Security Systems

BOSCH

<table>
<tr><td>From</td><td></td><td>Nuremberg</td></tr>
<tr><td>BT-VS/MKP-XPT</td><td>Product Management</td><td>22.06.2023</td></tr>
</table>

Release Letter

<table>
<tr><td rowspan="2">Products:</td><td>***H.264/H.265 Firmware for***

CPP14 HD/UHD/MP cameras</td></tr>
<tr><td></td></tr>
<tr><td>Version:</td><td>***8.80***.*0090*</td></tr>
</table>

This letter contains latest information about the above-mentioned firmware version.

1 General

This firmware release is a feature release for the new platform CPP14.

This firmware supports, and recombines all sub-platforms.

The enhancements with this FW 8.71 for CPP14 are based on FW 8.71.

Changes since former firmware versions are marked blue.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

2   Applicable products

- DINION 7100i IR
- FLEXIDOME indoor 5100i
- FLEXIDOME indoor 5100i IR
- FLEXIDOME outdoor 5100i
- FLEXIDOME outdoor 5100i IR
- FLEXIDOME panoramic 5100i
- FLEXIDOME panoramic 5100i IR
- FLEXIDOME multi 7000i
- FLEXIDOME multi 7000i IR

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

3   Important notes:

3.1   Two-factor authenticated firmware signature

The security of the signature of the firmware file has been strengthened by using a two-factor authentication process for signing the final released firmware file.
The new signature protects from non-released versions being installed in production systems. As a result, pre-release (beta) versions, required sometimes in projects, need to have a special license installed prior to the firmware update. Requests for pre-release versions need to be handled via tech support tickets in order to allow tracking and require a concession signed by the customer.

3.2   "Originally manufactured" certificate

All cameras are prepared to receive a unique Bosch certificate during production, assigned and enrolled by Escrypt LRA. These certificates prove that every device is an original Bosch-manufactured and untampered unit.
Escrypt is a Bosch-owned company, providing the Bosch certificate authority (CA).
Enrollment of the certificates in production is asynchronous to this firmware release.

3.3   Secure Element (TPM)

All CPP14 devices incorporate a new secure crypto-microcontroller, which we call our Secure Element.
"A Secure Element is a tamper-resistant platform capable of securely hosting applications and their confidential and cryptographic data (for example cryptographic keys) in accordance with the rules and security requirements set by well-identified trusted authorities."[1] In this specific case the requirements are defined in the Trusted Platform Module library specification defined by the Trusted Computing Group (TCG). As the Secure Element supports the main functionalities specified by TCG, the ones needed for an IoT device, it is often referred to as a "TPM".
Due to security reasons, the firmware or functionality of the secure crypto-microcontroller cannot be altered in the field.
Thus, not all new security features become available on devices with older secure crypto-microcontroller hardware or firmware revisions.

3.4   Secure Boot Protection

All CPP14 devices are shipped with secure boot enabled, protecting the device from execution of unauthorized code.
Even in the case that an attacker could circumvent all other security barriers, any malicious code would never become active due to secure boot hindering the camera to start with unauthorized code.

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[1] *https://globalplatform.org/wp-content/uploads/2018/05/Introduction-to-Secure-Element-15May2018.pdf*, page 1

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

3.5 Open-Source Software

Bosch Security Systems is an advocate of integrating open-source software into its products. The use of open-source software is noted in the *Service* menu on the *System Overview* page of every camera's web interface. For general information regarding open-source software in Bosch Security Systems products, please visit *http://www.boschsecurity.com/oss*.

- This software is based in part on the work of the Independent JPEG Group.
- This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (*http://www.openssl.org/*).

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

4   New Features

- Support of new camera family **DINION 7100i IR**.

- **Intelligent Streaming** is now also introduced on CPP14 cameras, radically reducing bit rates of encoded video while keeping image quality on high levels. As known from earlier platforms, different levels of bitrate optimization are selectable.
  Also refer to our *'Bosch_IntelligentStreaming_WhitePaper.pdf'*.

- **Autocalibration** allows the calibration of the cameras with minimal effort, just providing camera orientation and height. The camera will start the calibration process by using the P3D detector to identify objects and use this data as an input for estimating calibration. Once sufficient data is collected the camera is fully calibrated.

- **Intelligent Audio Analytics** is now commercially available on FLEXIDOME panoramic 5100i based on a perpetual license that can be ordered separately and installed via Remote Portal. This license enables audio analytics with sound detectors for:
  - T3 Alarm, Smoke detectors, three intermittent beeps followed by a period of silence
  - T4 Alarm, Carbon monoxide detectors, four intermittent beeps followed by a period of silence
  - Gunshot

  Direction of sound is detected and included in metadata. Alarms created by audio analytics are made available via the same interfaces used by other analytics, thus allow an easy integration.
  A demo mode is available, including the possibility to upload audio samples for analysis.

- Support of Simple Network Enrollment Protocol (**SCEP**) to allow an easier integration into Public Key Infrastructure (PKI) due to highly automated certificate distribution and renewal. Also refer to the tech note *'Bosch_CertificateManagement_TechNote.pdf'*.

- Cameras with a USB port option can be equipped with a WLAN USB stick to make commissioning of cameras easier, especially using Project Assistant.
  Supported USB sticks are:
  - Edimax V2 N150 (based on chipset RTL8188EU)
  - TPLINK TL-WN725N

- Network Authentication 802.1x now supports certificates using elliptic curve certificates and SHA384 hashing algorithm.

- The cameras now support intermediate certificates.

- New 8.3MP resolution support for FLEXIDOME panoramic 5100i 9MP to improve compatibility with some video management systems.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

5 Changes

- An issue is fixed where the secure element could be permanently damaged due to wear-out of its internal flash memory. This issue is only applicable if video authentication is enabled with default settings, using MD5, SHA1 or SHA256 as hashing algorithm. The error was introduced with FW 8.50 and affects all firmware versions since.
  For more details refer to our Security Advisory BOSCH-SA-435698-BT, published at our Security Advisory web page
  https://www.boschsecurity.com/xc/en/support/product-security/security-advisories.html
  or visit our PSIRT website at https://psirt.bosch.com.

- An issue is fixed for FLEXIDOME multi 7100i IR by disabling the 1Gbps option for manual network speed settings to avoid the camera entering a state where it only recovers from by a factory reset. In Auto mode, which is the default and recommended, 1 Gbps is still available.

- The function of the license to disable audio has been changed to allow audio analytics access to audio input. Instead of completely disabling the audio engine, the license now disables any audio streaming outside the camera or into recordings to still comply to legal and data privacy regulations.

- The queue size for ONVIF objects is increased to 64 IVA objects.

- Improved overall security by updating 3rd party components due to regular security maintenance.

- A warning message pop-up has been added to the SNMP dialog to ensure a privacy protocol is selected. Without this, SNMP traps are only sent as v1 traps.

- An issue is fixed where after long uptime the wrong time was used for certificate verification.

- An issue was fixed (already in FW 8.71) where the calibration was lost during reboot, causing wrong object detection and speed values.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

6   System Requirements

For configuration purposes:

- Bosch Project Assistant 2.0.1 or higher
- Bosch Configuration Manager 7.62 or higher
- Web Browsers:
  - Google Chrome
  - Microsoft Edge (chromium based)
  - Mozilla Firefox

For operation purposes:

- Bosch Video Security app 3.2.1 or higher
- Bosch Video Security Client 3.2.2 or higher
- Bosch Video Management System 11.0 or higher
- Bosch Video Management System Viewer 11.0 or higher

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

7 Restrictions; Known Issues

7.1 User Interface

- If UAC is set to default in Windows 7, no snapshot or recording via LIVEPAGE is possible.
- Video and audio may be asynchronous during replay via Web page.
- If a VCA configuration using a rule engine is switched to a VCA configuration without using a rule engine, e. g. MOTION+ or IVA default configuration, the saved configuration is invalid. Forensic search with this configuration may lead to undesired search results.
- In Firefox, no audio is audible on the Audio Settings page.
- Opera mini for mobile devices cannot work in Intranets because it gets all pages through an opera proxy on the Internet. If there is no Internet connection no content is provided.
- When changing GUI language, the browser cache may have to be deleted and the web browser be reloaded before the language will be selected correctly.
- Google Chrome requires a plug-in for displaying TIFF images to properly show the reference image.
- Fluent decoding of buffered .mp4 video from camera is strongly dependent on the browser, Jerky video may occur, e. g. with Mozilla Firefox 52.0, which is not a camera malfunction.
- Shutter time values in preview window might slightly deviate from rounded values selectable from dropdown menu.
- Privacy masks and other orientation-related parameters must be checked and eventually re-assigned after rotating a camera.
- On-screen display stamping
    - Font size minimum is ensured for lower resolutions if per mill value would be too small.
    - Font size is automatically limited when maximum display stamping capabilities are reached though values may indicate differently. Limitation is evenly distributed over all defined stamping sections.
- A defective SD card may show 'device ok' status while being unusable. Check recording status for high level error description.
- Microsoft Edge may request re-entering the login credentials multiple times after reactivating a sleeping tab.
- Stream limit settings change is directly executed without requiring the Set button.
- Masking color of the image circle is bound to the privacy mask color.
- When sensor modes are switched, e. g. from 5MP to 3.8 MP, resolutions in automatically generated scripts are not automatically updated, resulting in unsupported resolutions displayed for alarm e-mails. The images will be created with the resolution closest to the one in the script to keep alarm e-mails functional. As soon as a proper resolution is selected, the unsupported resolution disappears from the drop-down box.
- Video may appear stuttering with Firefox 108.02, use different browser version or brand.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- Live preview is not updated when changing stream limits. Page reload or opening the live preview window solves the issue.

7.2   Imaging

- With EIS enabled, as privacy masks are applied to the sensor image, privacy masks may jump depending on the corrections induced by EIS and not exactly match with the drawn area.

- EIS performance can be suboptimal after enabling EIS in 25/30 fps HDR modes, or after switching sensor mode towards HDR 25/30 fps while EIS is on. EIS performance recovers fully after a reboot. It is advisable to either use EIS in 50/60 fps or reboot after activating EIS for 25/30 fps HDR.

- With EIS enabled on perfectly stable cameras, the image might appear artificially shaking due to gyro sensor values varying when at edge, creating unnecessarily high bitrate. It is recommended to use EIS only when camera is mounted unstable.

- Focus area can still be drawn but zoomed display of the selection is not functional since it required MPAX which is not supported anymore by browsers.

- With EIS enabled, privacy masks might not match the drawn area depending on the EIS state since the masks are applied before image stabilization. It might be advised to slightly enlarge the privacy mask areas to ensure privacy.

- With EIS enabled, the virtual movement of privacy masks and the resulting unveiling of background around the masks might cause false motion detection.

7.3   Encoding

- For H.264, only Main/High Profile using CABAC is supported. CAVLC is not supported.

- Frame rates in low light mode might vary and cause bit rate control to produce higher bit rates than set as maximum.

- With GOP structure set to IBP and IBBP the I-frame distance may not exactly correspond with the set value.

- Encoder quality regions are not implemented.

- In case of a high load, the least prioritized stream may drop to a very low frame rate, e. g. 1 or 2 fps, making it difficult for a decoder to synchronize due to a large GOP size. This may result in temporarily showing black video.

- For FLEXIDOME panoramic 5100i in onboard dewarping mode, no B-frames are supported, thus GOP structure is limited to IP.

- When switching line 2 of a FLEXIDOME panoramic 5100i in onboard dewarping mode from quad to panoramic view with OSD configured, it may happen that the camera needs to be rebooted if not recovering automatically.

- With DINION 7100i IR 8MP and 4MP@60fps, B-frames are not supported and thus no GOP structure selectable in encoder profile.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- On FLEXIDOME multi 7100i with 30 fps and image rotated, full frame rate is not possible and frame rate will be limited to 15 fps even with prioritize stream.

7.4 Security

- When using certificates for mutual authentication, it must be ensured that the camera uses a solid and trusted time base. In case the time differs too much from the actual time, a client might be locked out. Then, only a factory default will recover access to the camera.
- Excessive signing, e. g. due to very short video authentication signing interval, may have an impact on TLS connection setup.
- If software sealing is active and SNMP is disabled in Network -> Network Services, no SNMP trap will be sent out on seal break due to the disabled service. The seal break itself is logged.
- Certificates with 3K and 4K keys cannot be used for recording encryption and video authentication.
- ~~SHA384 is not supported for Elliptic Curve certificates as the hash would be truncated to the EC key length of 256 bit.~~

7.5 Network

- QoS values are set according to group Video/Audio/Control for UDP packets, but for TCP packets, only the QoS value for Video is inserted.

  Note: Values are allowed to be entered as ToS values in increments of 4.
  To set a valid DSCP enter a (ToS) value between 32 and 224 as increments of 8.

- Changes to IPv6 settings, e. g. prefix, are not taking effect until device is restarted.
- Gateway setting is empty after switching DHCP to 'Off'. Make sure to manually configure a gateway when needed.

7.6 VCA

- Slow moving objects may not be detected. There is a minimum speed for objects to be detected as moving.
- IVA and flow need at least 12.5 frames per second video input frame rate. If IVA or Flow are configured, minimum frame rate of 12.5 must be set in ALC mode.
- There is only one configuration for IVA. When analysis type is changed, e. g. from IVA to IVA Flow, the former configuration is lost. Due to this, it is not possible to change the analysis type in a VCA profile switch.
- Due to a limitation of the script language that is used in the background, the delay timer for event triggered VCA starts immediately when the configuration is set. A trigger event during this period does not restart the timer. Once the timer has elapsed, operation is as desired.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- "Too dark" alarm is not triggered under normal conditions due to the cameras low-light capabilities.
- VCA shapes are not synchronized with video when using the open-source JavaScript library for decoding.
- In ceiling mount, when the gyro sensor is perpendicular to earth plane, the roll angle cannot be determined and appears unstable, thus must be ignored.
- Reference image becomes invalid with changing the base frame rate, or rotating or mirroring the image, and needs to be re-created.
- As dynamic lens curves are not implemented yet, especially applicable to varifocal lenses, the focal length is optimized for the r/2 of the inner circle of field-of-view to reduce deviations for IVA to a minimum. Introduction of the lens curves will improve this in future firmware.
- When using 3.8 MP 16:9 image mode, IVA objects are systematically displaced. This issue will be fixed with next firmware release.

7.7 MOTION+

- An alarm recording configured to be triggered by MOTION+ with masks may not be operational after reboot. Saving MOTION+ configuration without any changes recovers from that. Alternatively, masks may not be used with MOTION+.

7.8 Recording

- LUN size for local recording via "Direct iSCSI" is limited to 2 TB.
- VRM version 2.12 or higher is required.
- In some cases, formatting errors on external iSCSI drives may occur, which might need multiple tries to overcome.
- In rare cases it may happen that the owner of an iSCSI LUN is not displayed correctly. Recording is not affected; just previous owner remains displayed.
- If a device had primary and secondary recording running on SD card and is then added to a VRM system, the blocks used for primary recording will not be re-used, reducing the available recording space for the ANR recording. This can be solved by re-formatting the SD card.
- SD card recording performance is highly dependent on the speed (class) and performance of the SD card.
- With I-frame-only recording and audio also enabled for recording, audio will be fragmented or not audible during replay. Please disable audio recording in case of I-frame-only recording.
- Numbering of the recorded files on the replay page is not always contiguous.
  If snippets across block borders belong together, like pre-alarm and alarm recording, the snippets become logically united and only the lower file number is presented in the list.
- SDXC cards are formatted to FAT32 file system and not using the exFAT file system as being mandatory for SDXC standard compliance but fully recognized and accessible.
  The maximum size of 2TB is also supported with FAT32, once SD cards of that size might

become available.
FAT32 also increases portability to other than Windows platforms.

- If a local media is exchanged, existing former recordings are only discovered after rebooting the device.

- Physically removing the local storage media while recording causes the device to reboot. Recording must be stopped before removal.

- Changing audio format while audio is being recorded may cause unknown behaviour of the device and must be avoided.

- The storage system indicator status must be ignored during formatting of an SD card.

- Forcing the camera into an overload situation may cause undesired behaviour and in worst cases even recording gaps. It should always be ensured that the CPU load is not consistently around or at its maximum. This can be achieved by adapting encoder settings or avoiding too many tasks, e. g. client sessions, in parallel.

- Selection of streams for recording is limited to stream1 and 2 only.

- Encoder profile selection per stream is only possible for all four imagers simultaneously.

- Recording profile names are defined for defaults. Changes to the profile may mismatch with the pre-defined name, thus adaption may be advised.

- Recording will continue even if local storage is deselected until already allocated storage spans are utilized, then stop.

7.9 Export

- FTP exported files which include audio in a format other than AAC must be renamed from .mp4 to .m4a to allow correct playback in QuickTime.

- With JPEG Posting active when device is booting, the first posted JPEG image may be a no-cam logo.

- FTP posting with resolution 1080p delivers JPEG with size of 1920x1072 pixels due to 16 pixels macroblock boundary of the JPEG encoder.

- If FTP export files contain only a few frames some players might not correctly replay such a file, or the replay is too quick to recognize something. The exported file is not corrupt though it might seem so.

- Files exported using continuous FTP backup for Rec. 2 where stream 2 is set to I-frames only mode contain wrong timing information and play back too fast.

- FTP export file size is always 100 MB if resolution change occurred in exported time span.

- After modifying account settings, e. g. FTP server address, to get the changes applied either switching posting off and on or restarting the device is required.

- Using "export from memory" with pre-alarm recording exceeding the available memory will cause continuous recording on the account storage. Checking the memory requirement of the pre-alarm ring is advised to avoid unexpected memory consumption.

- Dropbox is not supported anymore.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- SD-card export of an entire file does not work. Manually configuring the export time will lead to a successful export though.
- On FLEXIDOME panoramic 5100i in onboard dewarping mode, JPEGs for image posting from line 2 and line 3 have resolutions adapted depending on their respective aspect ratio, with either the horizontal or vertical resolution, whatever is smaller, taken as the minimum from the resolution of line 1.

7.10 Audio Analytics

- Detection of arrival may be impacted by the installation location and surroundings, and not always be correct due to reverberations.
- Detection of arrival could be erratic in demo mode.
- Setting the threshold level to 1 will always trigger an alarm. Use a reasonable threshold to avoid a high false alarm rate.

7.11 Miscellaneous

- Before upgrading firmware, it is best practice to back-up all configurations first, incl. IVA and calibration.
- After reboot, the system time re-synchronisation may be delayed up to 9 seconds for SNTP respectively up to 14 seconds for time server protocol.
- AAC audio timestamps for UDP live video streams as well as for recording streams are based on 90 kHz instead of 16 kHz to ensure compatibility with Video SDK.
  AAC audio timestamps for TCP live video streams are based on the standard 16 kHz timestamps. Standard players should connect to live video with AAC audio using TCP.
- After changing the selectable camera mode via alarm input the switch back to a previous mode doesn't work anymore.
- Firmware upload stops recording when it fails or is terminated.
- Uploading a configuration file from a different camera platform may result in unpredictable behaviour.
- When combining CPU-intensive functions like e. g. encryption, watermarking, or dual recording, with high quality and high frame rate encoder settings, tuning of encoder profile settings might be required to avoid overload situations.
- No time change is allowed during the time when the "hour is repeated".
- Maintenance log file creation and download requires some time, though there is no progress indication, and needs to be waited for completion.
- Millisecond stamping is not supported.
- JPEGs with VCA overlay are not fully synchronized. Shapes might be slightly off.
- Audio back-channel in Chrome browser may be delayed when using an unsecure or unaccepted HTTPS certificate.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- In scenes with mixed lighting, the image appearance might be greenish. To solve this, switch the white balance mode to Sodium lamp Auto.

- If the configured bitrate for a JPEG is too low, the JPEG encoder will nevertheless create its minimally required bitrate, exceeding the expected bitrate.

- 5MP and larger JPEG streaming via RTSP is only possible with decoders supporting the ONVIF extensions.

  JPEG streaming via RTSP is based on RFC 2435. This RFC only allows for a maximum JPEG size of 2048 by 2048.
  With ONVIF, the original, larger JPEG headers can also be transmitted via RTP header extensions. Unfortunately, this only works with decoders using these extensions, i. e. it does not work with a standard VLC.

- JPEGs for JPEG posting and in alarm e-mails are taken from the JPEG stream, thus 'burn-in' metadata overlays are not possible.

- In onboard dewarping mode, HDMI output selecting the image circle on a 12 MP sensor camera will not show an image due to resource exhaustion.

- On FLEXIDOME panoramic 5100i in onboard dewarping mode, line 2 and line 3 do not show VCA overlay on JPEGs and MJPEG stream, but line 1 only. For alarm email option, when enabling VCA overlay, it should be prevented to choose line 2 or line 3.

- With using stream prioritization, non-prioritized streams will drop frame rate when camera is not able to fulfil all requested streams equally.

- JPEG generation, especially with resolutions that are not matching a pre-defined JPEG stream, puts extra load on the camera which could lead to frame drops with cameras that are close to the performance capacity. It is recommended to set an unused stream to JPEG with the required resolution, allowing snap.jpg to take a pre-processed JPEG from this stream without creating extra load.

Please check the respective release letter of a camera for further device-specific restrictions.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

8   Previous Revisions

8.1   New Features with 8.71.0066

- Adaptive IR has been introduced based on scene content to avoid over-exposure if objects are close to the camera.

- Highly reliable SD card recording with life cycle monitoring

  Industrial SD cards which provide wear level data can be monitored for their health and expected lifetime, providing much more reliable SD card recording.
  Three vendors have been tested and qualified:
    o   Micron
    o   Sony
    o   Western Digital (SanDisk)

  Due to the high dynamic in the Industrial SD card market, no direct reference to the models can be given.
  Therefore, Bosch has selected specific WD models and provides them as accessory:
    o   MSD-064G, MSD-128G, MSD-256G, SD-064G, SD-128G, SD-256G

- Genetec Stratocast support has been re-enabled with the same feature set as known from former platforms.

- Dynamically colored privacy masks, depending on surrounding video added. This can be used to not distract the operator due to intense color, e. g. white privacy mask in night scene.

- A stronger hashing algorithm, SHA384, is supported for HTTPS and network authentication 802.1x usages with RSA key certificates.

- The network parameter 'hostname' now remains in the configuration during factory default sequence due to application variant switching.

- Support of up to 4096 bit RSA key length in the Secure Element. This allows the creation of Certificate Signing Requests with up to 4096 bit RSA keys, and securing private data with hardware-protected 4096 bit RSA encryption and signature keys.

- Certificates with key length of 3072 bit and 4096 bit, using hashing algorithm of up to SHA256, can be used for HTTPS, EAP-TLS and user authentication usages.

- Network authentication 802.1x with EAP-MD5 and EAP-TLS is now supported.

- More streaming resolutions were added on streams 2 and 3.

- Support of ONVIF Profile M, including MQTT event forwarding.

- New Western Digital industrial SD cards with lifespan monitoring are supported.

- SNMP has been added, supporting v1 and v3, both including traps.
  RCP+ integration is widely done to create similar support as of earlier platforms.
  New MIB file is available and distributed with the firmware package.

- IR intensity level can be independently configured for each of the center and the four surrounding regions.

- Privacy masks can be enabled and disabled via a single switch command.
- For backward compatibility with legacy clients, applicable where alternative measures are put in place, the check on the HTTP referrer, an improvement to reduce the vulnerability for Cross Site Request Forgery (CSRF) attacks, can be disabled via the user interface.
- TLS 1.3 is supported, including the possibility to set the minimum TLS version.

8.2   Changes with 8.71.0066

- An issue is fixed for the Remote Portal credentials where necessary network settings were set to default on application variant switching.
- An issue is fixed where audio format could not be changed in browser after recording stopped, only after refreshing or re-opening the browser, or rebooting the camera.
- An issue is fixed where the SNMP trap community name could not be changed.
- An issue with certain VCA events erroneously reporting 'signal loss' via ONVIF is fixed.

8.3   Changes with 8.71.0066 on CPP14.2 only

- On FLEXIDOME panoramic 5100i, dynamically colored privacy masks have temporarily been disabled due to an issue that will be fixed in next version.
- Experimental Intelligent Audio Analytics are removed from this version. Installed pilot licenses will not work anymore.

8.4   New Features with 8.70.0067

- Support for new FLEXIDOME indoor 5100i (IR) and FLEXIDOME outdoor 5100i (IR) cameras, including support for
    - o   Electronic Image Stabilization (EIS)
    - o   Analog output on 2 MP and 5MP IR models
- Introduction of new Intelligent Video Analytics (**IVA**) **Pro Packs** with new licenses:
    - o   FLEXIDOME indoor/outdoor 5100i cameras are equipped with **IVA Pro Buildings Pack**. Based on deep learning, the IVA Pro Buildings Pack is ideal for intrusion detection and operational efficiency in and around buildings. Without the need for any calibration, it can reliably detect, count, and classify persons and vehicles in crowded scenes.
    - o   The **IVA Pro Perimeter Pack** is well-suited for reliable long-range intrusion detection, alongside perimeters of buildings, energy facilities, and airports even in extreme weather. Based on advanced background subtraction, it can detect crawling, rolling,

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

and other suspicious movements inside, outside, and under various environmental and lighting conditions while minimizing false triggers. IVA Pro Perimeter Pack is an additional, licensed option on the FLEXIDOME indoor/outdoor 5100i cameras. It also includes Camera Trainer.

- o The **IVA Pro Traffic Pack** is designed for ITS applications such as counting and classification, as well as Automatic Incident Detection. Robust algorithms based on deep neural networks are trained to detect and differentiate persons, bicycle, motorbikes, cars, busses and trucks while ignoring potential disturbances caused by vehicle headlights or shadows, extreme weather, sun reflections, and shaking cameras. IVA Pro Traffic Pack is an additional, licensed option on the FLEXIDOME indoor/outdoor 5100i cameras.

- On FLEXIDOME panoramic 5100i, in onboard dewarping mode, the supported resolutions for line 2 and line 3 have been increased:
  - o For e-PTZ, a maximum resolution of 2 MP is supported.
  - o For quad view, a maximum resolution of 5.3 MP is supported.
  - o For double panoramic, a maximum resolution of 3.7 MP is supported.
  - o A corridor mode with 1.9 MP is available.
  - o The former maximum resolution, 1.3 MP, is still the maximum for panoramic and full panoramic, and is also still available for the other modes except for the new corridor mode.

- On FLEXIDOME panoramic 5100i, up to 6 pre-positions can be set and saved for the dewarped view modes.

- FLEXIDOME panoramic 5100i is prepared for Intelligent Audio Analytics. Limited pilot licenses can be shared upon special request.

- Genetec Stratocast support has been re-enabled with the same feature set as known from former platforms.

- Dynamically colored privacy masks, depending on surrounding video added. This can be used to not distract the operator due to intense color, e. g. white privacy mask in night scene.

- A stronger hashing algorithm, SHA384, is supported for HTTPS and network authentication 802.1x usages with RSA key certificates.

8.5   Changes with 8.70.0067

- An issue is fixed where necessary network settings were set to default on application variant switching. This includes the hostname setting as well as the Remote Portal credentials.

- An issue is fixed where the hostname was not transferred to DHCP/DNS on Windows 2019 Server.

- Description and explanation were improved in web browser interface on using country code instead of country name in Certificate Signing Requests.

From			Nuremberg
BT-VS/MKP-XPT	Product Management		22.06.2023

- An issue is fixed where the EAP authorization was locked on PEAP, if included in the negotiation chain, but did not continue to EAP-TLS.
- The name of the menu 'IR Illumination' has changed to 'Illumination' only to prepare for white light illumination in future.

8.6 New Features with 8.51.0009

- HDMI output is now supporting dewarped views when the camera is running in onboard dewarping mode. View on HDMI output can be selected from one of the virtual lines.
- The network parameter 'hostname' now remains in the configuration during factory default sequence due to application variant switching.

8.7 Changes with 8.51.0009

- An issue is fixed where, in onboard dewarping mode, only the top-left image pane of a quad-view could be PTZ controlled.
- An issue is fixed where video was too dark in 20 fps HDR mode and onboard dewarping mode.
- An issue is fixed where the device could occasionally reboot when switching sensor modes.
- ICMP redirects are now disabled by default.

8.8 New Features with 8.50.0138

- Onboard dewarping for FLEXIDOME panoramic 5100i family, providing the possibility to switch the operational mode of the camera to provide three virtual cameras:
    - First virtual camera provides the image circle as with normal mode.
    - Second virtual camera allows to select one of several pre-defined panoramic views, or an electronic PTZ operation.
    - Third virtual camera provides an electronic PTZ operation.
- Support of up to 4096 bit RSA key length in the Secure Element. This allows the creation of Certificate Signing Requests with up to 4096 bit RSA keys, and securing private data with hardware-protected 4096 bit RSA encryption and signature keys.
- Certificates with key length of 3072 bit and 4096 bit, using hashing algorithm of up to SHA256, can be used for HTTPS, EAP-TLS and user authentication usages.
- Network authentication 802.1x with EAP-MD5 and EAP-TLS is now supported.
- More streaming resolutions were added on streams 2 and 3.
- Support of ONVIF Profile M, including MQTT event forwarding.
- New Western Digital industrial SD cards are supported.

- SNMP has been added, supporting v1 and v3, both including traps.
- RCP+ integration is widely done to create similar support as of earlier platforms.
- New MIB file is available and distributed with the firmware package.
- IR intensity level can be independently configured for each of the center and the four surrounding regions.
- As the lens can rotate independently from IR, the IR zones do not match up with the FoV orientation of the camera once manually rotated. The rotation offset can be entered manually.
- Privacy masks can be enabled and disabled via a single switch command.
- For backward compatibility with legacy clients, applicable where alternative measures are put in place, the check on the HTTP referrer, an improvement to reduce the vulnerability for Cross Site Request Forgery (CSRF) attacks, can be disabled via the user interface.
- TLS 1.3 is supported, including the possibility to set the minimum TLS version.

8.9   Changes with 8.50.0138

- Security improvements require the minimum firmware to be set to 8.50 with this firmware to avoid firmware downgrade which would circumvent the security improvements.
- Due to higher security requirements, global licenses now need new license keys.
  Note: These licenses can only be cleared via our repair services.
  - Internal storage can be disabled and hidden for certain LATAM countries.
    - 12-01.65.01-4E2A8B15-3FE4DA2E-94234DB9-09F2F9F8-2E53B935
  - The microphone can be permanently blocked to allow use of the cameras in countries where audio input is legally not permitted.
    - 12-01.63.01-380AAC7E-B71E0D3D-6ADCC50C-6F296E08-F3AFBB71
- Since increased security restrictions in browsers do not allow to use external company and device logo images, theses now non-functional controls were removed.
- An issue with changing image settings in menus 'Color', 'ALC' and 'Enhance' not breaking software sealing is fixed.

8.10 New Features with 8.20.0143

- Support of new cameras FLEXIDOME panoramic 5100i and FLEXIDOME panoramic 5100i IR with 12 MP and 6 MP models, both supporting HDR.
- Cameras provide an image circle together with an appropriate lens curve to allow dewarping at client side.
- Independent configuration and streaming of four streams is supported. All four streams can be configured to use H.265 or H.264 encoding on various resolutions. The fourth stream can also be configured for JPEG compression.
- Support of ONVIF Profile M, including MQTT event forwarding.

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BT-VS/MKP-XPT	Product Management		22.06.2023

- New Western Digital industrial SD cards with lifespan monitoring are supported.
- SNMP has been added, supporting v1 including traps and v3, traps pending. RCP+ integration is widely done to create similar support as of earlier platforms. New MIB file is available and distributed with the firmware package.
- IR intensity level can be independently configured for each of the center and the four surrounding regions.
- Privacy masks can be enabled and disabled via a single switch command.
- HDMI output is supported with resolutions up to 1080p, allowing to connect a monitor display directly.

8.11 Changes with 8.20.0143

- Camera Trainer license is not needed anymore, and Camera Trainer function is allowed by default.

During a penetration test, Kaspersky Lab, who was contracted by Bosch for IP camera security maturity certification, detected a vulnerability which required immediate action to ensure the security of installations using our cameras.

For more details refer to our Security Advisory BOSCH-SA-033305-BT, published at our Security Advisory web page
https://www.boschsecurity.com/xc/en/support/product-security/security-advisories.html
or visit our PSIRT website at https://psirt.bosch.com.

- An issue which provided a possibility to conduct a CSRF (Cross Site Request Forgery) attack is fixed (CVE-2021-23848).

8.12 Changes with 8.00.0155

- VCA can be switched off and does not impose any CPU load in this case.
- Tooltip is activated on CPU load indicator in top bar of web interface to provide more details.

8.13 New Features with 8.00.0153

- Quad-streaming capability providing three independently configurable H.264/H.265 streams plus M-JPEG stream per video imager.
- Stream prioritization for one of the H.264/H.265 streams per video imager.
- Support for next generation Secure Element microcontroller (TPM), supporting up to 4096 bits RSA keys
- Flexible on-screen display stamping

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BT-VS/MKP-XPT	Product Management		22.06.2023

- o Font size can be defined per stamping section, resolution-independent by per mill of screen size.
  Font size will automatically be limited to the possible maximum size, evenly distributed over all stamping sections.
- o Text and background colours can be defined per stamping section.

Please note that the firmware running this platform inherits the functionality and features from firmware version 7.80 for platforms CPP6, CPP7 and CPP7.3. For a complete overview of the comprehensive feature set and the history of introduction refer to release notes of one of these platform firmware releases.