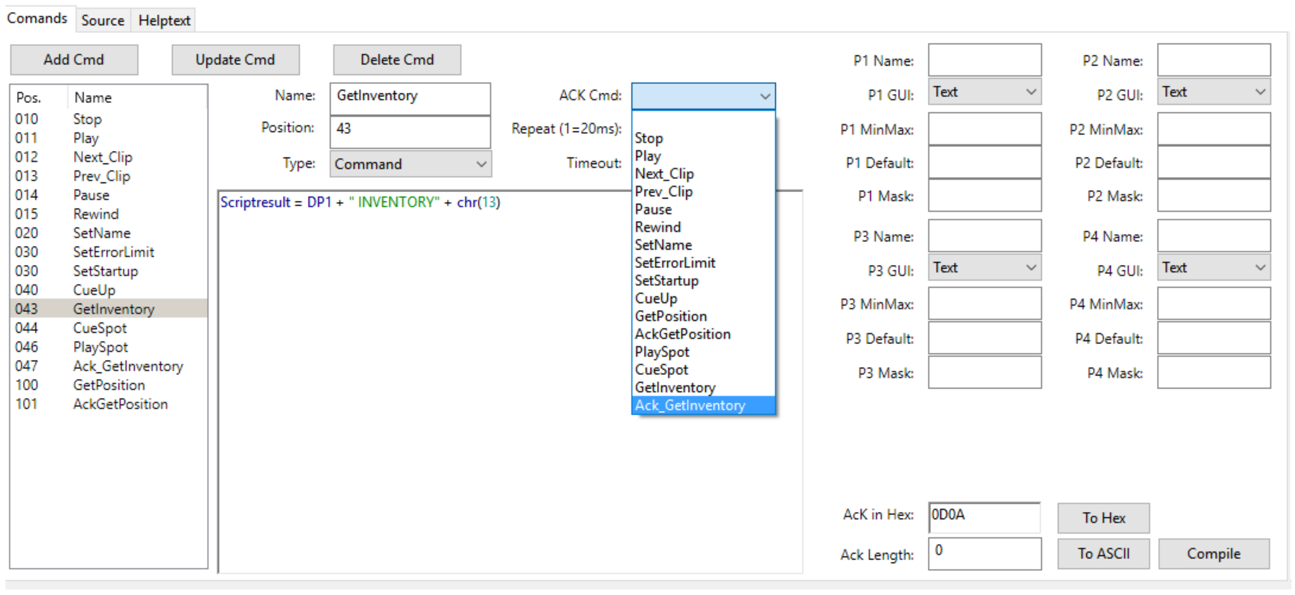
P1 Name: P1 GUI: Text P1 MinMax: P1 Default: P1 Mask:
P2 Name: P2 GUI: Text P2 MinMax: P2 Default: P2 Mask:
P3 Name: P3 GUI: Text P3 MinMax: P3 Default: P3 Mask:
P4 Name: P4 GUI: Text P4 MinMax: P4 Default: P4 Mask:
AcK in Hex:
Ack Length: 0

The script is quite complex, so here some explanations:

```
Dim i As Integer
Dim tmp, res As String

res = ""
For i = 1 To CountFields(IOResult,Chr(13))
   //Dont use the first row And last two Rows
   If (i > 1) And (i < CountFields(IOResult,Chr(13)) - 1) Then
      tmp = NthField(IOResult,Chr(13),i)
      //Delete first character because it's trash
      tmp = Mid(tmp,2)
      res = res + NthField(tmp," ",1) + ";"
  End
Next

//Delete last ";"
res = Left(res,Len(res)-1)
//Replace current MinMax Value with res
ChangeCMD_MinMax("CueSpot","P1",res)
ChangeCMD_MinMax("PlaySpot","P1",res)
```

Line 1 declares i as Integer variable. It is used in the For .. Next loop as counter. Tmp is used as temporary variable and res is used to hold the new MinMax list. The function `CountFields(IOResult,Chr(13)` tells how many lines (every line is terminated by chr(13)) in IOResult. The For .. Next loop is processed as many times, as chr(13) codes present in IOResult. The first line and the two last lines of IOResult don't contain any valid information, that's why the If .. Then statement present. The statement `tmp = NthField(IOResult,Chr(13),i)` assigns content of the i'st line to tmp. Then the content of tmp is added to res, followed by a semicolon.

Now we have to change the GetInventory command an tell it to use the acknowledge command.



Pos.	Name
010	Stop
011	Play
012	Next_Clip
013	Prev_Clip
014	Pause
015	Rewind
020	SetName
030	SetErrorLimit
030	SetStartup
040	CueUp
043	GetInventory
044	CueSpot
046	PlaySpot
047	Ack_GetInventory
100	GetPosition
101	AckGetPosition

Name: GetInventory
Position: 43
Type: Command
ACK Cmd:
Repeat (1=20ms):
Timeout:

```
Scriptresult = DP1 + " INVENTORY" + chr(13)
```

ACK Cmd list: Stop, Play, Next_Clip, Prev_Clip, Pause, Rewind, SetName, SetErrorLimit, SetStartup, CueUp, GetPosition, AckGetPosition, PlaySpot, CueSpot, GetInventory, Ack_GetInventory

P1 Name: | P2 Name:
P1 GUI: Text | P2 GUI: Text
P1 MinMax: | P2 MinMax:
P1 Default: | P2 Default:
P1 Mask: | P2 Mask:
P3 Name: | P4 Name:
P3 GUI: Text | P4 GUI: Text
P3 MinMax: | P4 MinMax:
P3 Default: | P4 Default:
P3 Mask: | P4 Mask:

AcK in Hex: 0D0A
Ack Length: 0

Set Ack Cmd to “ACK_GetInventory” (Update Cmd and Compile)

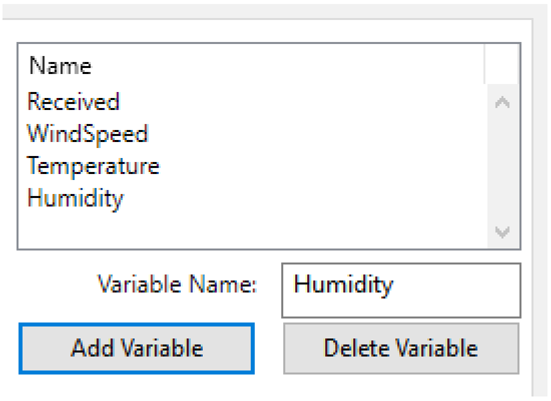
Events

From a device drivers point of view, an event is a message received from a device without requesting it before.

In this example I use a weather station that sends Wind Speed, Temperature and Humidity every second. The format of the string is 4 digit wind speed, 5 digit temperature and two digit Humidity, all packed in one string.

`12,323,5087` means 12,3 km/h wind speed, 23,50°C and 87% Humidity. There is no termination character, but we have a defined length (11 characters).

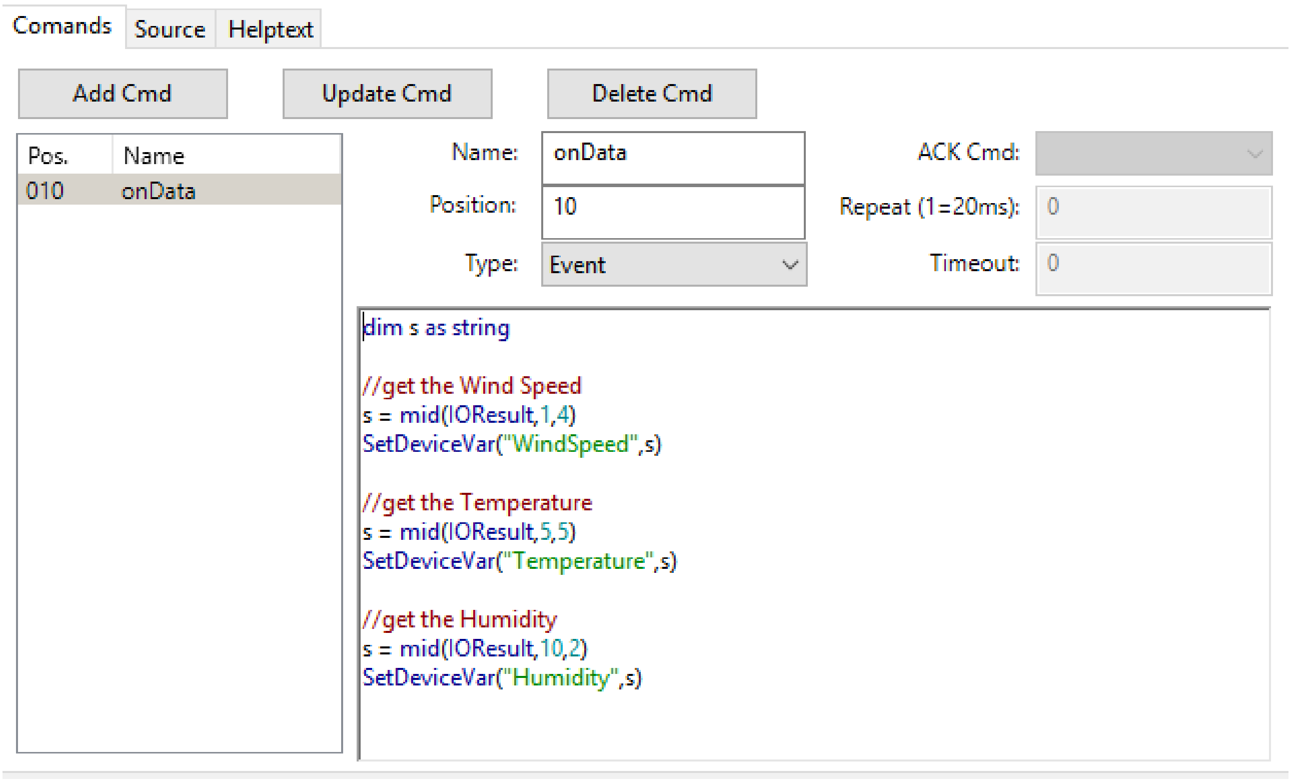
First we need 3 device variables to store the received data



Name
Received
WindSpeed
Temperature
Humidity

Variable Name: Humidity

Then we need a new command of type *Event*. Here we use the *ACK Length* field to determine the amount of data that we need to process the event. If the Channel, that is associated with the device receives the data, it will look to the *Ack in Hex* and / or *Ack Length* field. If one of them matches then the data is send to the device and the event is processed.



Pos.	Name
010	onData

Name: onData
Position: 10
Type: Event
ACK Cmd:
Repeat (1=20ms): 0
Timeout: 0

```
dim s as string

//get the Wind Speed
s = mid(IOResult,1,4)
SetDeviceVar("WindSpeed",s)

//get the Temperature
s = mid(IOResult,5,5)
SetDeviceVar("Temperature",s)

//get the Humidity
s = mid(IOResult,10,2)
SetDeviceVar("Humidity",s)
```

Export Device Driver

To transfer a driver from one system to another, the Export / Import menu item in the device editor is used. Via device editors menu *File -> Export...* the currently selected driver is exported to a file.

In the save dialog enter / select a file name and click Save.

This is also used to move new device drivers to the Devices.rsd database, which has all the drivers shipped with V-Control. If you created a new device like in the examples above, then this device exists only in your project file. Export it and the import it in the Devices.rsd by selecting *Configure -> Edit Device Templates*. Then import the new device.

Import Device Driver

To transfer a driver from one system to another, the Export / Import menu item in the device editor is used. The Import menu item is available only if the device editor is launched via Configure -> Edit Device Templates The File -> Import command imports a previously exported driver. A dialog box asks for the name of the new driver.

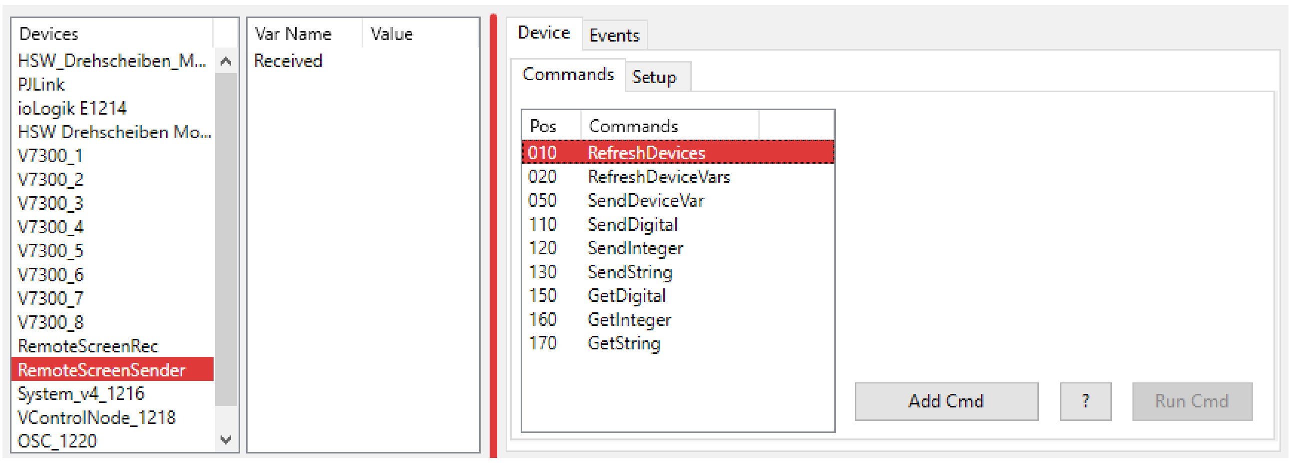
Device Drivers

The following chapters provide information for some device drivers shipped with V-Control. These drivers are used for special tasks.

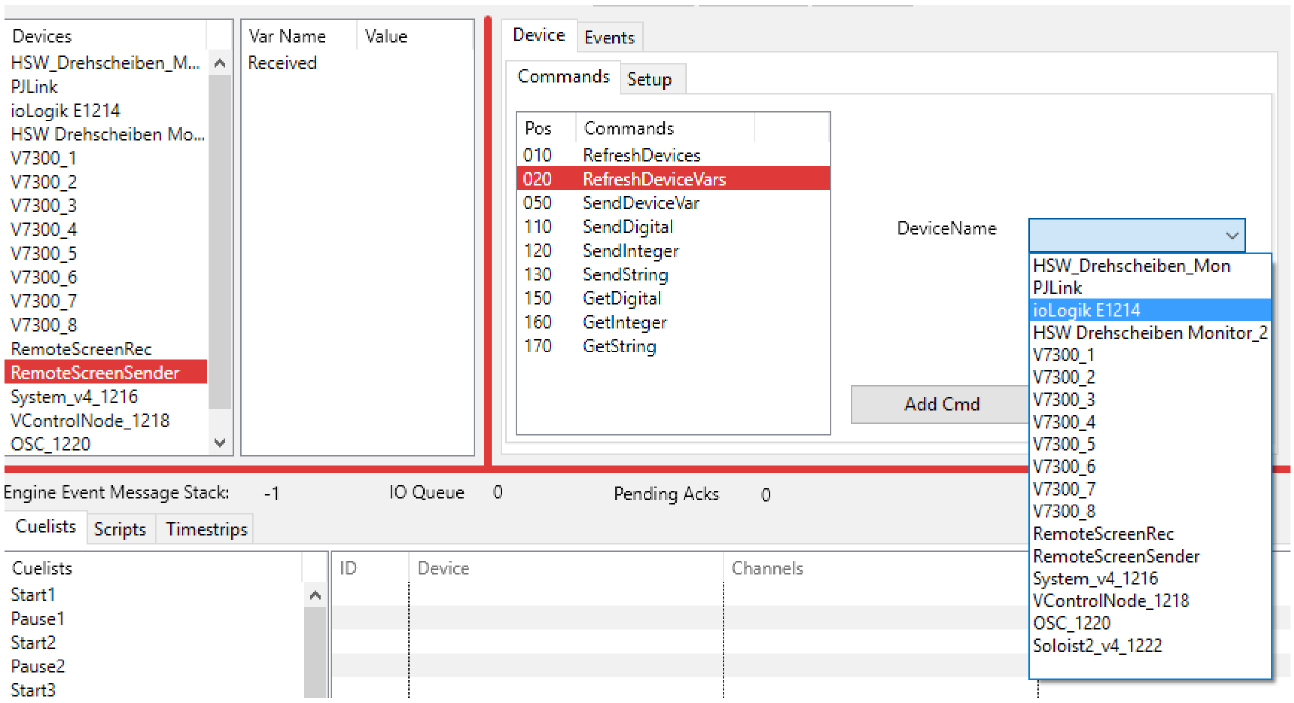
RemoteScreenSender

The RemoteScreenSender is used to send commands and / or information to a V-Control Designer instance. V-Control Designer elements (buttons, sliders, labels etc.) are referenced by join numbers. The RemoteScreenSender can send simple messages and device variables.

Sending Device Variables



Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString



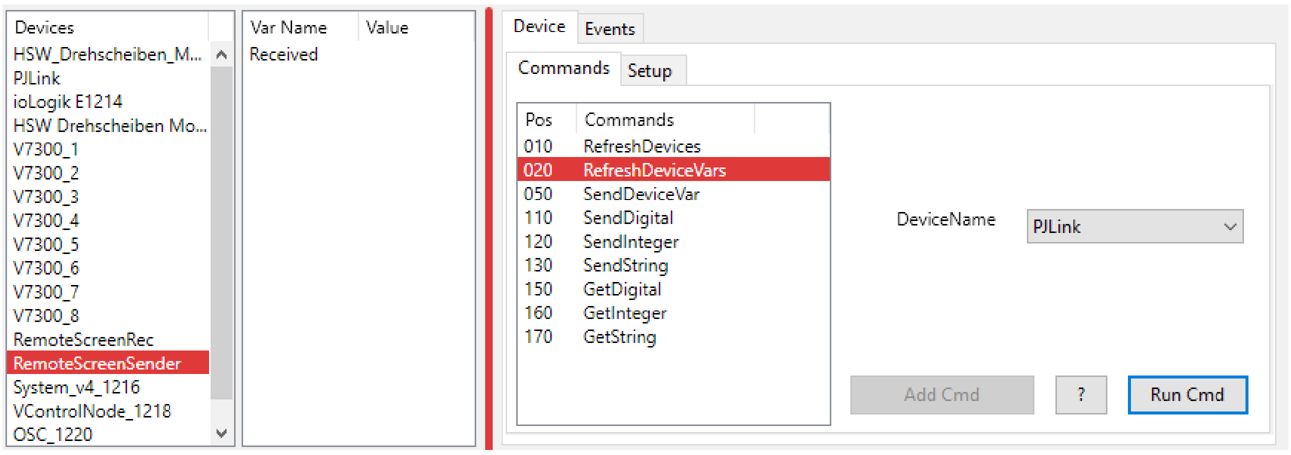
Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

To send a device variable, the RemoteScreenSender needs to know which device and which variable. To get a list of all available devices, the *RefreshDevices* command is used. Switch to *Run* mode and press the *Run Cmd* button if the *RefreshDevices* command is selected. Nothing happens for now, but next select the *RefreshDeviceVars* command. The drop down box

DeviceName now holds a list of all devices in the current project.

The *RefreshDevices* command has to be executed only once, or if devices were added or deleted from the current project. The list is stored with the project file.

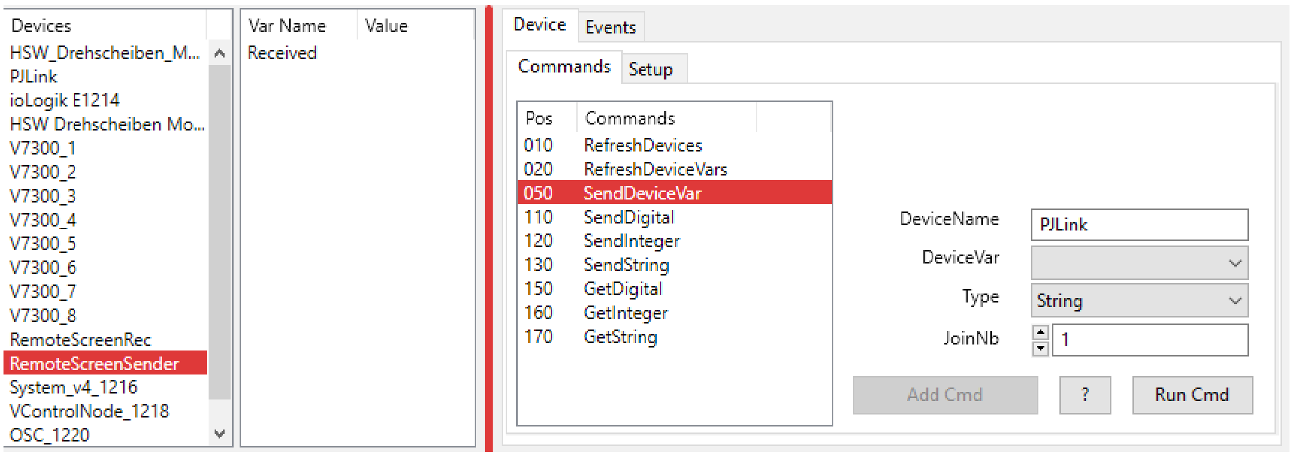
Next we need to get the device variables for a selected device. Select the *RefreshDeviceVars* command an select a device. then switch to *Run* mode and push the *Run Cmd* button.



Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

DeviceName PJLink

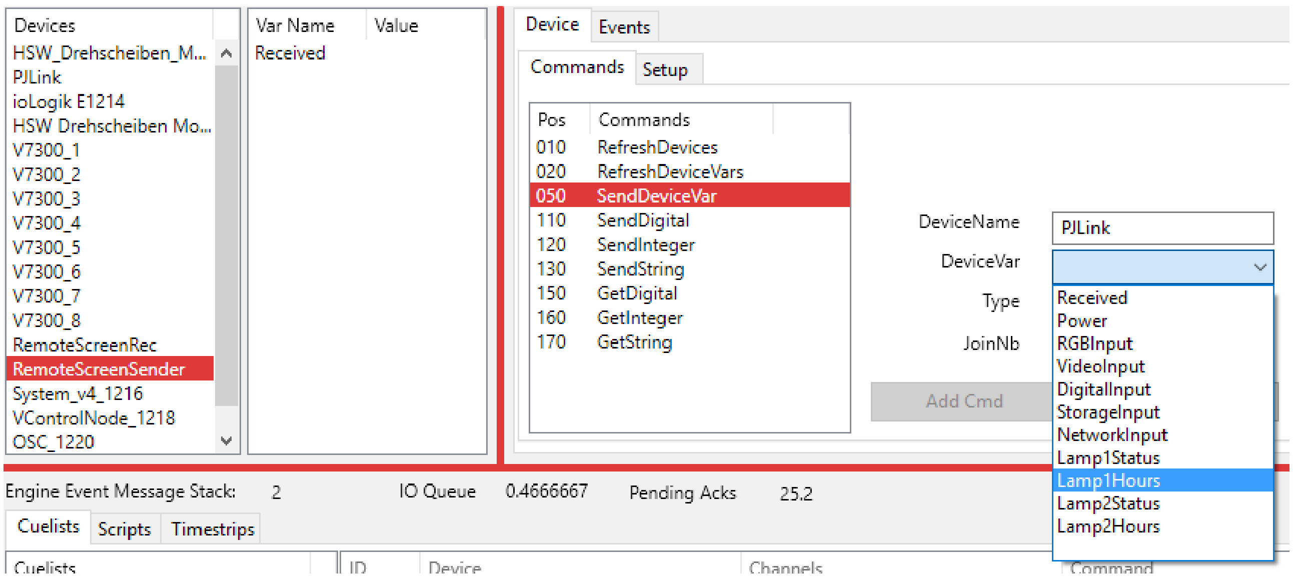
Again nothing seems to happen. But now select the *SendDeviceVar* command.



Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

DeviceName PJLink
DeviceVar
Type String
JoinNb 1

The *DeviceName* parameter is preselected with the device chossen with the *RefreshDeviceVars* command. Now select a device variable in the *DeviceVar* parameter box.


Devices
HSW_Drehscheiben_M...
PJLink
ioLogik E1214
HSW Drehscheiben Mo...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216
VControlNode_1218
OSC_1220

Var Name	Value
Received	

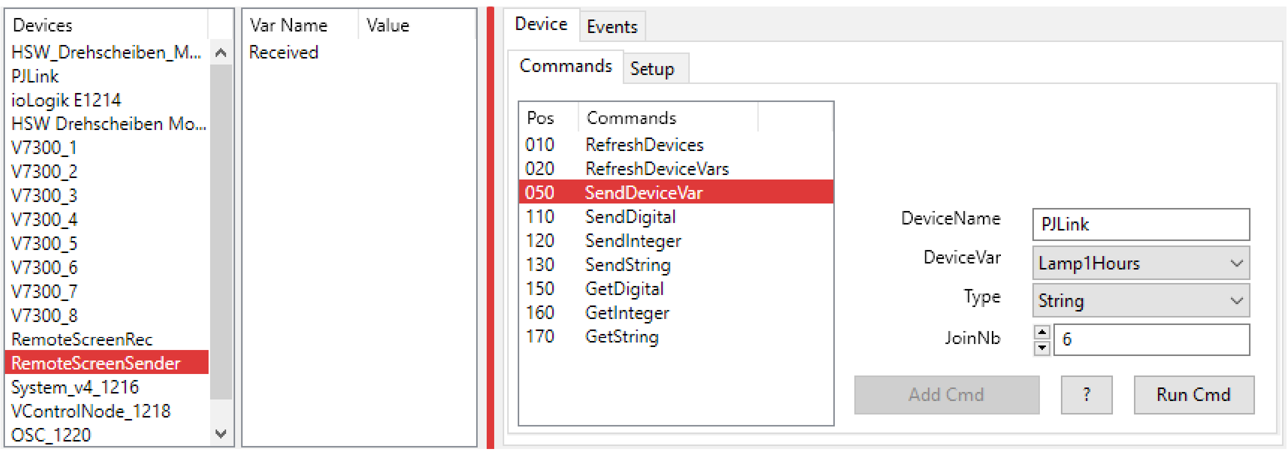
Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

DeviceName: PJLink
DeviceVar:
Type
JoinNb

Received
Power
RGBInput
VideoInput
DigitalInput
StorageInput
NetworkInput
Lamp1Status
Lamp1Hours
Lamp2Status
Lamp2Hours

Engine Event Message Stack: 2 IO Queue 0.4666667 Pending Acks 25.2

Next step is to choose to which join number in which format the content of the device variable is send.


Devices
HSW_Drehscheiben_M...
PJLink
ioLogik E1214
HSW Drehscheiben Mo...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216
VControlNode_1218
OSC_1220

Var Name	Value
Received	

Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

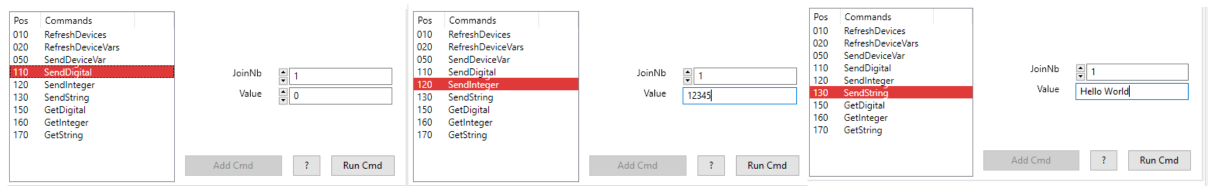
DeviceName: PJLink
DeviceVar: Lamp1Hours
Type: String
JoinNb: 6

One may wonder why we choose a string join number here. If we want to show the lamp hours of a projector, we usually use a label to show the information. In this case we have a label with the string join number 6 for caption. If we send this as integer, we need a widget with an integer join such as slider or progress bar.

Sending User Data

Another way to send messages to a V-Control Designer instance is to use the *SendDigital*, *SendInteger* and *SendString* commands.

If used in *Cuelists*, the only option is to enter the data direct as command parameter.



Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

JoinNb 1
Value 0

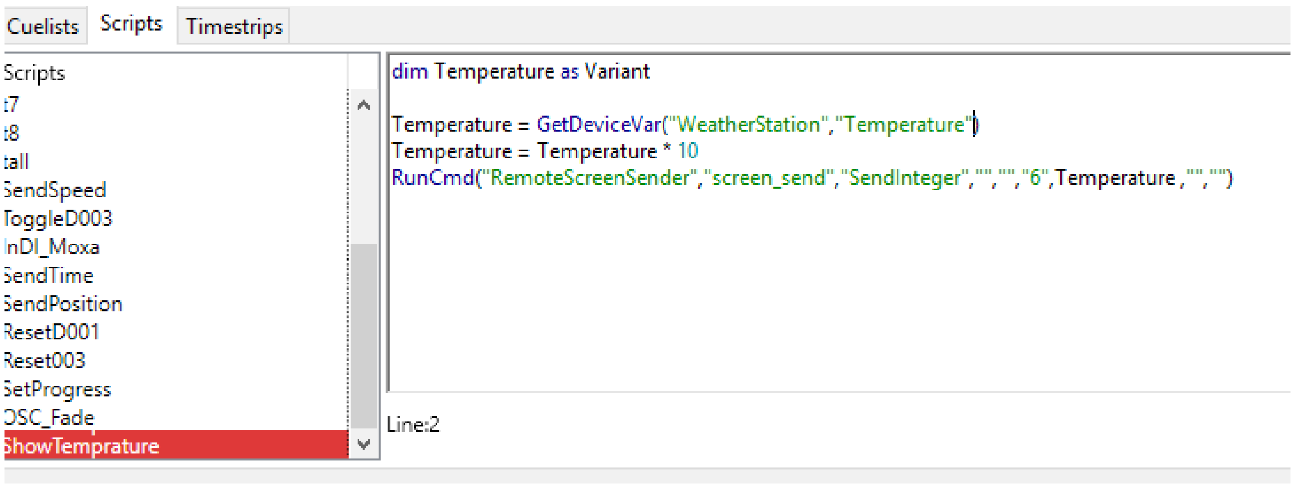
Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

JoinNb 1
Value 12345

Pos	Commands
010	RefreshDevices
020	RefreshDeviceVars
050	SendDeviceVar
110	SendDigital
120	SendInteger
130	SendString
150	GetDigital
160	GetInteger
170	GetString

JoinNb 1
Value Hello World

If used in *Scrips*, we can process the data that is send.



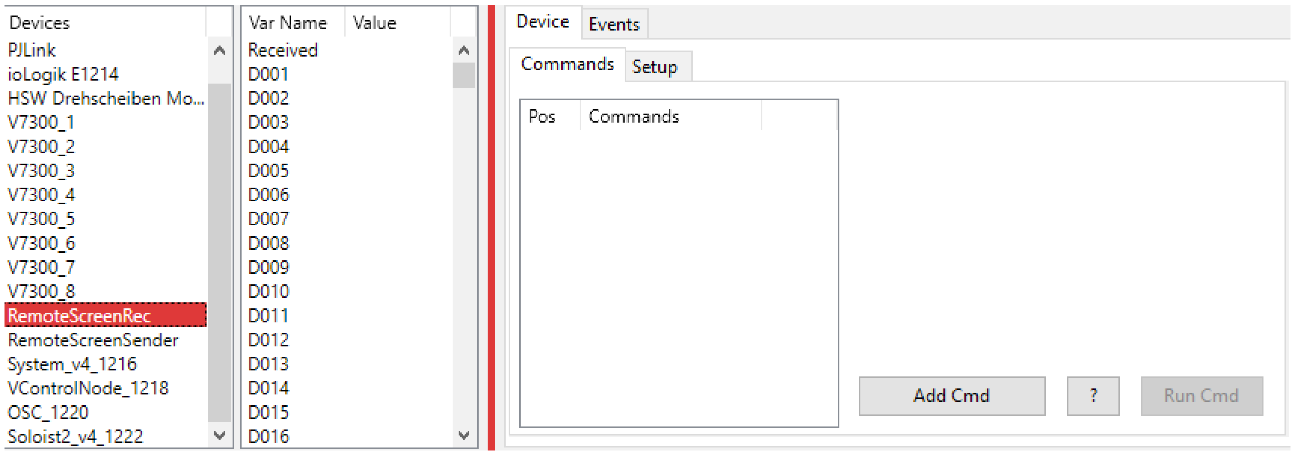
Scripts
:7
:8
:all
SendSpeed
ToggleD003
InDI_Moxa
SendTime
SendPosition
ResetD001
Reset003
SetProgress
OSC_Fade
ShowTemprature

```
dim Temperature as Variant

Temperature = GetDeviceVar("WeatherStation","Temperature")
Temperature = Temperature * 10
RunCmd("RemoteScreenSender","screen_send","SendInteger","","","6",Temperature,"","")
```

Line:2

In the example above we want to send the Temperature value of a weather station to a progress bar. But the Temperature comes in a format such as “20,5”. If multiplied by 10, the result is 205, which is an integer value. Imagine we have a progress bar with minimum value -300 and maximum 500, then it can now show Temperatures from -30 to 50°C.

RemoteScreenReceiver



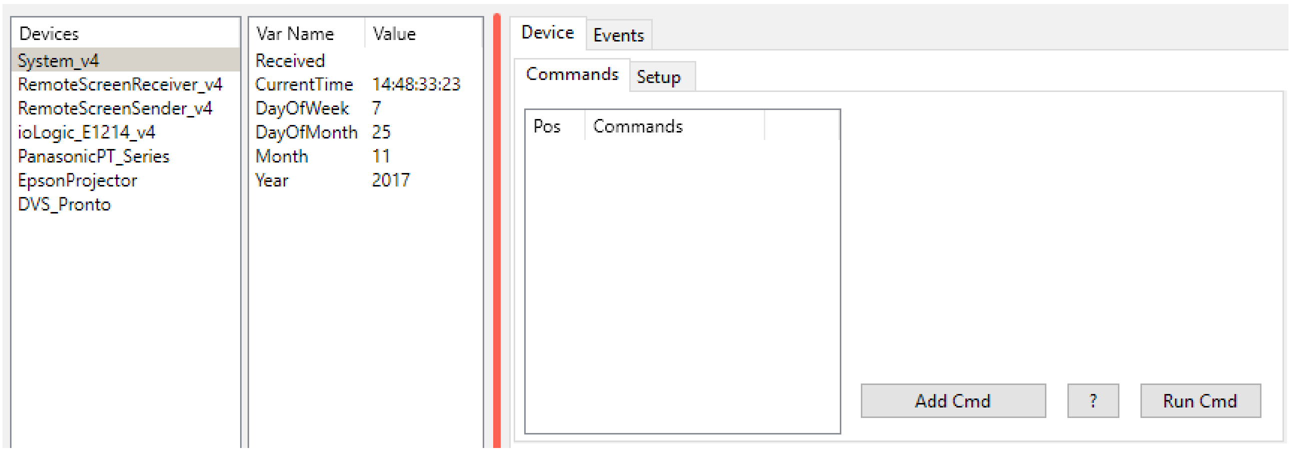
Devices
PJLink
ioLogik E1214
HSW Drehscheiben Mo...
V7300_1
V7300_2
V7300_3
V7300_4
V7300_5
V7300_6
V7300_7
V7300_8
RemoteScreenRec
RemoteScreenSender
System_v4_1216
VControlNode_1218
OSC_1220
Soloist2_v4_1222

Var Name	Value
Received	
D001	
D002	
D003	
D004	
D005	
D006	
D007	
D008	
D009	
D010	
D011	
D012	
D013	
D014	
D015	
D016	

The RemoteScreenReceiver does not have any commands. By default, it has the device variables *D001..D100*, *I001..I100* and *S001..S100*. The RemoteScreenReceiver is only used to generate events on a variable change. How to create events is described in the Events chapter.

System

The *System* device is used to provide Time and Date information.



Devices
System_v4
RemoteScreenReceiver_v4
RemoteScreenSender_v4
ioLogic_E1214_v4
PanasonicPT_Series
EpsonProjector
DVS_Pronto

Var Name	Value
Received	
CurrentTime	14:48:33:23
DayOfWeek	7
DayOfMonth	25
Month	11
Year	2017

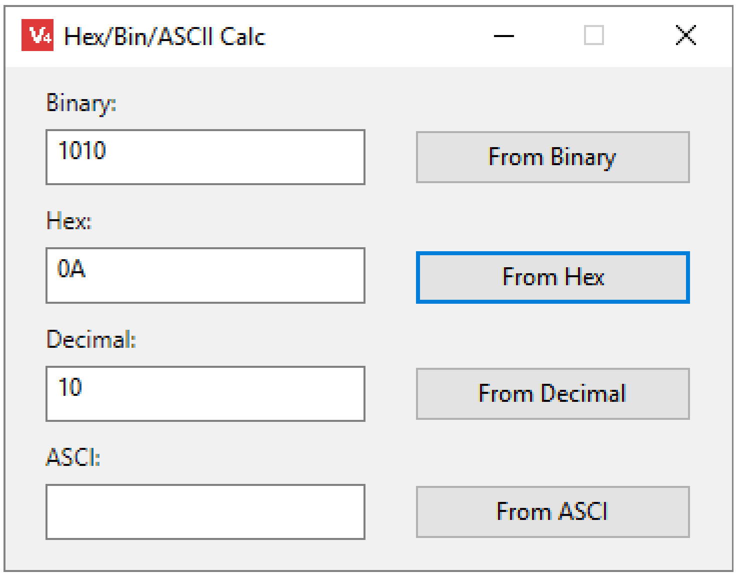
Pos	Commands

It has no commands and does not need a channel, because all the communication is internal.

Tools

Hex/Bin/Dec/ASCI conversion

The Hex/Bin/Dec/ASCI Tool (available via main menu *Tools -> Hex/Bin/Dec/ASCI/Calc*) converts data from one of the four formats to all other.



Binary: 1010

Hex: 0A

Decimal: 10

ASCI:

To convert e.g the hex number 4142, enter the number in the Hex field and click the From Hex button. As result, the hex value is shown in binary, decimal and ASCI representation.

Remote Protocol

A V-Control system that offers its service via network or RS232 communication is called a node. Via this service, nodes can communicate with other nodes or applications. The service give access to the tasks and attached devices. V-Control services are available via TCP, UDP, RS232 and, thanks to the build in webserver, HTTP. The communication protocol for TCP, UDP and RS232 connections is the same, the HTTP protocol differs a little.

To enable one or more of the services, see the V-Control Options chapter.

TCP, UDP and RS232 Message Format

Start of Transmission	**MSG Type (as string)**	**Separator**	**CMD (as string)**	**Separator**	**Parameter (as string)**	**End of Transmission**
Chr(4)	0=command 1=result 2=event 3=ProgressMSG	chr(5)	command string	chr(5)	strings separated by chr(2)	Chr(6)

Websocket Message Format

There are two valid ways to control V-Control via web interface. The first one is to use a link in the page such as <a `href="cgi-bin/scrRunTask %05AllLightsOff" target="ack">All LightsOff</a>`. This is very convinient if a simple GUI is needed. For complex, self updating GUIs the best solution is to use Websockets. The built in V-Control web server supports websockets from version 3.8 and later.

Start of Transmission	**MSG Type (as string)**	**Separator**	**CMD (as string)**	**Separator**	**Parameter (as string)**	**End of Transmission**
%04	0=command 1=result 2=event 3=ProgressMSG	%05	command string	%05	strings separated by %02	%06

Start of Transmission

The beginning of a new message is always $H04 or ASCII Code 4. If used in http protocol, this the "/cgi-bin/" string is used instead (see Examples).

Msg Type

ID	Description
	Command, a message was sent from the client to the Server (V-Control).
1	Result, this message contain the result of a client's request. The Data is stored in the Parameter Field.
2	Event, the server sent a message without a leading client request.
3	ProgressMSG, the server sent a message that contain a progress status

Separator

The ASCII code 5 ($H05 in hex.) separates the individual parts of the message. If using http, the separator is the string “%05”.

CMD

The Command sent to the server.

Parameter

Parameters used by the command (optional in some cases)

End of Transmission

The end of a message is always $H06 or ASCII Code

Web Interface

The connection from the html page to a task or command is made by a link. Usually, a link is used to navigate to another web page. Clicking on a link opens a new browser window, or replaces the current windows content with the linked page. But if we make a link to a task, there is no web page returned (and we do not want this). The task is launched and the return is only an acknowledge, saying that the task is executed or not. So we have to take care that the acknowledge message is not replacing our current browser content. One solution is to work with frames.

Frames divide a web page into two or more sections. In this example, we have 2 sections (frames). The ack frame is a located at the bottom with 30 pixel height, the main frame uses the remaining space at the top of the ack frame. The frame definition is done in the file index.html, located in V-Control httpRoot folder. index.html is the page that is shown if you type the V-Control web server url in your browser (i.e. http://192.168.1.45:8080). The listing below shows the content of index.html.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN"
"http://www.w3.org/TR/html4/frameset.dtd">
```

```
<html>
<head>
<title>V-Control Web Example</title>
</head>
<frameset rows="*,30">
<frame src="main.html" name="main">
<frame src="ack.html" name="ack">
<noframes>
 <body>


 </body>
</noframes>
</frameset>
</html>
```

The definition of the two frames is done by <frameset rows="*,30">, saying that the bottom frame is using 30 pixel, and the top frame the remaining space. Then, the top frame is linked to the file main.html, and its name is set to "main". The bottom frame is linked to ack.html and its name is set to ack. Via this name, the frame is accessible as target for a link. The page (file) main.html can contain a link to a task, and set the target for this link to ack.

```
<a href="cgi-bin/scrRunTask%05AllLightsOff" target="ack">All
LightsOff</a>
```

The link refers to the directory cgi-bin, which is a virtual directory. All links to this directory are interpreted as command. A task with the name "AllLightsOff" is called. Notice that the target is set to ack. The browser will show the result of the command in the frame ack. The "%05" is used as separator between the command (scrRunTask) and the parameter (AllLightsOff). If a command has more than one parameter, the parameters are separated by "%02".

If you like more information about html coding have a look at http://www.htmlcodetutorial.com and http://www.w3schools.com .

HTTP Message Format

Start of Transmission	CMD (as string)	Separator	Parameter (as string)
/cgi-bin/	command string	%05	strings separated by %02

Examples

TCP/UDP/RS232 Examples

To launch a task (Script or Cuelist) the scrRunTask comand is used. In the example below the name of the task we want to launch is "ExampleTask".

in Basic

```
Dim CMD As String
```

```
CMD = Chr(4)+"0"+Chr(5)+"scrRunTask"+Chr(5)+"ExampleTask"+Chr(6)
```

in Delphi / Pascal

```
var

cmd: string;

cmd := Chr(4)+'0'+Chr(5)+'scrRunTask'+Chr(5)+'ExampleTask'+Chr(6);
```

As result, the node send an acknowledge message.

Chr(4)	1	chr(5)	scrRunTask	chr(5)		Chr(6)

HTTP Examples

To launch a task (Script or Cuelist) via web browser, a link to the /cgi-bin/ directory attached by the command is made. The html file must be copied in the Webservers Document directory. It is then available at http://NodeAddress/Filename.htm. The complete example file is listed below.

```
<html>
<head>
<title>Remote</title>
</head>
<body>
<a href="/cgi-bin/scrRunTask%05wait1" name="ExampleTask"
target="anyFrame"><h1>Wailt1</h1></a>
</body>
</html>
```

Device Manager

CMD	Parameter	Result
devGetDeviceList		List of available Devices separated by chr(2)
devGetChannelList	DeviceName	List of channels assosiated with this device seperated by “,”
DevGetDeviceProperties	DeviceName	ID+chr(2)+DriverName+chr(2)+Name+chr(2)+Category+chr(2)+Helptext+chr(2)+Script+chr(2)+DP1Name+chr(2)+DP1GUIType+chr(2)+DP1MinMaxDef+chr(2)+DP1Default+chr(2)+DP1Mask+chr(2)+DP2Name+chr(2)+DP2GUIType+chr(2)+DP2MinMaxDef+chr(2)+DP2Defaul

		t+chr(2)+DP2Mask+chr(2)+Manufactor+chr(2)+DeviceGUI
devGetCommandList	DeviceName	List of available commands of the selected device separated by chr(2)
devGetCommandProperties	DeviceName(2)CommandName	CommandName+chr(2)+Position+chr(2)+Script+chr(2)+TabID+chr(2)P1Name+chr(2)+P1GUIType+chr(2)+P1MinMaxDef+chr(2)+P1Mask+chr(2)+P1Default+chr(2)P2Name+chr(2)+P2GUIType+chr(2)+P2MinMaxDef+chr(2)+P2Mask+chr(2)+P2Default+chr(2) P3Name+chr(2)+P3GUIType+chr(2)+P3MinMaxDef+chr(2)+P3Mask+chr(2)+P3Default+chr(2) P4Name+chr(2)+P4GUIType+chr(2)+P4MinMaxDef+chr(2)+P4Mask+chr(2)+P4Default+chr(2) Timeout+chr(2)+AckCmd+chr(2)+NextCmd+chr(2)+AckString+chr(2)+AckLen
devRunCommand	DeviceName(2)ChannelList(2)Command(2)DP1(2)DP2(2)P1(2)P2(2)P3(2)P4	DeviceName(2)ChannelList(2)Command(2)DP1(2)DP2(2)P1(2)P2(2)P3(2)P4(2)Ack

Script Manager

CMD	Parameter	Result	Example
scrGetTasks		List of available tasks separated by chr(2)	(4)0(5)scrGetTasks(5)Task1(2)Task2(2).....Taskn(6)
scrRunTask	Task Name	“0” if successful or Error Number	(4)0(5)scrRunTask(5)TaskName(6)
scrStopTask	Task Name	“0” if successful	(4)0(5)scrStopTask(5)TaskName(6)
scrSetGlobalVar	VarName(2)Value	“0” if successful	
scrGetGlobalVar	VarName	Var Value	

CMD	Parameter	Result	Example
plsUp		Move up	(4)0(5)plsUp(5)(6)
plsDown		Move down	(4)0(5)plsDown(5)(6)
plsFire		Fire selected Task	(4)0(5)plsFire(5)(6)

Change Log

Version 4.0 (NOV-2017)

V-Control 4.0 comes with a new redesign of the control engine and an updated user interface.

Version 3.7.19 (02-MAR-2017)

New Drivers

- Blackmagick Hyperdeck by Jonas Stade
- Simple OSC Client by Sebastian Spiegl
- AV Stumpfl Wings AVIO protocol

Bug Fixes

- Added Quit command to frmMain.Close event. The “Close” command closes and disposes of the window that calls it. In Windows this is enough, as with the last closed window the app exits. In MacOS however „Close“ disposes the window but keeps the menu bar alive, and therefore the app keeps running. The „Quit“ command terminates the application completely, regardless of platform. by Sebastian Spiegl
- Added PathType to FolderItem calls with strings as path. When a path is handed over to a new FolderItem as string, a path type has to be used. PathTypeNative is the OS independent path type. This only affected MacOS as there seams to be a different default PathType - probably AbsolutePath, though it was depreciated a long time ago. by Sebastian Spiegl
- Added Quit command to frmMain.Close event. The “Close” command closes and disposes of the window that calls it. In Windows this is enough, as with the last closed window the app exits. In MacOS however „Close“ disposes the window but keeps the menu bar alive, and therefore the app keeps running. The „Quit” command terminates the application completely, regardless of platform. by Sebastian Spiegl

Version 3.7.17 (8-FEB-2016)

New Drivers

- InFocus IN3118HD by Kilian Köppchen
- Generic Modbus -RTU driver (RS485 or RS232 only, Read and write)
- Oriental Motors Stepper Motor driver
- Barco E2 XML driver by Jonas Stade
- Ascender by Jonas Stade

New Script Commands

- New Script Function: CRC16 Checksum calculation
- New Script Function: FramecodeToTimecode(Frames, fps)

Bugfixes

- Delay function is precise now
- TCP Remote Service send event messages now

Version 3.7.16 (18-FEB-2015)

New remote Command devGetChannelList(DeviceName)

New Date Script Commands

- GetYear: Result integer
- GetMonth: Result integer
- GetDayOfMonth: Result integer
- GetDayOfWeek: Result integer (Sunday=0, Monday = 1...)
- GetHour: Result integer
- GetMinute: Result integer
- GetSeconds: Result integer

New Drivers

- Christie Phoenix Node
- Christie / Coolux Pandoras Box

Updated Drivers

- The old VLC driver was removed. We have now two new VLC drivers, VLC for Linux and VLC for Windows.
- Watchout (Driver supports Aux Timelines and Goto Timecode now)
- There was a bug in the Encore driver (No Timeout specified). This bug could lead to a broken RS232 connection. Solved now

Bugfixes

- Device Events (DMX / MIDI)
- A new event is checked for Unique Appearance now
- More then one Event can now assiged to a task

Version 3.7.15 (24-JUN-2014)

- New, improved driver for Barco Encore contributed by **Jonas Stade**
- New Driver for Image Pro controlled via Network
- New Driver for Barco PDS 902 by **Jonas Stade**
- Updated Driver: DVS Pronto has two new commands PlayClip and

PlayClipCountdown
- Updated Driver: Microsoft Powerpoint Driver update to work with V-ControlRemotePC 1.4 and above

Version 3.7.14 (13-FEB-2014)

- New: The integrated webserver supports websockets. We introduce websockets in our Blog here
- New: Playlist fires Timestrips as well
- New: Remote protocol for the playlist (Up / Down / Fire). With this feature in conjunction with a IO Box such as V-IO one can control the complete Playlist with three GPI contacts.
- New: 45 CallButtons in addition to Playlist. A User can open a Call Button window and have up to 45 buttons, each of them can be assigned to a task. This is for people who prefer buttons to click instead of a list with available tasks such as the playlist. To access the CallButtons window select P*layout->CallButtons* from main menu.
- Fix: Playlist and CallButton windows now remember the “Stop All before playing a new one” checkbox status (only until the program starts again)
- Fix: Calendar could show wrong weekdays or crash
- Fix: V-Control crash during termination if Webserver is active

Version 3.7.13 (20-SEP-2013)

- Threads are not allowed to make GUI updates any more. Instead of making GUI updates, the thread statuses are written to a list (EngineEventList). A Timer reads this list and updates the GUI as instructed in this list. A new label “Engine Event Message Stack” under the Acknowledge list shows the number of waiting messages in the queue.
- HexCalc window closes now on V-Control shutdown if the window was visible.
- PromptMessage command removed
- Timer Events can now be disabled or enabled by script or cuelist.
- New Main Menu item “Events-> Disable All Timer Events”
- New Main Menu item “Events-> Enable All Timer Events”
- New Contextual Menu Item in Cuelists “Disable Timer Event”
- New Contextual Menu Item in Cuelists “Enable Timer Event”
- New Contextual Menu Item in Scipts “Disable Timer Event”
- New Contextual Menu Item in Scipts “Enable Timer Event”

Version 3.7.12 (04-SEP-2013)

- V-Control could crash if a device driver uses Masks in its GUI (i.e. a Timecode field). This is fixed now.

Version 3.7.11 (03-SEP-2013)

- In some commands that contain binary values > 127 the UTF encoding convert theese bytes to an UTF char. This is solved in the device drivers by using chrB() instead of chr()
- Driver update DVS: CueUp Command does not hang anymore if the desired position is not reachable.
- Driver update Doremi: CueUp Command does not hang anymore if the desired position is not reachable
- Driver update Bonsai Drive: CueUp Command does not hang anymore if the desired position is not reachable.
- Driver update Turbo iDDR: CueUp Command does not hang anymore if the desired position is not reachable.
- GUI: The Device Editor is now resizeable
- Aborting saving the Acknowledge List to file no longer leads to a Nil exception

Version 3.7 (July 2013)

- Switched to GPLv3
- removed demo mode
- removed License key modules
- remove software key modules

Version 3.6.4

- Timeline works again (with 2012r2.1 compiled)

Version 3.6.3

- If command produces “Timeout” then the “Timeout” string is in IOResult
- Status message if ini file is written or read
- devMan:GetGlobalVar and SetGlobalVar for device driver

Version 3.6.2

- Resize some GUI for better fitting
- change Toggle Button in Playlist “Stop All Cuesets before playing a new” to checkbox
- Stop Task now also stops all sub tasks (call as function)
- Change TIniFile to make inis more robust
- Ini file is not written at exit
- New Menu Configure->Save Window Positions saves the current window positions (and write ini file)

Version 3.6.1

- Chasemode in Timeline works better

Version 3.5.7

- Change: Channel Editor lets now delete a channel that is physically not present

Version 3.5.4

- New Function: Send and receive UDP broadcast commands

Version 3.5.3

- Webserver compatibility improved for Android Browser
- Bugfix: On some systems a context menu call could cause a crash
- Bugfix: Sometimes a task did not stop clearly
- Bugfix: A mask error could crash the system in some rare cases

Version 3.5.2

- New Function: Tools Menu with calculator from and into hexadecimal, decimal, binary and ASCI
- Update: The channel editor now opens a splash screen to show the progress of scanning serial ports.
- Bugfix: To delete a row in a timestrip, click in the first column which is representing the timecode, and select Edit -> Cut

Version 3.5

- New: Timestrip programming:Cues are inserted into a time strip and synchronized to an external Timecode. Attached devices can be set to a chase mode and being synchronized to the Timecode if they support this feature.
- New: Flash support for then integrated web server.
- New: Keyboard events can control tasks now. Use Keyboard Events to control V-Control with a RF or IR Remote control.
- Linux: Wait for Timecode now shows correct remaining time
- Playlist Update: You can assign Function keys to a playlist item
- New Basic Script Command ChangeCMD_Code(CommandName, ParameterName, DefaultValue) to change a commands parameter during runtime

Version 3.0.5

- Windows Bugfix: Delete Task and Cut Task could raise an exception.
- New Toolbar icons

Version 3.0.4

- Device Editor: Fixed a bug that hides events if no commands present
- Configure Devices dialog now ask to save a changed list if not already done
- Playlist: The Textsize of the Playlist is now adjustable via Configure -> Options dialog.
- New Command ShellExecuteAsFunction: This command launches scripts, documents or programs (i.e. backup script) on the PC and returns when finished
- New Command ShellExecuteAsThread: This command launches scripts, documents or programs on the PC and returns immediately
- Event List: Now shows all event parameter
- Events: New event management enables devices to fire events.
- Via Configure -> Otions there is a Autostart Task option available. The task selected here will launch at startup
- Bugfix: New created device fire events only after saving an re opening the project. This is fixed now.
- New Basic command: StrToHex converts a string to hex numbers
- New Basic command: HexToStr converts a hex numbers to a string
- New Basic command: CheckSum8Bit calculates the 8 bit checksum of a string
- The column widths of the event list are restored next time the program executes
- Calendar Bugfix: The calendar now works with all date formats (24.12.2008, 24/12/2008 oder 12/24/2008)
- New Toolbar

Version 3.0.3

- TCP Remote service integrated. The service is used to communicate with other V-Control systems (nodes) or third party systems.
- UDP Remote service integrated. The service is used to communicate with other V-Control systems (nodes) or third party systems.
- RS232 service integrated. The service is used to communicate with other V-Control systems (nodes) or third party systems.
- Webserver integrated (HTTP)
- Mac OS X: Bug im TCP Client fixed
- Windows: List of available commports is now sorted correct
- Bug in UDP Client fixed

Version 3.0.2

- Playlist: Changed Checkbox “Stop All Before Playing...” to Bevel Button
- Device Editor: When selecting the “Empty Device”, the GUI of the Device Editor is build without error now
- Device Editor: When selecting a Command, the Command Script is now shown correct in every case
- Device Editor: When compiling a new Driver, the Device is now automaticly updated
- General: Ask to save a changed Project on exit
- Device Manager: New script command ChangeCMD_MinMax allows to change the MinMax Value of a command from script
- Device Manager: Added Delay Command in Drivers
- Cue List: if DP1 or P4 is used, the Cuelist commands didn't work. This is fixed now.
- Eventlist: Selecting “Edit Event” now works for Timer and Calendar events as well as for Device events
- Timer Events are now editable by double clicking in the Timer Editor

Version 3.0.1

- Playlist: No out of Bound Exception if trying to edit a key or comment in an empty row
- Added ShowMessage Command for Cliplists
- The context menu of the Script editor now supports GetGlobalVar, SetGlobalVar, ShowMessage and PromptMessage
- When loading a Project, we check if the Project File format matches the current version. Project files from earlier versions will not open.
- Updated Insert Menu in Main Menu. Now all Insert Items are available in this menu and in the context menu of the cuelist and the Script editor
- *Added SMTP Mail Client to let the system send mails in case of an event or status message*