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1 Overview

All Bosch IP cameras are ONVIF Profile S compliant, and exacqVision supports ONVIF cameras. While the ONVIF interface is fairly simple to use, there are a few tips that can maximize the video quality of Bosch IP cameras in an exacqVision VMS.

1.1 Versions

This paper is accurate with the following versions:

- *Exacq server (7.0.1) & client (7.0.1)*
- *Bosch CPP6 devices (CPP6_H.264_6.11.0006.fw)*
- *Bosch CPP5 devices (CPP5_H.264_5.92.0023.fw)*
- *Bosch CPP4 devices (CPP4_H.264_6.11.0008.fw)*
- *Bosch CPP3 devices (CPP3_H.264_5.73.0046.fw)*

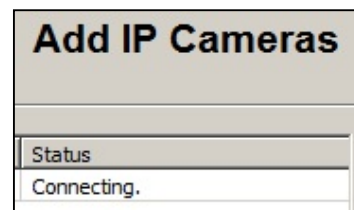
2 Camera Configuration

In general, all Bosch camera configurations should be accomplished before adding those cameras into an Exacq system, since many Bosch features lie outside of the ONVIF interface. In some cases, Bosch-specific settings cannot be accessed after adding the camera into an Exacq system, so it is important to complete these configurations first.

2.1 Passwords (CPP3, CPP5)

Bosch cameras offer three levels of access credentials: *service*, *user*, and *live*. Exacq, however, cannot connect to the camera stream if all three levels have passwords. CPP3 & CPP5 devices in an Exacq system must have a blank *live* password. Passwords for *service* and *user* levels may both be used.

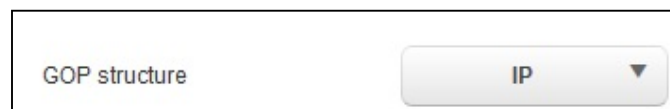
If you try to add a CPP3 or CPP5 device into Exacq with *live* credentials, the Exacq **Add IP Cameras** page will show **Connecting** for camera status, and never get to **Connected**.



2.2 Group of Pictures

The Encode Profile for Bosch streams can sometimes make use of B-frames in the stream. Exacq does not process B-frames effectively. Consequently, you will need to remove B-frames from the stream that Exacq is recording (usually Stream 1).

Note which Encoder Profile is assigned to the Non-recording profile for Stream 1.



Open the **Expert Settings** portion of that **Encoder Profile**, and set **GOP structure** to **IP**.

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Profiles on the camera need to be adjusted on the webpage BEFORE the first configuration is done with Exacq. If the **GOP structure** is left as **IBP** or **IBBP**, then the Exacq rendering of the stream will show distortion of fast-moving objects in view. Note: Megapixel streams do not have B-frames.

2.2.1 Configured by ONVIF

If a Bosch camera shows **Configured by ONVIF** for the stream profile after the camera has been added into Exacq, then Bosch parameters that are not part of ONVIF (such as **GOP structure**) will not be able to be modified until after the camera is removed from Exacq, and the stream profile in the camera is changed back to one of the 8 standard profiles.

| | |
|-----------------------|-----------------------|
| Non-recording profile | Configured by ONVIF ▼ |
| Current profile | Configured by ONVIF |

2.3 I-frames

Although Bosch can render streams from Bosch cameras very well, Exacq needs more frequent I-frames in the stream to display the best image.

| | | | |
|------------------|----|---|--------------------|
| I-frame distance | ◀▶ | 3 | (10.00 I-frames/s) |
|------------------|----|---|--------------------|

Note which Encoder Profile is assigned to the Non-recording profile for Stream 1. Open the **Expert Settings** portion of that **Encoder Profile**, and set **I-frame distance** as low as possible. The lowest setting will be 3, which corresponds to 10 I-frames per second. Do not use the **Auto** setting. Since more I-frames also means more bandwidth used, you will have to select a balance between bandwidth and picture quality.

If **I-frame distance** is very large, or left at **Auto**, the image rendered by Exacq will start out very clear, and then degrade in quality for a few seconds before the quality jumps back to maximum clarity. The image will continue to appear to pulse repeatedly.

2.4 VCA (CPP3, CPP4, CPP6)

Exacq can record video based on motion detection in the camera. Currently, only MOTION+ recording is supported in Exacq. Open the **VCA** page in the camera, and set **Analysis type** to MOTION+. Motion recording is not currently supported for CPP5 devices.

| | |
|---------------|-----------|
| Analysis type | MOTION+ ▼ |
|---------------|-----------|

3 Exacq Configuration

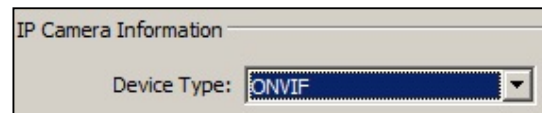
After all camera configurations are complete, the camera can be added into Exacq.

3.1 Device Selection

Exacq can scan the local network to find all available Bosch IP cameras. Bosch cameras will be listed in the **Find IP Cameras** pane as ONVIF cameras. Bosch cameras that have been added to an Exacq system are identified as Bosch cameras in the **IP Camera List**.

3.1.1 Adding Cameras

Bosch cameras that have not been detected by an Exacq scan can still be added into Exacq. Select **ONVIF** as the **Device Type** in **IP Camera Information**, and add the relevant address and credentials for the camera.

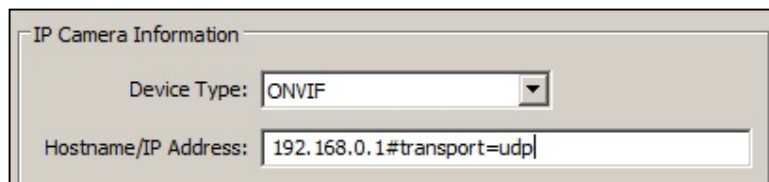


IP Camera Information

Device Type: ONVIF

3.2 Transport Selection

Exacq uses TCP as a default transport protocol for video streams. If UDP is required for an installation, simply append the string **#transport=udp** to the camera IP address and reconnect the camera to Exacq.



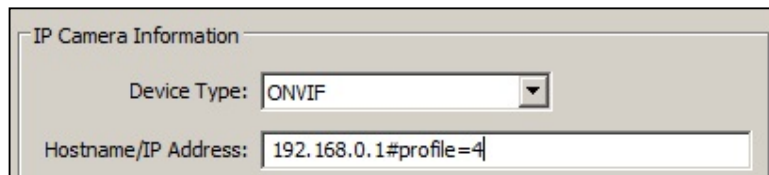
IP Camera Information

Device Type: ONVIF

Hostname/IP Address: 192.168.0.1#transport=udp

3.3 Stream Selection

Bosch cameras and encoders offer the option of multiple streams to select from. However, Exacq always selects Stream 1 of Video Input 1, by default. Other streams and/or other video inputs can be selected in Exacq by appending the string **#profile=x**, where **x** is a number between 1 and 48. The mapping of profile # to input and stream is shown in **Table 1 – Profile Numbers**.



IP Camera Information

Device Type: ONVIF

Hostname/IP Address: 192.168.0.1#profile=4

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Profile Numbers

| | STREAM 1 | STREAM 2 | MJPEG |
|----------------|-----------------|-----------------|--------------|
| Video Input 1 | 1 | 2 | 3 |
| Video Input 2 | 4 | 5 | 6 |
| Video Input 3 | 7 | 8 | 9 |
| Video Input 3 | 10 | 11 | 12 |
| Video Input 5 | 13 | 14 | 15 |
| Video Input 6 | 16 | 17 | 18 |
| Video Input 7 | 19 | 20 | 21 |
| Video Input 8 | 22 | 23 | 24 |
| Video Input 9 | 25 | 26 | 27 |
| Video Input 10 | 28 | 29 | 30 |
| Video Input 11 | 31 | 32 | 33 |
| Video Input 12 | 34 | 35 | 36 |
| Video Input 13 | 37 | 38 | 39 |
| Video Input 14 | 40 | 41 | 42 |
| Video Input 15 | 43 | 44 | 45 |
| Video Input 16 | 46 | 47 | 48 |

Table 1 – Profile Numbers

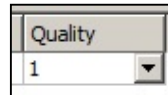
3.4 Connection Delays (CPP4, CPP6)

When a Bosch camera is added to Exacq, the camera will be listed in the IP Camera List, with a status of **Connecting**. Once Exacq has detected the video stream, the status will change to **Connected**.

With some cameras, particularly CPP4 and CPP6 devices, there can be an extended delay of up to one minute before the status becomes **Connected**.

3.5 Image Quality

In some situations, a Bosch camera will be set to the lowest Quality setting. While this helps to minimize video bandwidth and storage, the appearance of the image suffers. Remember to verify the recording quality settings for Bosch cameras in Exacq are appropriate.

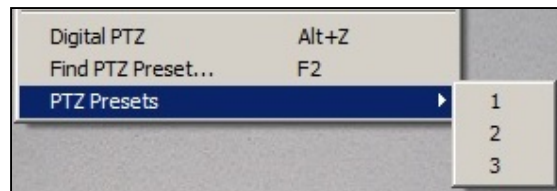


3.6 PTZ Cameras

Bosch PTZ cameras are automatically identified as PTZ by Exacq, and support all on-screen camera controls.

3.6.1 PTZ Presets

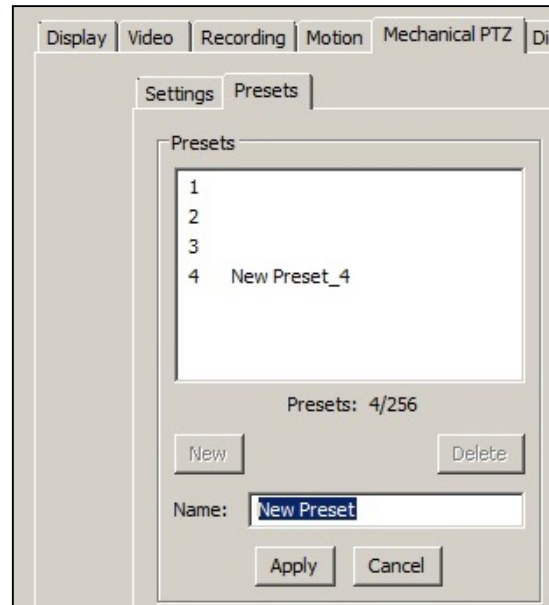
Any Presets that are configured in a Bosch PTZ camera are automatically accessible in Exacq. Right-click on the video pane to display the Preset options in Exacq.



3.6.2 Adding New Presets

You can add new PTZ Presets to a Bosch camera in Exacq. Position the camera as desired, and add the new preset on the **Mechanical PTZ** tab. Presets added in Exacq are automatically added to the camera as well.

Both new and existing PTZ Presets can be given unique, searchable names in Exacq.



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3.7 Video Loss (CPP4)

CPP4 cameras with firmware version 5.92 to 6.0 can experience a periodic loss of video. To resolve this, upgrade the cameras to the latest release. Alternatively, the connection can be made using UDP transport (see Section 3.2), but a camera firmware upgrade is the preferred approach.



3.8 Motion Recording

Motion recording is enabled by default in Exacq. The Bosch camera must be configured with **Motion+** analysis enabled (see Section 2.4).

3.9 Alarm Recording

Alarm recording can be used in Exacq, instead of Motion Recording. The Bosch camera must be configured with **Motion+** analysis enabled (see Section 2.4).

Alarm recording is enabled by creating a link on the **Event Linking** page in Exacq that associates the camera, the event, and the desired action.

Click the **New** button, and then select **Video Motion** as the **Event Type**, a Bosch camera as the **Event Source**, **Record Video** as the **Action Type**, and a Bosch camera as the **Action Target**.

Event Linking

| Log | Event Type | Event Source | Action Type | Action Target | Pre Trigger | Post Trigger | Status |
|-------------------------------------|--------------|--------------|--------------|---------------|-------------|--------------|--------|
| <input checked="" type="checkbox"/> | Video Motion | Camera 2 | Record Video | Camera 2 | 0 | 0 | Off |

Event Type

- Video Motion
- Video Loss
- Input Trigger
- Serial Port
- Serial Profile
- Health
- IP Camera Connection
- Soft Trigger
- Time Trigger

Event Source

- Camera 1
- Camera 2
- Camera 3

Action Type

- None
- Record Video
- Record Audio
- Output Trigger
- Notify
- Auto Export
- PTZ Preset

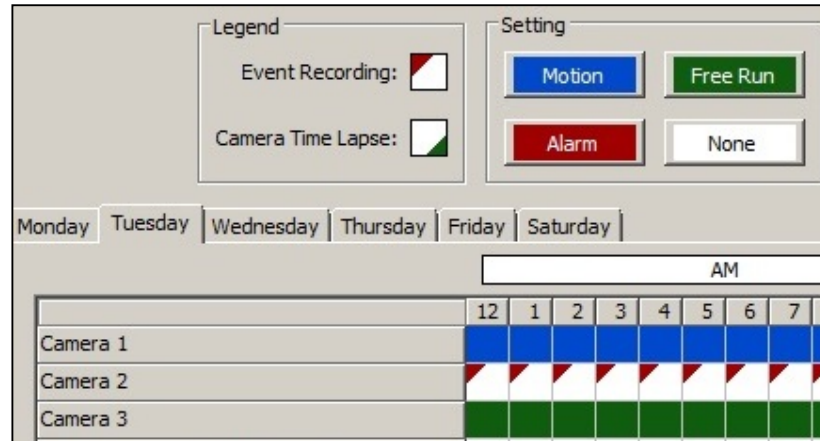
Action Target

- Camera 1
- Camera 2
- Camera 3

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3.10 Scheduling

Open the **Schedule** page to select the type of recording to be applied to a Bosch camera in Exacq, **Motion**, **Free Run**, **Alarm**, or **None**.



3.10.1 Motion

Motion recording is enabled by default, and is indicated by a blue border around the image pane, and a blue bar in the recording timeline.

3.10.2 Free Run

Free Run can be enabled, for continuous recording. **Free Run** is indicated by a green border around the image pane, and a green bar in the recording timeline.

3.10.3 Alarm

Alarm recording can be enabled if an event link has been created (see Section 3.9). **Alarm** recording is indicated by a red border around the image pane, and a red bar in the recording timeline.

Alarm recording can be combined with any of the other three recording modes.

3.10.4 None

Recording of any Bosch camera can be disabled by selecting **None**.