SIGRAND IPHOUSE-15 LIGHT CAMERA HOUSING

User's Manual

Revision 1.1b

1. Description

The IPhouse-15 Light Camera Housing is intended for outdoor IP camera installations. The IPhouse-15 provides protection, lighting, and heating for the camera. The IPhouse-15 is powered by PoE (Power over Ethernet) and forwards PoE to the camera.

The IPhouse-15 allows usage of cameras with two Ethernet ports and PoE chain capability.

The IPhouse-15 is able to control the LED lights and the heater in the automatic or manual mode and allows monitoring internal and external temperature, as well as remote power feeding parameters.

The IPhouse-15 is controlled by the Command Line Interface (CLI).

The IPhouse-15 can be supplied in several configurations:

• IPhouse-15E/W – PoE, White LEDs

• IPhouse-15E/IR – PoE, Infrared LEDs

2. Package Contents

Table 1. IPhouse-15 Package Contents

Item	Quantity	Units
IPhouse-15 Assembly	1	pcs
Bracket Assembly	1	pcs
Staple (for modem)	1	pcs
Short Ethernet Patch Cord	1	pcs
PoE Extraction Adapter	1	pcs
User's Manual	1	pcs
Package	1	pcs

3. Technical Data

Table 2. LED Lighting Characteristics

Parameter	Value	Units
Number of LEDs	10	pcs
Maximum LEDs power	10	W
Wavelength (Infrared LEDs)	850	nm
Color Temperature (White LEDs)	6000	K
Viewing Angle	45	°
Total Luminous Flux	1570	lm

Table 3. Mechanical Characteristics

Parameter	Value	Units
Housing Material	Aluminium	
Dimensions	396 x 137 x 102	mm
Camera Space	258 x 81 x 75	mm
Weight (without bracket)	1400	g
Weight (with bracket)	1800	g
Protection Rating	IP66	

Table 4. Operating Conditions

Parameter	Value	Units
Ambient Temperature	–40 to +40	°C
Relative Humidity (max at 25 °C)	85	%
Atmospheric Pressure (min)	60	kPa
Operation Mode	Non-stop	

Table 5. PoE Characteristics (* Recommended)

Parameter	Value	Units
Total Power Consumption (max)*	15	W
PoE Class	3	
Camera Power Consumption (max)*	7	W
Camera PoE Class*	2	

Table 6. Default Settings

Parameter	Value	Units
LEDs Power for Lighting	50	%
LEDs Power for Heating	50	%
LEDs Power for Preheat	100	%
Light ON Illuminance Threshold	10	lx
Light OFF Illuminance Threshold	50	lx
Heater ON Temperature Threshold	0	°C
Heater OFF Temperature Threshold	10	°C
Camera Preheat Target Temperature	0	°C

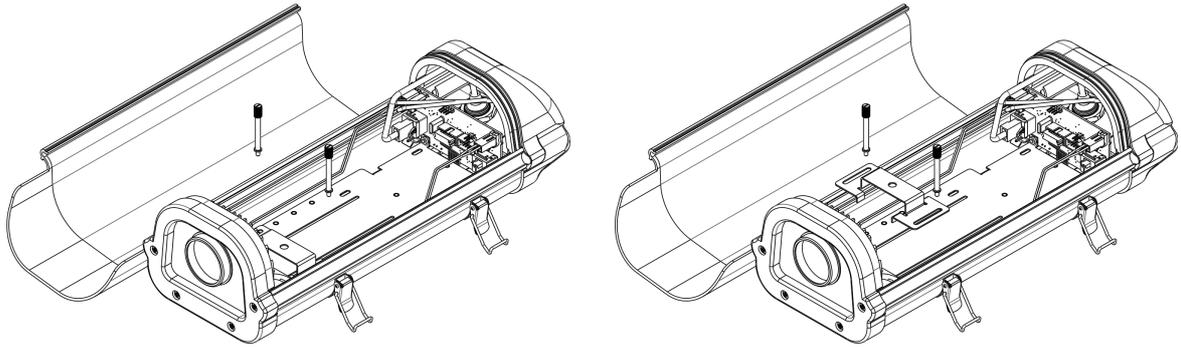## 4. Installation and Connection

4.1 Camera Installation

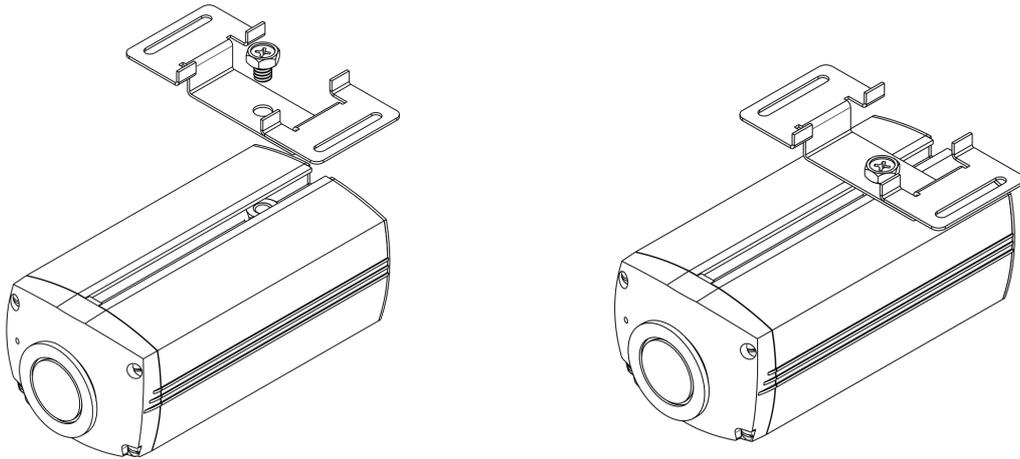4.1.1 Unlock the fasteners and open the cover of the housing.
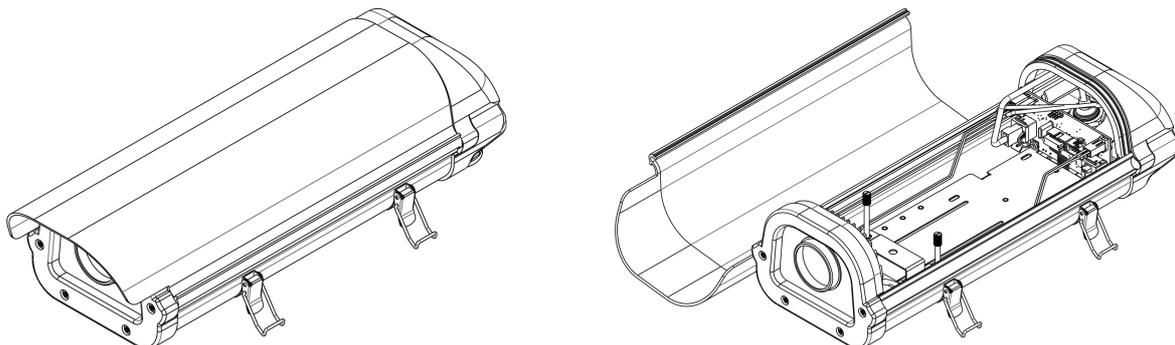
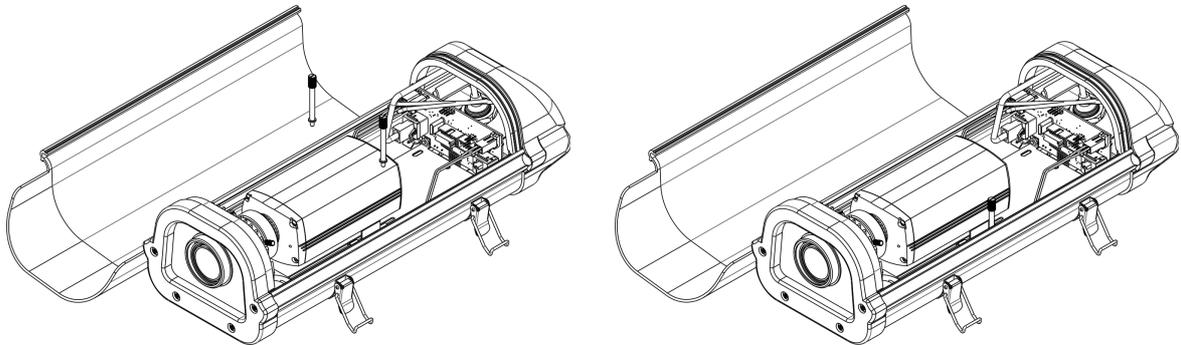4.1.2   Unscrew the temporary screw and remove the bracket assembly.

4.1.3   Unscrew the thumbscrews and remove the support.

4.1.4   Attach the support to the camera by means of the nut and the screw [1].
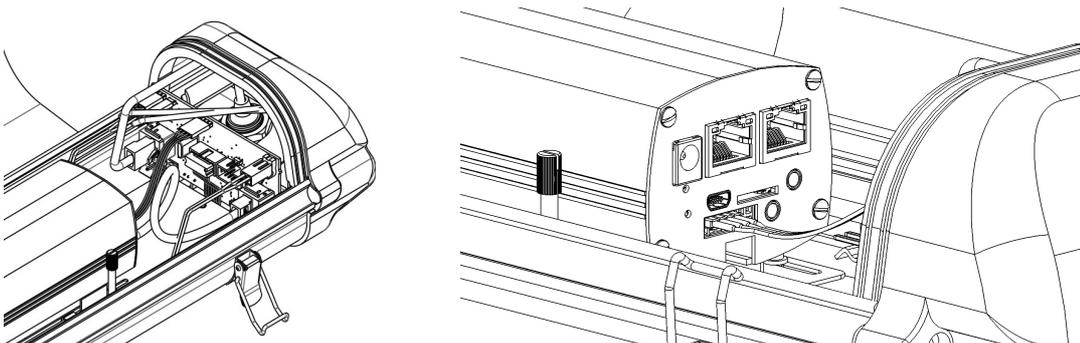

4.1.5   Insert the camera into the housing and fix it by the thumbscrews.


4.2   Serial Port Connection

4.2.1   If the camera has a serial port, connect the housing's console port to the camera's serial port by the 4-wire flat cable.

4.3 LAN Cable Entrance

The housing has two sealed LAN cable entrance points. Depending of the configuration, one or two entrances can be used. Two entrances are used in the PoE chain configuration, one for LAN IN cable and the other for LAN OUT cable.
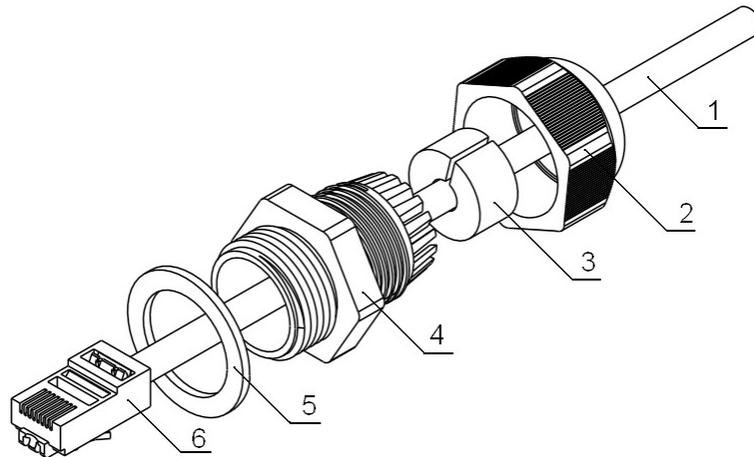
4.3.1 Unscrew the gland box nut [2] and push out the seal plug [3].

4.3.2 Pass the cable [6, 1] through the nut [2] and through the gland box [4] into the housing.
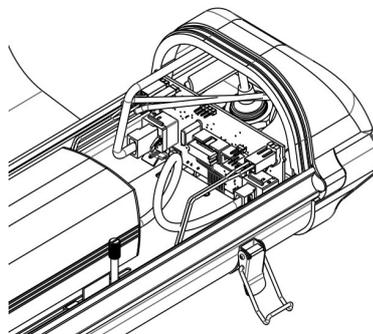
4.3.3 Put the seal plug [3] on the cable [1] and insert it into the gland box [4].

4.3.4 Tighten up the gland box nut [2].

4.4 Single-port LAN Connection

4.4.1 Connect the LAN IN cable to the PoE input port of the housing.

4.4.2 Connect the housing's PoE output port to the camera's PoE port by the short Ethernet patch cord.

4.5 PoE Chain LAN Connection

A camera with two Ethernet ports and PoE chain capability should be used to make a PoE chain. The housing has no PoE chain capability itself. In such a case the housing should be powered through its 48V DC input. The 48V DC voltage is derived from the LAN IN cable by means of supplied PoE Extraction Adaper.

Note: Some features are not functional in the PoE chain configuration: camera ON/OFF control, camera power consumption monitoring, and the Preheat feature.

4.5.1 Connect the LAN IN cable to one port of the PoE Extraction Adaper.

4.5.2 Connect the other port of the PoE Extraction Adaper to the PoE IN port of the camera by the short Ethernet patch cord.
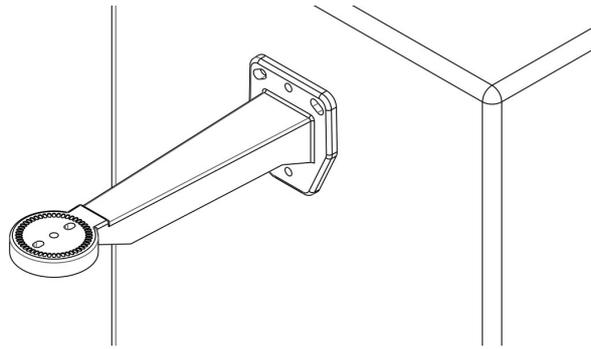
4.5.3 Connect the 48V OUT cable of the PoE Extraction Adaper to the 48V DC input of the housing.

4.5.4 Connect the LAN OUT cable to the POE OUT port of the camera.
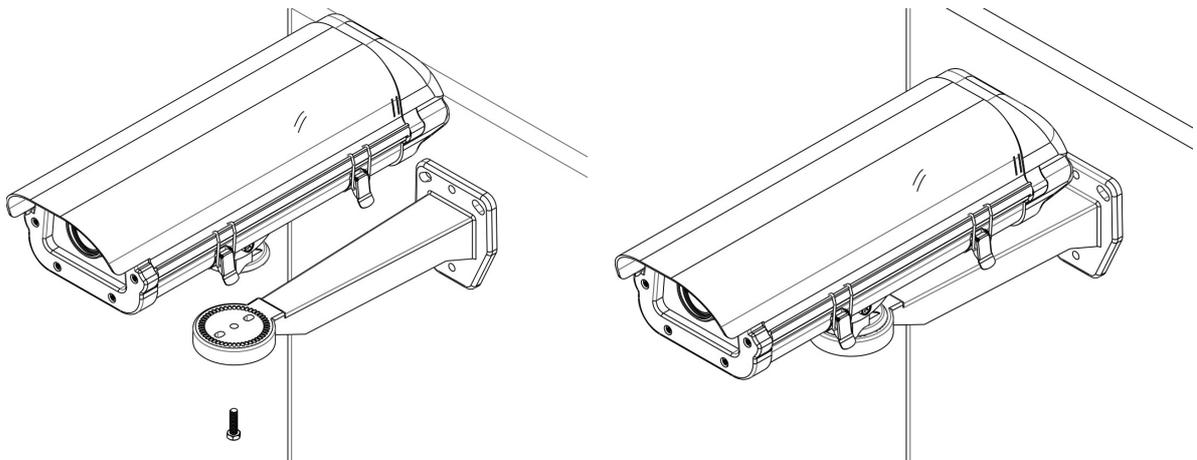
4.6 Mounting

4.6.1 Close the housing and lock the fasteners.

4.6.2 Attach the bracket assembly to the wall of the building.

4.6.3 Unscrew two screws from the bottom of the housing.

4.6.4 Mount the housing on the bracket and fix it by two screws.

5. Command Line Interface (CLI)

5.1 Features

The IPhouse-15 Command Line Interface (CLI) allows:

- Controlling LEDs, fans and camera manually or automatically
- Programming power of LEDs for illumination and heating
- Enabling or disabling thermostat and preheat (warm up) features
- Programming temperature and illuminance On/Off thresholds
- Monitoring temperature, illuminance and consumed power
- Accessing by SSH (through camera's serial port) or by a terminal

5.2 Accessing CLI through Camera's Serial Port

5.2.1 If the camera has an RS-232 serial port, it is possible to access the IPhouse-15 CLI remotely through an SSH connection. Connect the camera's serial port to the IPhouse-15 console port (XP7) by the 4-wire flat cable (supplied).

5.2.2 Setting up SSH Connection to Camera

Connect the IPhouse-15 to a PoE switch port. Wait about 1 minute till the camera is starting.

Run the SSH client program (for example, *putty.exe*).

Enter the camera's IP address and click OK. The telnet window will open.

```
login as:
```

Enter the username and the password for the camera. On successful connection the camera's command line shell prompt appears:

```
BusyBox v1.20.0 (2012-05-10 19:32:59 NOVT) built-in shell (ash)
Enter 'help' for a list of built-in commands.
sigTIcam /conf/root #
```

5.2.3 Setting up Connection from Camera to IPhouse-15

Run the *microcom* terminal emulation program on the camera as follows:

```
 # microcom -s 9600 /dev/ttyS0
```

Press Enter. The IPhouse-15 will show the command prompt **:** (the colon sign).

Issue the **info** command. The IPhouse-15 should answer as follows:

```
:info
Sigrand IPhouse-15 Light Camera Housing V.2.0
```

5.3 Accessing CLI through HyperTerminal

5.3.1 Attach BLS-4 connector of the IPhouse-15 Console Cable (Annex A) to the console port of the IPhouse15 device (XP7). Attach DB-9F connector of the Cable to the COM port of your PC.
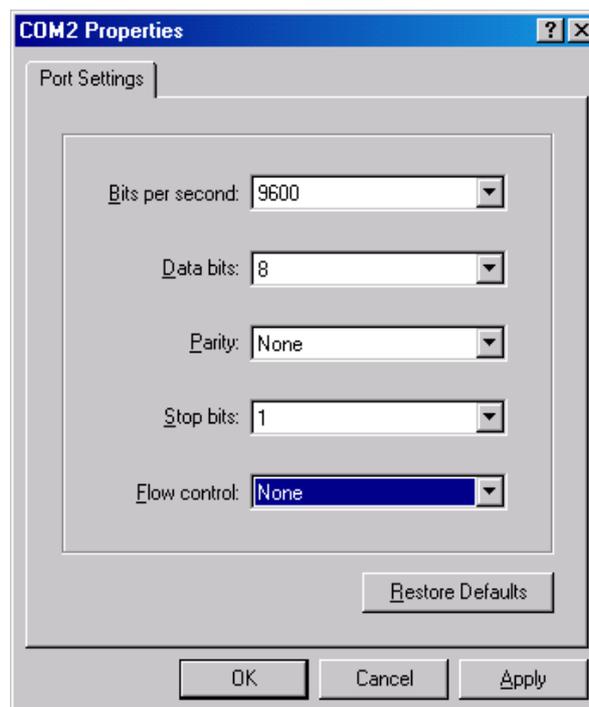
5.3.2 Setting up HyperTerminal

Run the HyperTerminal (Programs – Accessories – Communications – HyperTerminal).

Enter the name of the connection, *IPhouse15* for example, and click OK.

Choose the COM port from the list (COM1, COM2, etc) and click OK.

Set up the COM port as follows and click OK:

Connect the IPhouse-15 to a PoE switch port. The IPhouse-15 will start and the following information will appear on the terminal:

```
Sigrand IPhouse-15 Light Camera Housing V.2.0
Ready!
```

5.4 How to Use CLI

5.4.1 How to Enter Commands

When the IPhouse-15 is ready to execute a command, it displays the prompt **:** (colon). To issue a command, type the command and press the *Enter* key. Commands in this manual are highlighted by the **bold** font style.

```
:temp
```

```
+24.5'C
```

5.4.2 Command Repetition

Some commands have the repetition feature. After entering such a command first time, press *Enter* again to repeat the command. This feature is useful for monitoring temperature and other gradually changing parameters. Pressing *Enter* periodically allows observing their behaviour in real time.

```
:temp
+24.5'C
:
+24.3'C
:
+24.1'C
```

To stop the repetition, press *Space* and *Enter*, or issue the other command.

The other way to repeat the previous command is to press ↑ (*Arrow Up*) and *Enter*.

5.4.3 Command Editing

To invoke the command for editing, press the ↑ (*Arrow Up*) key. The only way to edit a command is deleting characters from the end of the string by pressing the ← (*Backspace*) key and typing new characters. Press *Enter* to execute the corrected command.

Note: There is no command history. Only the last command can be edited.

5.4.4 Error Messages

If the entered command is not a valid command, the device answers with the *Unknown command* message.

```
:abcd
Unknown command
```

If the command has arguments and one of them is not valid, the *Invalid keyword* message appears.

```
:help abcd
Invalid keyword
```

If the command requires a number and the number is out of range, the *Invalid number* message appears.

```
:led power 200
Invalid number
```

To correct the error, edit the command as described in the *Command editing* paragraph.

5.5 Commands

5.5.1 Reference Commands – **info** and **help**

The **info** command displays the name of the device and the version of the firmware.

```
:info
Sigrand IPhouse-15 Light Camera Housing V.2.0
```

The **help** command displays the list of available commands.

```
:help
HELP [LED | TH | PH | FAN | CAM] - detailed help
LED - LED settings
TH - Thermostat settings
PH - Preheat settings
FAN - Fan settings
CAM - Camera settings
LUX - Actual illuminance
TEMP - External temperature
POWER - Total power
DEFAULT - Set factory defaults
REBOOT - Reboot the device
```

To get the detailed help for a specific command, issue the **help** command with the name of the command as an argument. For example, the **help led** command displays the help text of the **led** command.

```
:help led
LED - LED status
LED [ON|OFF|AUTO] - turn LED On, Off, or Auto mode
LED POWER - LED power in %
LED LXON - turn-on illuminance
LED LXOFF - turn-off illuminance
LED TMAX - overheat temp.
LED PBO - power backoff for overheat in %
LED SAVE - save LED settings
```

5.5.2 LEDs Control Command – **led**

5.5.2.1 LEDs State Monitoring

The **led** command without arguments displays the LEDs state.

```
:led
LED: Auto ON Power=80% (80%) Temp=+22.1'C
```

The *Auto* parameter says that the LEDs are controlled automatically (see the **led auto** command). Not displayed otherwise.

The *ON* parameter says that the LEDs are currently on.

The *Power=* parameter is the current setting of the LEDs power for lighting in %. The number in parentheses is the actual power of the LEDs. It may differ from the setting if the LEDs are currently used for heating.

The *Temp=* parameter is the output of the LEDs temperature sensor.

5.5.2.2 Controlling LEDs

The LEDs can be controlled manually of automatically. The commands **led on** and **led off** are intended for the manual control. The **led on** command turns on the LEDs. The **led off** command turns them off.

```
:led on
:led off
```

Note: these commands disable the automatic mode.

The **led auto** command enables the automatic controlling the LEDs. In this mode the LEDs are turned on and off automatically in dependence of the actual illuminance and temperature.

```
:led auto
```

The actual state of the LEDs can be retrieved by the **led** command.

5.5.2.3 Setting LEDs Power

The **led power N** command sets the power of the LEDs for the purpose of lighting. The power is set in % of the maximum power (See Table 1). The valid range is from 1 to 100.

```
:led power 70
```

The **led power** command displays the current setting of the lighting power.

```
:led power
70%
```

5.5.2.4 Setting Illuminance Thresholds

In the automatic mode, the LEDs are turned on when the illuminance falls down to the lower threshold, and are turned off when the illuminance rises up to the upper threshold.

The **led lxon N** command sets the lower illuminance threshold (in lux).

```
:led lxon 10
```

The **led lxoff N** command sets the upper illuminance threshold (in lux).

```
:led lxoff 50
```

Note: The upper threshold should be higher than the lower one. Typically the upper threshold is several times higher. It is required to prevent LEDs flashing when the actual illuminance is near the threshold.

The commands **led lxon** and **led lxoff** display the current settings for the illuminance thresholds.

```
:led lxon
10 lx
:led lxoff
50 lx
```

For the actual illuminance, see the **lux** command.

5.5.2.5 Setting Overheat Parameters

The operating life of the LEDs depends of their temperature. To prevent the overheat of the LEDs, the temperature is limited to the *Tmax* value. When the LEDs temperature reaches *Tmax*, the power of the LEDs is automatically dropped to the value called power backoff (PBO).

The **led tmax N** command sets the upper temperature limit for the LEDs. The **N** value is the temperature in °C.

```
:led tmax 70
```

The **led tmax** command displays the current setting of the temperature limit.

```
:led tmax
+70'C
```

The **led pbo N** command sets the power backoff in %.

```
:led pbo 50
```

The **led pbo** command displays the current setting of the power backoff.

```
:led pbo
50%
```

Warning: Changing these setting may affect the LEDs' lifetime!

5.5.2.6 Saving LEDs Settings

The **led save** command writes the current LEDs settings to the EEPROM.

```
:led save
OK
```

Note: If the settings are not saved, they will be lost after power off. Do not forget to save the settings.

5.5.3 Thermostat Control Command – **th**

The thermostat is the feature that allows to keep the internal temperature within specified limits by using the LEDs as a heater.

5.5.3.1 Thermostat Monitoring

The **th** command displays the state of the thermostat.

```
:th
Thermostat: ON Power=50% Temp=+19'C Heater: OFF
```

The first parameter (*ON* or *OFF*) shows whether the thermostat is enabled or not.

The *Power=* parameter is the actual setting for the LEDs power used for heating.

The *Temp=* parameter is the internal temperature.

The last parameter displays the state of the heater (*ON* or *OFF*). When the thermostat is enabled, the heating is turned on and off automatically.

5.5.3.2 Enabling Thermostat

The **th on** command enables the thermostat, the **th off** command disables it.

```
:th on
:th off
```

5.5.3.3 Setting Power for Heating

The **th power N** command sets the power of the LEDs for the purpose of heating in %.

```
:th power 50
```

The **th power** command displays the current setting of the heating power.

```
:th power
50%
```

Note: the same LEDs are used for lighting and for heating, but the power assigned for heating may differ from the power assigned for lighting.

5.5.3.4 Setting Temperature Thresholds

If the thermostat is enabled, the LEDs are turned on when the internal temperature falls down to the lower threshold, and are turned off when the internal temperature rises up to the upper threshold.

The **th ton N** command sets the lower temperature threshold. The **N** is a signed integer value in *°C*.

```
:th ton 0
```

The **th toff N** command sets the upper temperature threshold.

```
:th ton 10
```

The commands **th ton** and **th toff** display the current settings for the temperature thresholds.

```
:th ton
+0'C
:th toff
+10'C
```

5.5.3.5 Saving Thermostat Settings

The **th save** command saves the current thermostat settings to the EEPROM.

```
:th save
OK
```

5.5.4 Preheat Control Command – **ph**

The preheat is the feature that allows to delay the camera startup until the internal temperature reaches the specified threshold. It allows the camera to avoid operating at the temperature which is out of the camera's ratings.

Note: Preheat is not functional in the PoE chain configuration and should not be enabled.

5.5.4.1 Preheat Monitoring

The **ph** command displays the state of the preheat.

```
:ph
Preheat: ON Power=100% Temp=+18'C Heater: OFF
```

The first parameter (*ON* or *OFF*) shows whether the preheat feature is enabled or not.

The *Power=* parameter is the actual setting for the LEDs power used during the preheat.

The *Temp=* parameter is the internal temperature.

The last parameter displays the state of the heater (*ON* or *OFF*).

5.5.4.2 Enabling Preheat Feature

The **ph on** command enables the preheat feature, the **ph off** command disables it.

```
:ph on
:ph off
```

5.5.4.3 Setting Power for Preheat

The **ph power N** command sets the power of the LEDs for the preheat in %.

```
:ph power 100
```

The **ph power** command displays the current setting of the preheat power.

```
:ph power
100%
```

Note: The preheat power can be set higher because the camera is off and does not consume power.

5.5.4.4 Setting Target Temperature

If the preheat is enabled, at the power up the camera is off and the Heater is on. When the internal temperature reaches the target value, the heater is turned off and the camera is turned on.

The **ph ton N** command sets the target temperature for the preheat. The **N** is a signed integer value in *°C*.

```
:ph ton 0
```

The **ph ton** command displays the current settings of the target temperature.

```
:ph ton
+0'C
```

5.5.4.5 Saving Preheat Settings

The **ph save** command saves the current preheat settings to the EEPROM.

```
:ph save
OK
```

5.5.5 Camera Control Command – **cam**

5.5.5.1 Camera State Monitoring

The **cam** command without arguments displays the camera's state.

```
:cam
CAM: Auto ON Temp=+21'C Vcam=51.6V Icam=48mA Pcam=2.46W
```

The command displays several parameters.

The *Auto* keyword says that the camera is controlled automatically. Not displayed otherwise.

The next keyword (*ON* or *OFF*) says whether the camera is on now.

The *Temp=* parameter is the internal temperature of the housing.

The *Vcam=* is the voltage powering the camera.

The *Icam=* is the current drawn by the camera.

The *Pcam=* is the power consumed by the camera from the PoE network.

Note: In the PoE chain configuration camera power monitoring is not functional; *Icam=* and *Icam=*are always 0.

5.5.5.2 Controlling Camera

The **cam auto** command enables the automatic controlling the camera. The automatic mode is used only for the preheat feature (see the **ph** command).

```
:cam auto
```

The **cam on** command turns the camera on and disables the automatic mode.

```
:cam on
```

The **cam save** command saves the camera settings to the EEPROM.

```
:cam save
OK
```

The **cam off** command turns the camera off.

The **cam reboot** command turns the camera off and on again, causing the restart of the camera.

Note: The last two commands are intended for debugging purposes and should not be used in the normal operation. Executing these commands causes loss of the SSH connection to the camera. The new connection is not possible until the camera's boot process completes.

Note: In the PoE chain configuration camera control is not functional. Camera is always powered regardless the **cam** command settings.

5.5.6 Cooler Fans Control Command – **fan**

The **fan** command displays the state of the cooler fans.

```
:fan
FAN: Auto ON
```

The *Auto* keyword says that the fans are controlled automatically. Not displayed otherwise.

The next keyword (*ON* or *OFF*) says whether the fans are on now.

The **fan auto** command enables the automatic controlling the fans. In this mode the fans are turned on or off automatically along with the LEDs. It is the default setting.

```
:fan auto
```

The **fan on** command turns the fans on. In this mode the fans are not turned off when the LEDs are off.

```
:fan on
```

The **fan off** command turns the fans off.

```
:fan off
```

Note: Do not turn the fans off unless the LEDs are turned off too. Disabling the fans can cause overheat of the LEDs.

The **fan save** command saves the fans settings to the EEPROM.

```
:fan save
OK
```

5.5.7 Ambient Temperature Monitoring – **temp**

The **temp** command displays the ambient temperature (in °*C*).

```
:temp
+24.5'C
```

5.5.8 Illuminance Monitoring – **lux**

The **lux** command displays the illuminance (in *lux*)

```
:lux
20 lx
```

Note: the illuminance reading highly depends on the placement of the illuminance sensor. For correct reading, the sensor should be directed to the source of light.

5.5.9 Total Power Monitoring – **power**

The **power** command displays the total power consumed by the device (including the camera).

```
:power
V=50.9V I=181mA P=9.23W
```

The command displays three parameters.

The *V=* parameter is the PoE voltage.

The *I=* parameter is the total current drawn from the PoE network.

The *P=* parameter is the total power consumed from the PoE network.

Note: The parameters are shown from the powered device's point of view. The power sourcing equipment's readings can be higher due to some power loss in the cable.

5.5.10 Restoring Factory Settings – **default**

The **default** command resets all settings to their default values (see Table 4). Press the **y** key to confirm the operation or the **n** key to cancel it.

```
:default
Load defaults? (y/n):y
Default settings loaded.
```

5.5.11 Restarting the Device – **reboot**

The **reboot** command causes the restart of the device. The camera is restarted as well.

```
:reboot
Rebooting...
Sigrand IPhouse-15 Light Camera Housing V.2.0
Ready!
```

Note: The SSH connection to the camera will be lost. The new connection is not possible until the camera's boot process completes.

5.6 Troubleshooting

5.6.1 Settings Not Saved

Problem: The settings changed to the previous values after power off.

Solution: After changing the settings, do not forget to issue the appropriate *save* command (**led save**, **th save**, etc) to store the settings to the EEPROM.

Note: some settings, such as *thresholds*, are stored to the EEPROM immediately.

5.6.2 Changing Settings Causes Reboot

Problem: The device restarts upon changing some settings, and the SSH connection is lost. After reboot the settings return to its previous values.

Cause: The problem occurs when the new configuration requires more power from the PoE network than the previous one. The PoE power limit is exceeded and the PoE switch turns the power off.

Solution: Check total power consumption by the **power** command. The maximum output power of the PoE class 3 power source is 15.4 watts. Due to the power loss in the cable, the maximum power consumption of the powered device should not exceed 13 watts. Change power settings to fit the limit. The higher the camera's power consumption, the lower should be the power setting of the LEDs.

5.6.3 Reboot Cycle at Power up

Problem: The device restarts continuously and never reaches the command prompt, making the settings management impossible.

Cause 1: Power consumption exceeds the PoE limit. The incorrect power settings are stored in the EEPROM and are applied at each startup attempt, causing restart.

Solution 1: Disconnect the camera or the LEDs physically to allow the device to start successfully. Reduce the power settings or restore the default settings by the **default** command. Connect back the camera and the LEDs.

Cause 2: Power consumption is too low, and the PoE switch recognizes a disconnect. It may occur if the camera is not connected to the housing and the fans as well as the LEDs are turned off in the settings.

Solution 2: Connect the camera to the PoE output of the housing.

5.6.4 Camera Never Starts after Preheat

Problem: When the preheat feature is enabled, the camera never starts.

Cause: Due to the low ambient temperature, it may be not enough heating power to reach the target temperature threshold.

Solution: Increase the power setting for the preheat by the **ph power** command or reduce the target temperature by the **ph ton** command. The power setting for the preheat can be higher because the camera does not consume power during the preheat.

5.6.5 LEDs Overheat

Problem: The LEDs reduces the power and the *overheat* message appears in the output of the **led** command.

```
:led
LED: ON Power=100% (70%) Temp=+70.5'C
Overheat!
```

The temperature of the LEDs reaches the *Tmax* limit.

Cause 1: The cooler fans are turned off or failed.

Solution 1: Check the fans settings by the **fan** command. Ensure that the fans are connected and running.

Cause 2: The ambient temperature is too high.

Solution 2: Use the automatic mode (see the **led auto** command), at which the LEDs are on only in the night-time, when the ambient temperature is usually lower. Reduce the power of the LEDs.

6. Annex A.

Table 7. IPhouse-15 Console Cable Pinout

BLS-2 (IPhouse-15) Pins	Network	DB-9F (COM port) Pins
1	TXD	3
2	RXD	2
3	GND	5
4	DTR	4