

Bosch Monitor Wall RCP+ Reference

Version 10.00

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General Notes

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Note

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Trade marks

All names used in this manual for hardware and software are very probably registered trade marks and must be treated as such.

Glossary

Hardware Decoder	Physical device that hosts one instance of the Monitor Wall application.
Monitor Wall	The name of the main application designed for showing streams (video, audio and metadata) from different video sources.
Line	One-based index for physical video out connectors of a hardware decoder. Each line corresponds thus to one connected physical screen.
Coder	One-based index for video panels on each line. Each video panel can display one video stream.
Layout	Arrangement of video panels (coders) on a line. Each line can have its own layout.
IP Matrix	Cluster of 1 to 4 hardware decoders that control up to 8 physical screens.

Transport Protocol

The transport protocol for this remote control follows the general specifications for Bosch Video over IP cameras. For further details, please refer to the corresponding Rcp+ specification document.

Remote Control ProtocolPlus Protocol Header Layout

Version 3 (VIP, VideoJet and VipX Series and VIP110Version 6.0 and higher). The RCP Plus protocol header consists of 16 Bytes. The begin of the payload section is now on DWORD boundary.

				16		32	
<div>Tag</div> <div>2 Bytes</div>				<div>Data Type</div> <div>1 Byte</div>	<div>Version</div> <div>4 Bits</div>	<div>R/W</div> <div>4 Bits</div>	
<div>C</div> <div>1</div>	<div>T</div> <div>1</div>	<div>Action</div> <div>6 Bits</div>	<div>Reserved</div> <div>1 Byte</div>	<div>Client ID</div> <div>2 Bytes</div>			
<div>Session ID</div> <div>4 Bytes</div>							
<div>Numeric Descriptor</div> <div>2 Bytes</div>				<div>Payload Length</div> <div>2 Bytes</div>			

Tag

Each tag is represented by two octets. It identifies the command which should be processed by the VideoJet.

Data Type

Specifies the data type of the payload section. These are the currently available data types:

Values:

F_FLAG	0x00 (1 Byte)
T_OCTET	0x01 (1 Byte)
T_WORD	0x02 (2 Byte)
T_INT	0x04 (4 Byte)
T_DWORD	0x08 (4 Byte)
P_OCTET	0x0C (N Byte)
P_STRING	0x10 (N Byte)
P_UNICODE	0x14 (N Byte)

Version

The current RCP version is 3. Backward compatibility to version 2 or version 0 is NOT provided.

R/W

Specifies whether the command should read or write. The Read/Write field is coded in the lower nibble of byte 4.

Values:

Read	0x0
Write	0x1

T

StringTable available. This bit signals, when set, that there is a string table appended to this RCP+ packet which contains IPv6 addresses or host names.

C

Continuation. This bit signals, when set, that this RCP+ packet is not terminated in the payload; additional packets with the full RCP+ header will follow immediately in the stream as long as this bit is cleared. The reassembly of the complete payload is up to the application and is beyond the scope of this document.

Action

Specifies the kind of the packet.

Values:

Request	0x00
Reply	0x01
Message	0x02
Error	0x03

Client ID

Each RCP client register results in a Client ID; this ID has to be provided in all following RCP commands.

Session ID

This ID is used for implementations which need to identify a once registered user in other applications or RCP sessions.

Numeric Descriptor

The Numeric Descriptor specifies an attribute for components which are installed more than one time inside the VideoJet, e.g. inputs or relays. The first component is always counted as 1. If this field is not applicable to the command in this packet, a value of zero should be inserted.

Payload Length

The number of data bytes inside the payload section. The length field itself is not counted.

Reserved

This byte is returned by the VideoJet unchanged. It is up to the user to setup a request ID here to assign the replies to multiple pending requests .

Identification

HARDWARE_VERSION

	Tag code	NumDes	Message	SNMP Support
	0x002e	No	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	read the hardware version	
Write			not supported	

Gets the system hardware version.

For devices “BOSCH CCTV HWD EL” or “BOSCH CCTV HWD HE” the result value is F1004940.

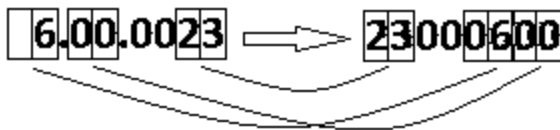
For other devices the result value is F100fe40

SOFTWARE_VERSION

	Tag code	NumDes	Message	SNMP Support
	0x002f	no	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	read the software version	
Write			not supported	

Gets the system software version.

For example: For build 6.00.0023 result is 23000600:



DEVICE_TYPE_IDS

	Tag code	NumDes	Message	SNMP Support
	0x0b07	no	No	no
	Datatype	Access Level	Description	
Read	p_octet	noprot	read the device type ids	
Write			not supported	

Gets the device type IDs.

1st four bytes: Product ID (0x49 for MW); 2nd four bytes: Variant ID. 3rd four bytes: reserved.

SERIAL_NUMBER

	Tag code	NumDes	Message	SNMP Support
	0x0ae7	no	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	returns the serial number of the device	
Write			not supported	

Gets the system serial number.

If it is not defined the result is "000000000000000000". Max length is 127characters.

UNIT_NAME

	Tag code	NumDes	Message	SNMP Support
	0x0024	no	no	no
	Datatype	Access Level	Description	
Read	p_unicode	noprot	read the unit name	
Write	p_unicode	service	set unit name	

Specifies the unit name(max 32 unicode characters).

UNIT_ID

	Tag code	NumDes	Message	SNMP Support
	0x0025	No	no	no
	Datatype	Access Level	Description	
Read	p_unicode	noprot	read the unit ID	
Write	p_unicode	service	set unit ID	

Specifies the unit name(max 32 unicode characters).

MONITOR_NAME

	Tag code	NumDes	Message	SNMP Support
	0x028a	Line	no	no
	Datatype	Access Level	Description	
Read	p_unicode	noprot	read the video monitor name	
Write	p_unicode	service	not supported	

Gets the name of each line.

CAPABILITY_LIST

	Tag code	NumDes	Message	SNMP Support
	0xff10	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	noprot	see detailed description	
Write			not supported	

Gets the list of system capabilities.

Reply payload Structure

0xBABA 2 Bytes	Version 2 Bytes	NbSection 2 Bytes	Section 1	...	Section N
--------------------------	---------------------------	-----------------------------	------------------	-----	------------------

Version

current version of the capabilities (0x0001)

NbSection

Number of following sections. Hardcoded (0x0019)

Section Structure

Type	Size	NbElement	Element	...	Element
2 Bytes	2 Bytes	2 Bytes	1		N

Type

Type of Element

Values:

Video 0x0001

Size

Size of the section including SectionType, Size and NbElement. If the section is unknown, you can skip to the next using the size.

NbElement

Determines how many Elements are following. The definition of each Element depends on the type of the section.

Element Structure

Type	Identifier	Compr	InputNo	Resolution
2 Bytes	2 Bytes	2 Bytes	2 Bytes	2 Bytes

Type

is one of the following

Values:

VIDEO_DECODER 0x0002

Identifier

One-based coder number.

Compression

is one or multiple of the following

Values:

VIDEO_COMP_MPEG2 0x0001
 VIDEO_COMP_MPEG4 0x0002
 VIDEO_COMP_H264 0x0004
 VIDEO_COMP_JPEG 0x0008
 VIDEO_COMP_H265 0x0010

OutputNo

One-based line number.

Resolution

Not used.

Other sections are not supported by Monitor Wall.

The number of decoders reported is by default 25. It can be influenced by the NUMBER_OF_DECODERS command.

PRODUCT_NAME

Tag code		NumDes	Message	SNMP Support
0x0aea		no	no	no
Datatype		Access Level	Description	
Read	p_string	noprot	Read the commercial type number (CTN) of the device (SKU number).	
Write			not supported	

COMMERCIAL_TYPE_NUMBER

Tag code		NumDes	Message	SNMP Support
0x0be7		no	no	no
Datatype		Access Level	Description	
Read	p_string	noprot	Read the commercial type number (CTN) of the device (SKU number).	
Write			not supported	

System**APP_OPTION_UNIT_ID**

Tag code		NumDes	Message	SNMP Support
0x09e1		no	no	no
Datatype		Access Level	Description	
Read	p_string	user	read unique unit id (installation code)	
Write				

Read out the unique unit id (installation code) for setting application options (licenses keys).

APP_OPTION_SET

Tag code		NumDes	Message	SNMP Support
0x09e2		no	no	no
Datatype		Access Level	Description	
Read	p_string	user	read installed application options	
Write	p_string	service		

Read request returns a readable string with details on all installed application options (license type, count, authorization number, start and end date if applicable).

Write request either installs an application option when the payload represents a license key, or uninstalls an application option when the payload represents the authorization number (order or purchase number) of an previously installed application option. A write request response does not contain a payload, the check

for a successful installation of an application option requires an inspection of the read request response after the device's application restart (triggered automatically by the write request).

Bosch hardware decoders may include pre-installed application options that cannot be deleted, identifiable by authorization numbers like "BoschDevice".

PERMISSIONS

	Tag code	NumDes	Message	SNMP Support
	0xe22a	no	no	no
	Datatype	Access Level	Description	
Read	t_int	user	read permissions	
Write	t_int	service	write permissions	

Gets and sets the permissions as bit-field (only the lower 16 bit are used):

Bit 0 (0x1): If set, permission to access the recording is granted (replay permission)

For write access, the upper 16 bit can optionally be used as mask field. If a mask is provided, only those permission flags will be changed where a mask bit is set. An empty mask (value 0x0000) will be interpreted like a full mask (0xFFFF).

SSD_CAPABILITIES

	Tag code	NumDes	Message	SNMP Support
	0xe226	no	no	no
	Datatype	Access Level	Description	
Read	t_word	user	read the SSD capabilities	
Write			not supported	

Gets the SSD capabilities as bit-field:

Bit 0 (0x1): Write protection feature is supported

Bit 1 (0x2): SSD encryption supported in principle, but write protection is turned on and blocks changes to the SSD encryption mode

Bit 2 (0x4): SSD encryption supported

SSD_WRITE_PROTECTION_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe227	no	no	no
	Datatype	Access Level	Description	
Read	t_word	user	read the SSD write protection mode	
Write	t_word	service (VJD only)	set the SSD write protection mode	

Gets/sets the SSD write protection mode:

0: Off

1: On

Only supported when the SSD write protection feature is supported.

The device will perform an immediate automatic reboot after a change of the SSD write protection mode.

Note: If SSD write protection feature is supported but SSD write protection is turned off, the device will enter an extended configuration mode. In this mode, extensive changes to configuration can be performed, like SSD encryption. Standard configuration is still possible in extended configuration mode, but video connections are not supported. The user can distinguish this mode by the extended configuration icons shown in the middle of each video panel. By turning on the SSD write protection, the device will leave the extended configuration mode and will resume normal operation after the automatic reboot.

SSD_ENCRYPTION_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe228	no	no	no
	Datatype	Access Level	Description	
Read	t_word	user	read the SSD encryption mode	
Write	t_word	service (VJD only)	set the SSD encryption mode	

Gets/sets the SSD encryption mode:

0: Off

1: On

Can only be set when the SSD write protection feature is either not supported or turned off (see SSD_CAPABILITIES and SSD_WRITE_PROTECTION_MODE).

The device will perform an immediate automatic reboot after a change of the SSD encryption mode.

Encryption/decryption of the SSD may take several minutes, a progress indicator is shown on the screen.

The monitor wall service is not available while encryption/decryption is still running.

Attention: As long as the SSD is encrypted, the factory reset feature is not available. Before performing a factory reset, turn off SSD encryption.

USB_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe229	no	no	no
	Datatype	Access Level	Description	
Read	t_word	user	read the USB lockdown mode	
Write	t_word	service (VJD only)	set the USB lockdown mode	

Gets/sets the USB lockdown mode:

0: Off, all USB human interface devices (mouse, keyboard) are supported

1: On, USB is locked down, no USB devices are supported

Can only be set when the SSD write protection feature is either not supported or turned off (see SSD_CAPABILITIES and SSD_WRITE_PROTECTION_MODE).

The device will perform an immediate automatic reboot after a change of the USB lockdown mode.

Attention: After turning on the USB lockdown, no human interface devices are supported, thus the serviceability of the device is severely restricted. The only remaining access method is the Ethernet connector.

Network

MAC_ADDRESS

	Tag code	NumDes	Message	SNMP Support
	0x00bc	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	noprot	read out the systems MAC address	
Write			not supported	

Gets the system MAC address.

IP_STR

	Tag code	NumDes	Message	SNMP Support
	0x007c	no	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	read the unit's IP address using string notation (xxx.xxx.xxx.xxx)	
Write	p_string	service (VJD only)	set unit's IP address using string notation (xxx.xxx.xxx.xxx)	

Specifies the system IP address

Note: Monitor Wall should be started with administrative rights.

GATEWAY_IP_STR

	Tag code	NumDes	Message	SNMP Support
	0x007f	no	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	read the gateway IP using string notation (xxx.xxx.xxx.xxx)	
Write	p_string	service (VJD only)	set gateway IP using string notation (xxx.xxx.xxx.xxx)	

Specifies the system gateway IP address.

Note: Monitor Wall should be started with administrative rights.

SUBNET_STR

	Tag code	NumDes	Message	SNMP Support
	0x007d	no	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	get current subnet mask string notation (xxx.xxx.xxx.xxx)	
Write	p_string	service (VJD only)	set subnetmask string notation (xxx.xxx.xxx.xxx)	

Specifies current system subnet mask.

Note: Monitor Wall should be started with administrator rights

DEVICE_IP_ADDRESS

	Tag code	NumDes	Message	SNMP Support
	0xd052	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	noprot	get network configuration	
Write	p_octet	service (VJD only)	set current network configuration	

Get/set network configuration.

Payload:

6 byte MAC address, 2 bytes reserved

4 bytes IPv4 address

4 bytes IPv4 subnet mask

4 bytes IPv4 gateway

128 bytes reserved

1 byte selector, 3 bytes reserved

Used selector bits for write commands:

Bit0 (0x01): Set IPv4 address

Bit1 (0x02): Set IPv4 subnet mask

Bit2 (0x04): Set IPv4 gateway

Note: Use selector 0x07 to configure all network settings in one step.

DHCP_VAL

	Tag code	NumDes	Message	SNMP Support
	0x00af	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the DHCP state (0=OFF, 1=ON)	
Write	t_octet	service (VJD only)	set DHCP ip configuration (0=OFF, 1=ON)	

Time

DATE_WDAY

	Tag code	NumDes	Message	SNMP Support
	0x0027	no	No	no
	Datatype	Access Level	Description	
Read	p_string	noprot	"Sunday" ... "Saturday"; read the weekday according to the systems date setting	
Write			not supported	

Gets the current system weekday.

For example if date is 01/17/2013, result will be "Thursday".

DATE_DAY

	Tag code	NumDes	Message	SNMP Support
	0x0028	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the day of month	
Write			not supported	

Gets the current system day.

Example: Date is 1/17/2013. Result is 17

DATE_MONTH

	Tag code	NumDes	Message	SNMP Support
	0x0029	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the month	
Write			not supported	

Gets the current system month.

Example: Date is 1/17/2013. Result is 1

DATE_YEAR

	Tag code	NumDes	Message	SNMP Support
	0x002a	no	no	no
	Datatype	Access Level	Description	
Read	t_word	noprot	read the year	
Write			not supported	

Gets the current system year;

Example: Date is 1/17/2013. Result is 2013

TIME_HRS

	Tag code	NumDes	Message	SNMP Support
	0x002d	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the hours	
Write			not supported	

Gets the current system count of hours;

Example: Time is 14:35:48. Result is 14

TIME_MIN

	Tag code	NumDes	Message	SNMP Support
	0x002c	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the minutes	
Write			not supported	

Gets the current system count of minutes.

Example: Time is 14:35:48. Result is 35

TIME_SEC

	Tag code	NumDes	Message	SNMP Support
	0x002b		no	no
	Datatype	Access Level	Description	
Read	t_octet	noprot	read the seconds	
Write			not supported	

Gets the current system count of seconds.

Example: Time is 14:35:48. Result is 48

TIMEZONE

	Tag code	NumDes	Message	SNMP Support
	0x024e	no	no	no
	Datatype	Access Level	Description	
Read	t_int	noprot	the timezone in which the unit has to operate (UTC +- nbr of seconds +- nbr of seconds DLS)	
Write			not supported	

Gets the current system time zone as difference in seconds from UTC (including daylight saving time adjustment).

For example UTC+02:00 is represented as 7200; UTC-01:00 is represented as -3600

TIME_ZONE_STRING

	Tag code	NumDes	Message	SNMP Support
	0xd027	no	no	no
	Datatype	Access Level	Description	
Read	p_unicode	noprot	On read direction the command returns all possible localized timezone strings, delimited by ";". The first timezone string denotes the current timezone and is therefore contained twice in the payload.	
Write	p_unicode	service (VJD only)	On write direction the command sets the timezone determined by the timezone string in the payload.	

NTP_SERVER_IP_STR

	Tag code	NumDes	Message	SNMP Support
	0x024f	No	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	Get the NTP server URL	
Write	p_string	service (VJD only)	Set the NTP server URL	

FORCE_TIME_SET

	Tag code	NumDes	Message	SNMP Support
	0x0a0f	No	no	no
	Datatype	Access Level	Description	
Read	p_string	noprot	read the time, 8 bytes payload, offset 0: year (word); offset 2: month (octet); offset 3: day (octet); offset 4: hrs (octet); offset 5: min (octet); offset 6: sec (octet); offset 7: reserved (octet)	
Write	p_string	service (VJD only)	set the time, parameter 8 bytes payload, offset 0: year (word); offset 2: month (octet); offset 3: day (octet); offset 4: hrs (octet); offset 5: min (octet); offset 6: sec (octet); offset 7: reserved (octet)	

Connection

PASSWORD_SETTINGS

	Tag code	NumDes	Message	SNMP Support
	0x028b	password level	No	no
	Datatype	Access Level	Description	
Read	p_string	service, user	get the unit password (scrambled). num parameter sets the password levels; 1=user, 2=service	
Write	p_string	service	set the unit password. num parameter sets the password levels; 1=user, 2=service. Max length is 127 characters.	

Configures password for specified access level.

Type: Read command returns obfuscated password.

There are two different password levels:

- user
- service

ALARM_CONNECT_TO_IP_STR

	Tag code	NumDes	Message	SNMP Support
	0x0081	Password table index	no	no
	Datatype	Access Level	Description	
Read	p_string	service, user	read IP using string notation (xxx.xxx.xxx.xxx)	
Write	p_string	service	set IP using string notation (xxx.xxx.xxx.xxx)	

Specifies the password table index for IP addresses of password-protected devices that connect to the Monitor Wall. Supported password index table number are 1 to 9.

The corresponding passwords need to be added by command REMOTE_PASSWORD.

REMOTE_PASSWORD

	Tag code	NumDes	Message	SNMP Support
	0x010c	Password table index	no	no
	Datatype	Access Level	Description	
Read	void	service, user	password	
Write	p_string	service	deposit the password of the called station. Max length is 19 characters.	

Specifies the passwords of password-protected devices that connect to the Monitor Wall.

Read command returns obfuscated password.

Password table indexes 1 to 9 are reserved for IP addresses added via ALARM_CONNECT_TO_IP_STR, the password table entry at index 10 is used for all those IP addresses that have not been configured via ALARM_CONNECT_TO_IP_STR.

NBR_OF_ALTERNATIVE_ALARM_IPS

	Tag code	NumDes	Message	SNMP Support
	0x0303	no	no	no
	Datatype	Access Level	Description	
Read	t_dword	noprot	get the number of available alarm ip addresses (total presets)	
Write	void	service	not supported	

Returns the number of supported passwords for devices (here: always 10)

ALARM_CONNECT_TO_IP

	Tag code	NumDes	Message	SNMP Support
	0x0041	destination IP number	no	no
	Datatype	Access Level	Description	
Read	t_dword	service, user	specifies the IP address .	
Write	t_dword	service	specifies the IP address	

Specifies the password table index for IP addresses of password-protected devices that connect to the Monitor Wall. Supported password index table number are 1 to 9.

The corresponding passwords need to be added by command REMOTE_PASSWORD.

CONNECT_TO

	Tag code	NumDes	Message	SNMP Support
	0xffcc	no	yes	no
	Datatype	Access Level	Description	
Read			not supported	
Write	p_octet	service, user	see detailed description	

Connects media streams from a device.

Write Packet

16		32	
<div>Destination IP Address</div> <div>4 Bytes</div>			
<div>Reserved</div> <div>1 Byte</div>	<div>Reserved</div> <div>1 Byte</div>	<div>Flags</div> <div>2 Bytes</div>	
<div>Local Coder</div> <div>1 Byte</div>	<div>Local Line</div> <div>1 Byte</div>	<div>Put Channels</div> <div>2 Bytes</div>	
<div>Remote Coder</div> <div>1 Byte</div>	<div>Remote Line</div> <div>1 Byte</div>	<div>Get Channels</div> <div>2 Bytes</div>	
8		24	

Destination IP Address

The reception of this command will force the host to connect to the mentioned camera IP address.

Flags

NOTE: Only one video mode can be used; setting all bits will result in best currently available mode.

Values:

Bit0

Reserved

Bit1	Request video mode MPEG-4
Bit2	Request video mode MPEG-2
Bit3	Force the use of TCP as transportation protocol
Bit4	Connect to the HDD to receive recorded stream
Bit6	Connect a VCA meta data stream
Bit8	Use SSL for the RCP control connection; if no destination port is specified, the remote port defaults to 443 (HTTPS) in case of SSL is requested otherwise 80(HTTP)
Bit9	Request video mode H.264
Bit10	Request video mode JPEG
Bit13	Request video mode H.265

Local Coder

This parameter carries the number of the local video input number. A wildcard of '0' will result in first match

Local Line

This parameter carries the number of the local decoder line number. A wildcard of '0' will result in first match.

Put Channels

Not supported

Remote Coder

Not supported

Remote Line

Not supported

Get Channels

Values:

Bit0	Video. Ignored in this command.
Bit1	Audio
Bit2	Data. Ignored in this command.
Bit3-Bit15	Reserved

NOTE: For audio connections, the local and remote line parameter are taken from the video settings.

If this command is extended with the optional appendix, the remote port number for RCP login must be specified. This can be either 1756 for the normal RCP port or any available HTTP port at the remote host.

When a port number different to 1756 is used, the login will use a HTTP tunneling.

Optional Appendix

16	Dest. Port 2 Bytes	Reserved 2 Bytes	32
Reserved 4 Bytes			
8		24	

Dest. Port

This parameter carries the number of the remote TCP port number used for RCP login.

Reply / Read / Message

The reply to this command will have the same content as the request..

A message will be generated if all requested channels are established; if a channel fails, the appropriate bit will be cleared in the channel section.

DISCONNECT_PRIMITIVE

	Tag code	NumDes	Message	SNMP Support
	0xff0d	no	yes	no
	Datatype	Access Level	Description	
Read			not supported	
Write	p_octet, f_flag	service, user	see detailed description	

Disconnecting video streams from the application

Reply Payload Structure

Status	Cause	Reserved
1 Byte	1 Byte	2 Bytes
Remote Host IP		
8	4 Bytes	24

Status

Values:

Connection disconnected	0x01
Connection identified by the given Session ID not found on this host	0x02

Cause

Values:

Not closed	0x00
Normal termination	0x01
Abnormal termination	0x02
No response	0x03
Remote host terminated	0x04
Timed out	0x05
Remote login rejected	0x06
No common media channels	0x07
Connection substituted	0x08
Automatic disconnect	0x09
Stop streaming	0x0a

Remote Host IP

IP address of the remote connected host.

NOTE: This command is NOT readable.

ACTIVE_CONNECTION_LIST

	Tag code	NumDes	Message	SNMP Support
	0xffc1	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	see detailed description	
Write			not supported	

Gets list of all active connections.

Payload Structure

Sequence of:

16			32
Destination IP Address			
4 Bytes			
Local Coder 1 Byte	Local Line 1 Byte	Flags 2 Bytes	
Session ID			
4 Bytes			
Remote Coder 1 Byte	Remote Line 1 Byte	Destination Port 2 Bytes	
TX Channels			
4 Bytes			
RX Channels			
4 Bytes			
8		24	

Destination IP Address

IP address to which the unit is connected.

Local Coder

The coder number where the stream is connected to.

Local Line

The line number where the stream is connected to.

Flags

Values:

Bit0	Connection is MPEG2 VES
Bit2	Connection is MPEG4
Bit8	Connection is H.264
Bit9	Connection is Jpeg
Bit11	Connection is H.265

Session ID

Session identifier.

Remote Coder

The connected camera encoder number (relative to the camera line).

Remote Line

The connected camera line number.

Destination Port

Contains the optional. Default is zero.

TX Channels

See CONNECT_TO command for bit mask.

RX Channels

See CONNECT_TO command for bit mask.

CONNECT_URL

	Tag code	NumDes	Message	SNMP Support
	0xe20c	No	no	no
	Datatype	Access Level	Description	
Read			Not supported	
Write	t_string	service, user	URL with optional parameters	

Connect a video panel to an url. For a list of supported urls please check the VideoSDK documentation. The url may contain a password. If the default password shall be inserted automatically, use "*" as password in the url.

String format (separator: space character):

<url> [<option1>=<value1>] ... [<optionN>=<valueN>]

Optional parameters:

screen=<1..>	Monitor Wall line (default: 1)
tile=<1..>	Monitor Wall coder (default: 1)
line=<1..>	Camera line number (default = 1). Not supported for some urls.
coder=<1..>	Camera encoder number (default = 1). Not supported for some urls.
protocol=<tcp udp>	Streaming protocol (default see VideoSDK documentation)
multicast=<true false>	Multicast flag (default: true for rcpp urls, else false)
type=<string>	VideoSDK proxy type, e.g. VIP (for Bosch cameras), RTSP, ONVIF, etc.
audio=<uint>	Audio flags (0x1: connect audio stream)
preset=<int>	Dome preset to be applied after successful connection
centerX=<float 0..1> centerY=<float 0..1> scale=<float>	VideoSDK IZoomView parameters
pan=<float> tilt=<float> scale=<float>	VideoSDK IDewarpingView parameters
recording=<uint>	Recording flags (0x1: connect to HDD recording)

Examples:

rcpp://user:*@192.168.1.2

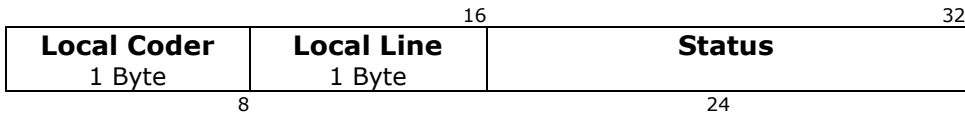
https://user:*@192.168.1.2:443 screen=1 tile=2 line=1 type=VIP audio=1

VIDEO_OUTPUT_STATUS

	Tag code	NumDes	Message	SNMP Support
	0xe20e	No	yes	no
	Datatype	Access Level	Description	
Read	t_word	noprot	Not supported, message only	
Write			Not supported	

Signals changes of the video output

Payload Structure



Local Coder

The decoder's coder number.

Local Line

The decoder's line number.

Status

Values:

1	Streaming connection established
2	First frame decoded and displayed
0x1000	Connection failure

DISCOVERY_PORT

	Tag code	NumDes	Message	SNMP Support
	0x0976	No	no	no
	Datatype	Access Level	Description	
Read	t_word	service, user	reading current value of port	
Write	t_word	service	set port for application discovery via multicast	

Specifies the discovery port.

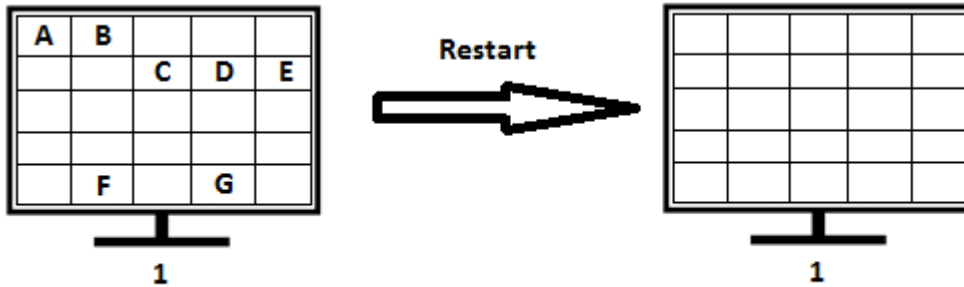
NOTE: Default value is 1800.

RECONNECT

	Tag code	NumDes	Message	SNMP Support
	0xe20a	No	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service	set reconnect 0=Disable; 1=Enable	

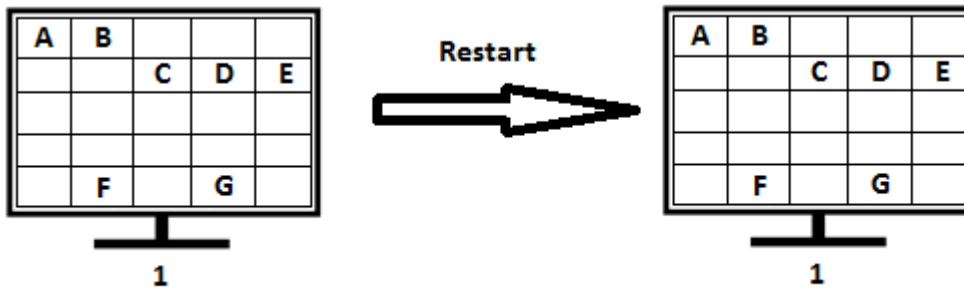
Specifies whether all streams should be reconnected after application restart.

If the parameter is equal 0, after restart all video streams will be lost:



A-G – connected video streams

If the parameter is equal 1, after restart all video streams will be reconnected at the same places:



Monitor

BOARD_RESET

	Tag code	NumDes	Message	SNMP Support
	0x0811	No	no	no
	Datatype	Access Level	Description	
Read			not supported	
Write	void	service	Resets the board.	

This command restarts the Monitor Wall application after returning the result.

Write command returns 0x01 value.

DECODER_LAYOUT_LIST

	Tag code	NumDes	Message	SNMP Support
	0x09a1	Line	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	list of supported layouts. Each element has 2 bytes	
Write			not supported	

Gets the layout list for specified line.

The layouts are defined via a 16 bit layout descriptor. This descriptor can be used to set the current layout with DECODER_LAYOUT.

The scheme defined below in detail describes the Monitor Wall consisting of an array with same number of columns and rows. This base concept is extended by a set of smaller video panels that always occupy a vertical and a horizontal edge (thumbnail border) in order to keep the overall aspect ratio.

For monitors deviating from the camera aspect ratio extra columns are inserted to the right. It is not possible to control this insertion via the API.

The concept defines a main area containing a monitor array plus an optional thumbnail border pair. A monitor layout is specified via a 16 bit value that is assembled from four times four bit values

15	12	11	8	7	4	3	0
extra columns		orientation		thumbnails		array	

The table below describes the meaning of sixteen possible values of the four four-bit codes.

value	Thumbnail border orientation	thumbnail count	array	extra columns
0	top and left	no thumbnails		None
1	left and bottom		single	1
2	bottom and right		2x2	2
3	right and top		3x3	3
4			4x4	4
5		5	5x5	5
6			6x6	5
7		7	7x7	7
8			8x8	6
9		9		9
10				10
11		11		11
12				12
13		13		13
14				14
15		15		15

Supported layouts depend on physical characteristics of monitor and on the set aspect ratio.

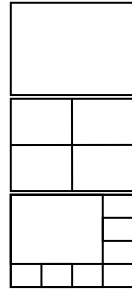
For example for a monitor with optimal resolution 1920 X 1080 the following layouts are supported. Other resolutions may have different values. Any monitor resolutions are supported.

Aspect ratio	Layouts										
16:9	1 x 1	2 x 2	3 x 3	4 x 4	5 x 5	1 + 5	1 + 7	1 + 9	1 + 11	1 + 13	1 + 15
4:3	1 x 1	2 x 2	4 x 3	5 x 4	6 x 5	1 + 8	1 + 11	1 + 14	1 + 23	1 + 27	1 + 31
9:16	3 x 1	6 x 2	9 x 3	12 x 4	15 x 5	1 + 23	1 + 39	1 + 59	1 + 83	1 + 118	1 + 152
3:4	2 x 1	4 x 2	7 x 3	9 x 4	11 x 5	1 + 17	1 + 27	1 + 39	1 + 59	1 + 76	1 + 95

The corresponding layout codes are:

Aspect ratio	Layout's codes									
16:9	0x0001	0x0002	0x0003	0x0004	0x0005	0x0251	0x0271	0x0291	0x02b1	
	0x02d1	0x02f1								
4:3	0x0001	0x0002	0x1003	0x1004	0x1005	0x1251	0x1271	0x1291	0x22b1	
	0x22d1	0x22f1								
9:16	0x2001	0x4002	0x6003	0x8004	0xa005	0x6251	0x8271	0xa291	0xc2b1	
	0xf2d1	0x112f1f								
3:4	0x1001	0x2002	0x4003	0x5004	0x6005	0x4251	0x5271	0x6291	0x82b1	
	0x92d1	0xa2f1								

Examples:



ID: 0x0001

ID: 0x0002

ID: 0x0271

DECODER_LAYOUT

	Tag code	NumDes	Message	SNMP Support
	0x09a2	Line	yes	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	first 2bytes are the layout, followed by the coder list in bytes (000101 for first monitor singleview, 000201020304 for quadview with chronological order)	
Write	p_octet	service, user	First 2 bytes are the layout, all further bytes will be ignored	

Gets the current layout for specified line.

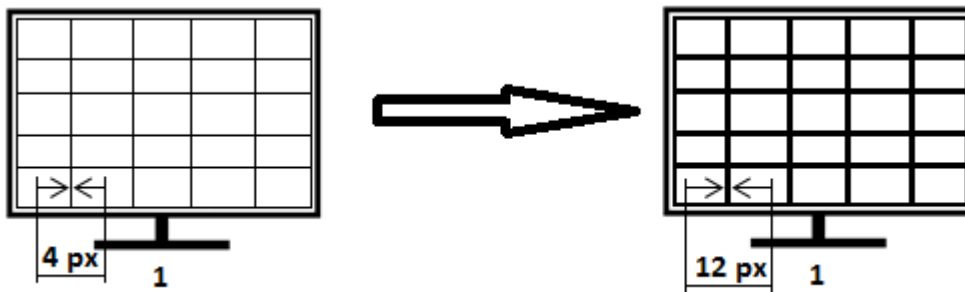
Command uses the same layout codes as DECODER_LAYOUT_LIST command

CAMEO_DISTANCE

	Tag code	NumDes	Message	SNMP Support
	0xe209	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service	set border size of video panels (cameos)	

Specifies the video panel border size. Default value is 4px, this implies that the video panel spacing is 8px on the screen.

For example parameter was changed from 2px and 6px:



NOTE: With a border size of 0px the blinking red alarm borders won't be rendered anymore.

CAMEO_ALARM_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe22c	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service	set alarm mode of video panels (cameos)	

Specifies the video panel border behavior in case of an alarm event.

- 0: Alarms are suppressed
 - 1: Alarms are displayed as blinking red border around the respective video panel for some seconds
 - 2: Alarms are displayed as static red border around the respective video panel for some seconds
- Default value is 1.

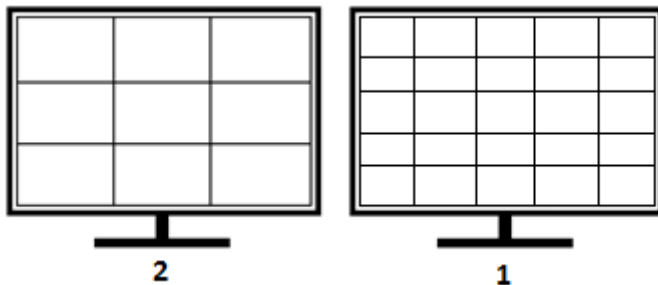
SWAP_MONITOR

	Tag code	NumDes	Message	SNMP Support
	0xe207	no	no	no
	Datatype	Access Level	Description	
Read			not supported	
Write	p_octet	service	see detailed description	

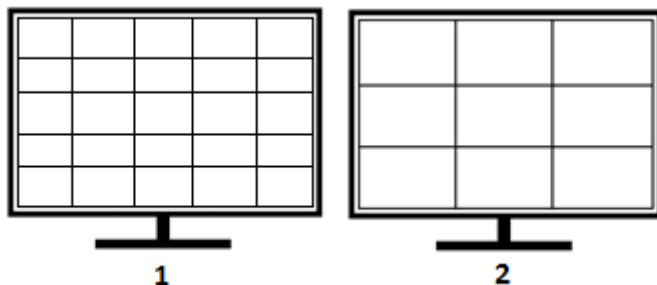
Specifies the mapping between physical video outputs and line numbers.

By default the one-based line number is identical to the one-based physical video output number.

For example there are 2 screens which were placed in this order (the numbers indicate the line numbers):



In order to change the line numbers from 2-1 to 1-2, send {0x2, 0x1} as payload:



Payload structure

16	
Screen number	Screen number
1 Byte	1 Byte
8	

Sequence of screen numbers (one-based physical video output numbers), the length of the list is defined by the number of supported lines. The first entry defines the screen number of line 1, the second entry defines the screen number for line 2, etc. The default values for a dual line decoder are {0x1, 0x2}.

Note: This command restarts Monitor Wall after returning the result of a write command.

SHOW_METADATA

	Tag code	NumDes	Message	SNMP Support
	0xe201	no	no	no
	Datatype	Access Level	Description	
Read	f_flag	service, user	get current value	
Write	f_flag	service	set rendering of VCA overlay	

Specifies whether movement metadata should be shown.

This command allows the Monitor Wall to show visual overlays if there is any movement on video stream.

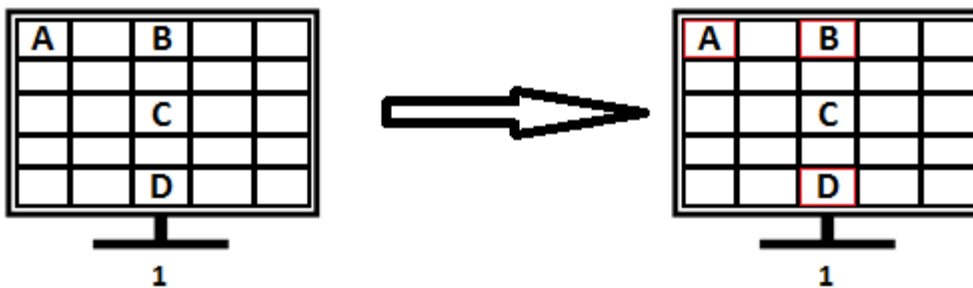
There are two visual effects:

- Blinking red border
- Video content analysis (VCA) overlay

Parameter value: 1 – Enable; otherwise – Disable.

Red border is the default visual effect; VCA overlay depend on VCA meta data (see CONNECT_TO command).

Example of red borders:



A-D – connected video streams.

A, B, D – video streams with motion alarms.

AUTO_RESOLUTION_CHANGE

	Tag code	NumDes	Message	SNMP Support
	0xe204	no	no	no
	Datatype	Access Level	Description	
Read	f_flag	service, user	get current value	
Write	f_flag	service (VJD only)	set automatic monitor resolution	

NOTE: The datatype is f_flag, but will be interpreted as t_octet (both datatypes have the size 1 byte). Specifies whether monitor resolution should be set automatically. The color depth is always 32bit.

- 0: Off
- 1: Highest resolution at 60Hz (default)
- 2: Highest resolution at 50Hz
- 3: Highest resolution at 30Hz (useful for 4K screens that do not support 60Hz)
- 4: Best resolution for 1080p60 video streams (smallest resolution at 60Hz with at least 1920x1080)
- 5: Best resolution for 1080p50 video streams (smallest resolution at 50Hz with at least 1920x1080)
- 6: Best resolution for 720p60 video streams (smallest resolution at 60Hz with at least 1280x720)
- 7: Best resolution for 720p50 video streams (smallest resolution at 50Hz with at least 1280x720)
- 8: Highest screen resolution compatible with 60Hz video (30Hz or 60Hz screen frequency)
- 9: Highest screen resolution compatible with 50Hz video (50Hz or 75Hz screen frequency)

SMOOTHNESS

	Tag code	NumDes	Message	SNMP Support
	0xe202	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service	set smoothness level for jittery video connections [0..100]	

Specifies the global video de-jittering buffer configuration. A smoothness level of 0 minimizes the de-jittering buffer, thus resulting in minimum video latency but potentially non-fluent video due to network transmission issues or varying camera encoder workloads for different frame types. A smoothness level of 100 allows automatic detection of the optimum de-jittering buffer length, thus resulting in smooth and fluent video but causing some delay (up to several 100ms even though optimized) until the video is displayed on the screen. Smoothness levels between 0 and 100 are compromises between the two extremes. Default setting is 100.

PREFERRED_ASPECT_RATIO

	Tag code	NumDes	Message	SNMP Support
	0xe203	no	no	No
	Datatype	Access Level	Description	
Read	t_octet	service, user	get current value	
Write	t_octet	service	set current aspect ratio. 0='4:3'; 1='16:9'; 2='9:16'; 3='3:4'	

Specifies the current aspect ratio.

This command is changing aspect ratio of Monitor Wall video panels.

The standard values zero to three are defined as enumeration:

0='4:3';

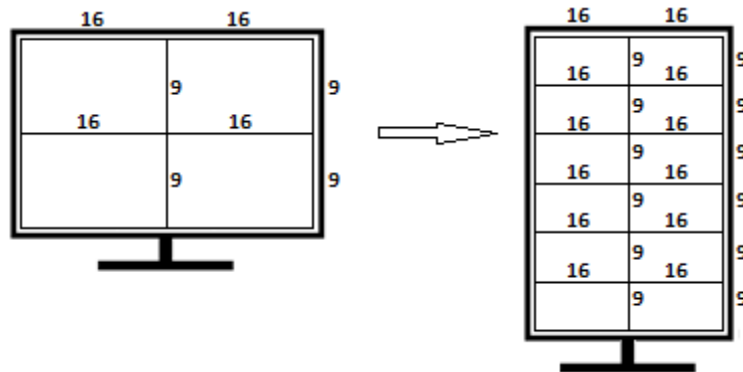
1='16:9';

2='9:16';

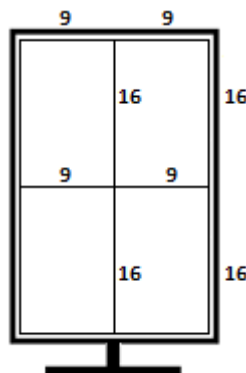
3='3:4'

Any values above are defined as width percentage of the height. So 4:3 can also be defined as 133.

For example, a video panel aspect ratio 16:9 is rendered on horizontal and vertical monitors as:



The aspect ratios 9:16 and 3:4 are primarily defined (but not exclusively) for rotated monitors as shown in the picture below:



NOTE: The Monitor Wall will perform a restart

NUMBER_OF_DECODERS

	Tag code	NumDes	Message	SNMP Support
	0xe20b	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current limit	
Write	t_int	service	set current limit	

Specifies the maximum number of video panels across all lines supported by the device. The limit per line is obtained by dividing the value by the number of lines.

Changing the value has no effect on the current layout setting. Since clients may not expect the capabilities and decoder layout list to change during device operation a reboot of the device and optionally the client may be required.

ZOOM_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe20c	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service	set mode	

The following modes are currently identified:

- 0 Show all video content and keep aspect ratio (default)
- 1 Stretch the video to fill the video panel, the video aspect ratio may not be kept

MONITOR_INFO

	Tag code	NumDes	Message	SNMP Support
	0xe20d	Line	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	see detailed description	
Write			not supported	

Get information about the line as a list of three four-byte DWORD values.

Info Structure

Width	Height	RefreshRate
4 Bytes	4 Bytes	4 Bytes

Width

Horizontal number of display pixel

Height

Vertical number of display pixel

RefreshRate

Display refresh rate in Hz

MONITOR_INFO02

	Tag code	NumDes	Message	SNMP Support
	0xe22d	Line	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	see detailed description	
Write			not supported	

Get information about the line as a list of five four-byte DWORD values.

Info Structure

Left	Top	Width	Height	RefreshRate
4 Bytes	4 Bytes	4 Bytes	4 Bytes	4 Bytes

Left

Horizontal position in display pixel

Top

vertical position in display pixel

Width

Horizontal number of display pixel

Height

Vertical number of display pixel

RefreshRate

Display refresh rate in Hz

MONITOR_POWER_MODE

	Tag code	NumDes	Message	SNMP Support
	0xe20f	no	no	no
	Datatype	Access Level	Description	
Read	t_int	service, user	get current value	
Write	t_int	service (VJD only)	set mode	

The setting allows to configure the desired monitor power save mode in case all video panels are unconnected.

This mode has no effect on the decoder device power state.

The following modes are currently defined:

- 0 Disabled (default). The monitor is powered on all time.
- 1 Sleep
- 2 Power Off

VOCS_CONFIG

	Tag code	NumDes	Message	SNMP Support
	0xe233	Line	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	get current config	
Write	p_octet	service (VJD-7513 and newer only)	set config	

The setting allows the configuration of the visual output capture service (VOCS) per line. The vocs provides a H.264 encoded stream per line with original or reduced frame rate and size. The divisors are transmitted as logarithm with base 2 of the actual value, i.e. a transmitted value of 2 will result in a divisor value of 4.

Frame rate divisor (log2)	Size divisor (log2)
2 Bytes	2 Bytes

- Frame rate divisor: Log2 range [0..4] (-> divisor range [1..16])
- Size divisor: Log2 range [0..3] (-> divisor range [1..8])

Stamping

NAME_STAMP_VAL

	Tag code	NumDes	Message	SNMP Support
	0x0084	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	service, user	get current value	
Write	t_octet	service (VJD only)	set mode	

Defines the position of the overlay

- 0 stamping off
- 1 stamping on bottom
- 2 stamping on top
- 3 stamping with custom attributes

For custom position and other detail configuration see the corresponding ATTR command.

TIME_STAMP_VAL

	Tag code	NumDes	Message	SNMP Support
	0x0085	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	service, user	get current value	
Write	t_octet	service (VJD only)	set mode	

Defines the position of the overlay

- 0 stamping off
- 1 stamping on bottom
- 2 stamping on top
- 3 stamping with custom attributes

For custom position and other detail configuration see the corresponding ATTR command.

ALARM_DISP_VAL

	Tag code	NumDes	Message	SNMP Support
	0x008e	no	no	no
	Datatype	Access Level	Description	
Read	t_octet	service, user	get current value	
Write	t_octet	service (VJD only)	set mode	

Defines the position of the overlay

- 0 stamping off
- 1 stamping on bottom
- 2 stamping on top
- 3 stamping with custom attributes

For custom position and other detail configuration see the corresponding ATTR command.

STAMP_ATTR_NAME

	Tag code	NumDes	Message	SNMP Support
	0x0936	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	Set configuration	
Write	p_octet	service (VJD only)	Get configuration	

x 1 Byte	y 1 Byte	reserved 2 Bytes
attributes 4 Byte		
reserved 2 Bytes	flags 2 Bytes	
Color 4 Byte		
BackgroundColor 4 Byte		

x

Horizontal position relative to the Cameo (0= left, 255=right)

y

Vertical position relative to the Cameo (0= top, 255=bottom)

attributesValues:

Bit 0 ... 11	reserved
Bit 12 ... 15	Height of the Text in percent of the screen height (Range 15% - 1%)
Bit 16 ... 31	reserved

flags

Reserved for future use.

Color

32 Bit RGBA encoded color and transparency of the font.

BackgroundColor

32 Bit RGBA encoded color and transparency of the text background.

Note: the first 12 byte of this command is identical for cameras and encoders. Check the payload size before accessing the additional two 32bit color values.

STAMP_ATTR_TIME

	Tag code	NumDes	Message	SNMP Support
	0x0937	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	Set configuration	
Write	p_octet	service (VJD only)	Get configuration	

For the payload definition refer to STAMP_ATTR_NAME.

STAMP_ATTR_ALARM

	Tag code	NumDes	Message	SNMP Support
	0x0938	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	Set configuration	
Write	p_octet	service (VJD only)	Get configuration	

For the payload definition refer to STAMP_ATTR_NAME.

ALARM_STRING

	Tag code	NumDes	Message	SNMP Support
	0x0090	Yes	no	yes
	Datatype	Access Level	Description	
Read	p_unicode	service, user	read the alarm string of a cameo	
Write	p_unicode	service (VJD only)	set an alarm string	

This command allows to set and get an alarm string of a video panel on a monitor.

The 16bit numeric descriptor is used as follows:

Line	Coder
1 Byte	1 Byte

Keyboard and IP Matrix Configuration

KBD_CONFIG_CAMERA_STR

Tag code	NumDes	Message	SNMP Support
0x0ba3	Camera table key [0-4095]	no	no
Read	Datatype	Access Level	Description
	p_octet	service, user	read entry of camera table
Write	p_octet	service (VJD only)	configure camera table entry

Payload Structure

Line 1 Byte	Coder 1 Byte	Preset 1 Byte	URL Length 1 Byte
URL and Options N Bytes			

Line

Camera video input line

Coder

Encoder number

Preset (optional)

(Dome-) preset position. (Every preset of a dome can be treated as a separate camera).

URL Length

Length of the following url

URL

Encoder/Camera URL and space-separated options (subset of CONNECT_URL options)

line=<1..>	Camera line number (default = 1). Not supported for some urls.
coder=<1..>	Camera encoder number (default = 1). Not supported for some urls.
type=<string>	VideoSDK proxy type, e.g. VIP (for Bosch cameras), RTSP, ONVIF, etc.
audio=<uint>	Audio flags (0x1: connect audio stream)
preset=<int>	Dome preset to be applied after successful connection
centerX=<float 0..1> centerY=<float 0..1> scale=<float>	VideoSDK IZoomView parameters
pan=<float> tilt=<float> scale=<float>	VideoSDK IDewarpingView parameters

NOTE: Options added to the url will override the values from the first three bytes of the payload.

KBD_CONFIG_MONITOR_STR

Tag code	NumDes	Message	SNMP Support
0x0ba4	Monitor table key [0-4095]	no	no
Read	Datatype	Access Level	Description
	p_octet	service, user	read monitor table entry

Write	p_octet	service (VJD only)	configure monitor table entry
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Payload Structure

Line 1 Byte	Coder 1 Byte	URL Length 1 Byte	Reserved 1 Byte
URL N Bytes			

Line

Video output line number

Coder

Video panel (coder) number

URL Length

Length of the following url

URL

Length > 1: Decoder/Monitor URL

Length = 1: One byte with index of the decoder in the decoder group [0-3], see DECODER_GROUP

KBD_CONNECT_PARAMS

	Tag code	NumDes	Message	SNMP Support
	0x0a33	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	read parameters for connections established via camera table	
Write	p_octet	service (VJD only)	set parameters for connections established via camera table	

Payload Structure

Flags 2 Bytes	Reserved 2 Bytes
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Flags (optional)

Values:

Bit 0	Request audio TX (listen at decoder side)
Bit 1	Request audio RX (speak at decoder side)

KBD_PASSWORD_CAMERA

	Tag code	NumDes	Message	SNMP Support
	0x0a34	no	no	no
	Datatype	Access Level	Description	
Read	p_string	service	get the password (scrambled) for all cameras in the camera table	
Write	p_string	service (VJD only)	deposit a common password for all cameras in the camera table	

KBD_PASSWORD

Tag code		NumDes	Message	SNMP Support
0x0a69		no	no	no
Datatype		Access Level	Description	
Read	p_string	service	get the password (scrambled) of the keyboard	
Write	p_string	service (VJD only)	deposit a password for the keyboard	

KBD_TIMEOUT

Tag code		NumDes	Message	SNMP Support
0x0a6a		no	no	no
Datatype		Access Level	Description	
Read	t_int32		read keyboard lock timeout in minutes	
Write	t_int32	service (VJD only)	set keyboard lock timeout in minutes, default value is 10min, max value is 2880min (2 days), 0min disables lock timeout	

KBD_CONFIG_SALVO

Tag code		NumDes	Message	SNMP Support
0x0a3e		Salvo table key [1-32]	no	no
Datatype		Access Level	Description	
Read	p_octet	service, user	read configuration of salvo from salvo table	
Write	p_octet	service (VJD only)	configure salvo in salvo table	

Payload Structure

Duration 2 Bytes		Line 1 Byte		Coder 1 Byte	
Camera Table Key 1 1 Byte		N x 1 Byte		Camera Table Key N 1 Byte	

Duration

Duration of one salvo position in seconds

Line

Video output line number

Coder

Video panel (coder) number

Camera Table Key N

Camera table key for salvo position N [0..255].

NOTE: Corresponding camera table entry has to be specified using KBD_CONFIG_CAMERA or KBD_CONFIG_CAMERA_STR

Salvo: A salvo is sequence of cameras that are cycled on one video panel (coder) with a fixed salvo cycle time (duration). The sequence is defined by a list of camera table keys. Salvos are stored in the salvo table.

Usage:

No longer adequate due to limited range of camera table key values. See KBD_CONFIG_SALVO2 for replacement.

KBD_CONFIG_SALVO2

Tag code	NumDes	Message	SNMP Support
0xe21e	Salvo table key [1-32]	no	no
Read	Datatype	Access Level	Description
	p_octet	service, user	read configuration of salvo from salvo table
Write	p_octet	service (VJD only)	configure salvo in salvo table

Payload Structure

Duration 2 Bytes		16	Line 1 Byte	Coder 1 Byte	32
Camera Table Key 1 2 Bytes	N x 2 Bytes	8	Camera Table Key N 2 Bytes	24	

Duration

Duration of one salvo position in seconds

Line

Video output line number

Coder

Video panel (coder) number

Camera Table Key N

Camera table key for salvo position N [0..4095].

NOTE: Corresponding camera table entry has to be specified using KBD_CONFIG_CAMERA or KBD_CONFIG_CAMERA_STR

Salvo: A salvo is sequence of cameras that are cycled on one video panel (coder) with a fixed salvo cycle time (duration). The sequence is defined by a list of camera table keys. Salvos are stored in the salvo table.

Usage:

- 1) **Configure a salvo table entry for a given salvo table key:** Provide salvo table key as numeric descriptor, set duration, set line and coder to zero, append up to 256 camera table keys with size 2 bytes in the range [0..4095]

- 2) **Start a configured salvo on a selected video panel:** Select salvo table entry by setting the numeric descriptor to the salvo table key, set duration to zero (will be ignored), set line and coder to select target video panel, do not add any camera table keys
- 3) **Configure and start salvo in one step:** See 1), but set line and coder to select target video panel
- 4) **Stop a running salvo:** Set numeric descriptor to zero, set duration to zero (will be ignored), set line and coder to select the video panel which salvo shall be stopped, do not add any camera table keys
- 5) **Clear a specific salvo in the salvo table:** Provide salvo table key as numeric descriptor, set duration to zero (will be ignored), set line and coder to zero, do not add any camera table keys
- 6) **Clear all salvos in salvo table:** Set numeric descriptor to zero, leave payload empty

KBD_CONFIG

Tag code		NumDes	Message	SNMP Support
0xe21a		Table entry type selection	no	no
Datatype		Access Level	Description	
Read	p_octet	service, user	read configuration tables	
Write	p_octet	service (VJD only)	configure camera, monitor, and salvo tables	

The Monitor Wall configuration database contains tables for camera, monitor, and salvo descriptors. Each table entry can be referenced by a table key, e.g. by typing in the table key on a video control keyboard connected to the hardware decoder device. A camera table entry describes a network video source (url, video input line, etc), a monitor table entry describes a video panel (coder) on a screen (line) for a certain hardware decoder (url), and a salvo table entry defines a sequence of camera table keys used for automatic cycling through a list of cameras in one video panel.

The table entry types can be selected by setting the corresponding bits in the numeric descriptor:

Bit0 (0x0001): Camera
 Bit1 (0x0002): Monitor
 Bit2 (0x0004): Salvo

Read

The numeric descriptor defines which table entry types shall be returned. E.g. 0x0001 will return only all camera table entries, 0x0007 will return all camera, monitor, and salvo table entries (0x0000 will also return all entries).

Write

The numeric descriptor defines which table entry types shall be deleted from the config before the new table entries will be added. If a certain table entry type is not set in the numeric descriptor but an entry of that type is found in the payload, it will still be written into the config (either replacing an existing entry or added as new entry, all other entries remain unchanged). Setting the numeric descriptor to 0x0007 and leaving

the payload empty will result in the deletion of all camera, monitor, and salvo table entries in the configuration database.

The payload is a sequence of camera, monitor, and/or salvo table entries and their corresponding headers.

Payload Structure

Sequence of

Length 2 Bytes	Type 2 Bytes	Key 2 Bytes	Reserved 2 Bytes	Entry Length-8 Bytes
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Length

Total length of the table entry description including the 8 byte header

Type

Table entry type, 0x0001: Camera, 0x0002: Monitor, 0x0004: Salvo

Key

Table key, range [0-4095] for cameras and monitors, [1-32] for salvos

Entry

Table entry, given as sequence of bytes as defined in the payload sections of the commands KBD_CONFIG_CAMERA_STR, KBD_CONFIG_MONITOR_STR, and KBD_CONFIG_SALVO2 (usage 1).

DECODER_GROUP

	Tag code	NumDes	Message	SNMP Support
	0xe21d	no	no	no
	Datatype	Access Level	Description	
Read	p_octet	service, user	read decoder group configuration	
Write	p_octet	service (VJD only)	configure decoder group configuration	

Allows the configuration of a decoder group that will form a cluster of hardware decoders and physical screens that can be controlled with video control keyboards. A decoder group can consist of 1 to 4 decoders, each with 1 or 2 attached physical screens. The first decoder entry is the master of the decoder group, all following decoder entries are slaves.

Payload Structure

The payload is a sequence of 0 to 4 entries.

0 entries:

Use an empty payload to clear the decoder group configuration

1 to 4 entries:

4 bytes hardware decoder IP address, 1 byte number of attached physical screens (1 or 2), 1 byte reserved, 4 bytes per attached physical screen with monitor table start key (one-based, range [1..999]) in the first two bytes and maximum number of monitors [1..] on that screen in the second two bytes

FREEZE_CHECK_INTERVAL

Tag code		NumDes	Message	SNMP Support
0xe220		no	no	no
Datatype		Access Level	Description	
Read	t_int32	noprot	read freeze check interval in seconds	
Write	t_int32	service	set freeze check interval in seconds, default value is 10s	

Each video panel is monitored separately for connection loss and frozen video. Whenever a connection loss is detected, the video connection is closed and will be established anew. Frozen video may recover, and can be interpreted as intermediate state before a connection loss is finally detected.

Connection loss will be displayed as grey background with the no-cam logo in the middle (video will be replaced), frozen video will be displayed as blinking red "FREEZE" text overlay on top of the last rendered video frame until the video resumes or a connection loss is finally detected.

It may happen that the default value of 10s for the freeze check interval is higher than the connection loss detection interval (which depends on the streaming protocol), then the freeze text overlay will not be displayed before the no-cam logo.

SALVO_PAUSE_TIMEOUT

Tag code		NumDes	Message	SNMP Support
0xe221		no	no	no
Datatype		Access Level	Description	
Read	t_int32	noprot	read salvo pause timeout in seconds (see SALVO_PAUSE_STATE)	
Write	t_int32	service (VJD only)	set salvo pause timeout in seconds, default value is 60s (see SALVO_PAUSE_STATE)	

Keyboard and IP Matrix Operations

INFO_OVERLAY_MODE

Tag code	NumDes	Message	SNMP Support
0xe219	no	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	t_int32	service, user (VJD only)	video panel info text overlay mode 0: off 1: video panel (coder) info 2: video source (camera) info

KBD_CONNECT_CAMERA

Tag code	NumDes	Message	SNMP Support
0xe211	yes	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	p_octet	service, user (VJD only)	connect a camera from the camera table to a video panel (monitor)

Payload Structure

Monitor Key 2 Bytes	Camera Key 2 Bytes
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Monitor Key

NumDes = 0: Monitor table key [0-4095]

NumDes >0: Line = NumDes, coder = monitor key

Camera Key

Camera table key [0-4095]

KBD_CONNECT_SALVO

Tag code	NumDes	Message	SNMP Support
0xe212	yes	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	p_octet	service, user (VJD only)	connect a salvo from the salvo table to a video panel (monitor)

Payload Structure

Monitor Key 2 Bytes	Salvo Key 2 Bytes
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Monitor Key

NumDes = 0: Monitor table key [0-4095]

NumDes >0: Line = NumDes, coder = monitor key

Salvo Key

Salvo table key [1-32]

KBD_LAYOUT_STEP

Tag code		NumDes	Message	SNMP Support
0xe213		no	no	no
Datatype		Access Level	Description	
Read			not supported	
Write	p_octet	service, user (VJD only)	change the number of video panels	

Payload Structure

Line 2 Bytes	Layout Step Code 2 Bytes
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Line

Video output line number

Layout Step Code

1: Decrease number of video panels

2: Increase number of video panels

PTZIF

Tag code		NumDes	Message	SNMP Support
0xe215		no	no	no
Datatype		Access Level	Description	
Read			not supported	
Write	p_octet	service, user	manipulate pan, tilt, zoom, iris and focus settings of a video panel	

Payload Structure

	16	32
Line 1 Byte	Coder 1 Byte	Preset 2 Bytes
Pan Speed 4 Bytes ([-1..1] * 32768 as int32)		
Tilt Speed 4 Bytes ([-1..1] * 32768 as int32)		

Zoom Speed 4 Bytes $([-1..1] * 32768 \text{ as int32})$
Iris Speed 4 Bytes $([-1..1] * 32768 \text{ as int32})$
Focus Speed 4 Bytes $([-1..1] * 32768 \text{ as int32})$

Preset

A preset value of 0 indicates that the speed values shall be applied. A preset value > 0 indicates that the speed values shall be ignored (and may be omitted in the payload), and that the selected PTZ preset shall be activated by the camera.

Speed Values

Speed values between -1.0 and 1.0 are supported. A speed value of 0.12 needs to be set as upscaled int32 speed value $(\text{int32})(0.12 * 32768) = (\text{int32})3932,16 = 3932$

Multiple speed values can be set in parallel, unused speed values need to be set to zero.

Depending on the displayed video stream and the video source's PTZIF capabilities, either corresponding PTZIF speeds are send to the camera, or mapped to a digital zoom feature (PTZ only), or used for dewarping of panoramic video streams (PTZ only, Bosch cameras only).

Digital zoom and dewarping settings will get lost whenever the video source is changed on the respective video panel.

FULLSCREEN_TILE

Tag code	NumDes	Message	SNMP Support
0xe21b	no	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	p_octet	service, user	set fullscreen tile and mode

Payload Structure

Line	Coder	Reserved	Fullscreen Mode
1 Byte	1 Byte	1 Byte	1 Byte

Fullscreen Mode

0: Off (coder is ignored)

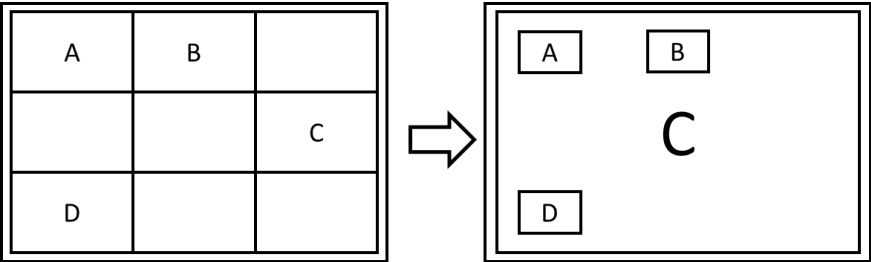
1: Single fullscreen mode

2: Picture in picture mode

In single fullscreen mode, the selected video panel is maximized and placed in front of the other video panels. All streaming connections are kept open. This is different to 1:1 layout where the video connections are closed for all coders > 1.

In picture in picture mode, the selected video panel is maximized and placed behind all other connected video panels. Not connected video panels will be hidden. All those connected video panels in front of the maximized video panel are scaled down to achieve the typical picture in picture layout. Please note that multiple picture in picture video panels are supported in parallel, and that multiple picture in picture layouts

are supported. The actual layout and the position of the connected videos define the picture in picture video panel sizes and positions. One example where video panel C is put into picture in picture mode:



Any video panel that is displaying a video stream can be put into one of the fullscreen modes in any of the supported layouts with any number of other connected video panels. Salvos are paused in fullscreen mode. Fullscreen mode is automatically deactivated on layout changes and new video connections. Active fullscreen modes are persisted in the configuration and applied at startup.

FREEZE_MODE

Tag code		NumDes	Message	SNMP Support
0xe216		no	no	no
Datatype		Access Level	Description	
Read			not supported	
Write	p_octet	service, user	freeze/unfreeze video panel(s)	

Payload Structure

Line	Coder	Reserved	Freeze Flags
1 Byte	1 Byte	1 Byte	1 Byte

Freeze Flags

Video and metadata overlays can be frozen independently. Set/clear the first bit (0x1) to freeze/unfreeze video, and set/clear the second bit (0x2) to freeze/unfreeze metadata overlays. Both bits can be used in parallel. Salvos will be paused in freeze mode (salvo pause timeout won't apply in this case).

Use line and coder to select a specific video panel, or set line and coder to zero to freeze/unfreeze all video panels.

The freeze state of a video panel will be cleared when a new video is connected.

SALVO_PAUSE_STATE

Tag code	NumDes	Message	SNMP Support
0xe222	no	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	t_octet	service, user (VJD only)	0: continue all active salvos, 1: pause all active salvos. Salvos will stay paused until either the continue command is received or the salvo pause timeout has elapsed (see SALVO_PAUSE_TIMEOUT)

ACTIVE_TILE

Tag code	NumDes	Message	SNMP Support
0xe217	no	no	no
Datatype	Access Level	Description	
Read		not supported	
Write	p_octet	service, user (VJD only)	Select highlighted video panel

Payload Structure Request

Line 1 Byte	Coder 1 Byte	Reserved 1 Byte	Highlighting Index 1 Byte
Reserved 4 Bytes			

Payload Structure Response

Notification 4 Bytes	Reserved 4 Bytes
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Highlighting Index

A highlighted video panel is displayed with a different border colour. There are 4 different highlighting colours supported, selectable with the highlighting index 1-4. Alarm highlighting (red blinking video panel border) is rendered on top. The same video panel may be highlighted with different highlighting indexes (colours) in parallel, but only the latest one is rendered, former highlightings are (temporarily) hidden.

The following combinations are supported:

Line = 0, coder = 0, highlighting index = 0: Reset highlighting for all video panels

Line = 0, coder = 0, highlighting index 1-4: Reset highlighting for all video panels for specific highlighting index

Line > 0, coder > 0, highlighting index 1-4: Select highlighting colour for specific video panel

Notification

The notification in the response is zero whenever the current video panel layout contains the selected coder (video panel). If the selected video panel is not included in the current layout, then the number of video panels in the current layout is returned.

SAVE_FAVORITE

Tag code		NumDes	Message	SNMP Support
0xe225		no	no	no
Datatype		Access Level	Description	
Read			not supported	
Write	t_int32	service, user (VJD only)	favorite index [0..9]	

Stores the current layout, active connections and active salvos as favorite.

LOAD_FAVORITE

Tag code		NumDes	Message	SNMP Support
0xe21c		no	no	no
Datatype		Access Level	Description	
Read			not supported	
Write	t_int32	service, user (VJD only)	favorite index [0..9]	

Restores a previously saved favorite, i.e. layout, connections and salvos.

KBD_LICENSED_CHANNELS

Tag code		NumDes	Message	SNMP Support
0xe21f		no	no	no
Datatype		Access Level	Description	
Read	t_int32	service, user	Reads the number of licensed channels of this decoder for IP matrix keyboard operations	
Write			not supported	

KBD_LICENSED_CHANNELS_GROUP

Tag code		NumDes	Message	SNMP Support
0xe223		no	no	no
Datatype		Access Level	Description	
Read	t_int32	service, user	Reads the number of licensed channels across the whole decoder group for IP matrix keyboard operations	
Write			not supported	

Configuration Sealing

CONFIG_SEALING_ENABLED

Tag code		NumDes	Message	SNMP Support
0x0c8a		no	no	no
Datatype		Access Level	Description	
Read	t_octet	noprot	get enabled state of config sealing 0=sealing disabled; 1=sealing enabled; 2=seal broken	
Write	t_octet	service	enable config sealing 0=sealing disabled; 1=sealing enabled	

CONFIG_SEALING_STATUS

Tag code		NumDes	Message	SNMP Support
0x0c8c		no	yes	no
Datatype		Access Level	Description	
Read	p_octet	noprot	return status of config seal	
Write	p_octet	service	read only	

Payload Structure

		16	32
Status 1 Byte	Reserved 3 Bytes		
SealSetTimestamp 4 Bytes			
SealRandom 4 Bytes			
SystemTimestamp 4 Bytes			
8		24	

Status

Values:

Sealing off	0
Sealing on and seal valid	1
Sealing on and seal broken	2

Reserved

Reserved, should be ignored

Values:

SealSetTimestamp

Timestamp when seal was activated in seconds since year 2000

SealRandom

Random number generated once when seal was activated

Values:

SystemTimestamp

Current system time in seconds since year 2000

Values:

Sealing concept

The system can be set up in a way that unexpected configuration changes on the device cause a alert message, even when the user uses a valid login and password for this action. To achieve this: After the whole system configuration is completed, CONFIG_SEALING_ENABLED needs to be set to 1 (= sealing enabled). In this state each critical configuration change causes the device to send a CONFIG_SEALING_STATUS message. In addition, a broken seal will also cause a CONFIG_SEALING_STATUS message at each monitor wall application start.

If a client wants to actively verify if a seal is valid, then it should read CONFIG_SEALING_STATUS and check its content for:

1. Status = 1 (sealing enabled and seal valid)
2. SealSetTimestamp, if the time contained here matches the time of the last known configuration change
3. (Optional) SealRandom, if this number matches the random number of CONFIG_SEALING_STATUS response after enabling the seal
4. SystemTimestamp, if it is about the actual local time (to protect against time manipulation)