

WORKSWELL
WIRIS COMMAND CONTROL PROTOCOL

USER MANUAL

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WORKSWELL®
INFRARED CAMERAS AND SYSTEMS

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1 User Information

1.1 Typographic Conventions

The following typographic conventions are used in this User Manual:

- UPPER CASE is used for the names of keys, buttons and menu items
- COURIER is used for file names and paths
- *Italic* is used for important information and document names
- Underline is used for the links to other sections, for function names or Internet sites

1.2 Help and Support

For technical questions that are not answered in this User Manual feel free to contact your dealer or visit the product website at workswell.eu, or contact our support team via support.workswell.eu.

1.3 Updates

The primary aim of Workswell s.r.o. company is to supply its products in a way that meets the current needs of its users and at the same time to remove all the weaknesses found in the use ofits products as quickly as possible. For this reason, Workswell s.r.o. regularly releases updates for all its products.

Visit my.workswell.eu to download the latest firmware release. The update process itself is described in a later section.

1.4 Firmware

Firmware is the „internal“ control program of the device. From the user’s point of view, only the official firmware released by Workswell s.r.o. can be used to update the device.

2 Revision history

1.0

- Initial release

200301

- Update the commands for the latest FW version 1.4.4

220630

- Add commands for WIRIS AGRO
- Add commands for GIS-320

220815

- Fix mistakes in WIRIS AGRO commands
- Delete unused ”set video location” command

220818

- Add commands for WWE

220825

- Add command to change HR camera resolution

220613

- New document format
- Add ip setters

221024

- New main image

260915

- Add WGE device support

3 Overview

This chapter includes basic information about the WIRIS Communication Protocol.

3.1 Basic Information

Sometimes it is not possible to control the WIRIS device with an RC controller. This protocol was designed as a full alternative to the RC controller.

It gives the user an option to control the WIRIS with simple text-based commands using different physical layers.

The protocol is currently compatible with seven models of WIRIS:

- Workswell WIRIS PRO (WWP)
- Workswell WIRIS ENTERPRISE (WWE)
- Workswell WIRIS SECURITY (WWS)
- Workswell GIS-320 (GIS)
- Workswell WIRIS AGRO (CWI)
- Workswell GIMBAL ENTERPRISE (WGE)

Differences between models will be noted.

> **Note**: Unless stated otherwise, commands supported on WIRIS PRO (WWP) are also supported on WIRIS ENTERPRISE (WWE) and WIRIS GIMBAL ENTERPRISE (WGE) radiometric version

3.2 Getting Help and Suggestions

The Workswell Command Control protocol was designed to be as stable and robust as possible. Still, if you find any bugs, inconveniences or if you have any suggestions for improvement, please contact us at support.workswell.eu.

4 Physical Layers

Currently both CAN bus and UART are supported.

Note: See your device's User Manual for HW connection (connector location, pinout)

4.1 CAN Bus

CAN bus is a rugged, digital serial bus designed for industrial environments. To use it with a WIRIS device, connect the CAN High (CANH) and CAN Low (CANL) wires to your device.

The CAN bus communication has the following parameters:

- Bitrate 1000000 bps.
- Frame ID 0xA1 for command to the camera and ID 0xA2 for answer from the camera.
- 8 bytes of data in one frame.

4.1.1 Message Dividing

Since protocol commands and responses cannot fit into one CAN frame, they must be divided into several frames. The following protocol describes how to do it.

Byte	Function
1	Header: 0x02
2 to 3	Size of message (little-endian): N from 0x0000 to 0xFFFF
4	1st message character byte
5	2nd message character byte
...	
N + 3	Nth message character bytes
N + 4	Footer: 0x03

Table 4.1: Protocol parameters

For example, the basic command to test the functionality is `HIWS` and the answer for it is `OK`.

The communication bytes are as follows:

- Command: 0x02 | 0x05 | 0x00 | 0x48 | 0x49 | 0x57 | 0x53 | 0x0A | 0x03
- Answer: 0x02 | 0x03 | 0x00 | 0x4F | 0x4B | 0x0A | 0x03

4.2 UART

The universal asynchronous serial communication protocol can be used for WIRIS Commands. The UART has the following parameters:

- Baud Rate 115200 bps (default, customizable)
- 8 data bits.
- No parity.
- 1 stop and 1 start bit.
- No flow control.

The UART port is shared between MAVLink, GPS and WIRIS Command Control Protocol. Only one of these can be used at a given time. The used peripheral is automatically detected. The detection is reset and repeated after each WIRIS reboot.

> **Note**: Each protocol can be set to OFF to improve autodetection speed at boot. Please refer to your device's User Manual

4.2.1 Detection

It can take up to several seconds for WIRIS to detect that the Command Control Protocol is being used, so the command `HIWS` should be repeated in a loop until `OK` answer is received. The command should be repeated with a period between 10 and 100 milliseconds.

The detection must be repeated after each WIRIS reboot.

> **Note**: To improve autodetection response time on the WIRIS sid we recommend setting baud rates of other UART protocols, such as MAVLink and NMEA to "OFF". Please see your device's User Manual.

4.2.2 Message

The commands and answers are serialized into UART protocol as follows:

Byte	Function
1	Header: 0x02
2 to 3	Size of message (little-endian): N from 0x0000 to 0xFFFF
4	1tst message character byte
5	2nd message character byte
...	
N + 3	Nth message character bytes
N + 4	Control sum of all message character bytes
N + 5	Footer: 0x03

Table 4.2: Protocol parameters

For example, the basic command to test the functionality is `HIWS` and the answer for it is `OK`.

The communication bytes are as follows:

- Command: 0x02 | 0x05 | 0x00 | 0x48 | 0x49 | 0x57 | 0x53 | 0x0A | 0x45 | 0x03
- Answer: 0x02 | 0x03 | 0x00 | 0x4F | 0x4B | 0x0A | 0xA4 | 0x03

5 Communication protocol description

This chapter contains information about the protocol.

The most common responses are `OK` in case of success and `ERR` in case of error. When parameters are given or returned, they are separated by one space.

> **Note**: Some commands work only for a specific camera type. If so, this is specified in the command description or in the header of the relevant command group. If unspecified, the command is valid for all devices listed in section 3.1

The parameters and return values can be either integers (denoted by [int] tag), floats (denoted by [float] tag) or strings defined as a list of discrete possibilities. The return values can also be strings (e.g. serial number, denoted by [string] tag) or lists (usually set of possible settings which can be dependent on camera calibration or current state). Lists can consist of strings, floats or integers (or their combination) and each entry is separated by a newline. Lists are indicated by { } around the type tags.

5.1 Command control protocol activation

Most commands from the command control protocol are initially locked behind a license. To unlock them, you need to enter the correct license key. For more information about the license key for your camera, please contact the Workswell support team at support.workswell.eu. Once the license is entered, it persists through the device reboots and you do not need to enter it every time you use the protocol..

> **Note**: Activation is not necessary on the Workswell Gimbal products (WGE)

5.1.1 Activate / get activation status

command	1st parameter	answer
ACCP	LICENCE NUMBER	▪ OK ▪ ERR
IACP		▪ TRUE ▪ FALSE

5.2 Basic commands

5.2.1 Commands delimiter

The delimiter for command messages can be either `LINE` ('\n' character) or `NULL` ('\0' character). This delimiter is used for detecting the end of a command. The `LINE` is mainly useful for manual input via some basic TELNET client, the `NULL` is better for software development. Default value is `LINE`.

command	1st parameter	answer
SDLM	▪ NULL ▪ LINE	▪ OK ▪ ERR
GDLM		▪ NULL ▪ LINE

Example:

```
SDLM  NULL
OK
GDLM
NULL
```

5.2.2 Check connection

Command used to check the connection ("ping command")

command	answer
HIWS	OK

5.2.3 Basic camera information

Returns a string with camera information.

Note: These getters are available before activating the SDK license.

command	answer
GSRN	[string]serial number
GATN	[string]article number
GFWV	[string]firmware version

Example:

```
GSRN
20062-046-2305
```

5.2.4 Camera temperature and fan power

The device internally measures temperature on several components. Each temperature value is in the set temperature units see 5.5.

command	answer
GTCU	[float]CPU temperature
GTIC	[float]thermal core temperature
GTIN	[float]Internal electronic temperature
GFPW	[float]Fan power (0-1)

Example:

```
GTCU
32.2
```

5.3 Menu navigation

When using the commands in normal mode (with HDMI output active, no RTSP stream) it is possible to emulate the keyboard control using the `MOVE` commands.

command	1st parameter	answer
MOVE	▪ UP ▪ DOWN ▪ CANCEL ▪ OK	OK

Example:

```
MOVE  OK
OK
```

5.4 GPS

5.4.1 Get GPS coordinates

Returns the current GPS coordinates when GPS data is provided to the camera from an external source. Returns either `N/A` when GPS is not connected, `INVALID` when GPS data is not valid or the coordinates in the following format:

```
LATITUDE 14.4444 S
LONGITUDE 57.5555 W
ALTITUDE 156.156
```

command	answer
GGPS	▪ N/A ▪ INVALID ▪ LATITUDE 14.4444 S LONGITUDE 57.5555 W ALTITUDE 156.156

Example:

```
GGPS
LATITUDE 14.4444 S
LONGITUDE 57.5555 W
ALTITUDE 156.156
```

5.5 Units

The camera can operate in Kelvins (K), degrees Celsius ($^{\circ}C$) or degrees Fahrenheit ($^{\circ}F$). All temperatures used in this protocol are in the set scale without the unit specifier unless explicitly stated otherwise.

command	1st parameter	answer
STUT	▪ K ▪ C ▪ F	▪ OK ▪ ERR
GTUT		▪ K ▪ C ▪ F

Example:

```
STUT  K
OK
GTUT
K
```

5.6 Wiris Pro, Wiris Enterprise, GIS and Wiris Gimbal radiometric thermal parameters

Please refer to the camera User Manual for more in-depth explanation of these parameters.

Note: All commands in section 5.6 are available only for the Wiris Pro, Wiris Enterprise, GIS 320 and radiometric variant of Wiris Gimbal Enterprise camera

5.6.1 Range mode settings

Get/set the range mode

command	1st parameter	answer
SRMD	▪ AUTOMATIC ▪ MANUAL ▪ SPAN	▪ OK ▪ ERR
GRMD		▪ AUTOMATIC ▪ MANUAL ▪ SPAN

Example:

```
SRMD  SPAN
OK
GRMD
SPAN
```

5.6.2 Manual range settings

Returns the currently set manual thermal range minimum and maximum (values for Manual Range).

command	1st parameter	2nd parameter	answer
SRMM	[float]min	[float]max	▪ OK ▪ ERR
GRMM			[float]min [float]max

Example:

```
SRMM  20.0  30.0
OK
GRMM
 20.0  30.0
```

5.6.3 Span range settings

command	1st parameter	2nd parameter	answer
SRWC	[float]center	[float]window	▪ OK ▪ ERR
GRWC			[float]center [float]window

Example:

```
SRWC  20.0  30.0
OK
GRWC
 20.0  30.0
```

5.6.4 Environment settings

Note: The possible setting depends on the installed lens and calibration. Only values returned by the command 5.7.2.1 command are possible

command	1st parameter	2nd parameter	answer
SREN	[float]min	[float]max	▪ OK ▪ ERR
GREN			[float]min [float]max

Example:

```
SREN  -25.0  150.0
OK
GREN
-25.0  150.0
```

5.6.4.1 Get possible environment settings

command	answer
GREL	{[float]min [float]max}

Example:

```
GREL
-25.0  150.0
-40.0  550.0
100.0  1000.0
400.0  1500.0
```

5.6.5 Environment variables

command	1st parameter	answer
STEM[1]	[float]<0.5-1> emissivity	▪ OK ▪ ERR
GTEM[1]		[float]emissivity
STRT[1]	[float][2]reflected temperature	▪ OK ▪ ERR
GTRT[1]		[float][2]reflected temperature
STAT[1]	[float][2]atmospheric temperature	▪ OK ▪ ERR
GTAT[1]		[float][2]atmospheric temperature

Note:
[1] not valid for Wiris Agro
[2] setting is passed in set units (see 5.5), valid range is from $-40^{\circ}C$ to $100^{\circ}C$

Example:

```
STEM 0.6
OK
GTEM
0.600000
```

5.6.6 Image interpolation

command	1st parameter	answer
STII	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GTII		▪ TRUE ▪ FALSE

Example:

```
STII TRUE
OK
GTII
TRUE
```

5.6.7 Shutter

5.6.7.1 Synchronous shutter settings

command	1st parameter	answer
STSC[1] [2]	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GTSC[1] [2]		▪ TRUE ▪ FALSE
STCP[1]	[int]<120s-1800s>shutter period (synchronous shutter)	▪ OK ▪ ERR
GTCP[1]		[int]camera shutter period
GTSL		[int]seconds elapsed from last shutter
GTSN [1]		▪ [int]seconds to next shutter (synchronous shutter) ▪ N/A (asynchronous shutter)

Note: [1] not valid for GIS 320
[2] TRUE denotes the synchronous shutter setting, FALSE asynchronous setting

Example:

```
STSC FALSE
OK
GTSC
FALSE
```

5.6.7.2 Perform thermal camera shutter

Performs the thermal camera shutter immediately. Suggested: ”On GIS-320, a shutter (e.g. the lens cap) must be placed in front of the lens before sending this command, because GIS-320 has no integrated shutter.

command	answer
IMCR	▪ OK ▪ ERR

Example:

```
IMCR
OK
```

5.6.8 Current lens

Note: Some devices can be calibrated for more than one thermal lens. If you have purchased your device with multiple lens calibrations, these commands are available

command	1st parameter	answer
SLEN	[int]Lens index	▪ OK ▪ ERR
GLEN		[int]Lens index
GLEL		{[string] lens}

Example:

```
GLEL
640P-45D-13MM
640P-32D-19MM
OK
SLEN 0
GLEN
0
```

5.7 Wiris Gimbal non-radiometric thermal parameters

Note: All commands in section 5.7 are available only for the non-radiometric variant of the Wiris Gimbal Enterprise camera

5.7.1 Image equalization type

Get/set the equalization type.

command	1st parameter	answer
SRMD	▪ AUTOMATIC ▪ MANUAL	▪ OK ▪ ERR
GRMD		▪ AUTOMATIC ▪ MANUAL

Example:

```
SRMD  MANUAL
OK
GRMD
MANUAL
```

5.7.2 Environment settings

Note: The possible settings depend on the installed lens and calibration. Only values returned by command 5.7.2.1 are possible

command	1st parameter	2nd parameter	answer
SREN	[float]min	[float]max	▪ OK ▪ ERR
GREN			[float]min [float]max

Example:

```
SREN  -25.0  150.0
OK
GREN
-25.0  150.0
```

5.7.2.1 Get possible environment settings

command	answer
GREL	{[float]min [float]max}

Example:

```
GREL
-25.0  150.0
```

```
-40.0  550.0
100.0  1000.0
400.0  1500.0
```

5.7.3 Plateau/Linear ratio

Get/set the plateau/linear ratio for automatic gain control mode.

command	1st parameter	answer
SPLR	[int] <0-10>	▪ OK ▪ ERR
GPLR		[int] <0 - 10>

Example:

```
SPLR 0
OK
GPLR
0
```

5.7.4 Smoothing

Get/set the number of frames used for image smoothing during quick temperature changes in automatic gain control mode. The actual number of frames used is two to the power of the parameter.

command	1st parameter	answer
SSFE	[int] <0-4>	▪ OK ▪ ERR
GSFE		[int] <0 - 4>

Example:

```
SSFE 0
OK
GSFE
0
```

5.7.5 Hot and cold rejection

Get/set the percentage of the hottest/coldest pixels to be saturated in automatic gain control mode.

command	1st parameter	answer
STRP	[int] <0-49>	▪ OK ▪ ERR
GTRP		[int] <0 - 49>

Example:

```
STRP 0
OK
GTRP
0
```

5.7.6 Clip limit

Get/set the clip limit for automatic gain control mode.

command	1st parameter	answer
SCLP	[int] <0-100>	▪ OK ▪ ERR
GCLP		[int] <0 - 100>

Example:

```
SCLP 0
OK
GCLP
0
```

5.7.7 Contrast

Get/set the contrast for manual gain control mode.

command	1st parameter	answer
SCPC	[int] <0-100>	▪ OK ▪ ERR
GCPC		[int] <0 - 100>

Example:

```
SCPC 0
OK
```

```
GCPC
0
```

5.7.8 Brightness

Get/set the image brightness for manual gain control mode.

command	1st parameter	answer
SBPC	[int] <0-100>	▪ OK ▪ ERR
GBPC		[int] <0 - 100>

Example:

```
SBPC 0
OK
GBPC
0
```

5.7.9 Median filter

Get/set the spatial median filter.

command	1st parameter	answer
SSMF	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GSMF		▪ TRUE ▪ FALSE

Example:

```
SSMF TRUE
OK
GSMF
TRUE
```

5.7.10 Time domain average filter

Get/set the time domain average filter settings.

command	1st parameter	answer
STAF	[int] < 0-2 >	▪ OK ▪ ERR
GTAF		[int] <0-2>

Example:

```
STAF 0
OK
GTAF
0
```

5.8 WIRIS Security thermal parameters

Specific parameters for WWS thermal camera.

Note: All commands in section 5.8 are available only for the Wiris Security camera

5.8.1 Time stabilization settings

command	1st parameter	answer
STST	[float]<0s-5s>stabilization time	▪ OK ▪ ERR
GTST		[float]stabilization time

Example:

```
STST 2.4
OK
GTST
2.4
```

5.8.2 Hot/cold rejection settings

command	1st parameter	answer
SHRJ	[float]<0%-30%>Hot rejection	▪ OK ▪ ERR
GHRJ		[float]Hot rejection
SCRJ	[float]<0%-30%>Cold rejection	▪ OK ▪ ERR
GCRJ		[float]Cold rejection

Example:

```
SHRJ   25
OK
SCRJ  30
OK
GHRJ
25.0
GCRJ
30.0
```

5.9 WIRIS AGRO thermal parameters

Specific parameters for WIRIS AGRO thermal camera.

Note: All commands in section 5.9 are available only for the Wiris Agro camera

5.9.1 CWSI mode settings

command	1st parameter	answer
SCWM	▪ THEORETIC ▪ EMPIRICAL ▪ DIFFERENTIAL	▪ OK ▪ ERR
GCWM		▪ THEORETIC ▪ EMPIRICAL ▪ DIFFERENTIAL

Example:

```
SCWM    EMPIRICAL
OK
GCWM
 EMPIRICAL
```

5.9.2 Air temperature

Note: Works only for `THEORETIC` and `DIFFERENTIAL` mode

command	1st parameter	answer
SCAT	[float]air temperature	▪ OK ▪ ERR
GCAT		[float]air temperature

Example:

```
SCAT  20.0
OK
GCAT
20.0
```

5.9.3 Stress level settings

Note: Stress level settings work only in `EMPIRICAL` modes

Note: When setting the stress level no argument is accepted. The currently measured temperature at CENTER CROSS is taken as the new stress level

Note: There is a minimum difference of $5^{\circ}C$ between 100% and 0% stress level

5.9.3.1 100 % stress level

command	answer
SUSL	▪ OK ▪ ERR
GUSL	[float]stress level temperature

Example:

```
SUSL
OK
GUSL
20.0
```

5.9.3.2 0 % stress level

command	answer
SLSL	▪ OK ▪ ERR
GLSL	[float]stress level temperature

Example:

```
SLSL
OK
GLSL
25.0
```

5.9.4 Crop setting

Note: Crop setting work only in `THEORETIC` mode

command	1st parameter	answer
SCRP	[int]<1-3>crop index	▪ OK ▪ ERR
GCRP		[int]<1-3>crop index

Example:

```
SCRP 2
OK
GCRP
2
```

5.9.5 Relative humidity setting

Note: Relative humidity setting works only in `THEORETIC` mode

command	1st parameter	answer
SCHY	[float] % relative humidity	▪ OK ▪ ERR
GCHY		[float] % relative humidity

Example:

```
SCHY 50.0
OK
GCHY
50.0
```

5.9.6 Intercept baseline setting

Note: Intercept baseline setting works only in `THEORETIC` mode

command	1st parameter	answer
SINB	[float] <0-10> intercept baseline	▪ OK ▪ ERR
GINB		[float] intercept baseline

Example:

```
SINB 2.0
OK
GINB
2.0
```

5.9.7 Slope baseline settings

Note: Slope baseline setting works only in `THEORETIC` mode

command	1st parameter	answer
SSLB	[float] <-5-0> Slope baseline	▪ OK ▪ ERR
GSLB		[float] Slope baseline

Example:

```
SSLB -2.0
OK
GSLB
-2.0
```

5.9.8 CWSI getters

5.9.8.1 d1 and d2 calculation parameters

Note: The parameters are valid only in `THEORETIC` mode

command	answer
GEDF	[float] d1
GEDS	[float] d2

Example:

```
GEDF
1.40
GEDS
-0.40
```

5.9.8.2 CWSI extremes value

Returns the percentages of CWSI for each extreme, similarly to GTEX command. The extreme consists of value designation (MIN/MAX/CENTER) and the CWSI value (can be `OUT_OF_RANGE` or `OFF` in case values are not displayed, see 5.20.1). Each extreme takes one line.

command	answer
GCWP	[string]image values

Example:

```
GCWP
MAXIMUM 30.1
MINIMUM OUT\_OF\_RANGE
CENTER OUT\_OF\_RANGE
```

5.9.8.3 CWSI graph ratios

Returns the percentages for each part of the CWSI graph or `NOT_ENOUGH_DATA`.

command	answer
GCGR	▪ [float]low [float]low medium [float]medium high [float]high [float]extremely high ▪ NOT_ENOUGH_DATA

Example:

```
GCGR
10.0 20.0 30.0 40.0 0.0
```

5.10 GIS 320 specific settings

Specific parameters for the GIS-320 camera.

> **Note**: All commands in section 5.10 are available only for the GIS-320 camera

5.10.1 Autofocus

command	answer
SGFA	▪ OK ▪ ERR

Example:

```
SGFA
OK
```

5.10.2 Focus to infinity

command	answer
SGFI	▪ OK ▪ ERR

Example:

```
SGFI
OK
```

5.10.3 Get remaining cooling time

command	answer
GCDT	[int]estimate of remaining time to cool down (in seconds)

Example:

```
GCDT
60
```

5.10.4 GIS filter mode

Note: Differential gas mode and High sensitivity mode cannot be combined

command	1st parameter	answer
SGFM	▪ NORMAL ▪ HSM ▪ DGM	▪ OK ▪ ERR
GGFM		▪ NORMAL ▪ HSM ▪ DGM

Example:

```
SGFM  DGM
OK
GGFM
DGM
```

5.10.5 High sensitivity mode

Note: Differential gas mode and High sensitivity mode cannot be combined

command	1st parameter	answer
SHSM	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GHSM		▪ TRUE ▪ FALSE

Example:

```
SHSM  TRUE
OK
GHSM
TRUE
```

5.11 Palettes of thermal video stream

Note: All commands in section 5.11 are **not** available for the Wiris Agro camera. See section 5.12 for Wiris Agro colourmap options

Note: Only palettes returned by get palette list command (5.11.1) can be set

command	1st parameter	answer
GPTE		[int] current palette index [string]current palette name
SPTE	[string] palette name	▪ OK ▪ ERR
SPTI	[int]palette index	▪ OK ▪ ERR

Example:

```
SPTE  GRAY
OK
GPTE
9  GRAY
```

5.11.1 Get camera palettes

command	answer
GPTL	{ [int]palette index [string]palette name }

Example:

```
GPTL
0  BLACKRED
1  BLUERED
2  BWIRON
3  BWIRONI
4  BWRAINBOW
```

5.11.2 Get palette Look-up table

A color palette is a look-up table of 8-bit RGB values for 8-bit normalized one channel image (temperature intensity). It is possible to download the currently used look-up table from the camera using the following command. The first line represents the color for the hottest pixels, the last line represents the coldest ones. There are 256 lines of the answer.

command	answer
GPLV	{ [int]R [int]G [int]B}

Example:

```
GPLV
0  0  0
2  0  2
4  0  4
...
```

5.12 Colourmap

Note: All commands in section 5.12 are available only for the Wiris Agro camera. See section 5.11 for Wiris Agro palette options of other devices.

Note: Only palettes returned by get colourmap list command (5.12.1) can be set

command	1st parameter	answer
GCMP		[string]current palette name
SCMP	[int]colourmap index	▪ OK ▪ ERR

Example:

```
SCMP  1
OK
GCMP
CROPSTEP_MAP
```

5.12.1 Get colourmap list

Get all available colourmaps in list.

command	answer
GCML	{ [int]colourmap index [string]colourmap name }

Example:

```
GCML
1  CROPSTEP_MAP
2  WATER_MAP
3  WATERSTEP_MAP
```

5.13 Capture and record

Note: The captured image type and recorded video type is set using command in section 5.14

5.13.1 Capture

The command returns an acknowledgement right away, but the capture itself can take up to several seconds depending on the settings. Returns NOT_READY if the previous capture has not yet finished or memory is full.

command	answer
CPTR	▪ OK ▪ NOT_READY

Example:

```
CPTR
OK
```

5.13.2 Is capturing

command	answer
ICPT	▪ TRUE ▪ FALSE

Example:

```
ICPT
FALSE
```

5.13.3 Recording start

Start recording thermal and visible video according to settings. The acknowledgement is returned right away, however the recording takes place until RCRF (5.13.4) is received or the memory is full. If recording is already taking place, ”NOT_READY” answer is returned.

command	answer
RCRS	▪ OK ▪ NOT_READY

Example:

```
RCRS
OK
```

5.13.4 Recording finish

Stops recording of thermal and visible video. If no recording is currently running the ”NOT_READY” answer is returned.

command	answer
RCRF	▪ OK ▪ NOT_READY

Example:

```
RCRF
OK
```

5.13.5 Is recording

Returns whether any video is being recorded.

command	answer
IRCR	▪ TRUE ▪ FALSE

Example:

```
IRCR
FALSE
```

5.13.6 Periodic image capture settings

command	1st parameter	answer
SPIC	[int]<0s-60s>period[1]	▪ OK ▪ ERR
GPIC		▪ OFF ▪ [int]<1s-60s>period

[1] 0 denotes periodic capturing OFF

Example:

```
SPIC 0
OK
GPIC
OFF
```

5.13.7 Geofencing trigger settings

command	1st parameter	answer
GGFT		▪ ON ▪ OFF
SGFT	▪ ON ▪ OFF	▪ OK ▪ ERR
SBFL[1]	[float]<40m-400m>[2]maximum altitude	▪ OK ▪ ERR
GBFL[1]		[float]maximum altitude in meters
SEFL[1]	[float]<0m-400m>[2]minimum altitude	▪ OK ▪ ERR
GEFL[1]		[float]minimum altitude in meters
SCSB[1]	[float]<0,1m/s-10m/s>maximum capture speed	▪ OK ▪ ERR
GCSB[1]		[float]maximum capture speed

[1]Works only if geofencing trigger is `ON`
[2] the minimum cannot be set above the maximum

Example:

```
SGFT ON
OK
SBFL 100
OK
SEFL 50
OK
SCSB 5
OK
```

5.13.8 Image location

command	1st parameter	answer
SILC	▪ SSD ▪ SD_CARD ▪ FLASH_DRIVE	▪ OK ▪ ERR
GILC		▪ SSD ▪ SD_CARD ▪ FLASH_DRIVE

Example:

```
SILC SSD
OK
GILC
SSD
```

5.14 Image and video settings

Note: Each WIRIS and GIS device only supports a subset of the mentioned image formats. Please refer to your device's user manual.

5.14.1 Images

Whether to save given image type

5.14.1.1 Radiometric JPEG

command	1st parameter	answer
SIRJ	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIRJ		▪ TRUE ▪ FALSE

Example:

```
SIRJ FALSE
OK
```

```
GIRJ
FALSE
```

5.14.1.2 Radiometric TIFF

command	1st parameter	answer
SIRT	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIRT		▪ TRUE ▪ FALSE

Example:

```
SIRT FALSE
OK
GIRT
FALSE
```

5.14.1.3 CWSI TIFF

command	1st parameter	answer
SICT	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GICT		▪ TRUE ▪ FALSE

Example:

```
SICT FALSE
OK
GICT
FALSE
```

5.14.1.4 Super-resolution

command	1st parameter	answer
SISR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GISR		▪ TRUE ▪ FALSE

Example:

```
SISR FALSE
OK
GISR
FALSE
```

5.14.1.5 Screenshot

command	1st parameter	answer
SISS	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GISS		▪ TRUE ▪ FALSE

Example:

```
SISS FALSE
OK
GISS
FALSE
```

5.14.1.6 Visible (OZ) image

Note: Resolution of image 1920 x 1080

command	1st parameter	answer
SIVI	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIVI		▪ TRUE ▪ FALSE

Example:

```
SIVI FALSE
OK
GIVI
FALSE
```

5.14.1.7 Visible High Resolution image

Note: Resolution of image depends on Wiris Enterprise settings

command	1st parameter	answer
SIHR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GIHR		▪ TRUE ▪ FALSE

Example:

```
SIHR FALSE
OK
GIHR
FALSE
```

5.14.2 Videos

5.14.2.1 Radiometric video

Also known as sequence.

Note: It is not possible to record Radiometric Video and Thermal encoded video at the same time

command	1st parameter	answer
SVTH	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVTH		▪ TRUE ▪ FALSE

Example:

```
SVTH  FALSE
OK
GVTH
FALSE
```

5.14.2.2 Thermal encoded video

Note: It is not possible to record Radiometric Video and Thermal encoded video at the same time

command	1st parameter	answer
SVTE	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVTE		▪ TRUE ▪ FALSE

Example:

```
SVTE  FALSE
OK
GVTE
FALSE
```

5.14.2.3 Visible (OZ) video

Note: Resolution of video 1280x720

command	1st parameter	answer
SVVI	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVVI		▪ TRUE ▪ FALSE

Example:

```
SVVI  FALSE
OK
GVVI
FALSE
```

5.14.3 Visible High Resolution video

Note: Resolution of video depends on Wiris Enterprise settings. At resolutions above 4000 × 3000, only images are available.

command	1st parameter	answer
SVHR	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GVHR		▪ TRUE ▪ FALSE

Example:

```
SVHR FALSE
OK
GVHR
FALSE
```

5.14.4 Wiris Enterprise HR camera resolution

Returns the current resolution setting of the HR camera. This command only works for WWE.

command	1st parameter	answer
SHRR[1]	▪ 4656x3496 ▪ 2320x1744 ▪ 1920x1080	▪ OK ▪ ERR
GHRR		▪ 4656x3496@10 ▪ 2320x1744@30 ▪ 1920x1080@30

[1] sets the resolution and reboots the device

Example:

```
SHRR 2320x1744
OK
GHRR
2320x1744@30
```

5.15 Temperature values

Note: All commands in section 5.15 are **not** available for the Wiris Security and Wiris Agro camera

5.15.1 Alarm mode settings

command	1st parameter	answer
SALM	▪ ABOVE ▪ BELOW ▪ BETWEEN ▪ OUTSIDE ▪ OFF	▪ OK ▪ ERR
GALM		▪ ABOVE ▪ BELOW ▪ BETWEEN ▪ OUTSIDE ▪ OFF

Example:

```
SALM  OFF
OK
GALM
OFF
```

5.15.2 Alarm values settings

command	1st parameter	2nd parameter	answer
SALV	[float]Above value	[float]below value	▪ OK ▪ ERR
GALV			[float]Above value [float]below value

Example:

```
SALV  40.0  50.0
OK
GALV
40.0  50.0
```

5.15.3 Alarm color settings

The colors are set and returned in order ”COLOR BELOW COLOR BETWEEN COLOR ABOVE”

command	1st parameter	2nd parameter	3rd parameter	answer
SALC	▪ RED ▪ GREEN ▪ BLUE	▪ RED ▪ GREEN ▪ BLUE	▪ RED ▪ GREEN ▪ BLUE	▪ OK ▪ ERR
GALC				▪ RED [three times] ▪ GREEN ▪ BLUE

Example:

```
SALC GREEN RED GREEN
OK
GALC
GREEN RED GREEN
```

5.15.4 Get extremes

Return the current thermal camera extremes. The extreme consists of value designation (MIN/MAX/CENTER), coordinates X and Y and the extreme value in the set units ($°C, K, °F$). Each extreme takes one line like:

```
MAXIMUM X Y VALUE
MINIMUM 300 100 10.000
CENTER 320 256 25.555
```

command	answer
GTEX	[string]image values

Note: This command works for all cameras. On non radiometric devices the temperature value is not present in the answer and only position is given

Example:

```
GTEX
MAXIMUM 572 90 49.575001
MINIMUM 384 193 23.650000
CENTER 320 256 25.850000
```

5.15.5 Get ROI temperature

Gets statistical values from a rectangular region of interest (ROI) defined by its coordinates ($x_{start}, y_{start}, x_{end}, y_{end}$; coordinate (0,0) is upper left corner). The result consists of a value designation (MIN/MAX/AREA AVG), coordinates X and Y for min and max, and the temperature value.

Note: This message can be queried with maximum frequency of 3Hz

command	1st parameter	2nd parameter	3rd parameter	4th parameter	answer
GROT	[int]column[1] start	[int]line start	[int]column end	[int]line end	[string]ROI statistic

[1]Coordinates start from upper left corner ([0, 0]) and end in bottom right corner ([width-1, height-1]) of the image.

Example:

```
GROT 0 0 200 200
AREA AVG 30.573807
MAXIMUM 0 0 31.750000
MINIMUM 10 12 29.500000
```

5.15.6 Get one pixel temperature

Returns the measured value of a pixel on given coordinates (coordinate (0,0) is upper left corner) in set temperature units. This message can be queried with maximum frequency of 3Hz.

command	1st parameter	2nd parameter	answer
GOPT	[int]column[1]	[int]line	[float]temperature

[1]Coordinates start from upper left corner ([0, 0]) and ends in bottom right corner ([width-1, height-1]) of the image.

Example:

```
GOPT 120 200
38.1
```

5.16 Laser rangefinder

Note: Command in section 5.16 ar available only for devices with LRF in their article number

5.16.1 Show position on HDMI

command	1st parameter	answer
SLRF	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GLRF		▪ TRUE ▪ FALSE

Example:

```
SLRF TRUE
OK
GLRF
TRUE
```

5.16.2 Get laser distance

Returns the distance, in meters, to the surface that reflects the laser. If the camera is not equipped with laser rangefinder (no LRF in the article number), returns ERR.

command	answer
GLRD	[float]distance

Example:

```
GLRD
20.4
```

5.17 Memory

There are three types of memory: SSD, SD_CARD or FLASH_DRIVE.

5.17.1 Memory status

The following commands return the status of each memory on one line like:
SSD SOME_STATUS
SD_CARD SOME_STATUS
FLASH_DRIVE SOME_STATUS

command	answer
GMST	▪ READY ▪ CONNECTED ▪ N/A
GMSI	▪ [int]size in bytes ▪ N/A
GMFR	▪ [float] percent free ▪ N/A
GMCP	[int]captured images

Example:

```
GMSI
SSD 251599224832
FLASH_DRIVE N/A
SD_CARD 31784960000
GMCP
SSD 22
FLASH_DRIVE 0
SD_CARD 0
```

5.17.1.1 Recorded video

Video can only be saved into the internal (SSD) memory. These commands return only the integer.

command	answer
GTRC	[int]seconds of thermal video
GVRC	[int]seconds of visible video

Example:

```
GTRC
689
GVRC
38
```

5.17.2 Get saving time

Returns the current estimated saving time in seconds.

Note: Saving time is affected by chosen memory for images and chosen formats to be saved.

command	answer
GEST	[float]estimated saving duration in seconds

Example:

```
GEST
1.2
```

5.17.3 Copy data

Copy all data from the SSD to another storage device: an SD card or USB flash drive. This operation can take a lot of time (up to hours in case of full SSD disk). Thus this command has two parts. Firstly, start the copying. Then periodically check the status. Please check that the memory has enough space, otherwise the ERR answer is returned.

command	1st parameter	answer
CPST	▪ SD_CARD ▪ FLASH_DRIVE	▪ OK ▪ ERR ▪ N/A
CPSS		▪ OK ▪ [int] progress percent ▪ ERR

Example:

```
CPST FLASH_DRIVE
OK
CPSS
40
CPSS
60
CPSS
OK
```

5.18 Stream

5.18.1 Get thermal camera resolution

command	answer
GTRE	[int]width [int]height

Example:

```
GTRE
640  512
```

5.18.2 Encoder parameter settings

Note: The encoder settings will affect both recorded encoded videos and the RTSP streams

Note: It is not possible to change the encoder settings when encoded video is being saved. RTSP stream will be paused in order to change the settings, if running.

command	1st parameter	2nd parameter	answer
SEBR	▪ THERMO ▪ VISIBLE	[int]<0-$2^{32}-1$>encoder bitrate[1]	▪ OK ▪ ERR
GEBR	▪ THERMO ▪ VISIBLE		[int]encoder bitrate[1]
SEGS	▪ THERMO ▪ VISIBLE	[int]<0-32767>GOP size	▪ OK ▪ ERR
GEGS	▪ THERMO ▪ VISIBLE		[int]GOP size
SEIR	▪ THERMO ▪ VISIBLE	[int]<0-$2^{32}-1$>IDR interval	▪ OK ▪ ERR
GEIR	▪ THERMO ▪ VISIBLE		[int]IDR interval
SEQZ	▪ THERMO ▪ VISIBLE	[int]<0-51> quantization quality parameter [2]	▪ OK ▪ ERR
GEQZ	▪ THERMO ▪ VISIBLE		[int] quantization quality parameter

Table 5.1: [1]0 = no bitrate control; constant quality mode is used
[2]ignored if bitrate set to non-zero value

Example:

```
SEBR VISIBLE 0
OK
GEBR VISIBLE
0
```

5.19 Trigger

command	1st parameter	answer
STRG	▪ CORRECTION ▪ CAPTURE ▪ RECORD ▪ NA	▪ OK ▪ ERR
GTRG		▪ CORRECTION ▪ CAPTURE ▪ RECORD ▪ NA

Example:

```
STRG  RECORD
OK
GTRG
RECORD
```

5.20 Appearance

These commands set the HDMI output features.

5.20.1 Display CWSI Value

This sets whether the CWSI value is being calculated and shown on the HDMI at the extreme cross position.

Note: This command is available only for the Wiris Agro camera

command	1st parameter	answer
SCWV	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GCWV		▪ TRUE ▪ FALSE

Example:

```
SCWV  TRUE
OK
GCWV
TRUE
```

5.20.2 Set layout

Set layout for the HDMI output.

command	1st parameter	answer
SLAY	▪ INSPECTION [1] ▪ SECURITY ▪ FULLSCREEN ▪ PIP	▪ OK ▪ ERR

[1] not available for WIRIS Security

Example:

```
SLAY SECURITY
OK
```

5.20.2.1 Picture in picture transparency

The PiP layout has optional opacity for the thermo camera overlay in range from 10% to 100%.

command	1st parameter	answer
STTY	[int]<10;100>opacity	▪ OK ▪ ERR

Example:

```
STTY 50
OK
```

5.20.3 Main camera settings

command	1st parameter	answer
SMCA	▪ THERMO ▪ VISIBLE	▪ OK ▪ ERR
GMCA		▪ THERMO ▪ VISIBLE

Example:

```
SMCA THERMO
OK
GMCA
THERMO
```

5.20.4 GPS info settings

command	1st parameter	answer
SGPI	▪ POSITION ▪ ALTITUDE_SPEED	▪ OK ▪ ERR
GGPI		▪ POSITION ▪ ALTITUDE_SPEED

Example:

```
SGPI POSITION
OK
GGPI
POSITION
```

5.21 Zoom

Note: While optical zoom (used on the visible spectrum camera) affects both the displayed video and encoded streams, thermal digital zoom affects only the HDMI output; the encoded RTSP stream and recorded video are not zoomed

5.21.1 Zoom in/zoom out

Zooms current main camera in (or both if the ”zoom simultaneously” is chosen) one step.

command	answer
SZIN	▪ OK ▪ ERR
SZOT	▪ OK ▪ ERR

Example:

```
SZIN
OK
```

5.21.2 Zoom simultaneously

command	1st parameter	answer
SZSM	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GZSM		▪ TRUE ▪ FALSE

Example:

```
SZSM  TRUE
OK
GZSM
TRUE
```

5.21.3 Thermal camera zoom

The discrete zoom steps can be defined either by zoom ratio or by index of the zoom step. Only certain ratios are possible (see 5.21.3.1).

command	1st parameter	answer
SZTN	[int]index	▪ OK ▪ ERR
GZTV		[int]index [float]ratio

Example:

```
SZTN  5
OK
GZTV
5  4.000000
```

5.21.3.1 Get list of possible thermal camera zooms

command	answer
GZTL	{[int]index [float]ratio}

Example:

```
GZTL
0  1.000000
1  1.200000
2  1.600000
3  2.000000
4  3.000000
5  4.000000
6  5.000000
7  6.000000
8  8.000000
9  10.000000
10  12.000000
```

5.21.4 Visible camera zoom

The discrete zoom steps can be defined either by zoom ratio or by index of the zoom step. Only certain ratios are possible (see 5.21.4.1).

command	1st parameter	answer
SZVN	[int]index	▪ OK ▪ ERR
GZVV		[int]index [float]ratio

Example:

```
SZVN 4
OK
GZVV
4 3.000000
```

5.21.4.1 Get list of possible visible camera zooms

command	answer
GZVL	{[int]index [float]ratio}

Example:

```
GZVL
0 1.000000
1 1.200000
2 1.500000
3 2.000000
4 3.000000
5 4.000000
6 5.000000
7 6.000000
8 8.000000
9 10.000000
10 12.000000
11 16.000000
12 20.000000
13 25.000000
14 30.000000
```

5.22 Gimbal control

Note: All commands in section 5.22 are available only for the Wiris Gimbal devices

5.22.1 Gimbal Controller

Gimbal only responds to control from set source - either Workswell protocols, S.BUS protocol or MAVLink protocol.

command	1st parameter	answer
GGCM		[int]<0-2> control method
SGCM	[int]<0-2> control method	▪ OK ▪ ERR

index	control method
0	MAVLink
1	S.BUS
2	Command Control Protocol & Ethernet SDK

Example:

```
GGCM
0
SGCM  2
OK
GGCM
2
```

5.22.2 Move camera

Note: Command in section 5.22.2 are available when gimbal control method is ”2”, see section 5.22.1

Gimbal move commands starts (stops) moving gimbal head in given direction.

command	1st parameter	answer
MOGI	▪ LEFT ▪ RIGHT ▪ UP ▪ DOWN ▪ STOP	▪ OK ▪ ERR

Example:

```
MOGI LEFT
OK
MOGI STOP
OK
```

5.22.3 Point camera

Note: Command in section 5.22.3 are available when gimbal control method is ”2”, see section 5.22.1

Gimbal point commands command moves gimbal head to predefined position.

command	1st parameter	answer
POGI	▪ DOWN ▪ HOME	▪ OK ▪ ERR

Example:

```
POGI DOWN
OK
```

5.22.4 Set gimbal motor speed

command	1st parameter	answer
SGIS	[int] <0-2000>	▪ OK ▪ ERR
GGIS		[int] speed

Example:

```
GGIS
200
SGIS 400
OK
GGIS
200
```

5.22.5 Gimbal yaw lock

command	1st parameter	answer
GGYM	▪ FOLLOW ▪ LOCK	▪ OK ▪ ERR
SGYM		▪ FOLLOW ▪ LOCK

Example:

```
GGYM
LOCK
SGYM  FOLLOW
OK
GGYM
FOLLOW
```

5.22.6 MAVLink properties

5.22.6.1 MAVLink IDs

command	1st parameter	answer	ID
GSID		[int]<0-255>	system ID
SSID	[int]<0-255>	▪ OK ▪ ERR	system ID
GGID		[int]<171-175> or [int]154	gimbal ID
SGID	[int]<171-175> or [int]154	▪ OK ▪ ERR	gimbal ID
GRID		[int]<0-255>	Range finder ID
SRID	[int]<0-255>	▪ OK ▪ ERR	Range finder ID

Example:

```
GSID
0
SSID  1
OK
GSID
1
```

5.22.6.2 MAVLink gimbal manager

command	1st parameter	answer
SMGI	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GMGI		▪ TRUE ▪ FALSE

Example:

```
GMGI
TRUE
SMGI  FALSE
OK
GMGI
FALSE
```

5.23 System

5.23.1 IP

Note: When changing the IP settings the TELNET control is disconnected and the connection needs to be re-established at the new address.

command	1st parameter	answer
STIP	[string]IPv4	▪ OK ▪ ERR
STMS	[string]IPv4 mask	▪ OK ▪ ERR
GTMS		[string]IPv4 mask
STGW	[string]IPv4 gateway	▪ OK ▪ ERR
GTGW		[string]IPv4 gateway
SMGW[1]	▪ TRUE ▪ FALSE	▪ OK ▪ ERR
GMGW		▪ TRUE ▪ FALSE

[1] Use manual gateway settings - if set to false (default) the set gateway has no effect

Example:

```
STIP 10.0.0.230
OK
```

5.23.2 Default settings

Setting the default settings can take up to 10 seconds. This command will exit the Ethernet Mode and change the IP and baud rates to default.

command	answer
SDST	▪ OK ▪ ERR

Example:

```
SDST
OK
```

5.23.3 Shut down

command	answer
SHDW	▪ OK ▪ ERR

Example:

```
SHDW
OK
```

5.23.4 Reboot

command	answer
REBT	▪ OK ▪ ERR

Example:

```
REBT
OK
```

5.23.5 Date and time

command	1st parameter	2nd parameter	answer
SDTI	[string]yyyy/MM/dd-hh:mm:ss		▪ OK ▪ ERR
GDTI			[string]yyyy/MM/dd-hh:mm:ss
STUS [1]	[int]seconds since epoch [2]	[int]microseconds	▪ OK ▪ ERR

[1]Not saved across reboots
[2]1.1.1970 00:00

Example:

```
SDTI 2023/06/05-14:52:35
OK
GDTI
2023/06/5-14:52:38
```

5.23.6 Update

The update file needs to be uploaded to the camera by physically connecting memory with it (SD card), or using the FTP access to the camera.

command	answer
CUPD[1]	▪ OK ▪ ERR
IUPD[2]	▪ OK ▪ ERR

[1]Searches for the update file, might take several minutes to answer
[2] only accessible if CUPD was sent and returned OK on given telnet instance. Reboots the camera and installs the update.

Example:

```
CUPD
OK
IUPD
OK
```



Contacts

Sales Department

Mobile: +420 725 955 464

E-mail: sales@workswell.eu

Headquarters

Workswell s.r.o.

Na Okraji 335/42

162 00, Praha 6

Czech Republic

Technical support

my.workswell.eu

support.workswell.cz

Company contact details

Mobile: +420 725 877 063

E-mail: info@workswell.eu

Web: workswell.eu

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