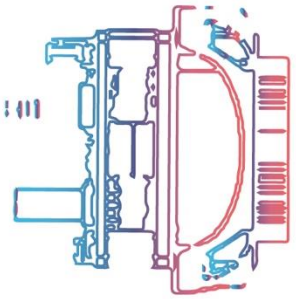
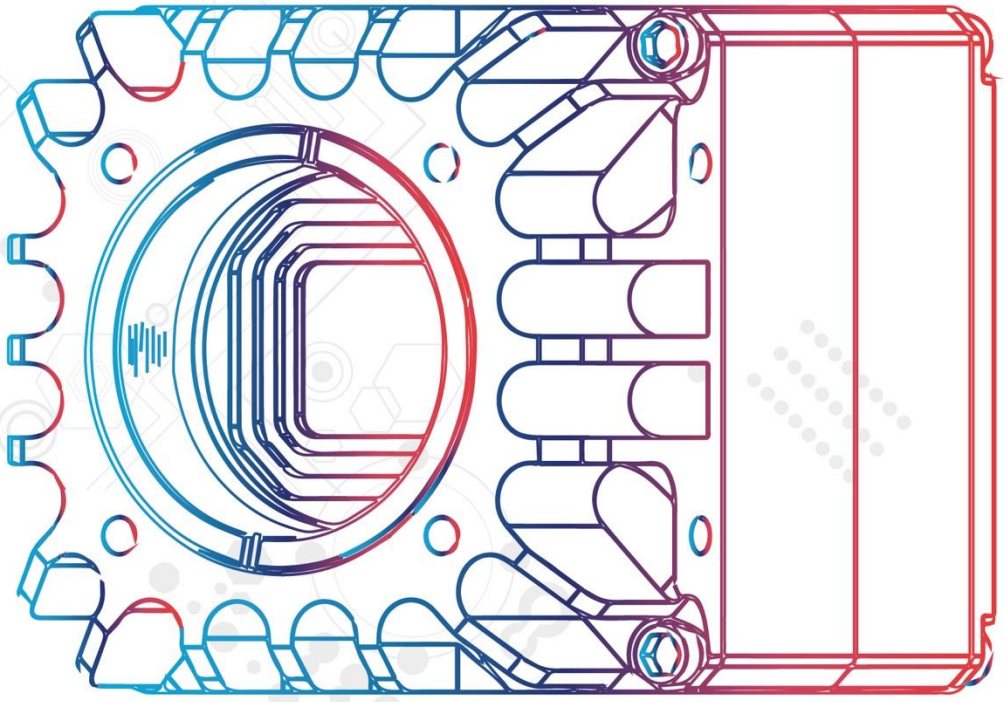
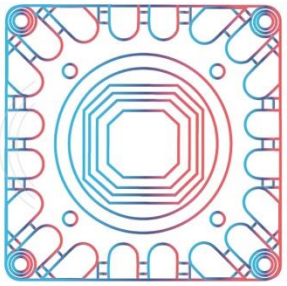
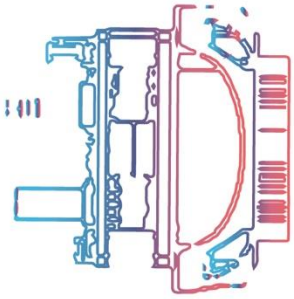
www.new-imaging-technologies.com







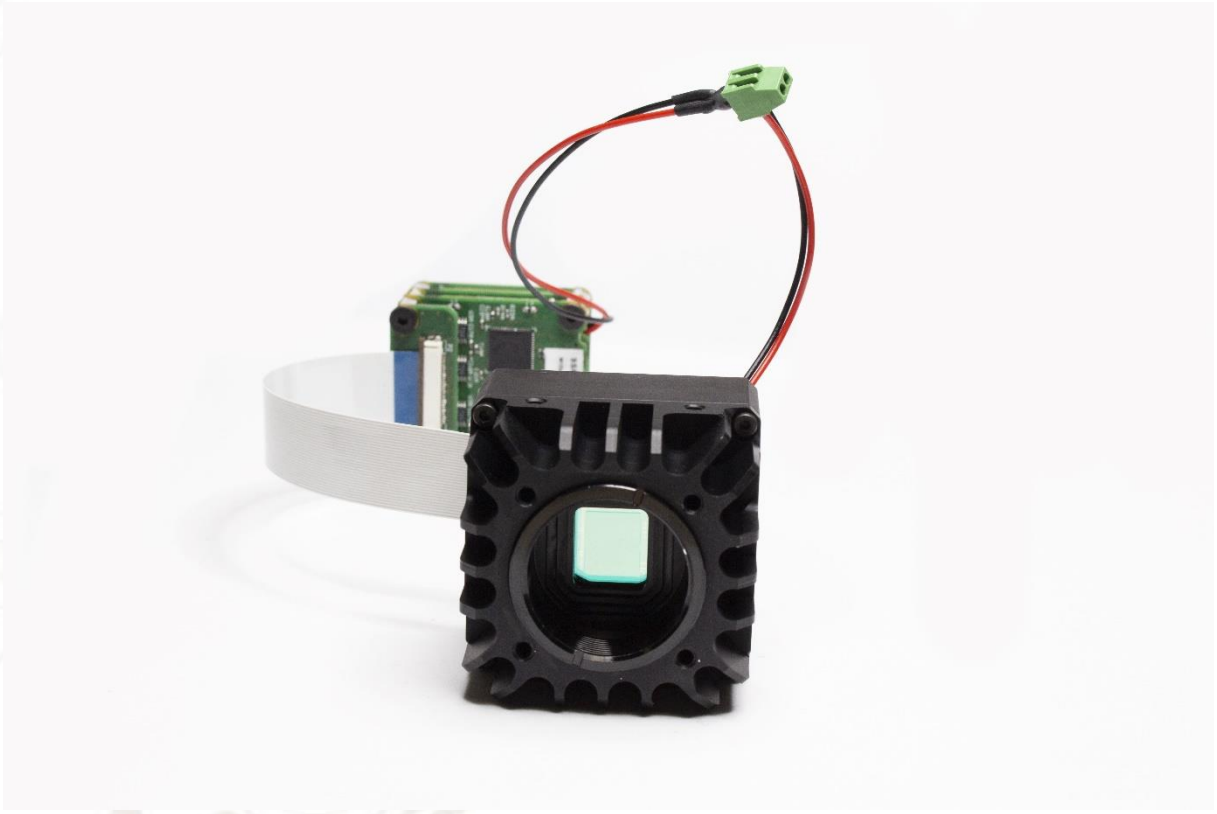


WiDy SenS 640 V-STP OEM

Camera Datasheet

DOCUMENT

Date	Modification	Revision
15/10/2019	Document creation	V1.0



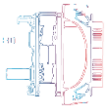


Table of contents

OVERVIEW

Commercial Reference

Commercial reference	Description	Ordering information
WIDY SenS 640V-STP OEM	USB3.0 TEC VGA GATED OEM CAMERA	9SMG1601AT31VR0A

References

Index	Title of document	Revision	Issued by
R1	SWIR TEC camera interface		NIT
R2	WiDyVISION Reference Guide		NIT
R3	User Manual	1.2	

A reference document contains elements which are used to draft this specification.

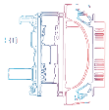
Subject

This document specifies the camera:

- Sensor description
- Presentation
- Mechanical dimension and optics interface
- Electrical and video interface
- Functionalities
- Software compatibility
- Electro-optics characteristics
- Environment
- Accessories
- Annexes

Definitions, Terminology and abbreviations

- NIT : New Imaging Technologies
- FPGA : Field Programmable Gate Array
- L : Length
- H : Height
- W : Width
- WDR : Wide Dynamic Range
- FPN : Fixed Pattern Noise



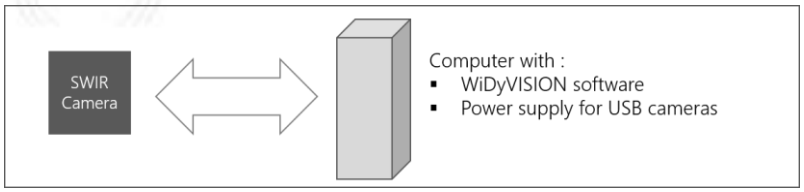
Sensor description

Optical format	1 inch
Active pixel	640x512
Material	InGaAs
Pixel size	Square 15 x 15µm
Readout mode	Global Shutter
Option	CDS
Dual mode	LOG or CTIA
Packaging	OEP252

PRESENTATION AND CONFIGURATION

General presentation

The WIDY SenS 640V-STP-OEM integrates the T-Cooled sensor NSC1601T-SI Monochrome. This camera integrates control of temperature to improve the intrinsic characteristics of the sensor.



Camera configuration

The camera is composed of Sensor, ADC, FPGA and Interface boards:

- Sensor board which integrate the sensor and the Peltier (thermoelectric cooling).
- ADC board
- FPGA board which integrate the timing sensor generation and the USB 3.0 synchronization and data
- Interface board which integrate the management of the main power supply, the trigger, the Peltier management and the USB3.0 transceiver
- The Sensor Board and ADC board are connected with connecting boards on both ends and a ribbon cable between.

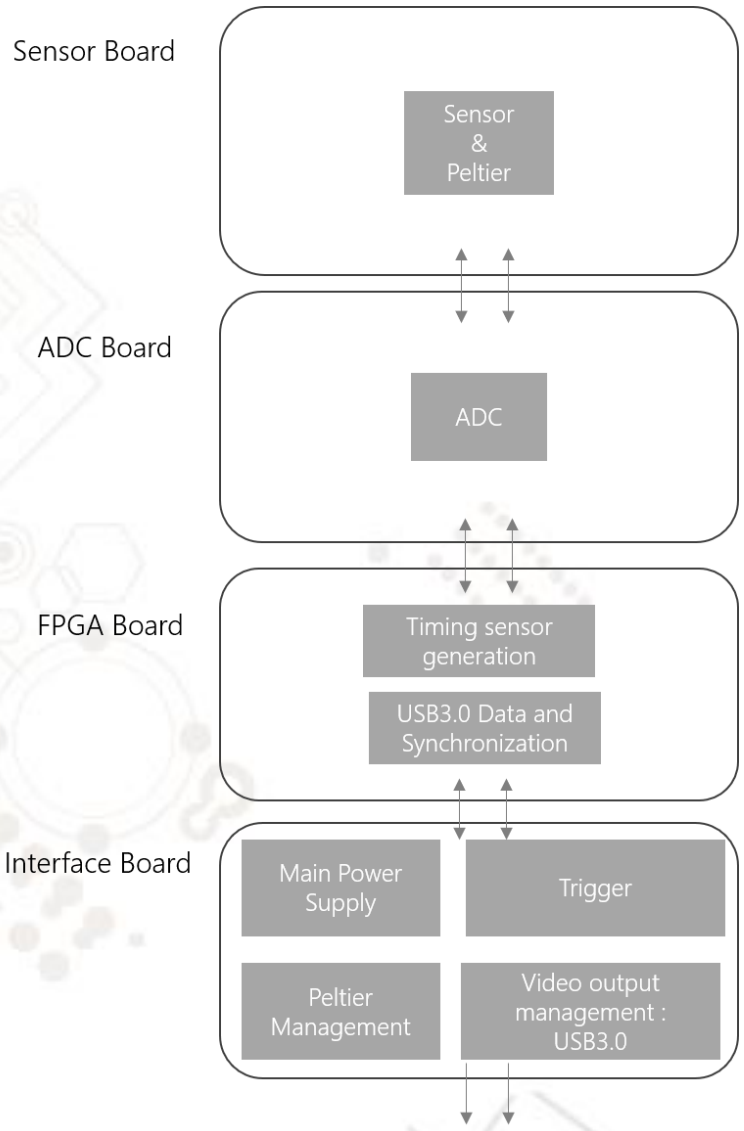
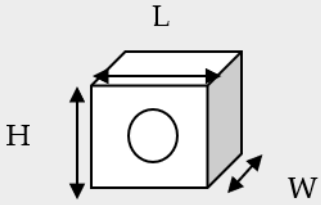
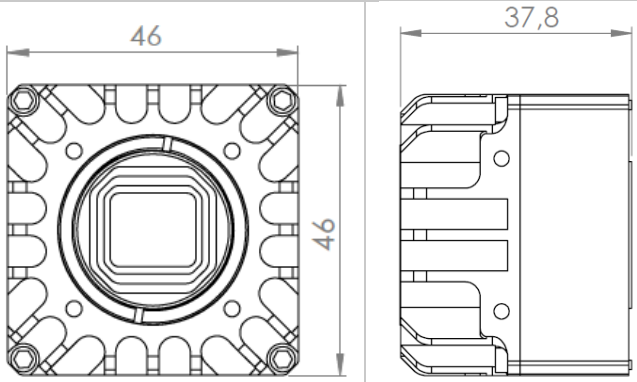
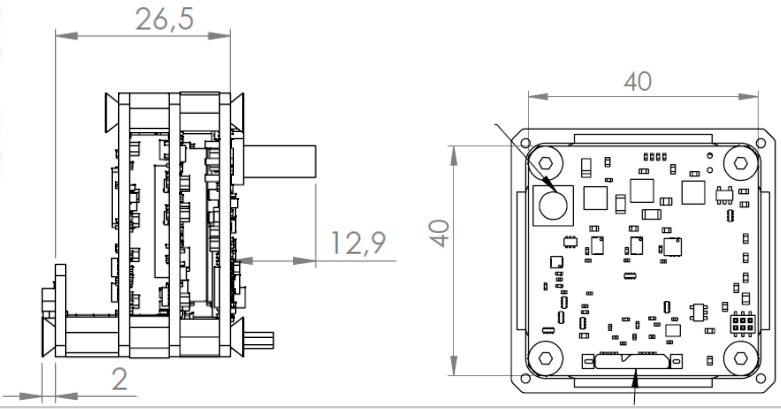
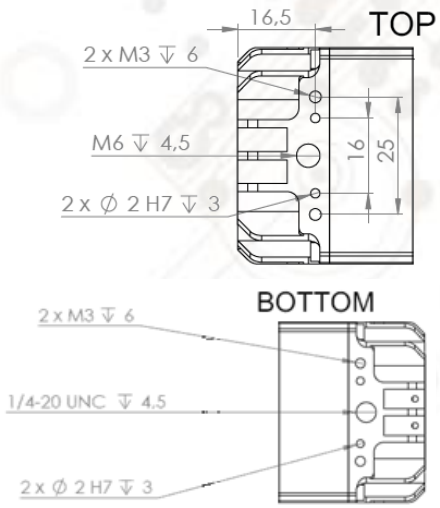


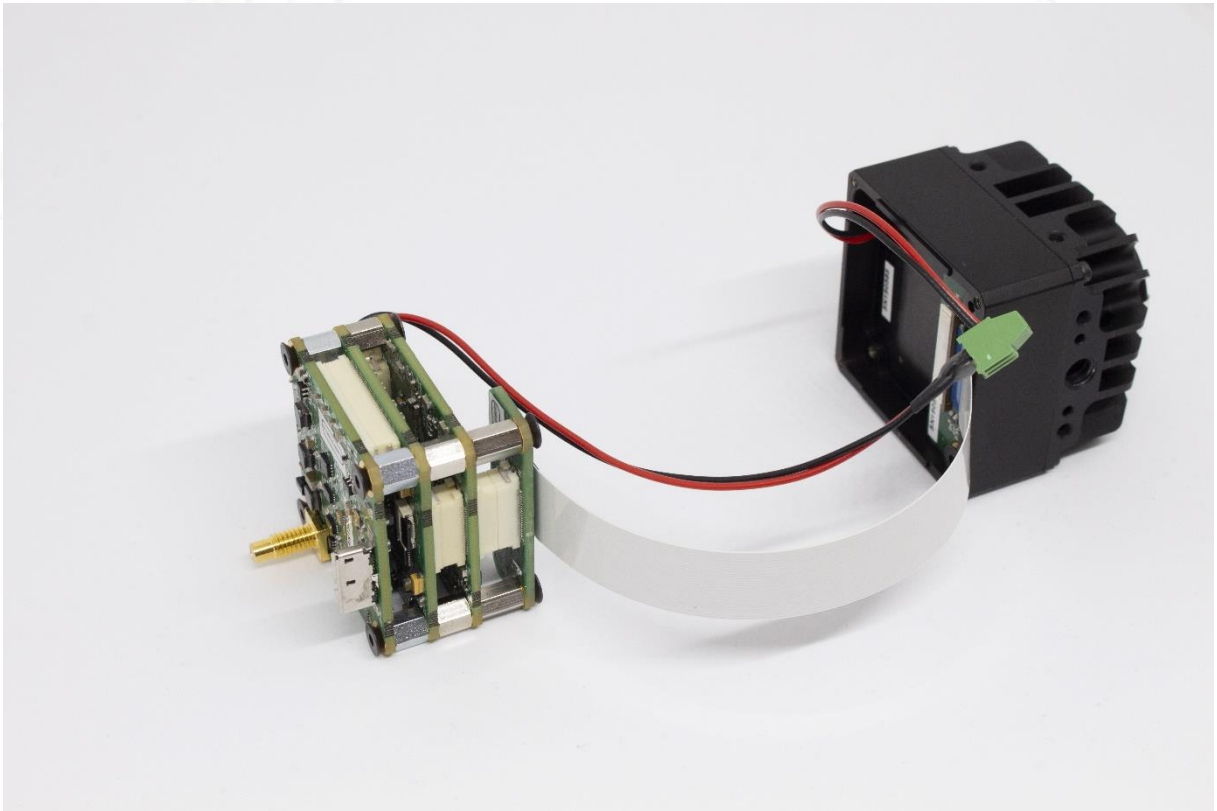
Figure 1 Camera architecture

SPECIFICATIONS

Mechanical dimension and optics interface

Mechanical dimensions	L : 46mm H: 46mm W: 56.9mm (without the connector) 
Camera	
Mount	C
Weight	Camera <200g
Board dimensions	

Interface	
Notice	If front face and mechanical parts are to be removed, this is under the responsibility of the customer. NIT will decline any responsibility for damage. Upon request, NIT can mount the mechanical parts without thread lock.
Ribbon Cable	Standard ribbon length is 127mm. Ribbons of 51mm and 150mm are also available upon request.



Electrical Video Interface

This OEM version is delivered without a rear mechanical part. Consequently, user must pay a special attention to the USB connector as the latter is not protected. NIT will decline any responsibility for damage for misuse of this interface.

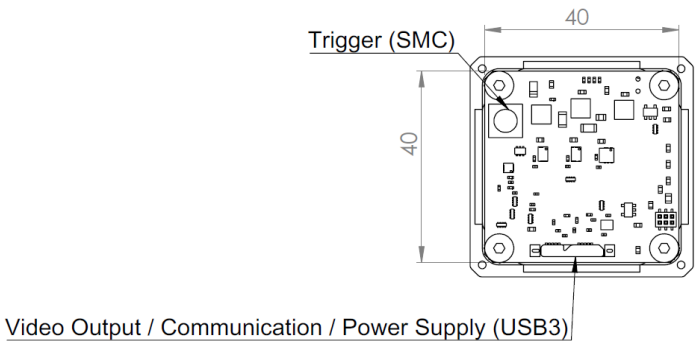


Figure 2 electrical and videos interface

Power supply

Power supply signal is provided through standard female USB3.0 plug connector.
Power supply range is 4 to 6V

Reference	Designation	Manufacturer
897-10-010-00-300002	Mini USB 3.0	MILL-MAX

Output Data

The WIDY SenS 640V-STP provides a 14-bit output data through the USB 3.0 connector. The software displays the processed image sensor (8 bits).

Synchronization connectors

A synchronization signal can be provided through a standard female SMC connector.
2 configurations modes are available:

- From camera to external source, SMC connector is defined as an output
- From external source to camera, SMC connector is defined as an input

The voltage range of the trigger signal must be [0-3.3V / LVTTL format].

2 modes in Trigger Output:
1/
High level: integration start on sensor pixels.
Falling edge: Integration stop and beginning of the reading and send of the image on the video output connector.
2/
High level: Integration start on sensor pixels
Integration time is equal to the exposure time register.

Reference	Designation	Manufacturer
152140	SMC connector	Amphenol

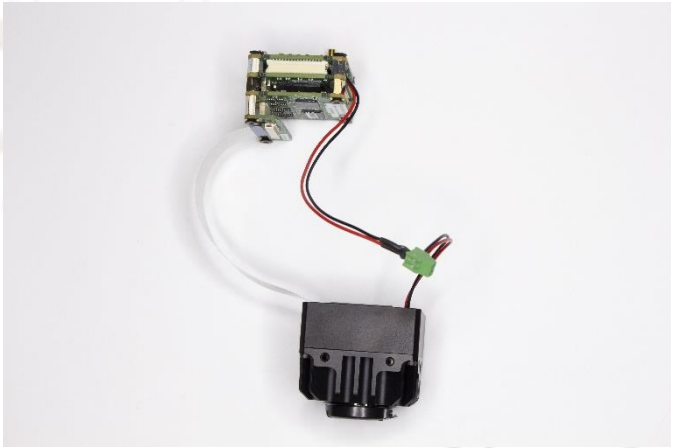
A delay is selectable in trigger input and output.

- TEC cables

The red and black wires are used to power the TEC.
They are soldered on the proxy board side and on the USB3 card side.
They are linked together with a domino/split fitting so that the user can adjust the length if needed.
They can be welded together instead of using the domino, shortened an extension can be inserted as needed.
It is strongly advised not to de-solder the wires from the boards.

- Ribbon cable Precaution

Analog signals run through the Ribbon. As a result, there may be parasitic effects on the image if the ribbon is in contact with external elements or if noisy Signals are nearby. Precaution must be taken during integration.



FUNCTIONALITIES

Camera mode	Frame rate	Up to 230Hz (in full resolution)
	Mode of sensor	Standard Global shutter : Integration time variable from 10us to 220ms in ITR Integration time variable from 100us to 220ms in IWR Maximum integration time in Log mode : 10ms Dual mode : Log or CTIA Sensor Reading : ITR or IWR CTIA mode : Low Gain and High Gain Option : CDS (only in CTIA High Gain) Gated mode : Only ITR available Integration time variable from 100ns to 9us. Dual mode: Log or CTIA High Gain. Option : CDS available in CTIA High Gain
	Trigger	Input or Output Delay selectable
	Partial reading mode	Possible to integer just a part of the sensor (ROI) and display only this window on the video output. This option allows a frame rate increase on the ROI
Software control (all functions are realized on computer)	Min/Max Settings for display – Histogram Stretching	Automatic or Manual. In Automatic the gain and offset are calculating depending of the histogram. In Manual you can choose the gain and offset you want to apply on the image. In Manual you can choose the gain and offset you want to apply on the image.
	Zoom	Bicubic zoom function available.
	Gamma correction	From 0 to 3.
	Contrast enhancement	Contrast improvement by local histogram equalization
	Colour maps	Grey, Jet, Hot, HSV, Rainbow, Cool, Night Vision
	Cross Hair	Display of the cross hair with variable position, color and dimension.
	Filters	Canny, Laplace, Sharp, High Boost, Invert
	NUC correction	Correction 1-Point or 2-Point calculated in factory (possible to realize it also by user) – For more details See [R2]
	Bad pixel correction	Correction of bad pixel in factory (possible also by user)– For more details See [R2]
	Recording videos	Recording video in .AVI or. PTW (Raw 14 bits)
	Image capture	.jpeg, .png or. Tiff
	Temperature	Temperature reading. Resolution: 0.1462°C/LSB
	Horizontal and vertical inversion	Flip on the image in horizontal and vertical
Analysis Functions (all functions are realized on computer)	Histogram computation	
	Statistics analysis	
	ROI (region of interest)	
	Cross section Profiles	
	Rectilinear profiles	
	Linear profiles	

Camera

Different features can be controlled with WiDyVISION software – for more details see [R2]

Trigger Delay

Camera WiDy SenS 640V-STP	Trigger Mode	
	Trigger from ext. to camera	Trigger from camera to ext.
Global shutter	Min value: -1280 µs Max value: 1270 µs Step: 10 µs	Min value: -1280 µs Max value: 1270 µs Step: 10 µs
WiDy SenS 640 VSTP (Gated)	CDS OFF Min Value: 0.1 µs Max value: 12.85 µs Step: 0.05 us CDS ON Min Value: 6 µs Max value: 12.85 µs Step: 0.05 µs	Min Value: -6.4 µs Max value: 6.35 µs Step: 0.05 µs

Peltier / Control of the temperature

PELTIER	Control of temperature +/-1°C	Single stage TE cooler *Note: The NUC and BPR files are delivered only for +15°C in global shutter and +35°C in Gated mode.* In global shutter mode, you can select the temperature from -15°C to 48°C. In gated mode the software WiDyVISION fixes the temperature control @35°C and no change is possible.
	3 modes	1- Low current < 1W 2- Middle current < 2W 3- High current < 4W ⚠ The camera can be used only with USB3-Jack /Mini USB3
	Cooling capacity	Depends on system integration. Please contact NIT for more details.

⚠ The respect of the TEC mode and the type of cable are critical, you risk damaging the camera or your computer

SOFTWARE COMPATIBILITY

The Software WiDyVISION uses Cypress driver.
WiDyVISION is compatible only with Windows 7, 8, 8.1 or 10.
We don't guarantee that the software is working with previous versions of Windows.

We highly recommend to not use Renesas host controller on windows 7 PC for USB3.0 cameras.

Software Development Kit

A SDK is delivered with the camera. It calls NITLIBRARY.
The SDK is written on C++ which provides primary functionalities to interface with NIT USB cameras. It contains functions related to the device management, the parameters settings (pixel clock, exposure time, sensor mode…) to integrate our cameras in your project.

ELECTRO-OPTICS CHARACTERISTICS

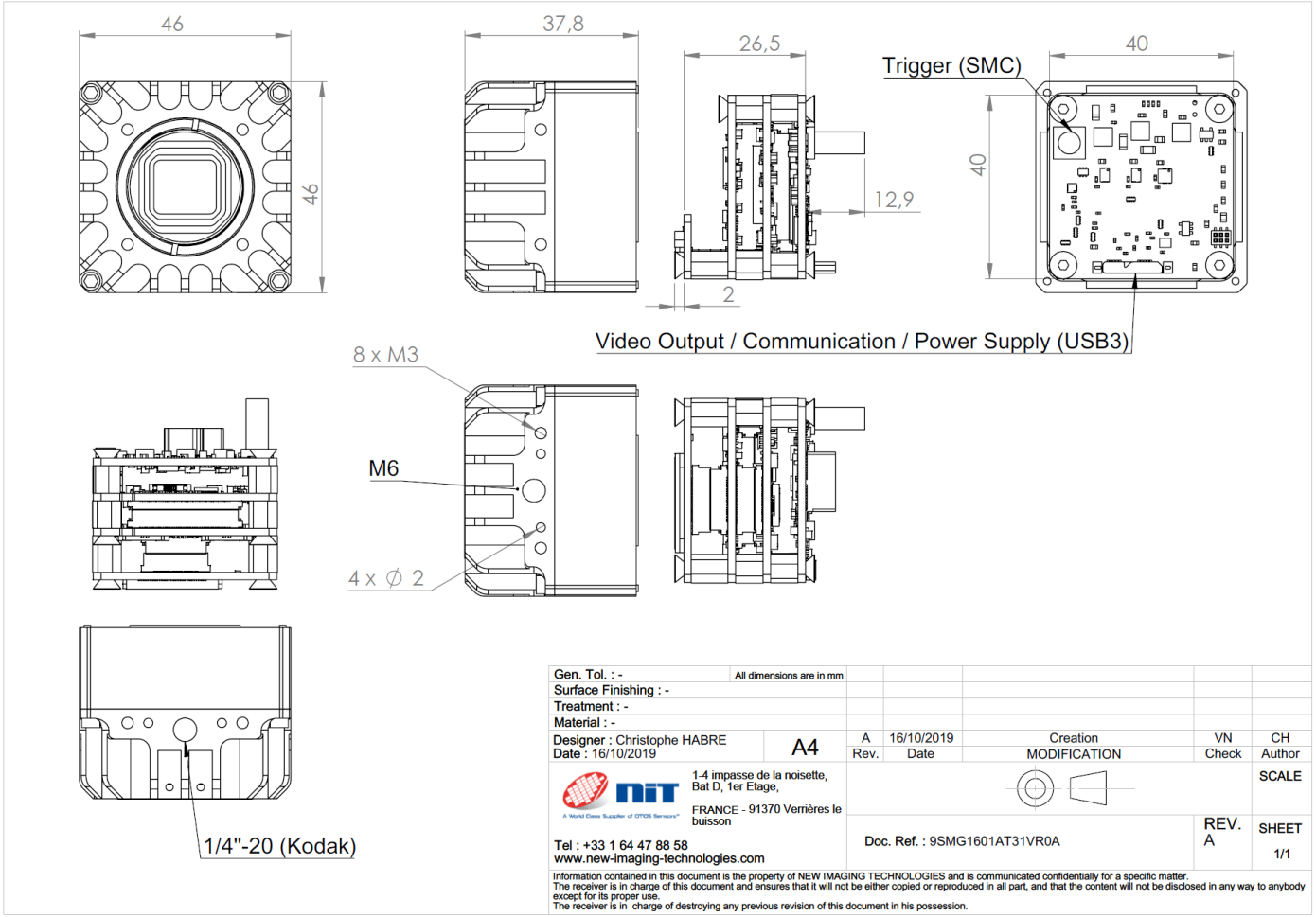
Consumption	<2.5W TECless in global shutter mode <4W TECless in gated mode
	<4 W TEC
Dynamic Range	Global Shutter: 120dB typical in Log 63dB typical in CTIA (Low Gain) 49 dB typical in CTIA (High Gain) Gated mode: Low Gain: 58 dB High Gain: 44 dB
Full well capacity (in CTIA)	Global shutter: >380ke- (Low Gain) >17ke- (High Gain) Gated mode: >230ke- (Low Gain) >17ke- (High Gain)
Rise time 10%/90%	<40ns in gated mode
MTF @ 33pl/mm (typical)	>50%
Sensor Noise	Global shutter: High Gain with CDS<50e- Low Gain < 270e- Log < 340e- Gated mode: Low Gain < 290e- High Gain <125e-
Logarithmic sensibility	600 lsb/decade

ENVIRONMENT & ACCESSORIES

	USB3 / Mini US3	USB3-Jack/ Mini USB3	SDK	BNC/SMC	Software	Adaptator CS/C
WiDy SenS 640V-STP		✓	✓	✓	✓	

Storage	**-10 to 80˚C**
Operating Temperature	0 to 65˚C

ANNEXES \ Camera Interface



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