

# CAMERA PROTOCOLS FOR CONFERO AND D-CERNO AE

## Camera Protocol

The Camera protocol is disabled by default. When you enable the camera protocol, you can configure the following parameters:

- > **Camera protocol:** select the protocol you want to use. Three protocols are available: TLVCAM 1, TLVCAM 2 and T-CAM. These are the most commonly used camera protocols that are also provided with CoCon. For more information on camera protocols, see **Camera Protocol Explained** in the next section. You can only choose one at a time.
- > **Network protocol:** Choose either TCP/IP or UDP.
- > **Port:** This is the port on the client where the camera protocol is either sent to (UDP) or where the third party client has to listen to on the Confero 360 engine (TCP)
- > **IP address:** When you select UDP, you need to specify the IP address of the destination (third-party).

The screenshot shows a configuration interface with a top navigation bar containing tabs: General, Network, License, Camera protocol (selected), Backup, and API Settings & Type. Below the tabs is a section titled "Camera protocol settings". This section contains four rows of settings: "Enable" with a green toggle switch turned on; "Camera protocol" with a dropdown menu showing "TLVCAM2"; "Network protocol" with a dropdown menu showing "TCP"; and "Port" with a text input field containing "12345". At the bottom of the settings area is a green button labeled "Apply settings".

Figure 1-1 Camera protocol tab for Confero

# Camera Protocols Explained

When UDP is not selected, every call needs an acknowledgement. If no acknowledgement is sent back, the system tries to send the call up to 3 times. An acknowledgement is 1 byte long and contains hexadecimal value 0x06.

## COMMANDS FOR TLVCAM1 PROTOCOL

A call is made up of four distinct parts and looks like the following: {STX}{Body}{CRC}{ETX}.

### STX

STX indicates the start of the command protocol. You can recognize STX because it appears as a percentage sign (%) in the command.

### BODY

The body is the second part of the protocol. The body itself consists of several parts as well. This is a letter (capitol or small) followed by the microphone number. The microphone number always contains four digits. For example, seat 1 will appear as 0001 in the protocol, seat 2 as 0002, and so on.

#### > **P/p:**

- > When a chairperson device activates, a capital P is used. The P is followed by the number of the microphone.
- > When a chairperson deactivates their microphone, a small p is used. The p is followed by the number of the microphone.

#### > **M/m:**

- > When a delegate device activates, a capital M is used. The M is followed by the number of the microphone.
- > When a delegate deactivates their microphone, a small m is used. The m is followed by the number of the microphone.

- > **R:** When the last active microphone is turned off, a 'reset' command is sent. This command starts with a capital R. An example is: (%)**R**(0052)

- › **S**: Every 5 seconds, a synchronized command is sent. This command starts with a capital S and contains all active microphones. The microphones are in order of activation. The first activated microphone is the first number in this part of the protocol. For example (%)**S00250001**(01DB) means that the first microphone to be activated was microphone 25. Microphone 1 was the second microphone to be activated. If no microphone is active, the synchronization will send S0000 as {Body} in the protocol: (%)**S0000**(0113).

## CRC

CRC is the third part of the command protocol. It is an extra check to make sure that nothing went wrong during the transmission.

The CRC is the 16 bit hexadecimal sum of all ASCII characters in {Body}. For example, {Body} can equal S00250001. CRC will then be :  $0x53+0x30+0x30+0x32+0x35+0x30+0x30+0x30+0x31 = 0x01DB$

As a result, the command will be as follows: (%)**S00250001****01DB**.

## ETX

ETX indicates the end of the command protocol. The ETX is a Carriage Return (CR). The hexadecimal presentation of ETX is **0x0D**.

## EXAMPLES OF TLVCAM1 COMMAND PROTOCOLS

- › If the **chairman microphone is activated**, and the chairman microphone is number '0001', then the following message is sent: **%P00010111<CR>**
- › When the **chairman microphone is deactivated**, then the following message is sent: **%p00010131<CR>**
- › If a **delegate microphone is activated**, and that delegate microphone is number '0003', then the following message is sent: **%M00030110<CR>**
- › When the **delegate microphone is deactivated**, then the following message is sent: **%m00030130<CR>**
- › Suppose now that the **delegate microphone with number '0003' is active**. On a **synchronization check**, the synchronization message will look like this: **%S00030116<CR>**

- > Suppose now that the delegate microphones with **number '0002' and '0004' are also active**. On a **synchronization check**, the synchronization message will look like this:  
**%S000300020004029C<CR>**
- > When **no microphones are active**, then the following synchronization will be received:  
**%S000300020004029C<CR>**
- > When the **camera control system should reset itself** to its start position, then the following message will be received: **%R0052**

## COMMANDS FOR TLVCAM2 PROTOCOL

A call is made up of three distinct parts and looks like the following: {STX}{Body}{ETX}.

### STX

STX indicates the start of the command protocol. You can recognize STX because it appears as a dollar sign (\$) or an ampersand sign (&) in the command.

### BODY

The body is the second part of the protocol. The body itself consists of several parts as well. This is a digit (1, 2 or 3) followed by the microphone number. The microphone number always contains four digits. For example, seat 1 will appear as 0001 in the protocol, seat 2 as 0002, and so on.

- > **1:** The microphone of the chairman or a delegate is activated. 1 is followed by the seat number of the microphone. E.g.: (\$)10001(<CR><LF>).
- > **2:** The microphone of the chairman or a delegate is deactivated. 2 is followed by the seat number of the microphone. E.g.: (\$)20001<CR><LF>.
- > **3:** All active microphones are deactivated. 3 is followed by number 0000. E.g.: (&)30000 (<CR><LF>).

### ETX

ETX indicates the end of the command protocol. The ETX is an Carriage Return (CR) followed by an Line Feed (LF). The hexadecimal presentation of CR is **0x0D** and the hexadecimal presentation of the LF is **0x0A**.

## EXAMPLES OF TLVCAM2 COMMAND PROTOCOLS

- › If the **chairman microphone is activated**, and the chairman microphone is number '0001', then the following message is sent: **\$10001<CR><LF>**.
- › When the **chairman microphone is deactivated**, then the following message is sent: **\$20001<CR><LF>**.
- › If a **delegate microphone is activated**, and the delegate microphone is number '0003', then the following message is sent: **\$10003<CR><LF>**.
- › When the **delegate microphone is deactivated**, then the following message is sent: **\$20003<CR><LF>**.
- › When **all microphones are deactivated**, then the following message is received: **&30000<CR><LF>**.

## COMMANDS FOR T-CAM PROTOCOL

Once the network protocol has been defined (UDP or TCP, refer to the beginning of this section), the camera protocol works as follows:

When there is a change in the state of the microphone, a UDP/TCP data package is sent to the camera. The package is in JSON format and has the following structure: {"UID": seat\_number, "status": status\_number}.

- › **seat\_number**: seat number of the microphone.
- › **status\_number**: status of the microphone. There are 2 possible status:
  - › **0**: The microphone is deactivated
  - › **1**: The microphone is activated

In case of multiple calls to turn off microphones, the activation order applies based on the "first in, first out" principle. For example, the call for the first microphone on will be sent as the first microphone off.

## EXAMPLES OF T-CAM COMMAND PROTOCOLS:

- › If the **delegate microphone is activated**, and the delegate microphone is number 7, then the following message is sent: **{"UID": 7, "status": 1}**.

- If the **delegate microphone is deactivated**, then the following message is sent: **{"UID": 7, "status": 0}**.
- If **delegate microphones number 2, 4 and 7 are deactivated** simultaneously while they were initially activated in order 4, 7 and 2, then the following messages are sent: **{"UID": 4, "status": 0}**, **{"UID": 7, "status": 0}** and **{"UID": 2, "status": 0}**.