Part 2: Hardware guide.

This guide covers electrical, mechanical and environmental aspects of CURRERA-R.

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Content:

Content (cont.):

CURRERA-R Introduction

CURRERA-R Intelligent Vision System overview

CURRERA-R Intelligent Vision System is highly integrated, compact, cost and energy efficient solution for rapid deployment of Machine Vision and Imaging systems using field proven tools and operating systems.

Document Scope

This document covers CURRERA-R hardware related information required for successful planning and implmentation of the CURRERA-R Intelligent Vision System. It contains specifications of electrical interfaces, connectors and their pinouts, mechanical drawings, specifications of operating environmental conditions and other information required for integration and use.

Audience

Engineers, managers and everyone involved in planning, development and deployment of Machine Vision and Imaging Systems based on CURRERA-R.

Document updates and other important information

Please visit our support web site at **www.ximea.com/support** to receive up to date technical information as well as most recent drivers and firmware.

CURRERA-R Online Support and Online Community

We are inviting you to visit the CURRERA online community section at **www.ximea.com/community** to ask for advice regarding any specific questions related to the CURRERA-R as well to contact our technical support and field application engineers any time at **www.ximea.com/support**.

CURRERA-R Models, P/N Decoder

Basic Models table:

CURRERA-R Model P/N:	Sensor Resolution:	Sensor:	Shutter:	BW/Color:	CPU:	RAM:	SSD Storage:
RS04	752×480	MT9V034C12STM	Global	B/W	Z510 1.1GHz	512MB	1GB
RL04	752×480	MT9V034C12STM	Global	B/W	Z530 1.6GHz	1024MB	4GB
RS04C	752×480	MT9V034C12STC	Global	Color	Z510 1.1GHz	512MB	1GB
RL04C	752×480	MT9V034C12STC	Global	Color	Z530 1.6GHz	1024MB	4GB
RS13	1280×1024	EV76C560ABT-EQV	Global	B/W	Z510 1.1GHz	512MB	1GB
RL13	1280×1024	EV76C560ABT-EQV	Global	B/W	Z530 1.6GHz	1024MB	4GB
RS13C	1280×1024	EV76C560ACT-EQV	Global	Color	Z510 1.1GHz	512MB	1GB
RL13C	1280×1024	EV76C560ACT-EQV	Global	Color	Z530 1.6GHz	1024MB	4GB
RS50	2592×1944	MT9P031I12STM	Rolling	B/W	Z510 1.1GHz	512MB	1GB
RL50	2592×1944	MT9P031I12STM	Rolling	B/W	Z530 1.6GHz	1024MB	4GB
RS50C	2592×1944	MT9P031I12STC	Rolling	Color	Z510 1.1GHz	512MB	1GB
RL50C	2592×1944	MT9P031I12STC	Rolling	Color	Z530 1.6GHz	1024MB	4GB

Model P/N Decoder:

R L 5 0 C

	Environmental prot. class
R	IP67

	CPU
S	Z510 1.1GHz
L	Z530 1.6GHz

	Resolution:	Sensor:	Color:
04	752×480	MT9V034C12STM	B/W
04C	752×480	MT9V034C12STC	Color
13	1280×1024	EV76C560ABT-EQV	B/W
13C	1280×1024	EV76C560ACT-EQV	Color
50	2592×1944	MT9P031I12STM	B/W
50C	2592×1944	MT9P031I12STC	Color

System Architecture

CURRERA-R (further referred to as the "device") is essentially an ultra compact Personal Computer (PC) and Machine Vision Camera, integrated within compact and rugged IP67 class housing.

Its image sensor is connected to the PC via a 2.5Gbit/s high speed data bus. The entire transfer of image data to RAM transfer is highly optimized and requires no CPU resources. All the CPU capacity is available for the Vision or Imaging Software.

The PC is powered by a 45nm technology INTEL ATOM x86 CPU with 1.1GHz or 1.6GHz processor clock. It further has 533MHz DDR2 data RAM and Solid State Drive (SSD) with error correction and wear balancing. Independent system watch dog processor monitors system health and is capable of restarting the system in the case of a power supply brown out and/or software malfunction.

Interfaces

Similar to the standard PC, CURRERA-R is equipped with a complete set of hardware interfaces providing connectivity to standard PC peripherals including the Gigabit Ethernet, USB, RS-232 and Isolated Digital parallel I/O's for connection to Automation Interfaces and target hardware integration. One external Micro SD card slot is available for extended nonvolatile storage. XVGA analog interface is available for the connection to a standard PC monitor.

Power supply options and requirements

Versatile power supply options CURRERA-R either over Gigabit Ethernet, using Power Over Ethernet (PoE) standard in a Class 0 device, or through the System Port from external DC source, ranging from 12V to 48V DC. Actual power requirements range will be from 7W to 13.5W depending on the supply voltage and CPU usage.

Hardware and system overview

External hardware features

CURRERA-R shown with heatsink attached

IP67 sealed Aluminum body
IP67 class protection (max. 10 seconds submersion with Lens protection tube attached.)

Optional Heatsink
Required for operation at ambient temperatures above 45°C

Lens C/S Mount
Standard 1" C/S mount accepts both C/S mount lenses and C mount lenses with adapter.

Micro SD Card slot
Inner SD Card cavity is separated from the main housing and sealed with silicone rubber plug

Lens Tube thread
Provides attachment point for optional IP67 lens cover

LED Indicators block
Provides quick CURRERA status information

Front mounting points
Six mounting points for camera mounting at the front side

Rear mounting points
Four mounting points for camera mounting located on the rear plate and at the heatsink

Display Output Connector
M12 IP67 sealed connector carrying analog RGB display output

Gigabit Ethernet Connector with Power over Ethernet
M12 IP67 sealed industrial connector

System Port Connector
M16 IP67 sealed connector carrying USB, Digital I/O, RS232 and Power Supply connections.

CARD LIFT

LED 1
LED 2
ETHERNET
POWER OK

CURRERA

Electrical Interfaces & Connectors
Interfaces list, specifications and precautions

System Port - aggregates following interfaces:

USB 2.0 High speed interface
Expansion for more than one USB device is possible using a standard powered USB hub or system breakout box. USB Interface and its ground is galvanically connected to the housing. ⚠Maximum DC load of the USB VCC is 100mA peak. Cable must conform to USB standard both in terms of characteristic impedance and shielding.

RS-232 Serial Interface
Standard RS-232 serial port for up to 1Mb/s transfer rate. Rx and Tx data only, no hardware handshake signals. RS-232 Interface and its ground is galvanically connected to the housing.

Digital Inputs
Four user configurable, high speed, isolated current mode inputs with one ground common line. Can by readily used with 5V high side switched sources. ⚠For higher then 5V Vin sources the current shall be limited to 10mA by adding a serial resistor Rs according to the following equation:
Rs= (Vin-1.5)/0.01-360

Digital Outputs
Four user configurable, high speed, isolated open collector, low side switched outputs with one common ground line and isolated auxiliary 5V common source. ⚠Maximum current load per switch is 100mA. ⚠Maximum open switch voltage is 24V DC. ⚠No inductive loads are allowed. ⚠Maximum current load for the 5V digital outputs common source is 60mA.

See the **"Digital I/O interfaces cookbook"** application note at CURRERA online support area.

Power Supply Input
Provides optional power supply feed where PoE is not available. 12-48V DC 7-13.5W, maximum allowed ripple 200mV. ⚠Power Supply input is isolated towards the device electronics and the housing and has 200V isolation limitat towards Ethernet signals. Shall your Ethernet wiring require more than 200V isolation, you must use PoE or ensure that your power supply provides required isolation.

Gigabit Ethernet with PoE
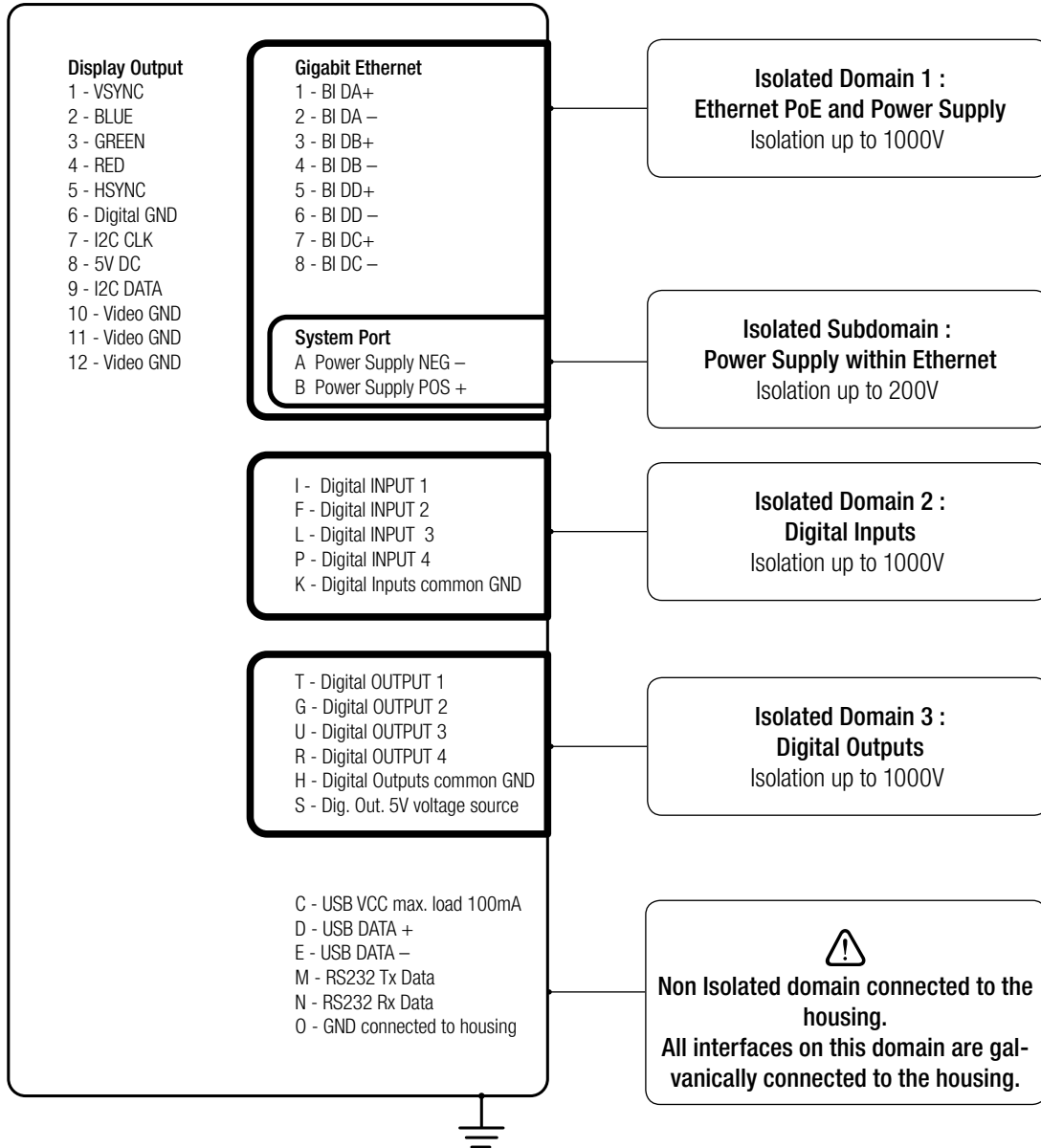1000BASE-T IEEE802.3af compliant Ethernet interface with Power Over Ethernet (PoE) Class 0.

Display output
Analog RGB display output, 75 ohms impedance, VESA compliant with resolution up to 1600x1200 pixels.

Electrical Interfaces & Connectors

Isolation domains & Grounding precautions

Following illustration shows the Galvanically Isolated domains and connectors pins assignment per domain.

Display Output	
1 - VSYNC	
2 - BLUE	
3 - GREEN	
4 - RED	
5 - HSYNC	
6 - Digital GND	
7 - I2C CLK	
8 - 5V DC	
9 - I2C DATA	
10 - Video GND	
11 - Video GND	
12 - Video GND	

Gigabit Ethernet
1 - BI DA+
2 - BI DA –
3 - BI DB+
4 - BI DB –
5 - BI DD+
6 - BI DD –
7 - BI DC+
8 - BI DC –

System Port
A Power Supply NEG –
B Power Supply POS +

Isolated Domain 1 :
Ethernet PoE and Power Supply
Isolation up to 1000V

Isolated Subdomain :
Power Supply within Ethernet
Isolation up to 200V

I - Digital INPUT 1
F - Digital INPUT 2
L - Digital INPUT 3
P - Digital INPUT 4
K - Digital Inputs common GND

Isolated Domain 2 :
Digital Inputs
Isolation up to 1000V

T - Digital OUTPUT 1
G - Digital OUTPUT 2
U - Digital OUTPUT 3
R - Digital OUTPUT 4
H - Digital Outputs common GND
S - Dig. Out. 5V voltage source

Isolated Domain 3 :
Digital Outputs
Isolation up to 1000V

C - USB VCC max. load 100mA
D - USB DATA +
E - USB DATA –
M - RS232 Tx Data
N - RS232 Rx Data
O - GND connected to housing

⚠
Non Isolated domain connected to the housing.
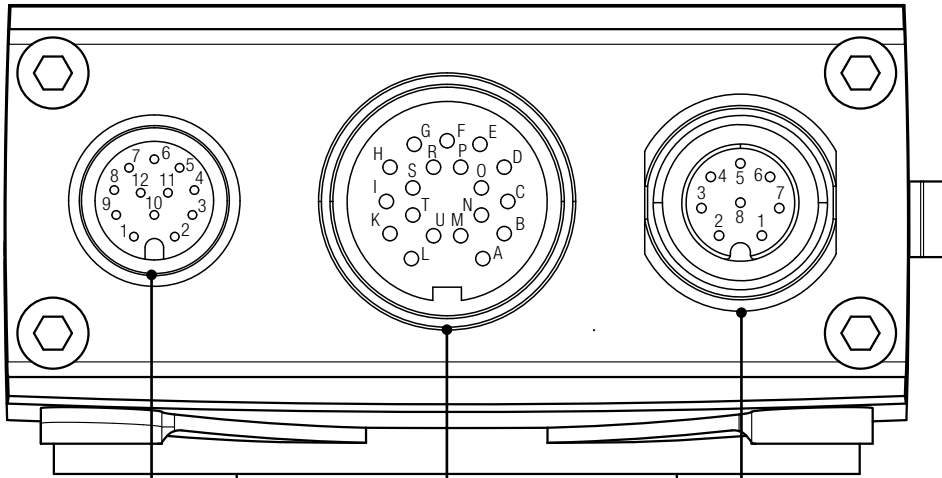**All interfaces on this domain are galvanically connected to the housing.**

Grounding

⚠ Connections to the non-isolated domain interfaces shall be always kept at the same ground potential to avoid ground currents and possible issues or hardware damages.

Electrical Interfaces & Connectors

Connectors, pin assignments and mating connectors

Display output

Pin Nr.	Function:	Comment:
1	VSYNC	
2	BLUE	
3	GREEN	
4	RED	
5	HSYNC	
6	Digital GND	
7	I2C CLK	
8	5V DC	max. load 50mA
9	I2C DATA	
10	Video GND	
11	Video GND	
12	Video GND	
	SHIELD	

M12 male socket, 12 pins
Binder P/N: 09-3491-969-12

Compatible mating connectors:
Binder P/N:
99-1492-822-12
99-1492-812-12
99-1492-992-12

System Port

Pin Nr.	Function:	Comment:
A	Power Supply NEG –	12V - 48V DC 13.5W
B	Power Supply POS +	12V - 48V DC 13.5W
C	USB 5V VCC +	100mA max. load
D	USB DATA +	
E	USB DATA –	
F	Digital INPUT 2	Isolated
G	Digital OUTPUT 2	Isolated
H	Digital outputs COMMON	Isolated
I	Digital INPUT 1	Isolated
K	Digital inputs COMMON	Isolated
L	Digital INPUT 3	Isolated
M	RS232 TX Data	
N	RS232 RX Data	
O	Ground - Chassis	
P	Digital INPUT 4	Isolated
R	Digital OUTPUT 4	Isolated
S	Digital Outputs +5V src.	max. load 60mA
T	Digital OUTPUT 1	Isolated
U	Digital OUTPUT 3	Isolated
	SHIELD	

M16 female socket, 19 pins
Binder P/N: 09-0464-90-19

Compatible mating connectors:
Binder P/N:
99-5461-00-19 ; 99-5461-15-19
99-5461-75-19 ; 99-5661-00-19
99-5661-15-19 ; 99-5661-75-19
99-5461-40-19 ; 99-5861-15-19

Gigabit Ethernet with PoE

Pin Nr.	Function:	Cable wire Color:
1	BI DA+	WHITE-ORANGE
2	BI DA –	ORANGE
3	BI DB+	WHITE-GREEN
4	BI DB –	GREEN
5	BI DD+	WHITE-BROWN
6	BI DD –	BROWN
7	BI DC+	WHITE-BLUE
8	BI DC –	BLUE
	SHIELD	

M12 female socket, 8 pins
Binder P/N: 09-3482-275-08

Compatible mating connectors:
Binder P/N:
99-1487-812-08
99-1489-814-08
99-1487-914-08
99-1487-992-08
99-1487-822-08

NOTE:
Please see the CURRERA-R system brochure or our online shop for a list of available cables and accessories.

Electrical Interfaces & Connectors
Cables and cabling requirements

Cabling Shielding

In general, all cables connected to the device requires a shielding jacket which must be connected to the interface connector to ensure EMC compliance. No plastic body connectors or unshielded cables are allowed. USB data lines and the monitor port signals require additional internal shield jackets due to signal integrity requirements. It is also recommended to have separate shield jackets on the RS-232 data lines and Digital I/O's to minimise crosstalk.

Cabling Wire gauges

Power supply wire gauges shall provide low enough resistance to supply the camera with at least 12V DC measured across the input terminals and 13.5W load. Ethernet PoE wiring shall be done in accordance to the standard.

LED Indicators

LED 1   - Red   - Software configurable indicator

LED 2   - Orange   - Software configurable indicator

Ethernet   - Blue   - Ethernet Activity

Power OK - Green   - Power Present, either via PoE or via Power Supply input
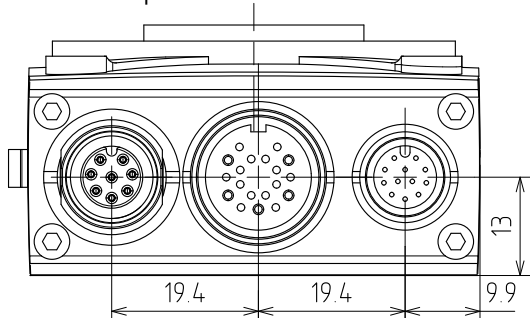
Please see the CURRERA-R Quick start guide to learn more about the LEDs configuration options.

Mechanical - dimensions and mounting
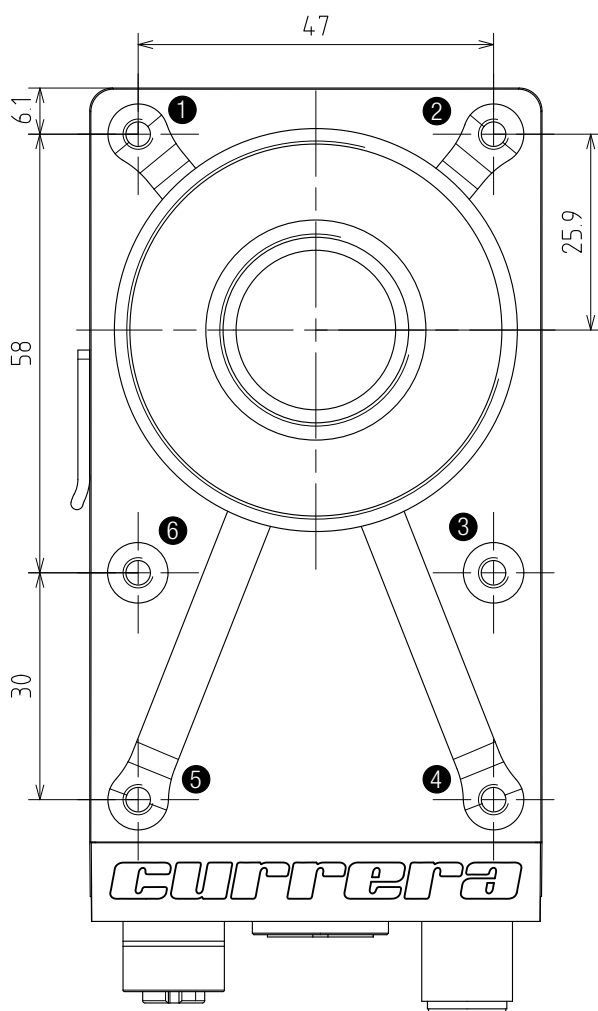
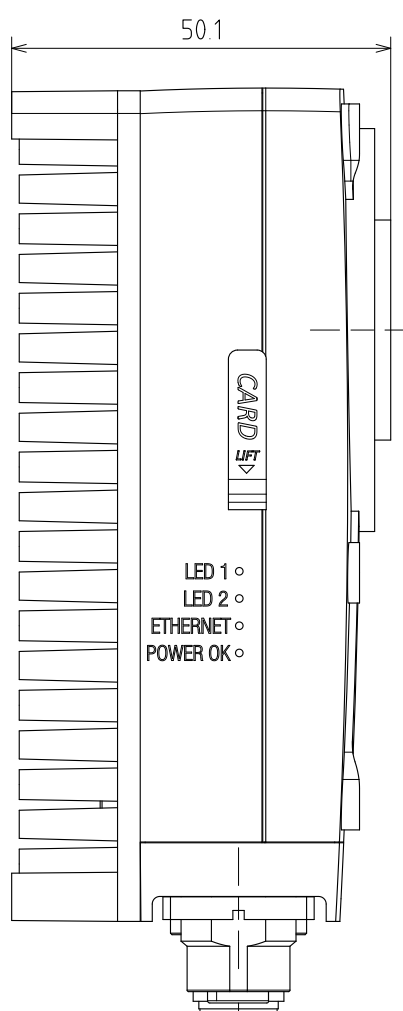## Front side mounting

Bottom View
Connectors positions

13

19.4   19.4   9.9

Front View
Mounting points positions

47

6.1

25.9

58

30

❶   ❷

❻   ❸

❺   ❹

Side View
Dimensions with heatsink

50.1

CARD
LIFT

LED 1 ○
LED 2 ○
ETHERNET ○
POWER OK ○

Side View
Dimensions without heatsink

33.1

29

∅ 29.1

∅ 53.3

2.1

CARD
LIFT

LED 1 ○
LED 2 ○
ETHERNET ○
POWER OK ○
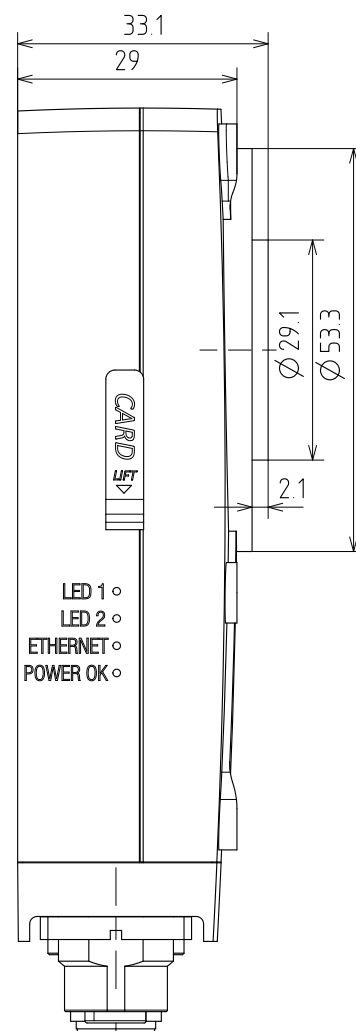
Six mounting threads M4 on the front side.
Maximum depth of the screw is limited to 5mm.
Max. screws torque is 1.3 N-m @ 5mm screw depth

Mechanical - dimensions and mounting

Rear side mounting, heatsink notes

Bottom View with heatsink attached

Heatsink use, installation and precautions.

Continuos operation above 45°C ambient temperature at full CPU load requires use of heatsink.
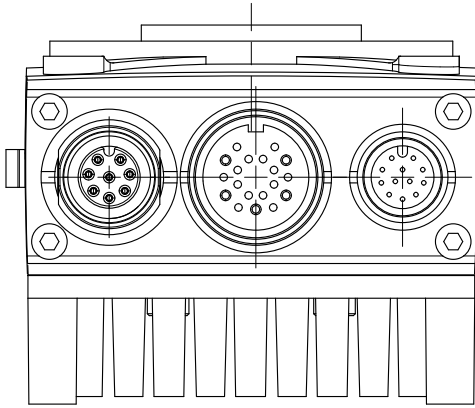
Heatsink kit comes with the heatsink itself, four M3x8 mounting screws and a temperature conductive gap filler already placed on the heatsink and protected by transparent plastic film against contamination and damage.
Installation requires removal of the protection film and simple attachment of the heatsink by four screws to the back panel of the device. ⚠Max. screws torque is 0.5 N-m.

Bottom View with heatsink attached
Mounting points positions
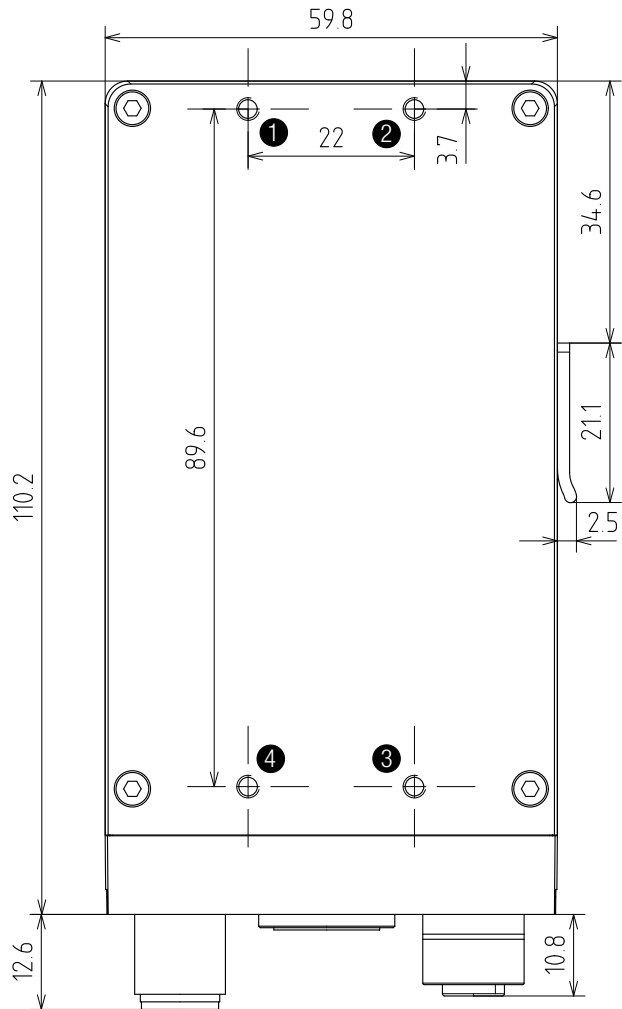

Rear View without heatsink
Dimensions & Mounting points positions
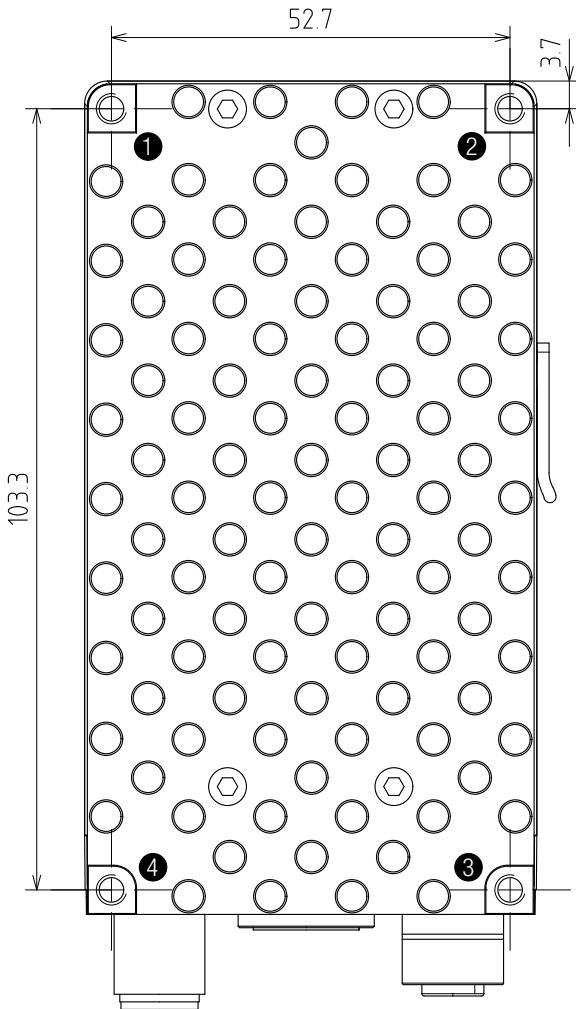
Four mounting points M4 on the heatsink.
⚠Max. depth of the screws is 6mm.
⚠Max. screws torque is 1.3 N-m @ 5.5mm screw depth

Four mounting points M3 on the rear panel.
⚠Max. depth of the screws is 6mm.
⚠Max. screws torque is 0.5 N-m @ 5.5mm screw depth

Environmental

Operating conditions and requirements.

Operating ambient temperature and conditions without heatsink

0°C - 45°C, requires obstacle free air flow path around device body

Operating ambient temperature and conditions with heatsink

0°C - 65°C, requires obstacle free air flow path around device body and heatsink

Storage ambient temperature and conditions

15°C - 65°C, relative humidity 5% - 95% no condensing

Operating Humidity, Maximum Altitude

Without lens protection tube: relative humidity 5% - 95% no condensing, Max. altitude 2500m.

With lens protection tube: not critical, otherwise preferred relative humidity 5% - 95% no condensing

Water and liquids

Without lens protection tube: IP60, no water in contact with the device body, no condensation allowed

With lens protection tube: IP67, limited to 5 minutes @ 1m water depth

⚠Note: Ingestion of water or fluids into the camera body for any reason will void the warranty.

Freezing water and liquids, Corrosive fluids, Salt water

Precautions shall be taken to not allow water to freeze on the device body

No liquids other than water are allowed to get in contact with the device body when the lens protection tube (lens sheath) is attached.

No corrosive fluids of any kind shall get in contact with the device body

No salt water shall get in contact with the device body

Vibrations and shock

Operating vibration random	10Hz - 1000 Hz $5g_{rms}$
Operating vibration sinusoidal	10Hz - 1000 Hz $5g_{rms}$
Operating shock	50g, 3ms half sine, 18 shocks, 6 orientations
	30g, 11ms half sine, 18 shocks, 6 orientations

EMC compliance, EMC immunity

CE, FCC part 15 Class A device compliant, radiated emissions within EN55011 Class A at 10m

EMC Immunity Complies to EN61326:1997 +A2:2001 Table 1, except exposed Image sensor

For EMC compliance you must operate this device with shielded cabling.

Ionising Radiation, Cosmic Rays

No operation or storage allowed in presence of man-made Ionising Radiation. Note: natural cosmic rays may cause bad pixels on the image sensor and as such are not covered under the warranty.

EMC Compliance declaration
CE and FCC Compliance

XIMEA GmbH
Hafenplatz 4
48155 Münster
Deutschland

VERIFICATION

Model:	**CURRERA-R -** RS04, RL04, RS13, RL13, RS50, RL50
Type of equipment:	Industrial Personal Computer, Industrial Camera
Applicable Directives:	89/336 IEEC Electromagnetic Compatibility Directive
	72/23 IEEC Low Voltage Directive
Standards of conformity:	EN 55011 Group 1, Class A, EMCl Limits for Electromagnetic Compatibility
	EN 50082-1 Electromagnetic Compatibility - Generic Immunity Standard
	EN 61010-1 Part 1: General Safety Requirements
Other Tests:	FCC Part 15A Radiated Emissions Limits

XIMEA GmbH hereby declares that the device specified above conform to the Directives and Standards, when installed and operated in accordance with the specifications set forth by XIMEA GmbH. The original copy of this document is kept at XIMEA with copies of the relevant test data and certificates, which constitute the required technical file for self declaration.
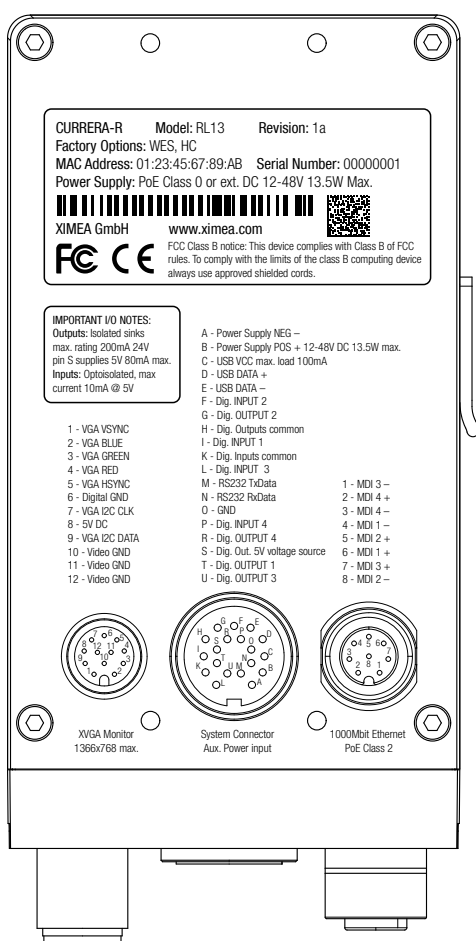
....   January 17th, 2011
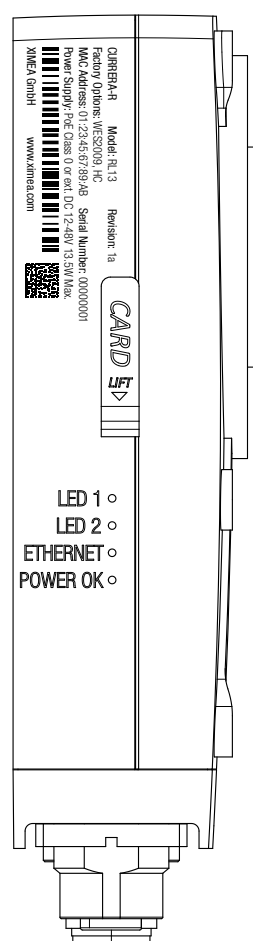Signature

Serial numbers and labels

Rear side Label placement

Contains model, serial number and HW version, barcoded serial number in Code 128 and Datamatrix. Connector pins assignments included for reference as well.

Left side Label placement

Contains model, serial number and HW version, barcoded serial number in Code 128 and Datamatrix.

XVGA Monitor
1366x768 max.

System Connector
Aux. Power input

1000Mbit Ethernet
PoE Class 2

Label text (rear):

CURRERA-R   Model: RL13   Revision: 1a
Factory Options: WES, HC
MAC Address: 01:23:45:67:89:AB   Serial Number: 00000001
Power Supply: PoE Class 0 or ext. DC 12-48V 13.5W Max.

XIMEA GmbH   www.ximea.com

FCC Class B notice: This device complies with Class B of FCC rules. To comply with the limits of the class B computing device always use approved shielded cords.

IMPORTANT I/O NOTES:
Outputs: Isolated sinks max. rating 200mA 24V pin S supplies 5V 80mA max.
Inputs: Optoisolated, max current 10mA @ 5V

1 - VGA VSYNC	A - Power Supply NEG –
2 - VGA BLUE	B - Power Supply POS + 12-48V DC 13.5W max.
3 - VGA GREEN	C - USB VCC max. load 100mA
4 - VGA RED	D - USB DATA +
5 - VGA HSYNC	E - USB DATA –
6 - Digital GND	F - Dig. INPUT 2
7 - VGA I2C CLK	G - Dig. OUTPUT 2
8 - 5V DC	H - Dig. Outputs common
9 - VGA I2C DATA	I - Dig. INPUT 1
10 - Video GND	K - Dig. Inputs common
11 - Video GND	L - Dig. INPUT 3
12 - Video GND	M - RS232 TxData
	N - RS232 RxData
	O - GND
	P - Dig. INPUT 4
	R - Dig. OUTPUT 4
	S - Dig. Out. 5V voltage source
	T - Dig. OUTPUT 1
	U - Dig. OUTPUT 3

1 - MDI 3 –
2 - MDI 4 +
3 - MDI 4 –
4 - MDI 1 –
5 - MDI 2 +
6 - MDI 1 +
7 - MDI 3 +
8 - MDI 2 –

Label text (left side):

CURRERA-R   Model: RL13   Revision: 1a
Factory Options: WES2009, HC
MAC Address: 01:23:45:67:89:AB   Serial Number: 00000001
Power Supply: PoE Class 0 or ext. DC 12-48V 13.5W Max.
XIMEA GmbH
www.ximea.com

CARD
LIFT

LED 1 ○
LED 2 ○
ETHERNET ○
POWER OK ○

Hardware Specifications Table

Electrical, Mechanical and Environmental:

Power Requirements	Power over Ethernet IEEE802.3af, Class 0: typ. 7W max. 12W	Power via System Port: 12-48V DC typ. 7W, max. 13.5W
Housing Dimensions without heatsink	WxHxD 59.2 x 109.8 x 31 mm	Optional Lens Sheath: height 60 mm, internal diameter 50mm
Housing Dimensions with heatsink attached	WxHxD 59.2 x 109.8 x 48 mm	Weight: 262g
Environmental	Ingress Protection: IP67 with lens sheath tube attached	Operating temperature with heatsink -10°C to +65°C
		Operating temperature without heatsink -10°C to +40°C

Interfaces and Connectors:

Connector	Signals	Mating Connectors:
Ethernet	1000BASE-T IEEE802.3af Ethernet with PoE	M12 M 8pins, Binder, P/N: 09-3482-275-08
Monitor	XVGA max 1366 x 768 pixels resolution	M12 F 12pins, Binder, P/N: 99-1492-822-12
Multi I/O Connector	4x Isolated Inputs, 5-24V 20mA max input current, 100nS trigger delay, user configurable	M16 M 19pins, Binder, P/N: 99-5461-00-19
	4x Isolated Outputs, 5-24V 100mA max sink current, 100nS output delay, user configurable	
	RS232 Serial Port, non isolated, up to 1Mb/s	
	High Speed USB, non isolated, 5V, max 100mA device power supply capable	
	Auxiliary Power Supply 12-48V DC typ. 7W, max. 12W	
BOBME Modular Breakout Box preliminary information	6 USB ports, 4 isolated I/O with 24V and 5V common sources, Illuminator driver with 1000mA max. Constant Current source, RS232 port, Dimensions TBD	

Note 1: BOBME Modular Breakout box for Multi I/O with integrated USB hub and standard PC connectors available at Q1 2011.
Note 2: Contact sales for cable and connectors kits for your application.

CURRERA-R Processor, Memory and Video Options, available options: RSxx and RLxx

Processor and Chipset	DDR2 RAM	SSD	Internal Micro SDHC Card	External Micro SDHC Card Slot	Analog Video Output
RSxx Intel Atom Z530 1.6GHz US15W	1GB 533MHz	4GB	optional	standard	XVGA max 1600 x 1200
RLxx Intel Atom Z510 1.1GHz US15W	512MB 400MHz	1GB	optional	standard	XVGA max 1600 x 1200

CURRERA-R Sensors, available options: Rx04 WVGA, Rx13 1.3MPx, Rx50 5Mpx

Sensor	WVGA Aptina MT9V034C12STM -04 suffix		1.3MP e2v EV76C560BB -13 suffix		5MP Aptina MT9P031I12STM -50 suffix	
Resolution	752 x 480 pixels		1280 x 1024 pixels		2592 x 1944 pixels	
Type	CMOS Global Shutter		CMOS Global Shutter		CMOS Rolling Shutter	
Active Area Size	1/3" 4.51 x 2.88 mm		1/1.8" 6.9 x 5.5 mm		1/2.5" 5.7 x 4.28 mm	
Sensor Pixel size	6 x 6 μm		5.3 x 5.3 μm		2.2 x 2.2 μm	
Dynamic range (typ.)	55dB linear ; 110dB HDR / linlog		62dB linear ; 100dB HDR / linlog		70dB linear	
Sensitivity	4.8V / lux-sec		6V / lux-sec (TBD)		1.4V / lux-sec	
Color Filter	N/A - Black and White		N/A - Black and White		N/A - Black and White	
Bit Depth	8,10,(12) bits		8,10 bits		8,10,12 bits	
Gain	0-12 dB		0-24 dB		0-42 dB	
Exposure time	10μs - 1s		5μs - 1s		33μs - 1s	
Basic Readout Modes	Resolution:	fps:	Resolution:	fps:	Resolution:	fps:
Full Resolution	752 x 480 px	60	1280 x 1024 px	60	2592 x 1944 px	15
Half Resolution	376 x 240 px	200	640 x 512 px	100	1296 x 972 px	45
Quarter Resolution	-	-	320 x 240 px	200	648 x 486 px	80
Linescan			1280 x 32 px	1600		

All cameras supports:
• arbitrary sized partial readout window with granularity 2x2 pixels
• image flipping H and V

Note 3: most of the sensors available in both Black and White and Color Bayer RGB versions, please contacts sales for availability.
Note 4: Other readout and ROI readout modes available.
Note 5: OEM and large integrators customized versions available.   Note 6: Additional sensors being added continuously. Please visit our web site for latest news.

Digital Inputs and Outputs Timing Table

Sensor	Digital Input to FPGA	Digital Input to Sensor (Trigger)	Trigger (Digital Input) to Strobe	Strobe (Sensor) to Digital Output	Trigger (Digital Input) to Strobe (Digital Output)	Trigger (Digital Input) to start of exposure
MT9P031	45 nS	100 nS	230 nS	72 nS	308 nS	2 µS
MT9V034	45 nS	100 nS	11 µS	72 nS	11 µS	11 µS
EV76C56 mode 01-96	45 nS	100 nS	18.62 µS	72nS	18.63 µS	42 µS
EV76C56 mode 23-114	45 nS	100 nS	18.62 µS	72 nS	18.63 µS	31µS

Please see the CURRERA-R Quick start guide to learn more about the available trigger modes and their selection.

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