Revision	Date	Comments
0.1	19/11/2015	Initial draft

Table of Content

1 Scope

This document presents a simple text-based protocol to trigger automation user-defined cues or actions over TCP/IP. These commands can target pre-defined automation devices (e.g. the player or the projector) as well as any user-defined devices.

The current transport protocol is plaintext TCP/IP only. Therefore all commands that would require a login (e.g. select some content in the player) are explicitly excluded.

The Barco ICMP automation server is listening on port 43748. This port is accessible via the projector network interface or via one of the two LAN ports of the Barco ICMP.

2 References

[BARCO-COMMUNICATOR] - Barco Communicator User Guide

3 Glossary

4 Overview

The current set of commands allows triggering the following:

- Actions: an action is a single command with user-defined parameters targeting a single automation device.
- Protocol control: commands that control the behavior of the protocol (e.g. turn on/off acknowledgement).

See [BARCO-COMMUNICATOR] for further information on automation settings for the ICMP.

4.1 Protocol overview

The following command syntaxes are defined.

Action command:

The following nomenclature is defined for action commands:

```
TARGET.ACTION[,P1,P2…];
```

Target and action names are mandatory.
Action parameters are action-specific and may be optional.

Protocol control command:

```
CONTROL[,P1,P2…];
```

The control name is mandatory.
Control parameters are control-specific and may be optional.

4.2 Multiple commands

It is allowed to send multiple commands at the same time, the semicolon command separator. The below example is valid:

```
ACK,1;GPIO.Pulse Up,5,10;
```

5 Specifications

5.1 Reserved characters

Some characters are reserved for the protocol:

- The dot (‘.’) character is reserved for splitting a command (not relevant for control).
- The comma (‘,’) character is reserved for separating command parameters.
- The semicolon (‘;’) character is reserved for separating commands.
- The quotation mark (‘”’) is reserved for quoted strings.
- The backslash (‘\’) escape character.

5.2 Command identifiers

Command identifiers (TARGET, ACTION, and CONTROL) are defined as printable strings and the following constraints are defined:

- It shall only contain single byte characters from the printable ASCII character set. Range is from 0x20 to 0x7e.
- It shall not contain any reserved character unless it is escaped.
- Command identifiers are case-sensitive.

5.3 Parameter types

5.3.1 Integer values

Integer values may be signed or unsigned. Bounding will be performed by the server counterpart.

Integer values are defined as decimal, hexadecimal, octal or binary strings.

The optional formatting character hash (‘#’), following by the format character, allows to specify the integer representation. Default formatting is signed decimal value.

The format may be specified as follows:

- none: signed decimal integer (e.g. 10 or -10)
- ‘#u’: unsigned decimal integer (e.g. #u65535)
- ‘#x’: hexadecimal integer (e.g. #xffffffff)
- ‘#o’: octal integer (e.g. #o2507)
- ‘#b’: binary integer (e.g. #b11111111)

A negative integer can only be represented by a decimal value, i.e. the minus (‘-’) character is illicit when formatting is present.

5.3.2 Real number values

Real number values may be signed or unsigned. Bounding will be performed by the server counterpart.

Real number are defined as floating point strings with an optional dot ('.') character as the radix point position.

5.3.3 String values

String values are defined as quoted strings. The quoted string is delimited by starting and ending quotation mark characters.

Some characters within the quoted string shall be escaped:

- The escape character
- The quotation mark character

Un-escaping is the only processing that should be performed by the server counterpart. The quoted string is forwarded to be sent "as is" to the target.

> ***The content of the string is not checked when receiving such command. An ACK may be returned even if the string content is not properly formatted.***

5.3.4 Others

Enumerations:

Enumeration values are represented with integers.

Arrays:

No array parameters are defined, though they can easily be mimicked.

6 Action commands

Action commands are required to target either a pre-defined system device or a user-defined device.

The list of actions available via this protocol will be extended as new automation actions will be added in new software releases.

6.1 System automation devices

The list of available pre-defined automation device is static. The list of available actions for each device is summarized in the below table.

Table 1. System automation devices action table

Device name	Description	Actions
GPIO	GPIO commands.	*Set Outputs* *Pulse Up* *Pulse Down* *Set Up* *Set Down*
PLAYER	Player commands	*Play* *Stop* *Pause* *Pause (seconds)* *Resume* *Enable Schedule* *Disable Schedule* *Emergency Stop* *Rewind (seconds)* *Play Scheduled Show*
PROJECTOR	Projector commands	*Close Dowser* *Open Dowser* *Turn Lamp On* *Turn Lamp Off* *Execute Macro*

For example the below commands are valid:

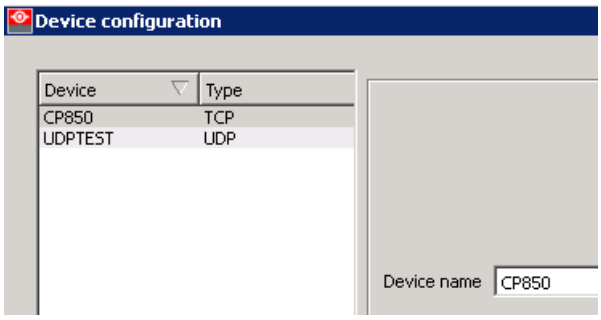
```
PLAYER.Pause (seconds),10;
PROJECTOR.Execute Macro,”2D_FLAT”;
```

See Appendix A for the GPIO actions.
See Appendix B for the PLAYER actions.
See Appendix C for the PROJECTOR actions.

6.2 User-defined automation devices

The list of available user devices depends on the settings of the target system.
The devices can be found in the relevant Barco Communicator panel.

See [BARCO-COMMUNICATOR] for further information.



Devices can only be created from a list of pre-defined device types. The list of available device types and related actions is summarized in the below table.

Table 2. User-defined automation devices action table

Device type	Description	Actions
TCP UDP	Generic TCP or UDP automation device.	*Send Text* *Send Hex* *Send Binary*
JNIOR	Jnior TCP automation device.	*Set Outputs* *Pulse Up* *Pulse Down* *Set Up* *Set Down* *Clear Input Counters* *Clear Input Usage Meter* *Clear Output Usage Meter* *Reset Input Latch* *Execute Macro*

See Appendix D for the TCP/UDP actions.
See Appendix E for the JNIOR actions.

7 Control commands

The list of currently available control commands is summarized in the below table.

Table 3. Control command table

Command	Description
ACK	Enable/disable acknowledgement.

See Appendix F for the control commands.

7.1 Acknowledgment

Acknowledgment is turned on by the following command:

```
ACK,1;
```

Acknowledgment is turned off by the following command:

```
ACK,0;
```

Acknowledgement can be switched at any time. Once enable the server will acknowledge (or not) whether a command was fully received and parsed.

> ***This is only a syntactic acknowledgment: a positive response does no guarantee that the command was actually send and/or received by the target device.***

It is the only command that will trigger an answer from the server counterpart.

Appendix A – GPIO device actions reference

The range for the output index parameter starts at 1. The maximum value is 8 for the GPIO device.
The same commands are available for the JNIOR device for which the maximum value could be different depending on the hardware device.

Set Outputs

Description: Set GPIO output states.

Parameters:

Parameter	Type	Description
output mask	string	List the modified outputs and their assigned state in the following format: <output-index>=Up/Down To change multiple outputs, list them with a comma separator. The complete list must be inside quotation mark. Example: GPIO.Set Outputs,"1=Up,2=Down,3=Down";

Pulse Up

Description: Set pulse state up on a specific output.

Parameters:

Parameter	Type	Description
output index	unsigned integer	8 bits output index.
duration	unsigned integer	Pulse duration in milliseconds.

Pulse Down

Description: Set pulse state down on a specific output.

Parameters:

Parameter	Type	Description
output index	unsigned integer	8 bits output index.
duration	unsigned integer	Pulse duration in milliseconds.

Set Up

Description: Enable a specific output.

Parameters:

Parameter	Type	Description
output index	unsigned integer	8 bits output index.

Set Down

Description: Disable a specific output.

Parameters:

Parameter	Type	Description
output index	unsigned integer	8 bits output index.

Appendix B – PLAYER device actions reference

Play

Description: Start the playback of the currently selected content.

Parameters: none.

Stop

Description: Stop the playback of the currently selected content.

Parameters: none.

Pause

Description: Pause the current playback.

Parameters: none.

Pause (seconds)

Description: Pause the current playback for a specific duration then resume.

Parameters:

Parameter	Type	Description
duration	unsigned integer	Pause duration in seconds.

Resume

Description: Resume the current playback.

Parameters: none.

Enable Schedule

Description: Set the schedule mode on

Parameters: none.

Disable Schedule

Description: Set the schedule mode off

Parameters: none.

Emergency Stop

Description: sets an error, forces the manual mode, stops the player and triggers automation events

Parameters: none.

Rewind (seconds)

Description: rewind the stream from n seconds.

Parameter	Type	Description
Offset	unsigned integer	Rewind Offset in Seconds

Play Schedule Show

Description: Start the playback of the scheduled show when the scheduler is configured to wait for this trigger.

Parameters: none.

Appendix C – PROJECTOR device actions reference

Close Dowser

Description: Close the projector dowser.

Parameters: none.

Open Dowser

Description: Open the projector dowser.

Parameters: none.

Turn Lamp On

Description: Turn the projector lamp on.

Parameters: none.

Turn Lamp Off

Description: Turn the projector lamp off.

Parameters: none.

Execute Macro

Description: Execute the specified macro on the projector.

Parameters:

Parameter	Type	Description
macro	string	The name of the macro

Appendix D – TCP/UDP device actions reference

Send Text

Description: Send a device specific text command to the target device.

The content and meaning of the command is outside the scope of this document. The only requirement is that the string is escaped as defined here.

Parameters:

Parameter	Type	Description
text	string	Text string.

Send Hex

Description: Send a device specific hexadecimal string command to the target device.

The content and meaning of the command is outside the scope of this document. The only requirement is that the string is escaped as defined here.

Parameters:

Parameter	Type	Description
hexadecimal text	string	Text string.

Send Binary

Description: Send a device binary string command to the target device.

The content and meaning of the command is outside the scope of this document. The only requirement is that the string is escaped as defined here.

Parameters:

Parameter	Type	Description
binary text	string	Text string.

Appendix E – JNIOR device actions reference

The JNIOR device supports the same commands than the GPIO device. It also supports the following commands.

Clear input counters

Description: Allows to clear counters for a given input.

Parameters:

Parameter	Type	Description
Input index	unsigned int	8 bits output index.

Clear input usage meter

Description: Allows to clear the usage meter for a given input.

Parameters:

Parameter	Type	Description
Input index	unsigned int	8 bits output index.

Clear output usage meter

Description: Allows to clear the usage meter for a given output.

Parameters:

Parameter	Type	Description
Output index	unsigned int	8 bits output index.

Reset input latch

Description: Allows to reset the latch corresponding to the supplied input index.

Parameters:

Parameter	Type	Description
Input index	unsigned int	8 bits output index.

Execute Macro

Description: Allows to execute a specific macro on the Jnior.

Parameters:

Parameter	Type	Description
macro	String	The name of the macro

Appendix F – CONTROL commands reference

ACK

Description: Enable/disable the acknowledgment mechanism.

The mechanism is disabled by default.
Note that the server may switch back to default when the TCP connection is lost or reset.

Parameters:

Parameter	Type	Description
onoff	integer	Acknowledgment status: 0=OFF, 1=ON.

Output parameters: N/A if acknowledgment is disabled.

Parameter	Type	Description
ack	string	Command acknowledgment: - "ACK": command acknowledged - "NACK" : command not acknowledged

See Acknowledgment section for further information.

Appendix G - Examples

Dolby CP850 Fader High:

```
CP850.Send Text,”sys.fader=75\\0D\\0A”;
```

The “CP850” device must exist.
The command string is escaped.