User Manual

TarisIR® mini

Compact Camera

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Table of Contents

1 Introduction

All listed product names and trademarks remain the property of their respective owners.

Please carefully read this user manual before initial start-up. This is the only way to ensure that you are able to fully leverage the performance capability of your thermography system. Please particularly observe the notes on device safety in accordance with chapter 4.1

All information provided within the framework of this user manual describes a completely equipped TarisIR® mini. Depending on the selected model and the individual customisation, technical data, scope of functions and supplied accessories of your thermography system may deviate from the version described herein. Equipment-dependent features are identified accordingly by means of an * within this user manual.

As a matter of principle, the descriptions of the technical data and the specific scopes of functions and delivery in the corresponding shipping documents are decisive (order confirmation/bill of delivery).

This product is subject to further developments within the scope of technical progress.
This manual has been prepared with due care. Nevertheless, errors and omissions cannot be completely excluded.
Further developments in the sense of technical progress are reserved.
No liability is assumed for damages resulting from non-observance of the information contained in this manual.

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2 Product Specifications

2.1 Camera Models

The TarisIR® mini is available in two versions:

- Standard version: respective instructions to be found in the complete manual
- M version: specifics of this camera model **see chapter 4**

Figure 1: TarisIR® mini – left M version and right standard version (examples with 13.6 mm lens)

2.2 Technical Data

Spectral Range	(8 … 14) µm
Pitch	12 µm
Detector format (IR pixels)	(640 ×480)
Temperature measuring range	(-40 … 600) °C; Range 1 (-40 … 120) °C, Range 2 (0 … 600) °C
Measuring accuracy	± 2 % or ± 2 K (-10 … 120) °C; ± 2 % or ± 5 K (larger value) ; T_{amb} (5 … 35) °C
Temperature resolution @30°C	0.02 K in LowNoise mode
Frame rate	50 Hz or < 9 Hz
Focus	Manual
Focusing range	Approx. (0.25 m … ∞)
Dynamic range	16 bit
Interfaces	GigE vision compliant (RJ45), RS-232
Trigger	2 IN/OUT; 3.3 V LVTTL
Tripod adapter	1/4" photo thread
Power supply	(9 … 36) VDC or PoE
Power consumption	Approx. 2.2 W @12 V, 2.7 W @PoE
Storage and operation temperature	(-40 … 85) °C, (-40 … 55) °C
Humidity (operation and storage)	Relative humidity (10 … 95) %, not condensing
Housing, Protection degree	Light metal housing, IP40
Dimensions	(50 × 55 × 55) mm
Weight (without lens)	220 g

2.3 Standard Lenses

Focal length	6.2 mm	13.6 mm	25 mm
Field of View (FOV)	(75 × 55)°	(32 × 24)°	(17.6 × 13.2)°
IFOV (mrad)	1.9	0.88	0.47

Further focal lengths are available on request. Lenses are not removeable.

2.4 Dimensions

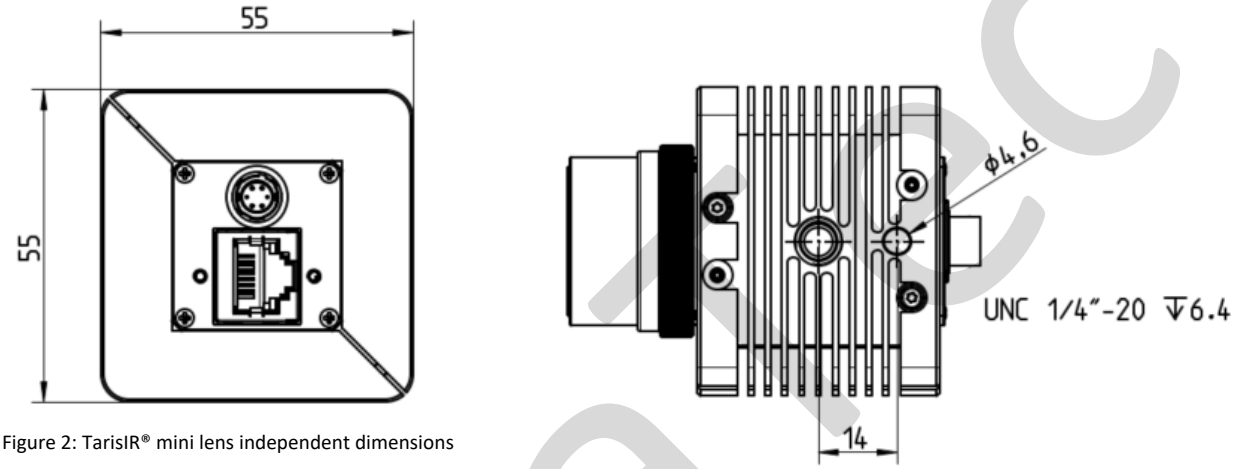


Figure 2: TarisIR® mini lens independent dimensions

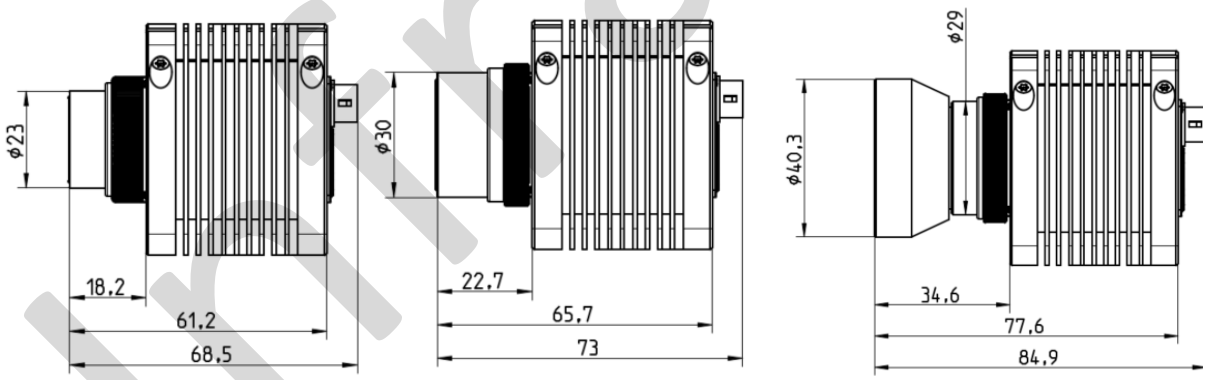


Figure 3: TarisIR® mini with 13.6 mm, 6.2 mm and 25 mm lens (minimal length depends on focus setting)

3 Technical Description

3.1 Components Overview

The TarisIR® mini comes with a 6-pin system Hirose connector and a RJ45 Ethernet jack.

1	Lens
2	Focus lock ring
3	Metal housing
4	RJ45 ethernet jack with 2 screw holes
5	6-pin system connector (Hirose)

3.2 Scope of Delivery

Component image	Designation
	**TarisIR® mini camera** Including lens
	**Focus adjustment ring** (Not necessary for every lens, see “Adjusting the focus”)
	**RJ45 Ethernet cable** Standard length: 3m, others on request

Power supply

AC wide range power supply (100 … 240) for the supply of power to the GigE camera (12 V DC).
Via a primary adapter, the power supply can be used either for EU or US mains wall sockets (both adapters are included by default).
Other primary adapters on request.

Breakout box (optional)

The breakout cable extends the single 6-pin system connector with proprietary pinout of the GigE camera to standard connectors. This way, all functions of the GigE system connector can be connected using standard equipment. The following extension connectors are provided:

- Power supply: 6-pin Hirose socket (same as on the camera)
- Control interface: D-Sub 9 socket with standard UART/RS232 pinout
- I/O ports: 2x BNC sockets

Power over Ethernet (PoE) Configuration (optional)

This powering option consists of an Ethernet cable and a power injector. This option replaces the regular power supply.

4 Specifics of TarisIR® mini – M Version

TarisIR® mini can be delivered without the heat sink. This version is specified as TarisIR® mini M. All operations are similar to the standard version. The form factor of this model and some specifications will differ as follows:

4.1 Dimensions and Specifications

Figure 4: TarisIR® mini M

Measurement accuracy	± 2 % or ± 2 K (-10 … 120) °C; ± 2 % or ± 5 K (larger value); $T_{housing}$ (10 … 50) °C
Operation temperature	(-40 … 70) °C $T_{camera\ housing}$
Dimensions	(50 × 30 x 30) mm
Weight (without lens)	66 g

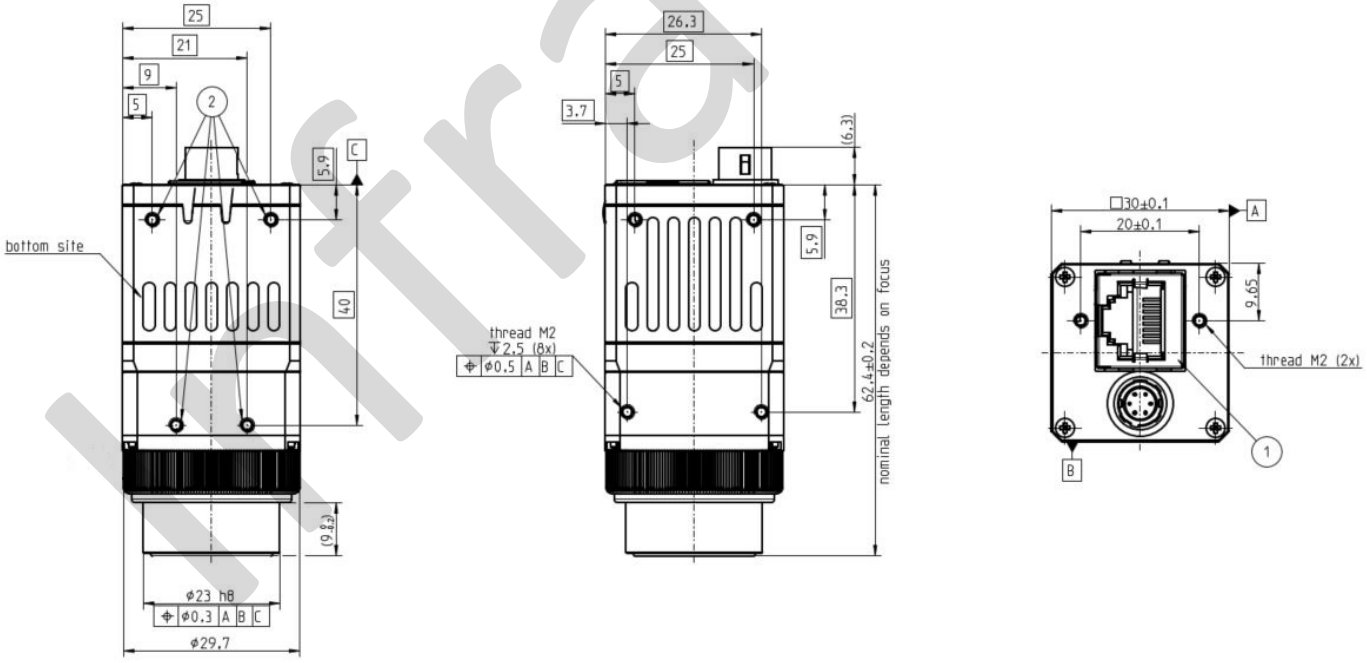


Figure 5: TarisIR® mini M with 13.6 mm lens

4.2 Mounting of the Body

The housing of the TarisIR® mini M features 4 threaded holes M2, 2.5 mm deep (indicated as “2” in figure 21)

- 4 on the bottom side
  4 on the side

For mounting at least two holes are to be used at each side.

5 Operation

5.1 Handling Precautions

Risk of damage

The TarisIR® mini camera is a high-quality, carefully calibrated optical device:

- Handle it with the corresponding care
- Avoid contaminations, particularly in the lens areas
- Never remove the lens or any part of the housing
- Observe the conditions for use, storage, and transportation

Detector precautions

The TarisIR® mini camera is equipped with a highly sensitive, uncooled microbolometer detector. The thermal radiation occurring in most common thermographic or observation tasks does not induce any damage to the detector. However, thermal radiation from objects having a temperature of approx. 1,000°C or more, or from other highly intense radiation sources, may result in detector dazzle or even damage and should be avoided. Detector dazzle from directing the camera accidentally to the sun is temporary, the detector can be expected to recover after several hours or perhaps days.

Directing the camera into an intense laser beam, may lead to irreversible damage of the detector.

- Do not direct the camera to the sun or to other highly intense radiation sources (e.g., into a laser beam), no matter whether the camera is switched off or is in operation.
- Ensure that also no direct reflections of the sun or of other highly intense radiation sources can enter the camera lens.
- Whenever the camera is not in use, cover the optical surface to protect the lens against damages.
- Never remove the lens.

The housing of the TarisIR® mini M version can become warmer than 45°C during operations.

5.2 Adjusting the Focus

Risk of damage

Any damage to the camera or lens due to incorrect focus adjustment will void the warranty.

Explanation

By default, the camera focus is set to the hyperfocal distance at the factory. This can be set manually on the lens coupling system. The focus adjustment is locked with a lock ring to prevent unexpected focus changes.
There are two different adjustment options:

- Direct adjustment on the focus ring without any tools (with the 25mm lens).
- Adjustment on the focus ring by using the tool focus adjustment ring (on most lenses).

Please note the following images for a better overview of the individual components.

Figure 6: Focus adjustment

1 Direction of rotation
2 Lens (Do not touch!)
3 Focus ring with 4 pitches for focus adjustment ring
4 Lock ring
5 Camera body

Figure 7: Lens and focus adjustment ring

1 Focus adjustment ring
2 Camera with lens

Procedure for adjusting the focus

The procedure differs slightly depending on the lens installed.

For **25mm lens** the adjustment takes place directly on the focus ring:

- Clockwise: increase distance to focus position
- Counterclockwise: decrease distance to focus position

For all other lenses please follow the steps below:

1. Make sure the camera's live image is visible on a monitor.
2. Turn the lock ring counterclockwise about half a turn, this will loosen the lens.
3. Insert the focus adjustment ring into the 4 pitches of the focus ring and rotate the focus ring to the required focus position.
   - Clockwise: increase distance to focus position
   - Counterclockwise: decrease distance to focus position
4. Turn the lock ring clockwise to lock the lens position.

Risk of damage

Do not loosen the focus ring by more than half a turn!
Otherwise, internal parts may come loose and fall out the focus ring.

Do not screw out the focus ring too far, otherwise the whole objective may become loose (and even fall out) and dust could enter the camera.

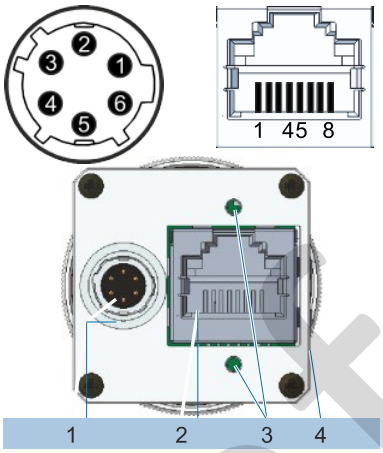
5.3 Camera Hardware Interfaces

The two connectors on the GigE camera rear side are end user interfaces.

- RJ45 socket – GigE vision compliant interface

A standard cable or an industrial-grade robust cable may be used for interconnection. Custom Ethernet cable max. length availability is 10 m. Those could also come with fastening screws to improve connection stability if needed.

- 6-pin Hirose circular connector for
  - DC power supply
  - 2 I/O ports (3.3 LVTTL)
    The optional break-out box (see section 3.2) may be needed for interconnection.



1	6-pin system Hirose connector
2	RJ45 ethernet jack
3	Screw holes for Ethernet cable
4	Camera body

Figure 8: Camera rear side

6 Operability

6.1 Mechanical Test Conditions

The following results have been verified for the TarisIR® mini (M version):

Vibration, noisy

Test norm		DIN EN 60068-2-64, Tab. A8
Excitation		Wideband noise
Frequency		10 Hz - 2000 Hz
Load	10 Hz - 100 Hz:	4 (m/s2)2/Hz
	200 Hz - 500 Hz:	8 (m/s2)2/Hz
	2000 kHz:	0.5 (m/s2)2/Hz
Duration		10 minutes per axis
Axes		3
Operating mode		Unpacked, active

Vibration, sinusoidal

Test norm	DIN ISO 9022-(3)-36-06-2
Stimulation	Sinusoidal with floating frequency
Frequency	10 Hz - 2000 Hz
Load	0.15 mm / 2 g
Cycle rate	1 oct/min
Number of cycles	10 per axis
Axes	3
Operating mode	Unpacked, active

Continuous shock

Test norm	DIN ISO 9022-(3)-31-05-1
Stimulation	Semi-sinusoidal
Load	50 g / 6 ms
Number of Stocks	1000 per direction Axes 3 (6 directions)
Operating mode	Unpacked, passive

High shock

To be applied to M version camera core with 25x25mm² housing only

Test norm	DIN ISO 9022-(3) 2015-8
Stimulation	Semi-sinusoidal
Load	800 g / 1 ms
Number of stocks	1000 in z direction (optical line)
Operating mode	Unpacked, passive

6.2 Climatic Test Conditions

The following results have been verified for the TarisIR® mini (M version):

Cold, passive

Test norm	DIN ISO 9022-10-08-1
Temperature	- 40°C
Duration	16 h
Operating mode	Unpacked, passive

Cold, active

Test norm	DIN ISO 9022-10-05-2
Temperature	See chapter 3 “Product specifications”
Duration	16 h
Operating mode	Unpacked, active
NUC interval	2 s

Dry heat, passive

Test norm	DIN ISO 9022-11-05-1
Temperature	+ 85°C
Duration	16 h
Operating mode	Unpacked, passive

Dry heat, active

Test norm	DIN ISO 9022-11-05-1
Temperature	See chapter 3 “Product specifications”
Duration	16 h
Operating mode	Unpacked, active
NUC interval	2 s

Constant humid heat

Test norm	DIN ISO 9022-12-02-1
Temperature	+ 40°C
Humidity	90-95% rel. humidity
Duration	96 h
Operating mode	Unpacked, passive

Rapid temperature change	
Test norm	DIN ISO 9022-15-02-1
Temperature	T1 = - 25°C T2 = + 40°C
Transfer time	≤ 20 sec.
Holding time	2.5 hours at T1 and T2
Number of cycles	5
Operating mode	Unpacked, passive

6.3 Electromagnetic Compatibility

The following results have been verified for the TarisIR® mini (M version):

Test	**Test norm**	**Target value**
Emitted interference	**DIN EN 61326-1**	
Radio interference	DIN EN 55011 DIN EN 55032	Group 1 Class A (VGA) Class B (QVGA)
Interference immunity	**DIN EN 61326-1**	
Electrostatic discharge	DIN EN 61000-4-2	
Electromagnetic RF fields	DIN EN 61000-4-3	0.08 – 1 GHz 10 V/m
	DIN EN 61000-4-3	1.4 – 2.0 GHz 3 V/m
	DIN EN 61000-4-3	2.0 – 2.7 GHz 1 V/m

7 GigE Interface

7.1 Installation Instructions

To operate the TarisIR® mini with the GigE interface, the driver software "WinPcap" must be installed. We recommend using a GigE network card that is independent of the corporate network to control the TarisIR® mini. Depending on the Ethernet adapter used, various configuration options are available after its installation.

TarisIR® mini is compliant with GigE vision standard.

We always recommend using the internal GigE network card for the camera connection.

For camera connectivity we recommend to deactivate energy saving options of the computer and the network adapter.

For the following installation, you will need administrative user rights.

7.2 Installing WinPcap

The driver software WinPcap must be installed for Ethernet interfaces. It will be automatically installed when installing the thermographic software IRBIS®. Not using the thermographic software IRBIS® a seperate installation of an actual version of WinPcap is needed. The auto start function of WinPcap driver must be selected.

After running the file "WinPcap_4_1_3.exe", follow the setup wizard by clicking "Next >".

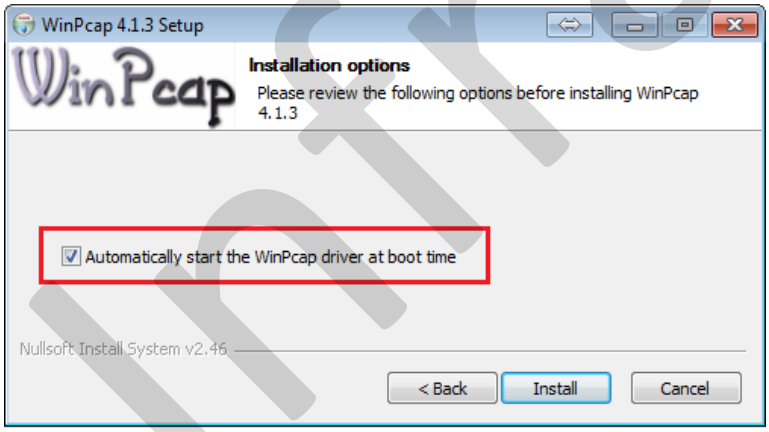


Figure 9: Set WinPcap Autostart

The installation finishes by clicking "Finish".

7.3 ConFiguring the Network Adapter

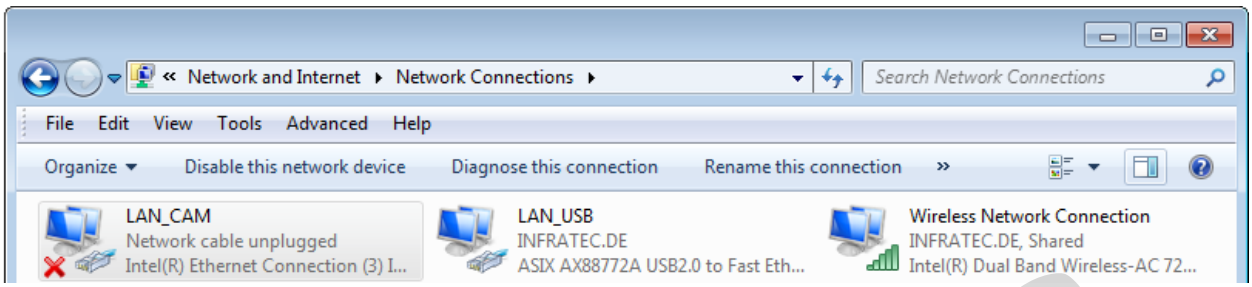


Figure 10: Select LAN Connection

After opening the "Network and Sharing Center", select the "Change adapter settings" menu item. Here, mark the network card to be used and access its properties via the right mouse button.

7.3.1 Setting the IP Address

The factory IP address of the camera is set to: 192.168.2.201.
Before configuring the network card for use with the camera, you must check the properties of the interface card to be used. It is important to disable unnecessary functions and assign a fixed IP address. The screenshots below provide an overview:

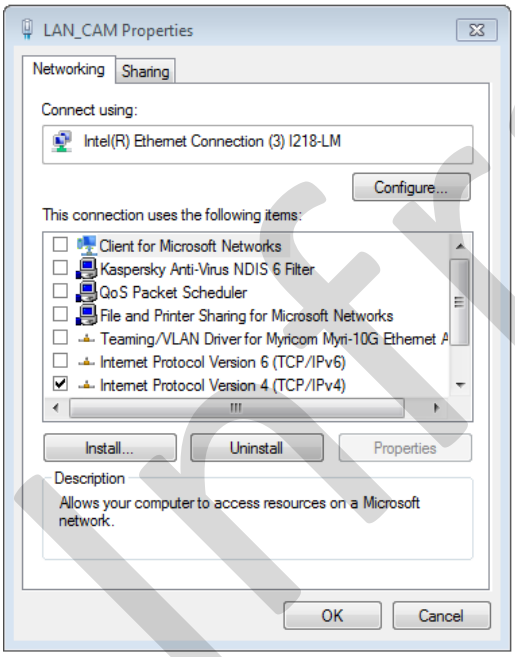


Figure 11: LAN Connection Properties

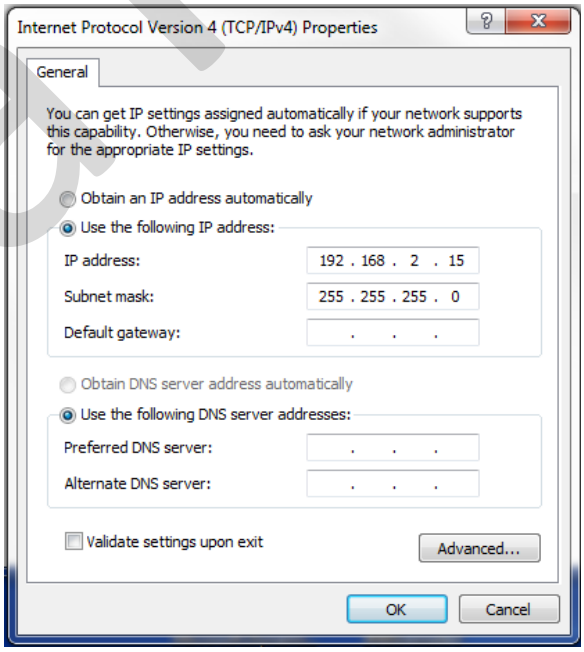


Figure 12: Set IP Address

Please note that only Internet protocol V4 is required for the Ethernet connection to the TarisIR® mini. It is recommended to disable all other components within the input mask.

By marking the entry "**Internet Protocol (TCP/IP)**", you can set the IP address of the GigE network card via the "Properties" button. This IP address can be defined within the 192.168.2.xxx range except 192.168.2.201 under the menu item "Use the following IP address" according to your network's specifications.

You will need two free network addresses during the further installation. For questions regarding this, please contact your network administrator directly.

The option "**Obtain an IP address automatically**" must **not** be selected using the factory setting. If this entry is activated, the computer tries to obtain a dynamic network address from the camera system, which is visible at the corresponding network symbol in the taskbar. Connecting to the TarisIR® mini might not be not possible in this case.

If you change the IP address, you should document and secure this change in your records to inform the supplier in case of service inquiries. It is recommended to note the changed IP address directly on the camera.

Configuring the Network Card

Within the "LAN Connection Properties" window, you can define the network card properties via the "Configure..." button.

For an interference-free Ethernet connection to the TarisIR® mini, it is strongly recommended to activate the "Jumbo Packet" property. This function significantly reduces network load and allows loss-free data transmission even at high frame rates.

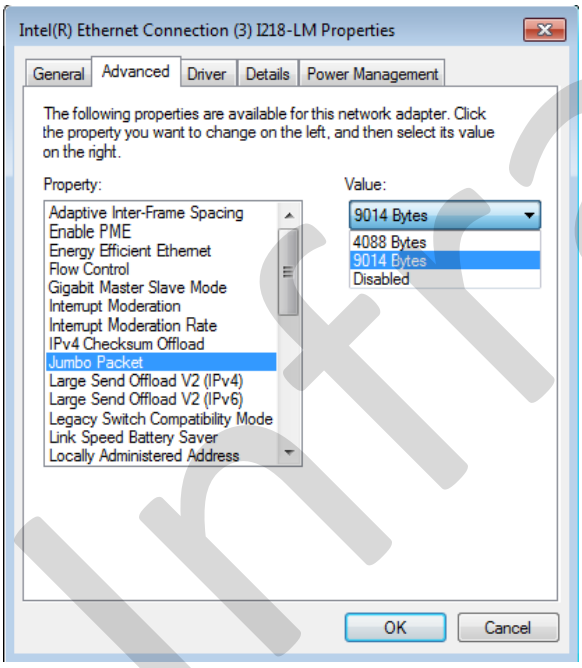


Figure 13: Setting "Jumbo Packet"

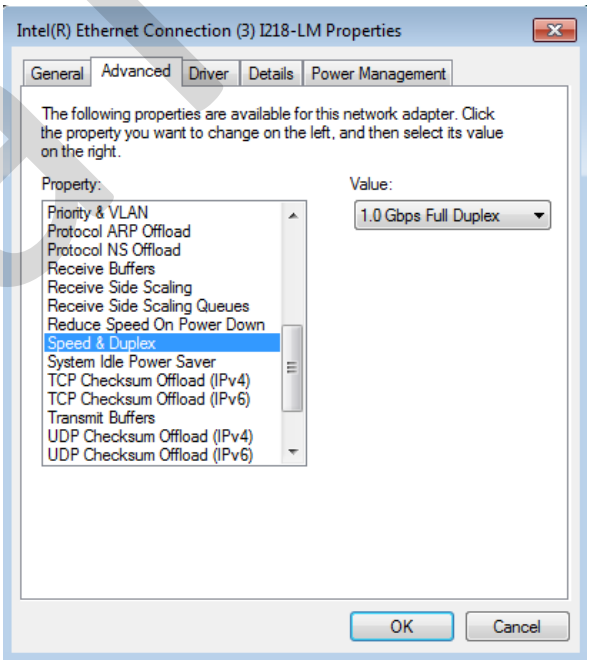


Figure 14: Speed and Duplex Mode

Please select the highest value (at least 4088 bytes or 4K bytes) from the available list.

Preferably select the value "1.0 Gbps Full Duplex", and if this is not available, select "Auto Negotiation".

If your network card supports this option, you could also set the receive and transmit buffer of the network card to the maximum adjustable value.

8 Connection with IRBIS® 3* Software

The installation and functions of the IRBIS® 3 program are described in detail in the "IRBIS® 3 – Infrared Thermography Software" manual. Therefore, only camera-specific functions are addressed here.

For the online operation of TarisIR® mini over Ethernet, additional software must be installed, and network settings must be made on the control computer (see Chapter 6.).

After starting the IRBIS® 3 program, click the "**Connect**" button in the "**Camera**" menu item to establish the camera's connection to the software. Select the camera "TarisIR® mini" from the list if you are operating multiple cameras via the software.

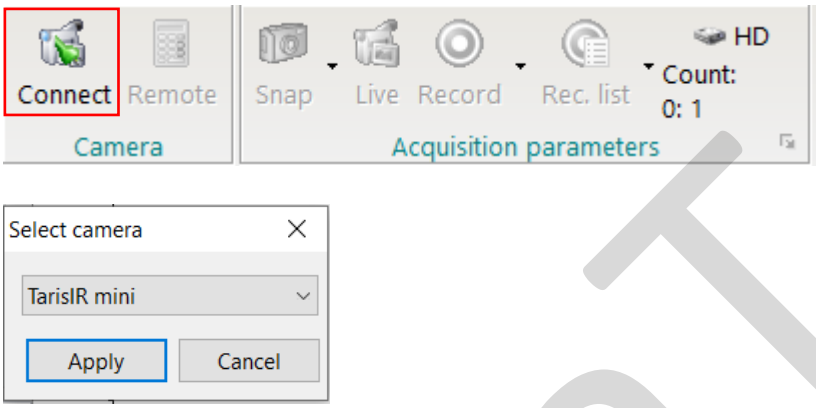


Figure 15:IRBIS® 3 "Camera" Menu - Connection

After establishing the connection, the camera image transmitted via Ethernet is displayed live in the thermal image window. It is recommended to operate the camera exclusively via the control PC afterwards. To do this, click the "Remote Control" button in the "Camera" menu item to call up the camera-specific remote control:

Figure 16: IRBIS® 3 – Open Camera Remote Control

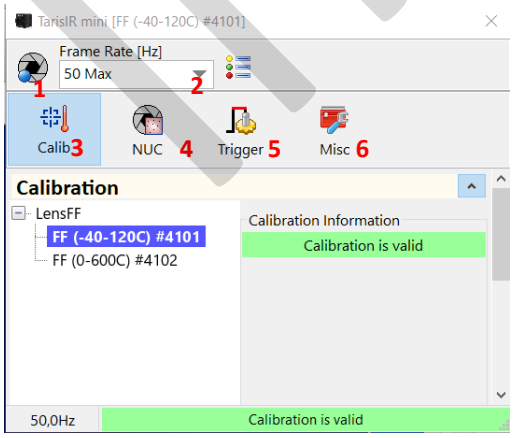


Figure 17: Camera remote control

The remote-control window will allow for setting of the most important camera functions. The ribbon items allow access to:

1 Manual shutter

2 Setting of camera frame rate (max. 50 Hz)

3 Calibration ranges to be selected

4 Shutter settings and resolution settings:

The shutter interval can be set in the following steps:

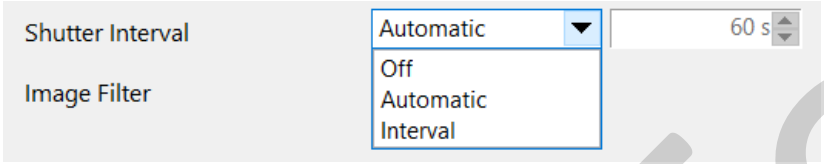


Figure 18: Shutter options

Off: Shutter will be turned off. This setting will result in decreased measurement accuracy.
Automatic: Shutter @ 60 s
Interval: Shutter frequency can be set by user. Please keep in mind that low shutter frequencies can influence the measurement accuracy.

The thermal resolution improvement can be set in the following steps. The “Contrast” setting though does improve the image quality displayed on the expense of the measurement accuracy:

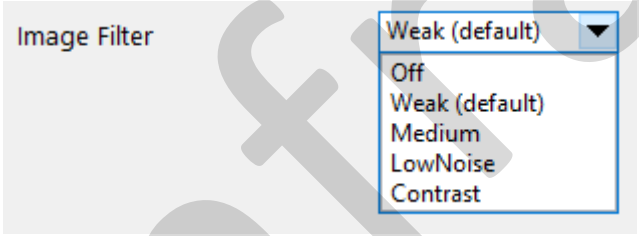


Figure 19: Resolution settings

5 Trigger settings:
TarisIR® mini comes with 2 configurable I/O ports for LVTTL 3.3 V. To access the ports physically additional hardware e.g. breakout box) is needed.

Frames can be marked for later analysis in the IRBIS® software suite by an external input signal. This low-high slope signal can be input in either of the two I/O ports after having been selected.

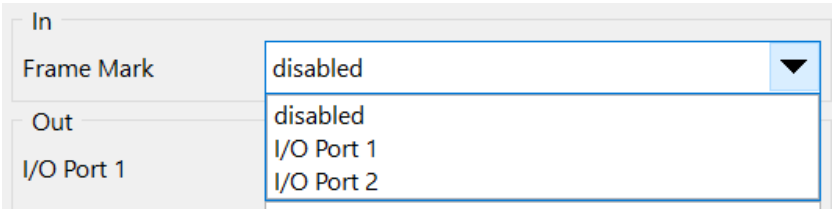


Figure 20: Input options

The available I/O ports can be configured as outputs. The following options can be selected for each available port providing a low-high slope output:

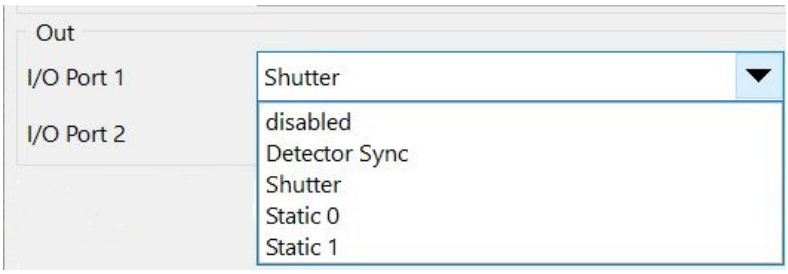


Figure 21: Output options

- Detector Sync – at the beginning of the acquisition of the very thermal image
- Shutter – when starting the shutter process
- Static 0 – static 0 V
- Static 1 – static 3.3 V

6 System information

9 Environmental Protection

TarisIR® mini is an optoelectronic device that contains special infrared optics and electronic circuit boards. These components require special disposal after the end of their usage.

The manufacturer offers to take back the TarisIR® mini product after the end of its usage to ensure environmentally friendly disposal.

Please send the device to the address listed in Chapter 10 Service.

10 Service

The manufacturer recommends that the TarisIR® mini system be serviced by customer support approximately every two years.

The manufacturer ensures service for the TarisIR® mini product.

In case of malfunctions and to perform technical maintenance, please contact your dealer or customer service at the following address:

InfraTec GmbH
Infrarotsensorik und Messtechnik
Gostritzer Straße 61 - 63
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GERMANY

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Website: www.InfraTec.de