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## 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.*

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## 5.3.4 Others

### Enumerations:

Enumeration values are represented with integers.

### Arrays:

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

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## 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.	<i>Set Outputs Pulse Up Pulse Down Set Up Set Down</i>
PLAYER	Player commands	<i>Play Stop Pause Pause (seconds) Resume Enable Schedule Disable Schedule Emergency Stop Rewind (seconds) Play Scheduled Show Jump To Clip End Recover Recover And Play Ignore Recovery Clear Enable Repeat Disable Repeat Next Previous Jump To Marker</i>
PROJECTOR	Projector commands	<i>Close Dowser Open Dowser Turn Lamp On Turn Lamp Off Execute Macro</i>

For example the below commands are valid:

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

See [Appendix A](#) for the GPIO actions.

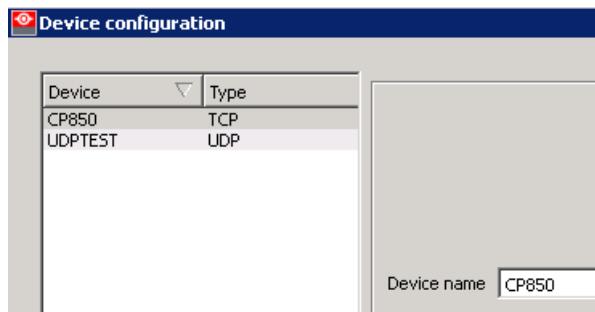
See [Appendix B](#) for the PLAYER actions.

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.	<i>Send Text</i> <i>Send Hex</i> <i>Send Binary</i>
JNIOR	Jnior TCP automation device.	<i>Set Outputs</i> <i>Pulse Up</i> <i>Pulse Down</i> <i>Set Up</i> <i>Set Down</i> <i>Clear Input Counters</i> <i>Clear Input Usage Meter</i> <i>Clear Output Usage Meter</i> <i>Reset Input Latch</i> <i>Execute Macro</i>

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

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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. The player goes to a manual mode.

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.

## **Jump To Clip End**

Description: Jump to the end of the currently playing alternative input clip. Only supported for alternative input clips in a playlist.

Parameters: none.

## **Recover**

Description: Select the show from the pending recovery data and change the position to the last saved one. The player remains stopped. This command does nothing if there's no pending recovery data.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Recover And Play**

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Description: Select the show from the pending recovery data and change the position to the last saved one. The player will then start playing. This command does nothing if there's no pending recovery data.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Ignore Recovery**

Description: Drop the pending recovery data. This command does nothing if there's no pending recovery data.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Clear**

Description: Clear the loaded content from the player. This command does nothing if the player is already cleared.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Enable Repeat**

Description: Set the repeat mode on.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Disable Repeat**

Description: Set the repeat mode off. The player goes to a manual mode.

Require ICMP v1.3.4.0 or higher.

Parameters: none.

## **Next**

Description: Go to the next clip in the playlist. This command does nothing if there's no next clip.

Require ICMP v1.3.5.0 or higher.

Parameters: none.

## **Previous**

Description: Go to the previous clip in the playlist. This command does nothing if there's no previous clip. Note that it does not rewind to the first frame of the current clip.

Require ICMP v1.3.5.0 or higher.

Parameters: none.

## **Jump To Marker**

Description: Go to the next marker in the playlist that matches the one given as a parameter. This command does nothing if the marker is not present after the current position. Marker can only be set in the playlist by inserting a cue that contains the "PLAYER.Set Marker" action. That action is not available in automation over IP. Require ICMP v1.3.5.0 or higher.

Parameter	Type	Description
Marker	string	The name of the marker to jump to, case-sensitive.

## 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.