

[i-Nova2 Series]

# [API manual]

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NOVITEC

## 1. Novitec i-Nova2 IP Camera Communication Protocol

It uses two TCP ports and one UDP port. The Stream Port uses only one of the following: TCP or UDP.

- Stream Port (TCP 1334): for receiving video
- Stream Port (UDP 1334): for receiving video
- Command Port (TCP 1335): for sending commands

## 2. How to Use Stream Port

### 2.1. How to Use TCP Stream

#### 2.1.1. Normal Mode

When connected to the Stream Port, the camera receives the following buffer as soon as it acquires image .

| content            | Size in Bytes | explanation                                   |
|--------------------|---------------|---|
| <b>Buffer Size</b> | 4 (int)       | Represents an integer of 4 bytes (Big Endian) |
| <b>JPEG Buffer</b> | Buffer Size   | JPEG data in 1 Frame encoded                  |

< Table> 1. TCP Stream Buffer

You only need to receive 4 bytes first, and then only the number of bytes that those 4 bytes represent, to receive a JPEG Buffer. Since the buffer size is Big Endian, it is necessary to swap the byte order in a small endian environment such as Intel CPUs.

The JPEG Buffer received is in a format that can be decoded as it is.

In addition, if the video is not continuously transmitted from the camera using Trigger mode when connecting to the stream port, if there is no communication content for more than 5 seconds, a time out will occur and the connection will be lost.

To prevent this, you can send a random packet from the client.(PING".)

### 2.1.2. Info Inclusion Mode

**This mode is supported from firmware version v1.1.0 and above.**

SetTCPStreamMode <mode> can be changed via Command. When you connect to the Stream Port, you will receive the following buffer as soon as the camera acquires the image

.First, you will receive a 256 byte UDP packet like the one below

| content              | Size in Bytes | explanation  |
|----------------------|---------------|--|
| <b>Type</b>          | 4 (int)       | JPEG compressed images are 1 and Uncompressed YUV images are 2.  |
| <b>Buffer Size</b>   | 4 (int)       | The size of the Content (image buffer).  |
| <b>Frame Count</b>   | 4 (int)       | The number of frames sent by the camera to the client  |
| <b>Exposure</b>      | 4 (int)       | Exposure (micro-second)  |
| <b>Gain 100</b>      | 4 (int)       | Value 100 times the value of the gain value  |
| <b>Trigger Count</b> | 4 (int)       | Number of hardware (external) triggers received by the camera  |
| <b>Image Width</b>   | 4 (int)       | H.264 image data width values (JPEG fixed at 1920)   |
| <b>Image Height</b>  | 4 (int)       | H.264 image data height value (JPEG fixed at 1080)   |
| <b>CamInfo</b>       | 4 (int)       | Information inside the camera.<br>Currently, it displays the level of the external trigger signal at the top 1 byte ( High (1), Low(0) ) |
| <b>Trigger Type</b>  | 4 (int)       | When using Trigger mode, displays the Trigger source of the current image .<br>H/W trigger – 0, S/W trigger - 1                          |
| <b>Reserved</b>      | 54 * 4        | Currently unused   |

After receiving this header, receive the Content (image data) by the Buffer Size.

|                    |             |                              |
|--------------------|-------------|------------------------------|
| <b>JPEG Buffer</b> | Buffer Size | Encoded 1 frame of JPEG data |
|--------------------|-------------|------------------------------|

As mentioned above, the received JPEG Buffer is in a format that can be decoded as it is.

After this, the usage is the same as in normal mode.

## 2.2. How to use UDP Stream

Connect to the Stream Port and send the following command

"CONNECT (UDP Port number to receive)" (for example, "CONNECT 1400")

The camera receives this command, it transmits the image data to the port specified by the CONNECT command as soon as the camera acquires the image

Receive a 256 byte UDP packet like the one below.

| content              | Size in Bytes | explanation  |
|----------------------|---------------|--|
| <b>Type</b>          | 4 (int)       | JPEG compressed images are 1 and Uncompressed YUV images are 2.  |
| <b>Buffer Size</b>   | 4 (int)       | The size of the Content (image buffer).  |
| <b>Frame Count</b>   | 4 (int)       | The number of frames sent by the camera to the client  |
| <b>Exposure</b>      | 4 (int)       | Exposure (micro-second)  |
| <b>Gain 100</b>      | 4 (int)       | Value 100 times the value of the gain value  |
| <b>Trigger Count</b> | 4 (int)       | Number of hardware (external) triggers received by the camera  |
| <b>Image Width</b>   | 4 (int)       | H.264 image data width values (JPEG fixed at 1920)   |
| <b>Image Height</b>  | 4 (int)       | H.264 image data height value (JPEG fixed at 1080)   |
| <b>CamInfo</b>       | 4 (int)       | Information inside the camera.<br>Currently, it displays the level of the external trigger signal at the top 1 byte ( High (1), Low(0) ) |
| <b>Trigger Type</b>  | 4 (int)       | When using Trigger mode, displays the Trigger source of the current image .<br>H/W trigger – 0, S/W trigger - 1                          |
| <b>Reserved</b>      | 55 * 4        | Currently unused   |

&lt; Table&gt; 2. UDP Stream Buffer

After receiving this header, receive the Content (image data) by the Buffer Size.

| JPEG Buffer | Buffer Size | Encoded 1 frame of JPEG data |
|-------------|-------------|------------------------------|
|-------------|-------------|------------------------------|

As mentioned above, the received JPEG Buffer is in a format that can be decoded as it is. To stop streaming, send the "**DISCONNECT**" command.

UDP streaming compares to TCP streaming in the following ways:

- The amount of data (bandwidth) that can be sent is large. (about 2 times)
- UDP communication is generally said to be unreliable.

### 3. How to Use the Command Port

Commands are sent to the Command Port in the following format

.Command <param1> <param2> ... [CRLF]

Command and parameter are in ASCII format, and Space (ASCII Code=0x20) is required in between.

And at the end of the command, you need a CRLF (ASCII Code 0x0d, 0x0a).

The command port can be connected to up to 4 clients at the same time.

The response to the command is shown below.

OK <Contents>[CRLF]: Execution succeeds

NG <Contents>[CRLF]:If execution fails

## 4. Command List

| Command and parameters                 | content                         |
|--|---------------------------------|
| <b>GetFirmwareVersion</b>              | Acquisition of firmware version |
| Example reply: OK Version 1.1.1 [CRLF] |                                 |

| Command and parameters                         | content                  |
|--|--------------------------|
| <b>GetSystemInfo</b>                           | Acquiring Camera ON Time |
| Camera returns last time after boot completion |                          |
| Example reply: OK UPTIME:0:1:15:11             |                          |

| Command and parameters                   | content                       |
|--|-------------------------------|
| <b>GetSerialNumber</b>                   | Obtain a camera serial number |
| Returns the camera's serial number value |                               |
| Example reply : OK I2MSFFFF01            |                               |

| Command and parameters   | content                                       |
|--|---|
| <b>SetExposure &lt;exp&gt;</b>   | Setting Manual Exposure Value (Shutter Speed) |
| <exp> Sony sensor : [43~33021] / On-Semi sensor : [47~33021]                             |   |
| Set the value of Manual Exposure in $\mu$ s (microsecond).                               |   |
| ☞ It can be set by changing it to the value of the exposure that the actual sensor uses. |   |

| Command and parameters                          | content                            |
|---|------------------------------------|
| <b>GetExposure</b>                              | Obtaining Manual Exposure Settings |
| Returns the value in $\mu$ s of Manual Exposure |                                    |

| Command and parameters   | content                             |
|--|-------------------------------------|
| <b>GetExposureRange</b>  | Minimum Exposure , Maximum Exposure |
| Settable Exposure Returns a value in minimum and maximum $\mu$ s |                                     |

| Command and parameters                                 | content                                   |
|--|---|
| <b>SetFrameRate &lt;profile&gt; &lt;fps&gt;</b>        | Set the Frame Rate of the desired profile |
| <profile>  |   |
| 0: JPEG / 1: H.264 / 2: HSUB                           |   |
| <fps>  |   |
| Index No. 0 ~ 7 for each FPS (30/15/10/6/5/3/2/1)      |   |
| ex) SetFrameRate 0 2: Sets the JPEG profile to 10 FPS. |   |

| Command and parameters   | content   |
|--|---|
| <b>GetFrameRate &lt;profile&gt;</b>                                      | Acquiring the Frame Rate Index of a Specified Profile |
| Returns the frame rate per second index value for the specified profile. |   |

| Command and parameters   | content  |
|--|--|
| <b>SetTotalGain &lt;gain&gt;</b>   | Set the Manual Gain magnification <b>of the video.</b> |
| <p>&lt;gain&gt;</p> <p>Sony Sensor : Magnification[1~252] / On-Semi Sensor : Magnification[1~5]</p> <p><math>y = 20 * \log(x)</math> It is adjusted according to the formula.</p> <p>For example, if you want to double the brightness of your video, type SetTotalGain 2,<br/>The camera calculates itself and sets it to 6 dB.</p> <p>However, there may be a slight decimal error in the calculation.</p> <p>SetTotalGain 2 outputs a value that has been changed to dB on that command reply.</p> <p>Example reply: OK 6</p> |  |

| Command and parameters  | content   |
|---|---|
| <b>GetTotalGain</b>   | Acquisition of the magnification (double) of <b>the currently applied Manual Gain</b> |
| Return of the camera's Total Gain magnification value. SetTotalGain returns the value of the <gain> position you set. |   |

| Command and parameters   | content                            |
|--|------------------------------------|
| <b>GetGainRange</b>  | Gain the maximum, minimum dB value |
| <p>Returns a configurable Gain dB value</p> <p>(Sony Sensor) 0 ~ 48dB</p> <p>(On-Semi Sensor) 0 ~ 13.9dB</p> <p>Example reply : (Sony Sensor)[OK 0 48.0] / (On-Semi Sensor)[OK 0 13.9]</p> |                                    |

| Command and parameters  | content                         |
|---|---------------------------------|
| <b>SetALC &lt;AEC&gt; &lt;AGC&gt; &lt;target&gt; &lt;min_exp&gt; &lt;max_exp&gt; &lt;min_gain&gt; &lt;max_gain&gt; &lt;temp&gt; &lt;AIC&gt;</b>   | Auto Luminance Control Settings |
| <p>Apply the Auto Brightness Control Mode setting value.</p> <p>Specify "ON"/"OFF" whether to include Exposure in &lt;AEC&gt; automatic control item</p> <p>&lt;AGC&gt; Specify "ON"/"OFF" whether to include Gain in the automatic control item</p> <p>&lt;target&gt; Set the auto-controlled target brightness value from 0 to 255</p> <p>&lt;min_exp&gt; Set the minimum exposure control value</p> <p>&lt;max_exp&gt; Set the maximum exposure control value</p> <p>☞ The EXP value can be set by changing it to the value of the exposure used by the actual sensor.</p> |                                 |

<min\_Gain> Set the minimum gain control value  
 <max\_Gain> Set the maximum gain control value  
 ☞ Greater gain can result in more noise and larger JPEG size.  
 In this case, if the transfer speed is insufficient, there will be a frame drop.  
 <temp> a value that doesn't use it, but it should take up space.  
 <ALC> Specify whether or not to auto-aperture adjustment as "ON"/"OFF"  
 ☞ Doesn't work with models with integrated zoom lens

| Command and parameters                            | content                                    |
|---|--|
| <b>GetALC</b>                                     | Acquiring Auto Luminance Control Setpoints |
| ALC setting. For detailed parameters, see SetALC. |  |

| Command and parameters   | content                          |
|--|----------------------------------|
| <b>SetALCArea &lt;x&gt; &lt;y&gt; &lt;w&gt; &lt;h&gt;</b>  | Setting the ALC Calculation Area |
| Set the ROI area to use in the ALC calculation<br>Note that the sum of <x> <w> Position x + Width w does not exceed the width limit of the image (1920)<br>Note that the sum of <y> <h> Position y + Height h does not exceed the height limit (1080) of the image . |                                  |

| Command and parameters  | content                      |
|---|------------------------------|
| <b>GetALCArea</b>   | Acquire ALC Calculation Area |
| Return the ROI zone setting used in the ALC calculation. <x> <y> <w> <h> order. |                              |

| Command and parameters  | content                                  |
|---|--|
| <b>SetJPEGCBR &lt;"ON"/"OFF"&gt; &lt;Mbps&gt;</b>   | JPEG CBR (Constant Bit Rate) Mode On/Off |
| When set to ON, the maximum size of the image that can be reached by automatically adjusting the compression ratio according to the video is specified as a number set to <Mbps>.<br><param1> : ON/OFF, <param2> mbps (max : 80 (approx)) |  |

| Command and parameters                            | content                   |
|---|---------------------------|
| <b>GetJPEGCBR &lt;"ON"/"OFF"&gt; &lt;Mbps&gt;</b> | Acquiring JPEG CBR status |
| SetJPEGCBR and CBR Mbps settings.                 |                           |

| Command and parameters                | content                            |
|---------------------------------------|------------------------------------|
| <b>SetJPEGQuality &lt;quality&gt;</b> | Setting the quality of JPEG images |



<quality>

[5~99] The smaller the value, the better the image quality and the larger the buffer size.

JPEG images can be received using Stream Port or RTSP.

| Command and parameters             | content   |
|------------------------------------|---|
| <b>GetJPEGQuality</b>              | Acquiring the image quality settings of JPEG images |
| Return JPEG quality setting [1~63] |   |

| Command and parameters   | content                         |
|--|---------------------------------|
| <b>SetResolution</b> <channel> <resolution>  | Set the resolution of the video |
| <channel><br>0: JPEG (not supported) / 1: H.264 / 2: HSUB<br><resolution><br>0 - 1920x1080, 1 - 1280x720, 2 - 800x600, 3 - 704x480<br>4 - 704x400, 5 - 640x480, 6 - 640x360, 7 - 320x240<br><br>For JPEGs, changing the resolution is not supported.<br>For H.264 channels, full resolution is supported.<br>In the case of HSUB, it only supports resolutions corresponding to 6 and 7. |                                 |

| Command and parameters   | content                           |
|--|-----------------------------------|
| <b>GetResolution</b> <channel>   | Obtaining the Resolution Setpoint |
| <channel><br>0: JPEG (not supported) / 1: H.264 / 2: HSUB<br><br>Capture the resolution setting value applied to the Channel. For parameters, see SetResolution. |                                   |

| Command and parameters  | content                        |
|---|--------------------------------|
| <b>SetBitrateControl</b> <channel> <mode>   | Bitrate mode setting for video |
| <channel><br>0: JPEG / 1: H.264 / 2: HSUB<br><mode><br>0 - OFF, 1 - VBR, 2 - CBR, 3 - CVBR<br><br>For JPEG, only 0~2 mode is available. |                                |

| Command and parameters             | content  |
|------------------------------------|--|
| <b>GetBitrateControl</b> <channel> | Acquiring the Bitrate Mode Setting of an Image |

<channel>

0: JPEG / 1: H.264 / 2: HSUB

Acquire the bitrate mode applied to the channel. See SetBitrateControl for parameters.

| Command and parameters  | content                      |
|---|------------------------------|
| <b>SetBitrate</b> <channel> <bitrate>   | Bitrate Settings for Footage |
| <channel><br>0: JPEG / 1: H.264 / 2: HSUB<br><bitrate><br>Input is received in Kbit. It converts the input bitrate to the closest Kbit applicable to the camera and applies it.<br><ex><br>Command: SetBitrate 0 1040 / Reply: OK 0 1000<br>Command: SetBitrate 0 1080 / Reply: OK 0 2000 |                              |

| Command and parameters   | content  |
|--|--|
| <b>GetBitrate</b> <channel>  | Acquiring the Bitrate setting value of the image |
| <channel><br>0: JPEG / 1: H.264 / 2: HSUB<br><br>Acquire the Bitrate value applied to the Channel. For parameters, see SetBitrate. |  |

| Command and parameters  | content                            |
|---|------------------------------------|
| <b>SetQuality</b> <channel> <quality>   | Set the Quality value of the video |
| <channel><br>0: JPEG / 1: H.264 / 2: HSUB<br><quality><br>- JPEG (5~99)<br>- H.264, HSUB (10~51)<br><br>For JPEG, only 0~2 mode is available. |                                    |

| Command and parameters                    | content                                  |
|---|--|
| <b>GetQuality</b> <channel>               | Acquiring the Quality Settings of Images |
| <channel><br>0: JPEG / 1: H.264 / 2: HSUB |  |

Obtain the Quality value applied to the Channel. See SetQuality for parameters.

| Command and parameters  | content                        |
|---|--------------------------------|
| <b>SetGOP &lt;channel&gt; &lt;GOP&gt;</b>   | Set the GOP value of the video |
| <channel><br>1: H.264 / 2: HSUB<br><GOP><br>(1~240)<br><br>Apply the GOP value to each channel. |                                |

| Command and parameters  | content                               |
|---|---------------------------------------|
| <b>GetGOP &lt;channel&gt;</b>   | Capture the GOP setpoint of the video |
| <channel><br>1: H.264 / 2: HSUB<br><br>Obtain the GOP value applied to the channel. For parameters, see SetGOP. |                                       |

| Command and parameters  | content              |
|---|----------------------|
| <b>SetTriggerMode &lt;mode&gt; &lt;pol&gt; &lt;min_duration&gt; &lt;min_interval&gt;</b>  | Trigger mode setting |
| <mode> is shown below.<br>0: Free run,<br>1: One shot Trigger,<br>2: <del>Mixed trigger</del> (not implemented)<br>3: Pseudo Trigger<br>- One shot Trigger: Outputs 1 frame of video whenever there is a Trigger input. If you set a value in the SetTrigImgNum function, it outputs that many frames.<br><br>- Mixed Trigger: Toggles the video output mode to either One shot or Free run mode whenever the Trigger Level changes to the level specified in <pol>.<br>For example, when you switch to Mixed Trigger mode, it pauses the video output and waits for the trigger, just like the One shot Trigger mode. And when the trigger signal comes in while the <pol> is H, it becomes L →H→L, so the image acquisition mode is toggled and behaves like a free run. Then, when the trigger signal comes in, the acquisition mode is toggled back to behave like the one-shot mode.<br><br>- Pseudo Trigger: JPEG output behaves like One shot Trigger mode, H.264 output behaves like Free run. In this state, when the trigger signal is entered, it acquires the nearest Frame and outputs |                      |

a JPEG.As in the One shot Trigger mode, it is affected by the value of the SetTrigImgNum function setting.

<pol> specifies the level at which the trigger is valid as H or L.

<pol> is shown below.

H : Active High / L : Active Low

The parameters below are for suppressing noise signals from mechanical equipment, and in order to receive all trigger signals, you can set the default value to 0.

<min\_duration> [ms]

Specifies the minimum length of the Hardware Trigger pulse that it recognizes as a Trigger signal.

<min\_interval> [ms]

Ignore HW Trigger signals within min\_invterval of the previous Trigger signal input.

| Command and parameters  | content                            |
|---|------------------------------------|
| <b>GetTriggerMode</b>   | Acquiring the Trigger mode setting |
| Returns the current trigger mode setting value <mode> <pol> <min_duration> <min_interval> |                                    |

| Command and parameters   | content   |
|--|---|
| <b>SetTrigImgNum &lt;num&gt;</b>   | Set the number of images to be acquired per trigger |
| <num> [1 ~ 30]   |   |
| Set the number of frames to be acquired per trigger signal (ignored in Bracket Mode) |   |
| ※ If a trigger is entered while acquiring a video, it will be ignored.               |   |

| Command and parameters                | content                               |
|---------------------------------------|---------------------------------------|
| <b>GetTrigImgNum</b>                  | Number of images acquired per trigger |
| Returns a set image per trigger value |                                       |

| Command and parameters                             | content   |
|--|---|
| <b>GetTriggerCount</b>                             | Acquisition of the number of hardware (external) triggers |
| Returns the number of H/W Triggers entered so far. |   |

| Command and parameters                                 | content                               |
|--|---------------------------------------|
| <b>ResetTriggerCount</b>                               | Initialize the number of H/W Triggers |
| Initializes the number of H/W Triggers entered so far. |                                       |

| Command and parameters | content |
|------------------------|---------|
|------------------------|---------|

| <b>SetFlash &lt;mode&gt; &lt;pol&gt;</b>   | Flash Mode settings and polarity settings |
|--|---|
| <mode><br>0 (default) : off<br>1 : on (during integration time)<br><pol> Sets the Active Level of the FLO<br>"H" : active high<br>"L" : active low<br>2 : auto<br>Automatically controls Flahs, Filter Switch, and Monochrome based on the current Exposure value.<br>You can make the relevant settings via the SetAutoFlash Command. |   |

| <b>Command and parameters</b>   | <b>content</b>                             |
|---|--|
| <b>GetFlash</b>   | Acquiring Flash Mode and polarity settings |
| Returns the Flash Mode setting.<br>For more information about parameters, see SetFlash command. |  |

| <b>Command and parameters</b>   | <b>content</b>                   |
|---|----------------------------------|
| <b>SetAutoFlash &lt;maxExp&gt; &lt;minExp&gt; &lt;ctrlFilter&gt; &lt;ctrlMono&gt;</b>   | Detailed settings for Auto Flash |
| <maxExp> Sets the maximum exposure limit from day to night<br><minExp> Sets the minimum exposure limit from night to day<br><ctrlFilter> Set the IR CUT filter to be automatically removed or placed according to Auto Flash's Exposure settings. ("ON", "OFF")<br><ctrlMono> Automatically sets monochrome mode according to Auto Flash's Exposure settings. ("ON", "OFF") |                                  |

| <b>Command and parameters</b>                       | <b>content</b>                          |
|---|---|
| <b>GetAutoFlash</b>                                 | Obtain detailed settings for Auto Flash |
| Returns the value set by the SetAutoFlash function. |   |

| <b>Command and parameters</b>               | <b>content</b>               |
|---|------------------------------|
| <b>SetForcedTrigger</b>                     | Performing Software Triggers |
| Software Trigger Signal Generation (1 time) |                              |

| <b>Command and parameters</b>          | <b>content</b>                            |
|--|---|
| <b>SetTriggerSource &lt;source&gt;</b> | Setting the Camera's Trigger Input Source |

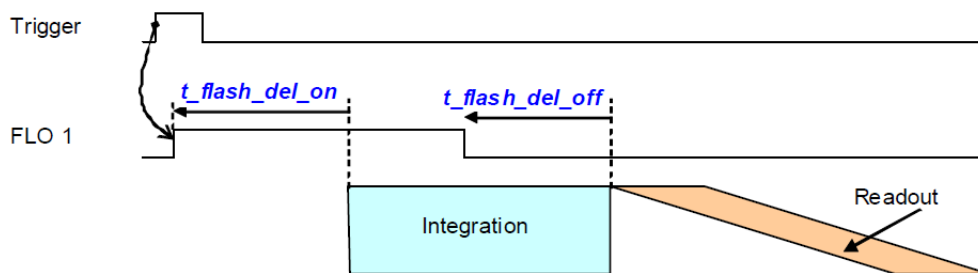
```
<source>
0: HW only. It accepts only HW (external) triggers and ignores SW triggers.
1: SW only. It accepts only SW triggers and ignores HW triggers.
2 (default): HW + SW (both). Both HW and SW triggers are accepted.
```

| Command and parameters   | content                                     |
|--|---|
| <b>GetTriggerSource</b>  | Acquiring the camera's trigger input source |
| For more information about parameters, see SetTriggerSource command. |   |

| Command and parameters                         | content                              |
|--|--------------------------------------|
| <b>SetOutputPort &lt;port&gt; &lt;type&gt;</b> | Type Setting of External Output Port |
| <port> output port number [1, 2]               |                                      |
| <type> The type of port. 0 : Flash, 1 : GPIO   |                                      |

| Command and parameters  | content                                  |
|---|--|
| <b>GetOutputPort</b>  | Capture Flash Mode and polarity settings |
| Returns the value of the Output Port setting. 0 : Flash, 1 : GPIO               |  |
| Reply: OK <out1> <out2>   |  |
| <out1> setting value for output port 1. <out2> setting value for output port 2. |  |

| Command and parameters  | content             |
|---|---------------------|
| <b>SetFlashOnDelay &lt;μs&gt;</b>   | Set Flash on delay. |
| Sets the delay time at which the exposure starts at the start of Active FLO. (default : 00) |                     |



<Image> 1. Flash delay behavior in global shutter mode

| Command and parameters  | content                   |
|---|---------------------------|
| <b>SetGPIO 11 &lt;output&gt;</b>  | GPIO port output settings |
| <output> controls the polarity of the GPIO output. The control letter must be in the third place. |                           |
| "H" : high level (3.3V)   |                           |

"L" : low level (0V)

| Command and parameters                            | content                              |
|---|--------------------------------------|
| <b>GetGPIO</b>                                    | Acquiring GPIO port output setpoints |
| Returns the polarity setpoint of the GPIO output. |                                      |
| "H" : high level (3.3V)                           |                                      |
| "L" : low level (0V)                              |                                      |

| Command and parameters  | content  |
|---|--|
| <b>SetBracketMode</b> <"ON"/"OFF"> <num>  | Used when images with different brightness are obtained sequentially |
| <"ON/OFF">  |  |
| "ON" - Activates Bracket Mode.  |  |
| "OFF" – Disables Bracket Mode.  |  |
| <num>   |  |
| For Sony Sensor Model, the num value is fixed at 4.                             |  |
| For On-Semi Sensor Model, num value is selectable from 3~4.                     |  |
| Used when you want to get images with different brightness as num sequentially. |  |
| Photographed set to a value set via SetBracketInfo                              |  |

| Command and parameters  | content                                 |
|---|---|
| <b>GetBracketMode</b>   | Bracket Mode Setting Status Acquisition |
| <mode> Indicates mode usage status 0 : OFF, 1 : ON  |   |
| <bracketcount> The number of images set when the bracket is set. The i-Nova2 is fixed at 4. |   |

| Command and parameters   | content   |
|--|---|
| <b>SetBracketInfo</b> <ch> <exposure> <digital gain>   | Set the exposure value to be applied in Bracket Mode. |
| Sets the exposure information used during Bracket Mode.  |   |
| <ch> Channel number to apply the setting value below [0~3]   |   |
| <exposure (μs)> the exposure time to set for that channel  |   |
| <Digital gain (int)> Use an integer multiplied by 10 instead of a decimal point.Example: Enter 158 to set 15.8 |   |

| Command and parameters  | content   |
|---|---|
| <b>GetBracketInfo</b> <ch>  | Acquire the exposure setting status of Bracket Mode |
| SetBracketInfo returns the bracket setting value of the specified channel |   |

Return Value - <channel> <exposure> <digital gain>

| Command and parameters                                  | content                        |
|---|--------------------------------|
| <b>SetFilterSwitch</b> <0_1>                            | IR CUT Filter Switcher Control |
| <0_1> 0 : Filter removed, 1 : Filter filtered IR gamut. |                                |

| Command and parameters                                | content                                  |
|---|--|
| <b>GetFilterSwitch</b>                                | Obtaining IR CUT Filter Placement Status |
| Return value - 0 : filter removed, 1 : filter placed. |  |

| Command and parameters                            | content                       |
|---|-------------------------------|
| <b>SetMonochrome</b> <0_1>                        | Video monochrome mode control |
| <0_1> 0 : Set color mode, 1 : Set monochrome mode |                               |

| Command and parameters  | content                              |
|---|--------------------------------------|
| <b>GetMonochrome</b>  | Acquisition of image monochrome mode |
| Return value - 0: color mode setting , 1 : monochrome mode setting status |                                      |

| Command and parameters   | content               |
|--|-----------------------|
| <b>SetSharpness</b> <sharp>  | Image Clarity Control |
| <sharp> [0~10] Sets the sharpness of the video to an intensity from 0 to 10. |                       |

| Command and parameters  | content                          |
|---|----------------------------------|
| <b>GetSharpness</b>   | Acquiring Image Clarity Settings |
| Return Value – [0~10] Returns the sharpness setting of the video. |                                  |

| Command and parameters  | content                               |
|---|---------------------------------------|
| <b>SetMirror</b> <mirror>   | Video left and right reversal control |
| <mirror> 0: does not reverse the left and right sides of the video, 1: reverses the left and right sides of the video |                                       |

| Command and parameters   | content  |
|--|--|
| <b>GetMirror</b>   | Acquiring the left and right reversal state of the video |
| Return value - 0: Flip off the left and right of the video, 1: The flip state of the video |  |

| Command and parameters | content                                  |
|------------------------|--|
| <b>SetFlip</b> <flip>  | Upside down and reverse control of video |



<flip> 0: does not reverse the top and bottom of the video, 1: reverses the top and bottom of the video

| Command and parameters  | content                                      |
|---|--|
| <b>GetFlip</b>  | Image upside down reversal state acquisition |
| Return value - 0: Flip up and down in the image, 1: Turn up and down in the video |  |

| Command and parameters   | content                |
|--|------------------------|
| <b>SetDefog &lt;set&gt; &lt;mode&gt; &lt;level&gt;</b>                               | Defog Function Control |
| <set> 1: With Defog, 0: Without Defog  |                        |
| <mode>   |                        |
| 0: Manual mode. The level value controls the degree of defog                         |                        |
| 1: Automatic mode. Defog level is automatically controlled regardless of level value |                        |
| <level> 0: LOW, 1: MIDDLE, 2: HIGH   |                        |

| Command and parameters                              | content                  |
|---|--------------------------|
| <b>GetDefog</b>                                     | Acquiring Defog Settings |
| Returns the value of the Defog setting.             |                          |
| For detailed parameters, see the SetDefog function. |                          |

| Command and parameters                 | content              |
|--|----------------------|
| <b>SetACE &lt;mode&gt;</b>             | ACE Function Control |
| <mode>                                 |                      |
| 0 : OFF, 1 : LOW, 2 : MIDDLE, 3 : HIGH |                      |
| ACE feature intensity can be set.      |                      |

| Command and parameters                     | content                |
|--|------------------------|
| <b>GetACE</b>                              | Acquiring ACE Settings |
| For return values, please refer to SetACE. |                        |

| Command and parameters  | content                           |
|---|-----------------------------------|
| <b>SetVideoFormat &lt;0_1&gt;</b>   | Streaming Mode (JPEG/YUV) Control |
| <0_1> 0: Set JPEG streaming mode, 1: Set YUV (uncompressed) streaming mode (Supports iN2-32SC, iN2-23SC, and iN2Z-32SC-6Z210) |                                   |

| Command and parameters | content |
|------------------------|---------|
|------------------------|---------|

|   |                                     |
|---|-------------------------------------|
| <b>GetVideoFormat</b>   | Acquiring Streaming Mode (JPEG/YUV) |
| Returns - 0: JPEG streaming mode, 1: YUV (uncompressed) streaming mode (Standard, Zoom supported) |                                     |

| Command and parameters   | content                    |
|--|----------------------------|
| <b>SetTCPStreamMode &lt;mode&gt;</b>   | TCP Streaming Mode Control |
| <mode><br>0: Normal Mode, 1: Information Contained Mode<br><br>For more information, see 2.1. Please refer to how to use TCP Stream.<br><b>Available from Firmware version 1.1.0 and above</b> |                            |

| Command and parameters                                       | content                      |
|--|------------------------------|
| <b>GetTCPStreamMode</b>                                      | Acquiring TCP Streaming Mode |
| Return Value - 0: Normal Mode, 1: Information Contained Mode |                              |

| Command and parameters   | content                 |
|--|-------------------------|
| <b>SetGamma &lt;gamma&gt;</b>  | Setting the Gamma Value |
| <gamma> Set the gamma value you want to set as a decimal.<br>As of version 1.0.0, there are 0.45, 0.5, 0.55, 0.6, 0.65, 0.7, 0.75 and 1 (gamma off). |                         |

| Command and parameters  | content                |
|---|------------------------|
| <b>GetGamma</b>   | Obtaining Gamma Values |
| Returns a set Gamma value. For what is returned, see the SetGamma function description. |                        |

| Command and parameters   | content                    |
|--|----------------------------|
| <b>SetOSD &lt;OSD&gt;</b>  | On-Screen Display Settings |
| <OSD><br>Set the OSD display value.<br>0: OSD off, 1: number of frames acquired,<br>2 : Current time display (If you do not use the SNTP function or use Get PC Time to set the time after booting, the time from the default time of 2019/09/01 09:00:00 will be displayed.)<br>3: JPEG codec info display, 4: H.264 codec info display, 5: Custom mode |                            |

| Command and parameters  | content                              |
|---|--------------------------------------|
| <b>GetOSD</b>   | Acquiring On-Screen Display Settings |
| For what is returned, see the description of the SetOSD function. |                                      |

| Command and parameters   | content                             |
|--|-------------------------------------|
| <b>SetCustomOSDFormat</b> <Size> <Character_Set><br><Color_R> <Color_G> <Color_B>  | Set Custom On-Screen Display Format |
| <p>Set the size, color, and character set of the Custom OSD.</p> <p>&lt;Size&gt; Sets the size of the OSD text. (1 ~ 15)</p> <p>&lt;Character_Set&gt; Set the OSD character set. (0 ~ 1)</p> <p>0 : English (Default)</p> <p>1 : Korean</p> <p>&lt;Color_R&gt; Sets the color of the Red color of the OSD character. (0 ~ 255)</p> <p>&lt;Color_G&gt; Sets the Green color of the OSD text. (0 ~ 255)</p> <p>&lt;Color_B&gt; Sets the Blue color of the OSD text. (0 ~ 255)</p> <ul style="list-style-type: none"> <li>- Before use, use "SetOSD" to change the OSD mode to Custom Mode.</li> <li>- The format of the characters output as "SetOSD" remains unchanged.</li> <li>- If the Size or Character Set is changed when the Upper Mat, all output OSD will be cleared.</li> <li>- When the size value is 1, the starting position of the OSD is the leftmost 1/5 point and cannot be changed.</li> <li>- If size value is 2 or higher, the OSD start position starts from the leftmost edge.</li> <li>- The maximum number of characters printed on a screen is 2048 characters.</li> </ul> |                                     |

| Command and parameters  | content  |
|---|--|
| <b>GetCustomOSDFormat</b>   | Acquiring Custom On-Screen Display Format Settings |
| Returns the Custom OSD Format setting. For detailed parameters, see SetCustomOSDFormat. |  |

| Command and parameters   | content                              |
|--|--------------------------------------|
| <b>SetCustomOSDText</b> <X> <Y> <text>   | Set up Custom On-Screen Display text |
| <p>Set the position and text of the Custom OSD and print it on the screen.</p> <p>&lt;X&gt; Sets the horizontal starting point of the OSD text. (0 ~ Max Range)</p> <p>Size 1 : 0 ~ 58 - Size 2 : 0 ~ 52 - Size 3 : 0 ~ 35</p> <p>Size 4 : 0 ~ 27 - Size 5 : 0 ~ 22 - Size 6 : 0 ~ 18</p> <p>Size 7 : 0 ~ 15 - Size 8 : 0 ~ 13 - Size 9 : 0 ~ 12</p> <p>Size 10 : 0 ~ 10 - Size 11 : 0 ~ 9 - Size 12 : 0 ~ 8</p> <p>Size 13 : 0 ~ 8 - Size 14 : 0 ~ 7 - Size 15 : 0 ~ 7</p> <p>&lt;Y&gt; Sets the vertical starting point of the OSD character. (0 ~ Max Range)</p> <p>Size 1 : 0 ~ 33 - Size 2 : 0 ~ 18 - Size 3 : 0 ~ 12</p> |                                      |

Size 4 : 0 ~ 9   -   Size 5 : 0 ~ 7   -   Size 6 : 0 ~ 6  
 Size 7 : 0 ~ 5   -   Size 8 : 0 ~ 4   -   Size 9 : 0 ~ 4  
 Size 10 : 0 ~ 3   -   Size 11 : 0 ~ 3   -   Size 12 : 0 ~ 2  
 Size 13 : 0 ~ 2   -   Size 14 : 0 ~ 2   -   Size 15 : 0 ~ 2

<text> sets the OSD string. (Maximum 20 characters in English, 10 characters in Korean)

In the case of English Character Set, you can use case, lowercase, numbers, and special symbols.  
 In the case of Hangul Character Set, you can use English capital letters, numbers, special symbols,  
 and 270 pre-assembled Korean characters.

- Before use, use "SetOSD" to change the OSD mode to Custom Mode.
- It is not possible to use "SetOSD" at the same time.
- Spaces are used in place of the ' symbol ( ASCII 96 ).  
     <ex> SetCustomOSDText 0 0 osd'test -> 0, 0 point "osd test" output.
- For the use of Hangul, EUC-KR encoding is used.

| Command and parameters                               | content                            |
|--|------------------------------------|
| <b>ClearOSD</b>                                      | Cleared all On-Screen Display text |
| Delete all characters and strings output to the OSD. |                                    |

| Command and parameters  | content                                     |
|---|---|
| <b>SetIris &lt;iris&gt;</b>   | (i-Nova2-Zoom models only) Aperture control |
| <iris> (0~1023)   |   |
| The closer it is to 1023, the more it opens the aperture to let in light,<br>The closer it is to zero, the less light it lets in by closing the aperture. |   |

| Command and parameters                                     | content  |
|--|--|
| <b>GetIris</b>   | ((i-Nova2-Zoom models only) Acquiring Aperture Opening and Closing |
| Returns the degree of opening and closing of the aperture. |  |

| Command and parameters   | content   |
|--|---|
| <b>SetIrisAbs &lt;iris&gt;</b>   | (i-nova2-motor models only) Aperture open/close control |
| <iris> (1~18)  |   |
| The closer you get to 18, the more you open the aperture to let in light,<br>The closer it is to 1, the less light it lets in by closing the aperture. |   |

| Command and parameters | content |
|------------------------|---------|
|------------------------|---------|

|  |  |
|--|--|
| <b>SetZoomFocusPosition &lt;zoom&gt; &lt;focus&gt;</b>   | (Models with integrated zoom lens only) Zoom and focus shift control |
| <p>It doesn't specify the current zoom and focus position, but sets the change from the current location.</p> <p>It behaves in the same way as SetIris, but you must provide both zoom and focus parameters.</p> <p>Example setting: SetZoomFocusPosition 0 15</p> |  |

| Command and parameters   | content  |
|--|--|
| <b>GetZoomFocusPosition</b>  | (i-Nova2 Zoom models only) Zoom and focus position acquisition |
| <p>&lt;zoom&gt;, &lt;focus&gt; receive the current zoom and focus location.</p> <p>This feature is only supported on the i-Nova2 Zoom model.</p> |  |

| Command and parameters  | content  |
|---|--|
| <b>ReadjustZoom</b>   | (i-Nova2 Zoom models only) Reset zoom and focus position |
| <p>If you move the position but don't save it, the camera may lose its lens position, which may be caused by mechanical vibration or a change in camera pose.</p> <p>If that happens, you can have your home location scanned again and then go back to the last saved location.</p> <p>This command may take up to 1 minute.</p> |  |

| Command and parameters   | content                     |
|--|-----------------------------|
| <b>SetAWB &lt;mode&gt;</b>   | Auto White Balance Settings |
| <p>Auto White balance mode setting</p> <p>&lt;mode&gt; 0:Auto/1:AutoExt/2:Preset/3:Manual</p> <p>&lt;Rgain&gt; [0~40] Auto Red Gain</p> <p>&lt;Ggain&gt; [0~40] Auto Green Gain</p> <p>&lt;Bgain&gt; [0~40] Auto Blue Gain</p> <p>&lt;ctemp&gt; [0~2] Color temperature setting in Manual mode. 0 : 3000K / 1 : 5000K / 2 : 7000K</p> <p>&lt;rgain&gt; [0~20] Red gain value setting in Manual mode. Apart from the above Auto Gain value,</p> |                             |

| Command and parameters                                  | content                 |
|---|-------------------------|
| <b>GetAWB</b>   | Acquiring AWB Setpoints |
| <p>For detailed parameters, please refer to SetAWB.</p> |                         |

| Command and parameters  | content   |
|---|---|
| <b>SaveSetting</b>  | Saving Camera-related Information (onto Camera) |
| Save the current settings in the Camera as they are. (Automatically applied as a saved value when power is applied) |   |

| Command and parameters  | content            |
|---|--------------------|
| <b>ResetCamera</b>  | Restart the Camera |
| Command to reset the camera (cold reset/ connection must be redone) |                    |

| Command and parameters   | content  |
|--|--|
| <b>RestoreDefaultSetting</b>   | Restoring the Camera settings to their default state |
| Put the Camera in a factory reset state and restart it. You will need to reconnect to communicate. |  |

# NOVITEC

## 5. Table of Contents

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## 6. Revision history

| Date          | Version    | Description   |  |
|---------------|------------|---|--|
| 03. Nov. 2023 | v1.01      | Added API for video format setting<br>Add TCP stream mode   |  |
| 18. Feb. 2022 | 2022_Ver.1 | New templates improve the appearance and update the content |  |

< Table > 3. Revision History Table

## 7. contact

- Address: 30-18, Baekjegobun-ro 39-gil, Songpa-gu, Seoul
- Tel : +82-70-7122-1000
- Fax : +82-70-7159-1315
- Website: <http://www.novitec.co.kr>
- E-mail : Technical Support – [support@novitec.co.kr](mailto:support@novitec.co.kr)  
Sales Inquiries – [sales@novitec.co.kr](mailto:sales@novitec.co.kr)