



# iX Link Protocol

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## Programming Guide

**Revision 1.10**

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## 1 Introduction

This document describes the iX Link protocol used for transportation of iX Link data messages between a host controller and a Phase One Industrial camera. It enables users to control the camera and capture images.

This revision of iX Link Protocol is designed to function with standard RS232 serial communication.

Note: To make use of all the features listed in this document, ensure that you have installed the latest firmware versions in your cameras.

## 2 Messages and Flow Control

There are two types of iX Link data messages:

- Request message with a command to perform
- Reply message with command's completion code and results

The host/controller always initiates a communication with a camera by sending a request message. When the request message is sent, the host waits until the camera sends reply message.

The camera executes most commands almost instantly. Usually, the timeout for receiving a reply message is 500ms. However, there are commands that require additional time for execution (e.g. capture command). For these commands, there is an option to specify in the request message when the camera should send the reply message:

- Async reply mode — right after receiving a command
- Sync reply mode — after completing a command

For capture command in sync reply mode, the timeout is 5000ms + (exposure time)\*2.

### 2.1 Request Message

Byte	Field	Value
0	iX Link protocol prefix	88
1	Message size	The message size starts from the 2 <sup>nd</sup> byte (Protocol version) and does not include Checksum field
2	Protocol version	1
3	Command ID	The Command ID (CMD_ID enumeration)
4-	Command data	0-253 bytes of command data
4+ (command data length)	Checksum	The Checksum of the message (XOR starting from 2 <sup>nd</sup> byte (Protocol version))

## 2.2 Reply Message

Byte	Field	Value
0	iX Link protocol prefix	88
1	Message size	The message size starts from 2 <sup>nd</sup> byte (Protocol version) and does not include Checksum field
2	Protocol version	1
3	Command completion code	The Command completion code (COMPLETION_CODE enumeration)
4	Command ID	The Command ID (CMD_ID enumeration)
5-	Command data	0-253 bytes of command data
5+ (command data length)	Checksum	The Checksum of the message (XOR starting from 2 <sup>nd</sup> byte (Protocol version))

## 3 Protocol Type Enumerations

### 3.1 Command ID

CMD_ID	Field Name	Description	Products support
8	GET_SYSTEM_INFO	Get System Information	All
10	SET_APERTURE	Set aperture value	All
11	GET_APERTURE	Get aperture value	All
12	GET_APERTURE_RANGE	Get aperture range	All
13	INCREMENT_APERTURE	Increment aperture	All
14	SET_ISO	Set ISO value	All
15	GET_ISO	Get ISO value	All
16	GET_ISO_RANGE	Get ISO range	All
17	INCREMENT_ISO	Increment ISO	All
18	SET_SHUTTER_SPEED	Set shutter speed value	All
19	GET_SHUTTER_SPEED	Get shutter speed value	All
20	GET_SHUTTER_SPEED_RANGE	Get shutter speed range	All
21	INCREMENT_SHUTTER_SPEED	Increment shutter speed	All
25	SET_BLACK_CALIB_MODE	Set black calibration mode	All
27	SET_EXPOSURE_MODE	Set exposure mode	All
28	SET_EXPOSURE_COMPENSATION	Set Exposure Compensation	All
29	GET_EXPOSURE_COMPENSATION	Get Exposure Compensation	All

30	GET_EXPOSURE_COMPENSATION_RANGE	Get Exposure Compensation Range	All
31	INCREMENT_EXPOSURE_COMPENSATION	Increment Exposure Compensation	All
32	SET_FOCUS_DISTANCE	Set Focus Distance	Only iXM
33	SET_FOCUS_ENCODER_POSITION	Set Focus Encoder Position	Only iXM
34	GET_FOCUS_DISTANCE	Get Focus Distance	Only iXM
35	GET_FOCUS_ENCODER_POSITION	Get Focus Encoder Position	Only iXM
37	GET_FOCUS_CURRENT_POSITION	Get Focus Current Position	Only iXM
38	GET_FOCUS_INFO	Get Focus Information	Only iXM
39	SET_GPS_ENABLE	Enable or disable receiving GPS data	Only iXM
40	GET_GPS_ENABLE	Get receiving GPS data enabled or disabled	Only iXM
41	SET_GPS_RECEIVER	Set GPS receiver type	Only iXM
42	GET_GPS_RECEIVER	Get GPS receiver type	Only iXM
43	SET_GPS_BAUD_RATE	Set GPS baud rate	Only iXM
44	GET_GPS_BAUD_RATE	Get GPS baud rate	Only iXM
110	CAPTURE	Capture an image	All
111	GET_SYSTEM_STATUS	Get system status	All
112	GET_EXT_SYSTEM_STATUS	Get extended system status	All

114	START_LIVE_VIEW	Start live view mode	All
115	STOP_LIVE_VIEW	Stop live view mode	All
116	SET_REGION_OF_INTEREST	Set region of interest (ROI) for HDMI LV only	All
117	SET_HDMI_EXPOSURE_MODE	Set HDMI exposure mode	Except for iXM
118	SET_HDMI_LIGHTNESS	Set HDMI lightness	Except for iXM
119	SET_HDMI_ISO	Set HDMI ISO	Except for iXM
120	SET_HDMI_EXPOSURE_TIME	Set HDMI exposure time	Except for iXM
127	SET_HDMI_OVERLAY_MODE	Set HDMI overlay mode	Only iXM
128	GET_HDMI_OVERLAY_MODE	Get HDMI overlay mode	Only iXM
130	GET_LOCAL_STORAGE_STATUS	Get information (status) about local storage	Only iXM
131	SET_LOCAL_STORAGE_ACTION	Perform local storage action	Only iXM
255	UNDEFINED_ID	Undefined command ID – may be used when no ID available (in reply message)	All

### 3.2 Command Completion Code

COMPLETION_CODE	Field Name	Description
0	NO_ERROR	Command finished successfully
-1	ERR_GENERAL	General error message
-2	ERR_NOT_SUPPORTED	Command not supported
-3	ERR_CANNOT_EXECUTE	Cannot execute command
-4	ERR_MSG_SIZE	Message size is invalid
-5	ERR_PROTOCOL_VERSION	Protocol version is invalid
-6	ERR_INPUT_OUT_OF_RANGE	Input values exceed limits



### 3.3 Black Calibration Mode

BLACK_CALIB_MODE	Field Name	Description
0	FORCED	Black calibration is always performed
1	SUPPRESSED	Black calibration is never performed

### 3.4 System Status

SYS_STATUS	Field Name	Description
0	STATUS_ERROR	System is in error state (general error)
1	STATUS_READY	System is ready to capture
2	STATUS_BUSY	System is not ready to capture

### 3.5 Reply Mode

REPLY_MODE	Field Name	Description
0	ASYNC_REPLY_MODE	Reply message is sent to the host right after receiving the request message and before completing the requested command
1	SYNC_REPLY_MODE	Reply message is sent to the host after completing the requested command

### 3.6 Exposure Mode

EXPOSURE_MODE	Field Name	Description
0	MANUAL_MODE	Exposure parameters in use are the one set manually
1	AUTO_MODE	Exposure parameters are set automatically by the system

### 3.7 GPS enable

GPS_ENABLE	Field Name	Description
0	DISABLE_GPS	Disable GPS receiving data
1	ENABLE_GPS	Enable GPS receiving data

### 3.8 GPS receiver type

GPS_RECEIVER_TYPE	Field Name	Description
0	NMEA	NMEA GPS receiver
1	NOVATEL	Novatel GPS receiver
2	APPLANIX	Applanix GPS receiver
3	IGI	IGI GPS receiver
4	GGG_OxTS	GGG or OxTS GPS receiver
5	VECTORNAV	VectorNav GPS receiver

### 3.9 GPS baud rate

GPS_BAUD_RATE	Field Name	Description
0	9600	Baud rate 9600
1	19200	Baud rate 19200
2	38400	Baud rate 38400
3	57600	Baud rate 57600
4	115200	Baud rate 115200

### 3.10 HDMI Exposure Mode

HDMI_EXPOSURE_MODE	Field Name	Description
0	AUTO_MODE	Exposure parameters are set automatically by the system

1	MANUAL_MODE	Exposure parameters in use are the one set manually
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### 3.11 HDMI ISO

HDMI_ISO	Field Name	Description
0	ISO 50	ISO value 50
1	ISO 100	ISO value 100
2	ISO 200	ISO value 200
3	ISO 400	ISO value 400
4	ISO 800	ISO value 800
5	ISO 1600	ISO value 1600
6	ISO 3200	ISO value 3200
7	ISO 6400	ISO value 6400
8	ISO 12800	ISO value 12800

### 3.12 HDMI Exposure Time

HDMI_EXPOSURE_TIME	Field Name	Description
0	TIME_1_10000	Exposure time is 1/10000 of a second
1	TIME_1_8000	Exposure time is 1/8000 of a second
2	TIME_1_4000	Exposure time is 1/4000 of a second
3	TIME_1_2000	Exposure time is 1/2000 of a second
4	TIME_1_1000	Exposure time is 1/1000 of a second
5	TIME_1_500	Exposure time is 1/500 of a second
6	TIME_1_250	Exposure time is 1/250 of a second
7	TIME_1_100	Exposure time is 1/100 of a second

8	TIME_1_60	Exposure time is 1/60 of a second, supported only for HDMI mode 1080p30
9	TIME_1_60_fit	Exposure time is 1/60 of a second, supported only for HDMI mode 720p60
10	TIME_1_50	Exposure time is 1/50 of a second, supported only for HDMI mode 1080p25
11	TIME_1_50_fit	Exposure time is 1/50 of a second, supported only for HDMI mode 720p50
12	TIME_1_30	Exposure time is 1/30 of a second, supported only for HDMI mode 720p60
13	TIME_1_30_fit	Exposure time is 1/30 of a second, supported only for HDMI mode 1080p30
14	TIME_1_25	Exposure time is 1/25 of a second, supported only for HDMI mode 720p50
15	TIME_1_25_fit	Exposure time is 1/25 of a second, supported only for HDMI mode 1080p25
16	TIME_1_20	Exposure time is 1/20 of a second, supported only for HDMI mode 720p60
17	TIME_1_15	Exposure time is 1/15 of a second, supported only for HDMI mode 1080p30 and 720p60
18	TIME_1_13	Exposure time is 1/13 of a second, supported only for HDMI mode 1080p25 and 720p50

19	TIME_1_10	Exposure time is 1/10 of a second, supported only for HDMI mode 1080p30, 720p50 and 720p60
20	TIME_1_8	Exposure time is 1/8 of a second, supported only for HDMI mode 1080p30 and 720p60
21	TIME_1_6	Exposure time is 1/6 of a second, supported only for HDMI mode 1080p25 and 720p50
22	TIME_1_5	Exposure time is 1/5 of a second
23	TIME_1_4	Exposure time is 1/4 of a second

### 3.13 HDMI Overlay Enable

HDMI_OVERLAY_ENABLE	Field Name	Description
0	DISABLE_HDMI_OVERLAY	Disable HDMI overlay
1	ENABLE_HDMI_OVERLAY	Enable HDMI overlay

### 3.14 HDMI Overlay Layout

HDMI_OVERLAY_MODE	Field Name	Description
0	HDMI_OVERLAY_STANDARD	Standard HDMI overlay layout
1	HDMI_OVERLAY_DJI	DJI HDMI overlay layout

### 3.15 HDMI Preview To Display Enable

HDMI_PREVIEW_TO_DISPLAY_ENABLE	Field Name	Description
0	DISABLE_HDMI_PREVIEW	Disable HDMI overlay preview displaying
1	ENABLE_HDMI_PREVIEW	Enable HDMI overlay preview displaying

### 3.16 HDMI Preview To Display Orientation

HDMI_PREVIEW_TO_DISPLAY_ORIENTATION	Field Name	Description
0	ORIENTATION_0	Landscape 0 degrees

1	ORIENTATION_90	Portrait 90 degrees
2	ORIENTATION_270	Portrait 270 degrees
3	ORIENTATION_180	Landscape 180 degrees

### 3.17 HDMI Focus Peaking Enable

HDMI_FOCUS_PEAKING_ENABLE	Field Name	Description
0	DISABLE_FOCUS_PEAKING	Disable HDMI overlay focus peaking
1	ENABLE_FOCUS_PEAKING	Enable HDMI overlay focus peaking

### 3.18 Local Storage Type

LOCAL_STORAGE_TYPE	Field Name	Description
0	LOCAL_STORAGE_XQD	XQD card

### 3.19 Local Storage Status

LOCAL_STORAGE_STATUS	Field Name	Description
0	LOCAL_STORAGE_UNAVAILABLE	No local storage available
1	LOCAL_STORAGE_READY	Local storage available and ready
2	LOCAL_STORAGE_FORMATTING	Local storage under formatting process

### 3.20 Mass Storage Mode

MASS_STORAGE_MODE	Field Name	Description
0	MASS_STORAGE_OFF	Mass storage mode disabled
1	MASS_STORAGE_READ_ONLY	Mass storage mode enabled for read only

### 3.21 Mass Storage Action

MASS_STORAGE_ACTION	Field Name	Description
0	QUICK_FORMAT	Run quick format of local storage

1	FULL_FORMAT	Currently not supported
2	ENABLE_MASS_STORAGE_MODE	Enable USB mass storage mode
3	DISABLE_MASS_STORAGE_MODE	Disable USB mass storage mode

## 4 Protocol Types

Type	Description
UInt8	1 Byte, Unsigned
UInt16	2 Bytes, Unsigned, MSB first
UInt32	4 Bytes, Unsigned, MSB first
UInt64	8 Bytes, Unsigned, MSB first
Int8	1 Byte, Signed
UInt8[n]	String, n bytes, Unsigned

## 5 Command Data

### 5.1 Request Message Command Data

The request messages below have one-byte command ID and command data. Request messages without command data are not detailed here since they only consist of one byte of command ID.

#### 5.1.1 SET\_APERTURE (#10)

Field Name	Type	Description
Aperture_value_num	Int8	Numerator of an apex value
Aperture_value_denom	UInt8	Denominator of an apex value

#### 5.1.2 INCREMENT\_APERTURE (#13)

Field Name	Type	Description
Aperture_inc_step_num	Int8	Numerator of an apex value
Aperture_inc_step_denom	UInt8	Denominator of an apex value

#### 5.1.3 SET\_ISO (#14)

Field Name	Type	Description
ISO_value_num	Int8	Numerator of an apex value
ISO_value_denom	UInt8	Denominator of an apex value

#### 5.1.4 INCREMENT\_ISO (#17)

Field Name	Type	Description
ISO_inc_step_num	Int8	Numerator of an apex value
ISO_inc_step_denom	UInt8	Denominator of an apex value

#### 5.1.5 SET\_SHUTTER\_SPEED (#18)

Field Name	Type	Description
Shutter_speed_value_num	Int8	Numerator of an apex value
Shutter_speed_value_denom	UInt8	Denominator of an apex value



#### 5.1.6 INCREMENT\_SHUTTER\_SPEED (#21)

Field Name	Type	Description
Shutter_speed_Inc_step_num	Int8	Numerator of an apex value
Shutter_speed_Inc_step_denom	UInt8	Denominator of an apex value

#### 5.1.7 SET\_BLACK\_CALIB\_MODE (#25)

Field Name	Type	Description
Black_calib_mode	UInt8	Black calibration mode (BLACK_CALIB_MODE enumeration)

#### 5.1.8 SET\_EXPOSURE\_MODE (#27)

Field Name	Type	Description
Exposure_mode	UInt8	Exposure mode (EXPOSURE_MODE enumeration)

#### 5.1.9 SET\_EXPOSURE\_COMPENSATION (#28)

Field Name	Type	Description
Exposure_Compensation_value_num	Int8	Numerator of an apex value
Exposure_Compensation_value_denom	UInt8	Denominator of an apex value

#### 5.1.10 INCREMENT\_EXPOSURE\_COMPENSATION (#31)

Field Name	Type	Description
Exposure Compensation Inc_step_num	Int8	Numerator of an apex value
Exposure Compensation Inc_step_denom	UInt8	Denominator of an apex value

#### 5.1.11 SET\_FOCUS\_DISTANCE\_TARGET (#32)

Field Name	Type	Description
Reply_mode	UInt8	The reply mode (REPLY_MODE enumeration)
Focus distance target	UInt32	Focus distance target [mm] (Lens to object)

#### 5.1.12 SET\_FOCUS\_ENCODER\_POSITION (#33)

Field Name	Type	Description
Reply_mode	UInt8	The reply mode (REPLY_MODE enumeration)
Focus encoder position target	UInt32	Focus encoder position [Steps]

#### 5.1.13 SET\_GPS\_ENABLE (#39)

Field Name	Type	Description
GPS_enable	UInt8	Enable or disable GPS data receiving (GPS_ENABLE enumeration)

#### 5.1.14 SET\_GPS\_RECEIVER (#41)

Field Name	Type	Description
GPS_receiver	UInt8	GPS receiver type (GPS_RECEIVER_TYPE enumeration)

#### 5.1.15 SET\_GPS\_BAUD\_RATE (#43)

Field Name	Type	Description
GPS_baud_rate	UInt8	GPS baud rate (GPS_BAUD_RATE enumeration)

#### 5.1.16 CAPTURE (#110)

Field Name	Type	Description
Reply_mode	UInt8	The reply mode (REPLY_MODE enumeration)

#### 5.1.17 STOP\_LIVE\_VIEW (#115)

Field Name	Type	Description
Reply_mode	UInt8	The reply mode (REPLY_MODE enumeration)

#### 5.1.18 SET\_REGION\_OF\_INTEREST (#116)

Field Name	Type	Description
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ROI_center_point_x	Uint8	Center point horizontal position, while 1 is left end and 255 right end
ROI_center_point_y	Uint8	Center point vertical position, while 1 is bottom end and 255 top end
ROI_scale_percentage	Uint8	Region scaling in percentage

#### 5.1.19 SET\_HDMI\_EXPOSURE\_MODE (#117)

Field Name	Type	Description
HDMI_exposure_mode	Uint8	HDMI exposure mode (HDMI_EXPOSURE_MODE enumeration)

#### 5.1.20 SET\_HDMI\_LIGHTNESS (#118)

Field Name	Type	Description
HDMI_lightness	Uint8	HDMI lightness in range of 0 to 100

#### 5.1.21 SET\_HDMI\_ISO (#119)

Field Name	Type	Description
HDMI_ISO	Uint8	HDMI ISO (HDMI_ISO enumeration)

#### 5.1.22 SET\_HDMI\_EXPOSURE\_TIME (#120)

Field Name	Type	Description
HDMI_exposure_time	Uint8	HDMI exposure time (HDMI_EXPOSURE_TIME enumeration)

#### 5.1.23 SET\_HDMI\_OVERLAY\_MODE (#127)

Field Name	Type	Description
HDMI_overlay_enable	Uint8	Enable or disable HDMI overlay (HDMI_OVERLAY_ENABLE enumeration)
HDMI_overlay_layout	Uint8	Select HDMI overlay layout (HDMI_OVERLAY_LAYOUT enumeration)
HDMI_overlay_transparency	Uint8	HDMI overlay transparency 0 to 255

HDMI_preview_to_display_enable	Uint8	Enable or disable HDMI overlay will display image preview (HDMI_PREVIEW_TO_DISPLAY_ENABLE enumeration)
HDMI_preview_to_display_timeout	Uint8	HDMI overlay display image preview timeout in seconds
HDMI_preview_to_display_orientation	Uint8	HDMI overlay display image preview orientation (HDMI_PREVIEW_TO_DISPLAY_ORIENTATION enumeration)
HDMI_focus_peaking_enable	Uint8	Enable or disable HDMI overlay focus peaking (HDMI_FOCUS_PEAKING_ENABLE enumeration)
HDMI_focus_peaking_threshold	Uint8	HDMI overlay focus peaking threshold in %
Four bytes reserved	Uint8	More four bytes currently not in use

#### 5.1.24 GET\_LOCAL\_STORAGE\_STATUS (#130)

Field Name	Type	Description
Local_storage_type	Uint8	Local storage type (LOCAL_STORAGE_TYPE enumeration)

#### 5.1.25 LOCAL\_STORAGE\_ACTION (#131)

Field Name	Type	Description
Local_storage_type	Uint8	Local storage type (LOCAL_STORAGE_TYPE enumeration)
Local_storage_action	Uint8	Local storage action (LOCAL_STORAGE_ACTION enumeration)

## 5.2 Reply Message Command Data

The reply messages below are sent from the camera to the host in reply to the request messages. Reply messages without data are not detailed here since they only consist of command completion code (COMPLETION\_CODE) and command ID.

In case of an error (negative status byte value) no additional data is sent by the camera.

### 5.2.1 GET\_SYSTEM\_INFO (#8)

Field Name	Type	Description
Camera_brand_id	Uint8	Camera brand ID
Camera_model_id	Uint32	Camera model ID
Camera_name	Uint8[16]	Camera name
Lens_brand_id	Uint8	Lens brand ID
Lens_model_id	Uint16	Lens model ID
Lens_focal_length	Uint16	Lens focal length
Lens_name	Uint8[32]	Lens name

### 5.2.2 GET\_APERTURE (#11)

Field Name	Type	Description
Aperture_value_num	Int8	Numerator of an apex value
Aperture_value_denom	Uint8	Denominator of an apex value

### 5.2.3 GET\_APERTURE\_RANGE (#12)

Field Name	Type	Description
Aperture_value_min_num	Int8	Numerator of an apex value
Aperture_value_max_num	Int8	Numerator of an apex value
Aperture_step_num	Uint8	Numerator of an apex value
Aperture_value_denom	Uint8	Denominator of an apex value

#### 5.2.4 GET\_ISO (#15)

Field Name	Type	Description
ISO_value_num	Int8	Numerator of an apex value
ISO_value_denom	UInt8	Denominator of an apex

#### 5.2.5 GET\_ISO\_RANGE (#16)

Field Name	Type	Description
ISO_value_min_num	Int8	Numerator of an apex value
ISO_value_max_num	Int8	Numerator of an apex value
ISO_step_num	UInt8	Numerator of an apex value
ISO_value_denom	UInt8	Denominator of an apex value

#### 5.2.6 GET\_SHUTTER\_SPEED (#19)

Field Name	Type	Description
Shutter_speed_value_num	Int8	Numerator of an apex value
Shutter_speed_value_denom	UInt8	Denominator of an apex value

#### 5.2.7 GET\_SHUTTER\_SPEED\_RANGE (#20)

Field Name	Type	Description
Shutter_speed_value_min_num	Int8	Numerator of an apex value
Shutter_speed_value_max_num	Int8	Numerator of an apex value
Shutter_speed_step_num	UInt8	Numerator of an apex value
Shutter_speed_value_denom	UInt8	Denominator of an apex value

#### 5.2.8 GET\_EXPOSURE\_COMPENSATION (#29)

Field Name	Type	Description
Exposure_Compensation_value_num	Int8	Numerator of an apex value
Exposure_Compensation_value_denom	UInt8	Denominator of an apex value

**5.2.9 GET\_EXPOSURE\_COMPENSATION\_RANGE (#30)**

Field Name	Type	Description
Exposure_Compensation_value_min_num	Int8	Numerator of an apex value
Exposure_Compensation_value_max_num	Int8	Numerator of an apex value
Exposure_Compensation_step_num	UInt8	Numerator of an apex value
Exposure_Compensation_value_denom	UInt8	Denominator of an apex value

**5.2.10 GET\_FOCUS\_DISTANCE (#34)**

Field Name	Type	Description
Focus distance target	UInt32	Focus distance target [mm] (Lens to object)

**5.2.11 GET\_FOCUS\_ENCODER\_POSITION (#35)**

Field Name	Type	Description
Focus encoder position target	UInt32	Focus encoder position [Steps]

**5.2.12 GET\_FOCUS\_CURRENT\_POSITION (#37)**

Field Name	Type	Description
Current focus distance	UInt32	Current focus distance [mm]
Current focus encoder position	UInt32	Current focus encoder position [Steps]

### 5.2.13 GET\_FOCUS\_INFO (#38)

Field Name	Type	Description
Focus control flag	UInt8	0 = Stepper motor
Focus distance Min	UInt32	Focus distance Min [mm]
Focus distance Max	UInt32	Focus distance Max [mm]
Focus encoder position Min	UInt32	Encoder position Min [Steps]
Focus encoder position Max	UInt32	Encoder position Max [Steps]
Focus movement timeout	UInt32	Maximum time of focus movement [milliseconds]

### 5.2.14 GET\_GPS\_ENABLE (#40)

Field Name	Type	Description
GPS_enable	UInt8	Enable or disable GPS data receiving (GPS_ENABLE enumeration)

### 5.2.15 GET\_GPS\_RECEIVER (#42)

Field Name	Type	Description
GPS_receiver	UInt8	GPS receiver type (GPS_RECEIVER_TYPE enumeration)

### 5.2.16 GET\_GPS\_BAUD\_RATE (#43)

Field Name	Type	Description
GPS_baud_rate	UInt8	GPS baud rate (GPS_BAUD_RATE enumeration)

### 5.2.17 GET\_SYSTEM\_STATUS (#111)

Field Name	Type	Description
System_status	UInt8	System status (SYS_STATUS enumeration)



### 5.2.18 GET\_EXT\_SYSTEM\_STATUS (#112)

Field Name	Type	Description
System_status	Uint8	System status (SYS_STATUS enumeration)
Remaining_captures	Uint32	Remaining free space for images
Successful_captures_counter	Uint32	Counter of successful captures
Missed_captures_counter	Uint32	Counter of missed captures

### 5.2.19 GET\_HDMI\_OVERLAY\_MODE (#128)

Field Name	Type	Description
HDMI_overlay_enable	Uint8	HDMI overlay enabled or disabled (HDMI_OVERLAY_ENABLE enumeration)
HDMI_overlay_layout	Uint8	HDMI overlay mode (HDMI_OVERLAY_LAYOUT enumeration)
HDMI_overlay_transparency	Uint8	HDMI overlay transparency 0 to 255
HDMI_preview_to_display_enable	Uint8	HDMI overlay displaying image preview enabled or disabled (HDMI_PREVIEW_TO_DISPLAY_ENABLE enumeration)
HDMI_preview_to_display_timeout	Uint8	HDMI overlay displaying image preview timeout in seconds
HDMI_preview_to_display_orientation	Uint8	HDMI overlay displaying image preview orientation (HDMI_PREVIEW_TO_DISPLAY_ORIENTATION enumeration)
HDMI_focus_peaking_enable	Uint8	HDMI overlay focus peaking enabled or disabled (HDMI_FOCUS_PEAKING_ENABLE enumeration)

HDMI_focus_peaking_threshold	Uint8	HDMI overlay focus peaking threshold in %
Four bytes reserved	Uint8	More four bytes currently not in use

### 5.2.20 GET\_LOCAL\_STORAGE\_STATUS (#130)

Field Name	Type	Description
Local_storage_type	Uint8	Local storage type (LOCAL_STORAGE_TYPE enumeration)
Local_storage_status	Uint8	Local storage status (LOCAL_STORAGE_STATUS enumeration)
Local_storage_size	Uint64	Local storage size in bytes
Local_storage_capacity	Uint64	Local storage remaining free space in bytes
Local_storage_image_capacity	Uint32	Local storage remaining images
Mass_storage_mode	Uint8	Local storage mass-storage mode (MASS_STORAGE_MODE enumeration)
Four bytes reserved	Uint8	More four bytes currently not in use

## 5.3 Examples

Request message with command ID 11 (GET\_APERTURE): 88 2 1 11 10

Reply message for command ID 11 (GET\_APERTURE): 88 5 1 0 11 18 3 27 (no error)

Reply message for command ID 11 (GET\_APERTURE): 88 3 1 255(-1) 11 245 (error)

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