PEMBROKE INSTRUMENTS, LLC

SWIR CAMERA DATA SHEET

WIDY SWIR 640A S

Manufacturer: New Imaging Technologies (NIT)

Technical data reproduced from the original manufacturer datasheet.

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WIDY SWIR 640A-S CAMERA/MODULE

DATASHEET

Date	Modification	Revision
18/08/2015	Document creation	V1.0
16/05/2016	Update version	V1.1
09/05/2017	Update version for correction	V1.2
29/05/2017	Update Interface drawing	V1.3
23/03/2018	Update for NUC interpolation	V1.4

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18/08/2015	Visa : 	Visa : 	Visa : 

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1. COMMERCIAL REFERENCE

Commercial reference	Description	Ordering information
WIDY SWIR 640A-S	CCIR Monochrome camera	9SMC1201IY01PC0X
	NTSC Monochrome camera	9SMC1201IY01NC0X
WIDY SWIR 640A-S-OEM	CCIR Monochrome module	9SMC1201IY01PF0X
	NTSC Monochrome module	9SMC1201IY01NF0X

Note: Module is an OEM version so it will be supplied without the body and the rear cover.

2. REFERENCES

Index	Title of document	Revision	Issued by
R1	DATASHEET NSC1201	V1.1	NIT
R2	CIRENE PROTOCOL	V1.8	NIT
R3	WIDYCIRENE REFERENCE GUIDE	V1.3	NIT
R4	SWIR ANALOG CAMERA INTERFACE	-	NIT
R5	SWIR ANALOG MODULE INTERFACE	-	NIT
R6	NORM ITU-R BT.470-5		NORM

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

3. SUBJECT

This document specifies the camera:

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

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4. DEFINITIONS, TERMINOLOGY AND ABREVIATIONS

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

5. SENSOR DESCRIPTION

Optical format	1 inch
Output	Buffered analog differential
Active pixel	640x512
Material	InGaAs
QE	>70% (from 900nm – 1.7µm)
Pixel size	Square 15 x 15µm
Readout mode	Global Shutter
Option	Column FPN correction
Dynamic range	140dB typical
Power consumption	260 mW
Packaging	CLCC52
Storage temperature	-40°C to 125°C
Operation temperature	-40°C to +90°C

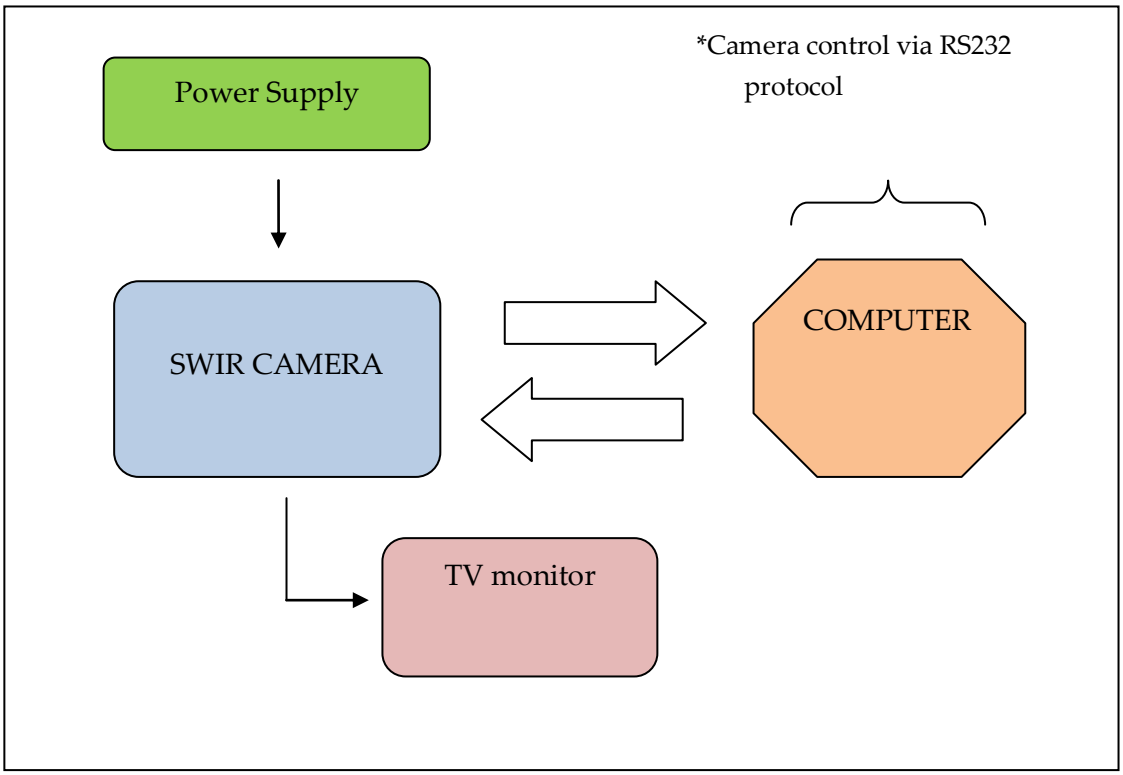
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6. PRESENTATION

6.1. General presentation

The WIDY SWIR 640A-S exists in different versions, module or camera which integrates the sensor NSC1201-SI Monochrome. This camera does not integer control of temperature thanks to the pixel design and the NUC correction:

- CCIR camera monochrome
- CCIR module monochrome
- NTSC camera monochrome
- NTSC module monochrome

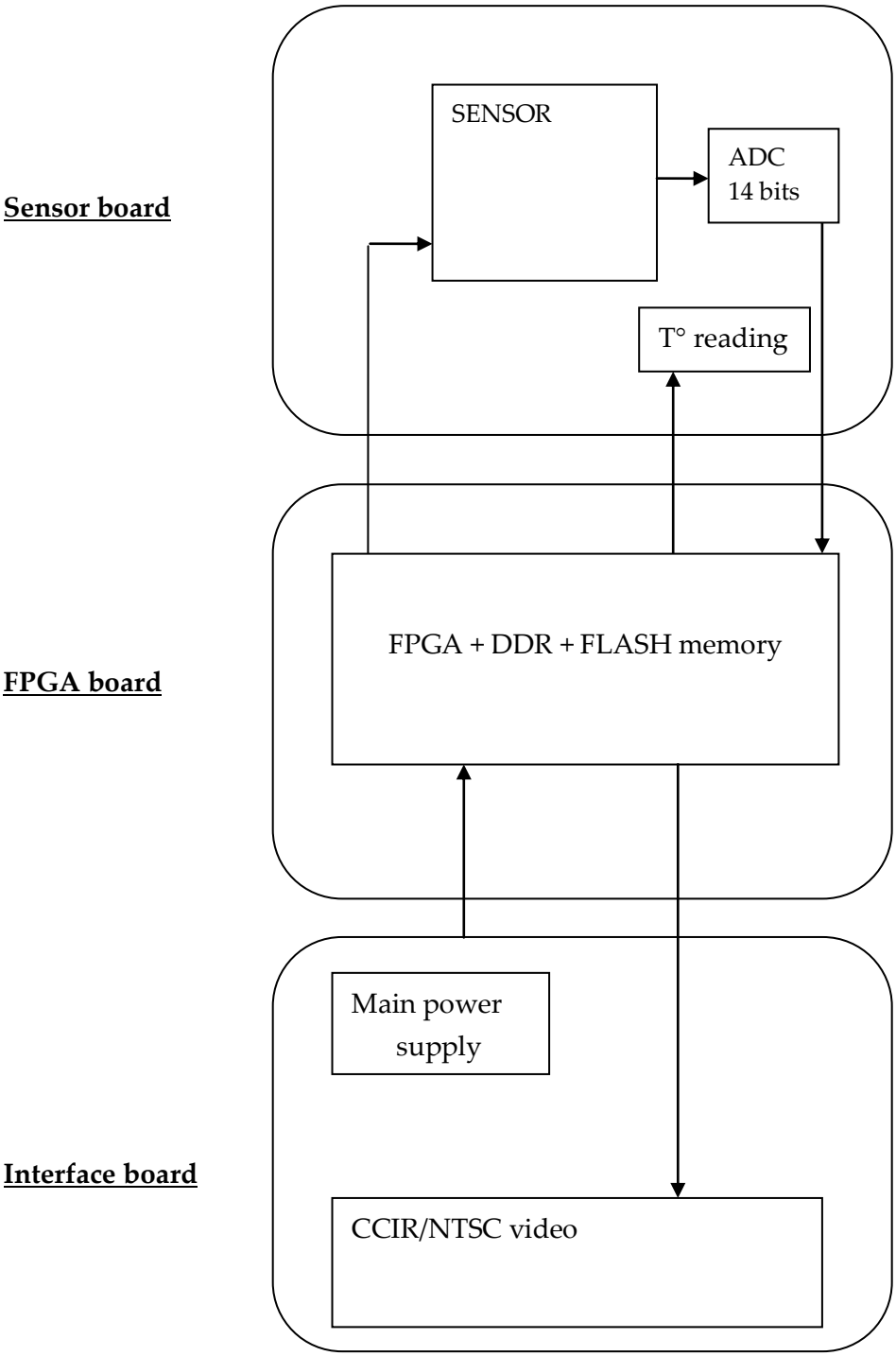


6.2. Camera configuration

The camera is composed of three boards, **sensor**, **FPGA** and **interface** boards:

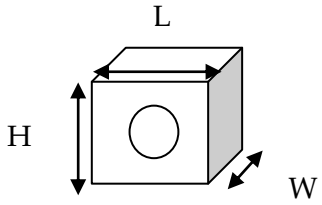
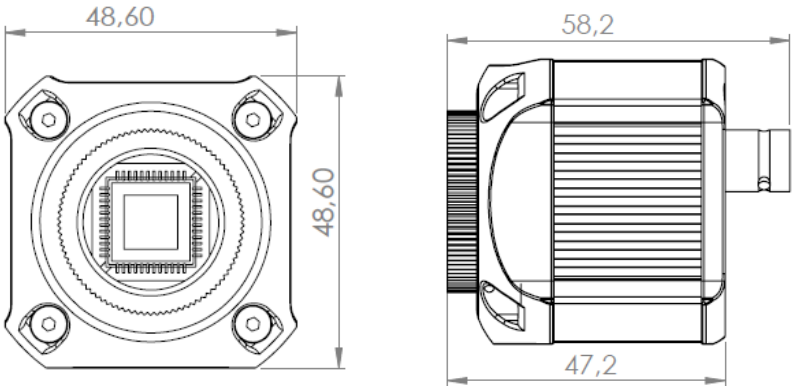
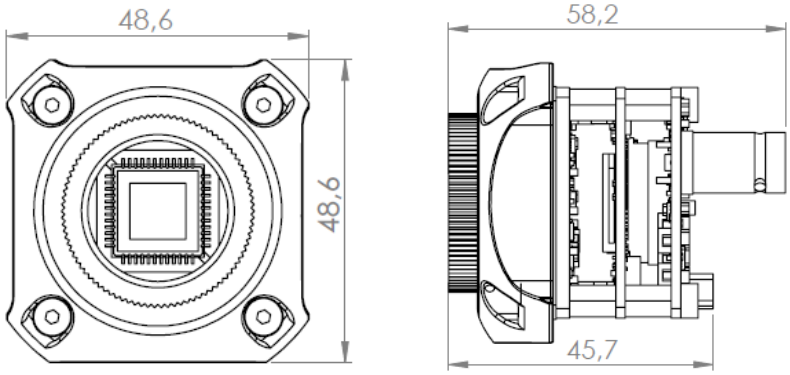
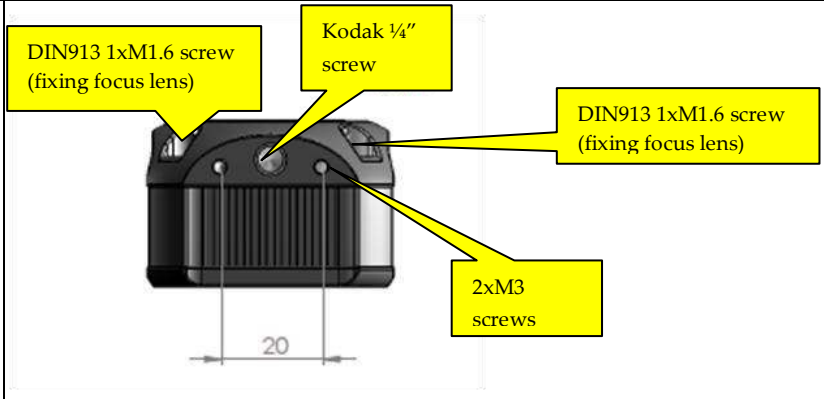
- Sensor board which integrate the sensor, the Analog to digital conversion and the temperature reading.
- FPGA board delivering the entire control signal sensor and the camera processing.
- Interface board which integrates the management of the main power supply and the CCIR/NTSC video generating.

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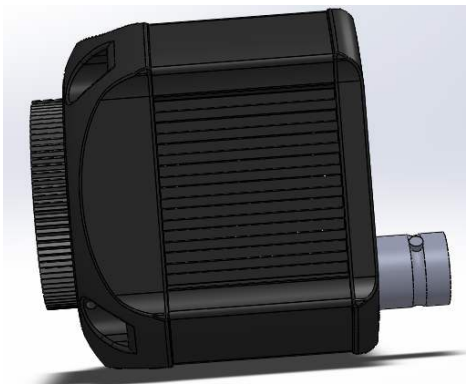
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7. MECHANICAL DIMENSION AND OPTICS INTERFACE

Mechanical dimension	L : 48.6mm H: 48.6mm W: 58,2mm (with the connector) 
Camera	
Module	
Mount	CS and C
Weight	Camera< 125g Module<90g
Interface	

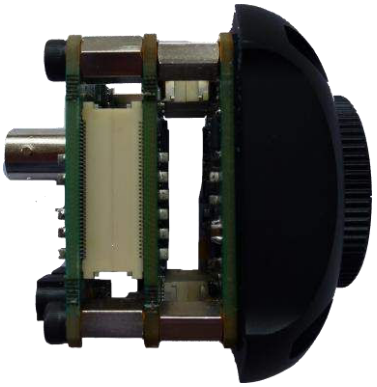
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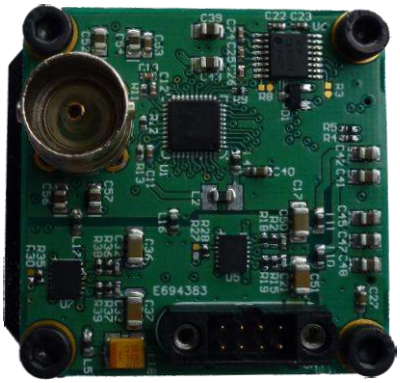
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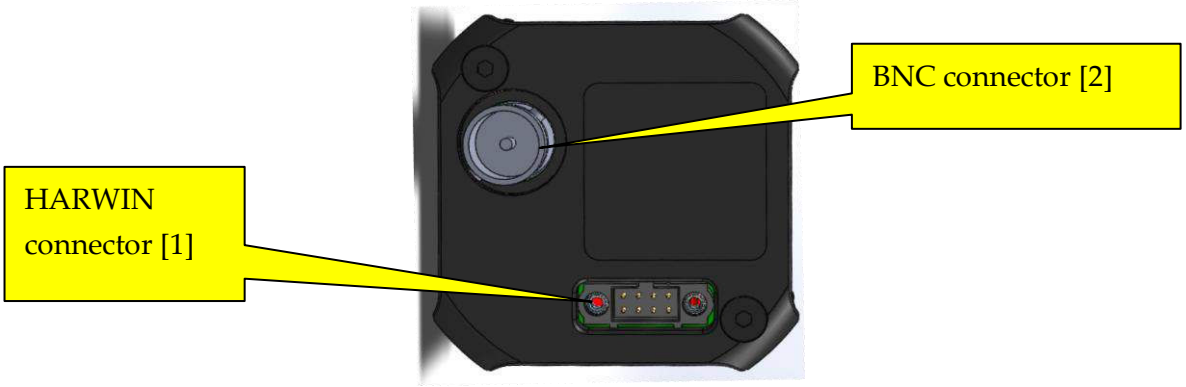


WIDY SWIR 640A-S-OEM





8. ELECTRICAL AND VIDEO INTERFACE



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Power supply and communication

Power supply signal and camera control is provided through HARWIN connector [1].
Power supply range is 5 to 15V (**Nominal 12V**).
Camera control is possible via RS232 electric protocol. For more details see [R2&R3]

Reference	Designation	Manufacturer	Picture
M80-5000842	HARWIN connector	HARWIN	[1]

Pinning:

Connector	Pin number	Description	Direction
M80-5000842	1	RS-232 TX	Out
	2	RS-232 RX	IN
	3	Reserved	--
	4	Reserved	--
	5	Electric ground	--
	6	Return power supply	--
	7	Power supply	--
	8	Power supply	--

Output data

The WIDY SWIR 640A-S provides an analog video signal through BNC connector [2], CCIR or NTSC according to standard video [R6].

Reference	Designation	Manufacturer	Picture
5-1634506-2	BNC	TE CONNECTIVITY	[2]

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9. FUNCTIONALITIES

Different operation modes can be controlled with WidyCIRENE Software (For more details see [R2]&[R3]).

Camera mode	Frame rate	Standard Frame Rate : 25Hz (CCIR) / 30Hz (NTSC)
	Mode of sensor	**Standard Global shutter** :Integration time variable from 100us to 20ms (CCIR), from 100us to 16ms(NTSC)
Software control (all functions are realized on the camera)	Image Displaying Settings (AGC)	Automatic or Manual. In Automatic the gain and offset are calculating depending of the histogram. Choose of the region of the interest for histogram calculation. In Manual you can choose the gain and offset you want to apply on the image.
	Gamma correction	From 0.3 to 3.3.
	Contrast enhancement CLAHE	Contrast improvement by histogram equalization
	Contrast enhancement by matrix 3x3	Contrast improvement by high path filter.
	Histogram Equalization	Contrast improvement by histogram equalization
	Cross Hair	Display of the cross hair with variable position and dimension
	Colour maps	Grey, Rainbow, Steel, Lockin, Threshold, Hot metal, Night Vision.
	Invert Polarity	Polarity Inversion
	NUC correction	Correction 1-Point, 2-Point and I-NUC calculated in factory (possible to realize it also by user) – 10 NUC tables are available
	NUC interpolation	NUC correction on the fly depending on the temperature
	Bad pixel correction	Correction of bad pixel in factory (possible also by user)– 1 BPR table is available
	Temperature	Temperature reading Resolution : 0.0625°C/LSB (12 bits)
	Communication	Camera control via RS232 serial communication. Variable baudrate available.

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10. ELECTRO-OPTICS CHARACTERISITICS

Consumption	2.7W (@12V at ambient)
Dynamic Range	140dB typical
MTF @ 33pl/mm (typical)	>50%
Logarithmic sensibility	600 lsb/decade

11. ENVIRONMENT

Storage temperature	-40 to 80°C
Operating Temperature	-40 to 71°C
Vibration	15g RMS from 5Hz to 500Hz (on the three axes)
Shock	3 bumps at 75g ½ sinus during 6 ms (on the three axes, positive and negative)

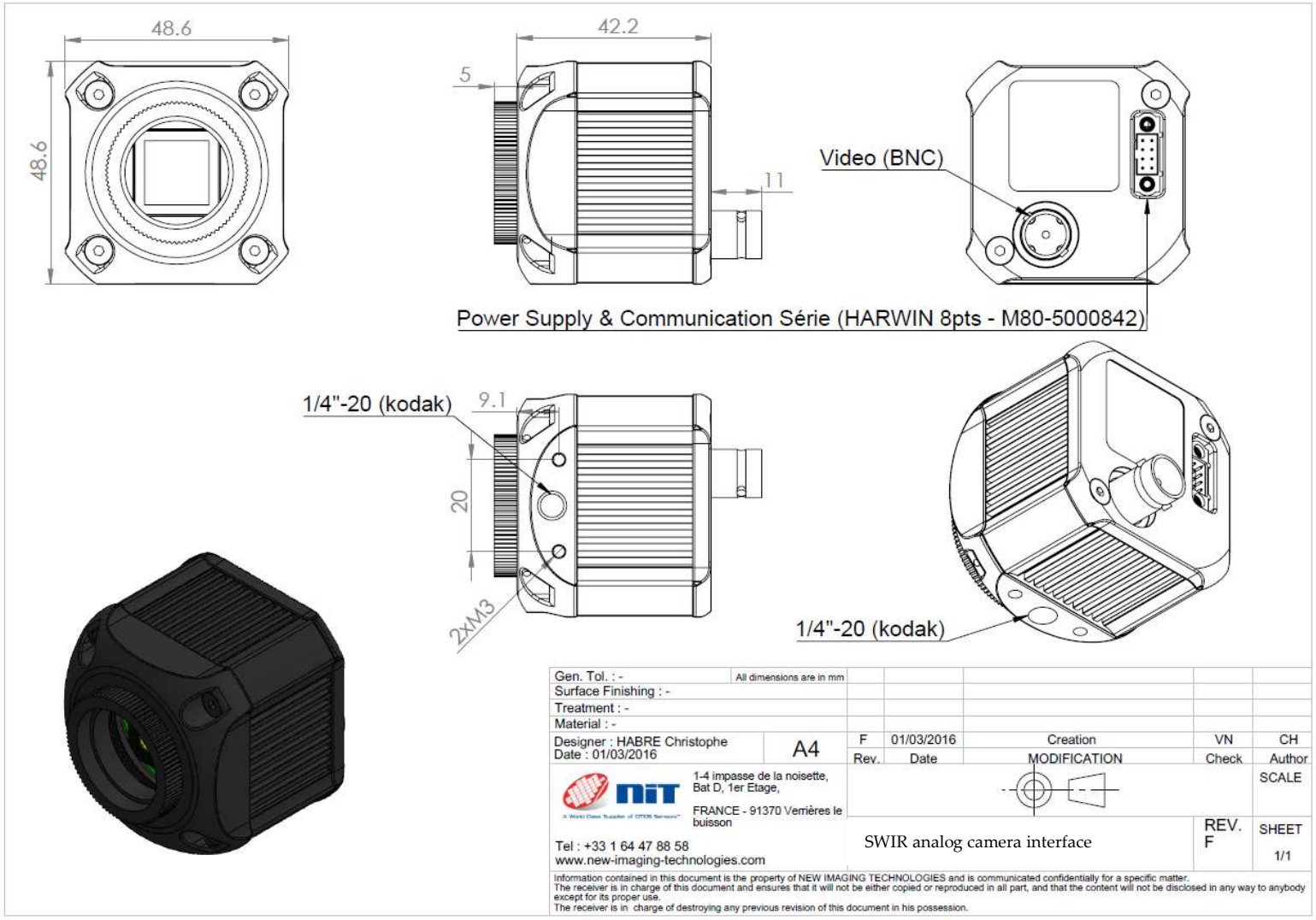
12. ACCESSORIES

	USB3-Mini USB3 cable	USB2-Mini USB2 cable	USB – SMA cable	BNC-SMC cable	WidyCIRENE Software	ADAPTATOR CS/C
WIDY SWIR 640A-S WIDY SWIR 640A-S-OEM					×	×

The camera is delivered with a cable, reference NIT **"8CR010F008F15001"** for the power supply and the RS232 management.

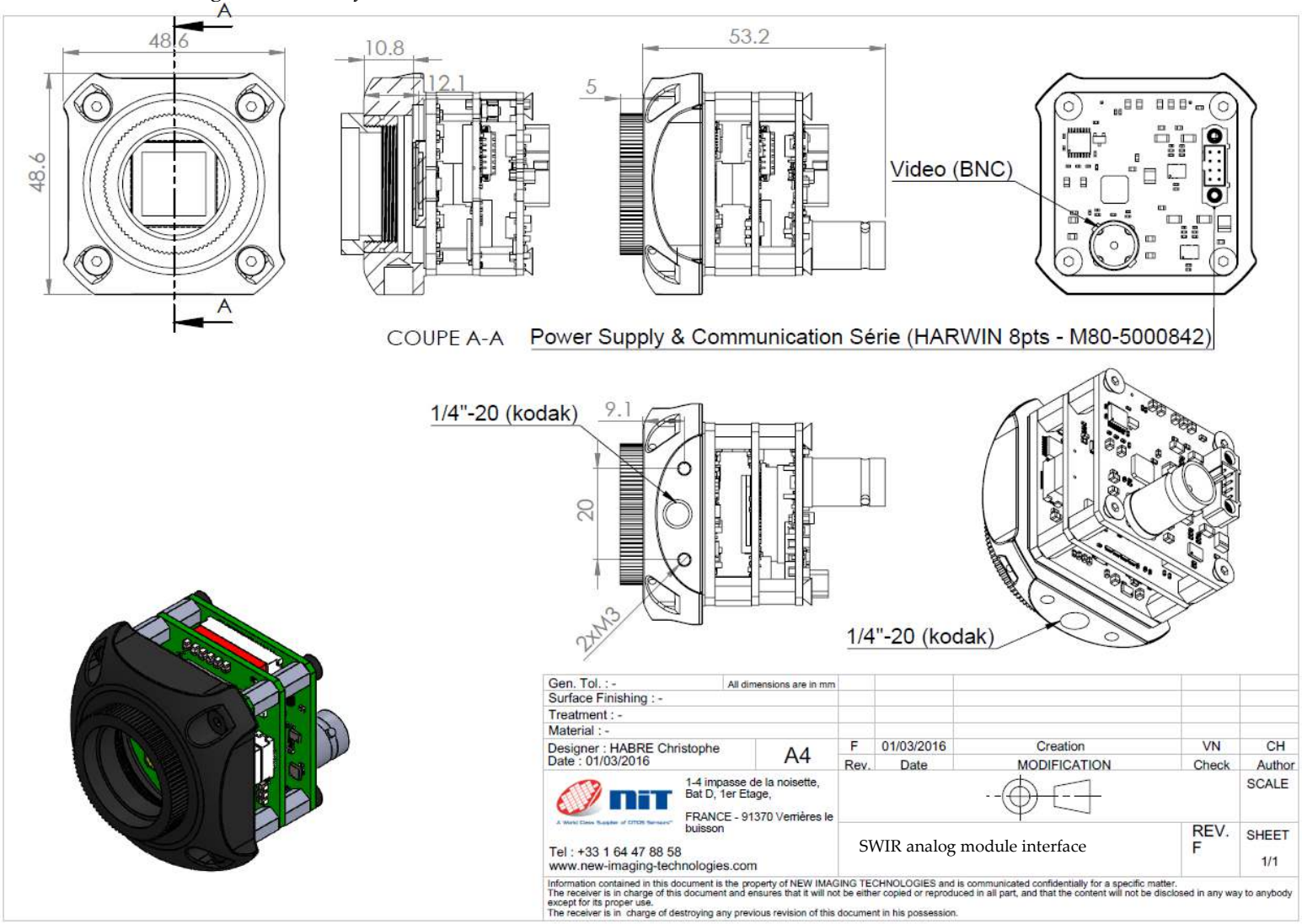
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A. ANNEXES \ SWIR analog camera interface



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B. ANNEXES \ SWIR analog module interface



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