Features

- **High Sensitivity and High SNR Performance Linear CCD Sensor**
- **Mono Line 1365 RGB Patterns (Total 4096 Active Pixels)**
- **Built-in Anti-Blooming, No Lag**
- **LVDS Data Format (RS-644)**
- **High Data Rate up to 60 Mpixels/s**
- **Flexible and Easy to Operate via RS232 Control:**
  - **Gain: 0 dB to 30 dB by Step of 0.05 dB**
  - **Trigger Mode: Free Run or External Trigger Modes**
  - **Data Output Mode (Dual, Single)**
- **Multi Camera Synchronization**
- **Single Power Supply: DC 12V to 24V**
- **Very Compact Design: 56 x 60 x 39.4 mm (w, h, l)**
- **High Reliability – CE and FCC Compliant**
- **F (Nikon), T2 (M42 x 0.75), or M42 x 1 Mount Adapter (Lens Not Supplied)**

AViiVA™ C2 LV 4010

LVDS Color Linescan Camera Preliminary

Product Description

As part of AViiVA family, this is designed with three concepts in mind: accuracy, versatility and easy implementation:

- A very compact mechanical design incorporates a 4k color linear sensor.
- Atmel manages the whole chain, from the sensor to the camera. The result is a camera able to work in 8- or 12-bit, with a dedicated electronics offering an excellent signal to noise ratio.
- The programmable settings let you work at different integration time, gain and offset. External clock and trigger allow to synchronize several cameras.

Applications

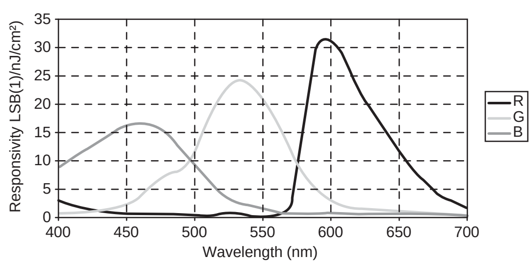
Performance and reliability of this camera make it suitable for machine vision applications requiring low cost color capture i.e. print, packaging inspection or part sorting. Using this camera avoids to face usual problems observed with tri-linear sensor on optical alignment and object synchronization.

Rev. 2188C–IMAGE–04/03

Typical Performances

Table 1. Typical Performances

Parameter	Value			Unit
Sensor Characteristics at Maximum Pixel Rate				
Resolution	1365 RGB patterns or 4096 pixels			pixels
Pixel dimensions	Blue	Green	Red	–
Pixel size	7 x 19.8	7 x 20	7 x 17.4	µm²
Pixel pitch	10	10	10	µm
Max Line rate	14			kHz
Anti blooming	x 150			–
Radiometric Performances (maximum Pixel Rate, Tamb = 25°C)				
Output format	8 – 12			bit
Spectral range	250 – 1100			nm
Linearity	< 1			%
Gain range (step of 0.047 dB)	Gmin 0	Gnom 18	Gmax 30	dB
Peak response(1)(2) Blue Green Red	 16.6 24.2 31.3	 132.8 193.6 250.4	 1062.4 1548.8 2003.2	 LSB/(nJ/cm²) LSB/(nJ/cm²) LSB/(nJ/cm²)
Output RMS noise SNR Effective bit	 67.4 11.2	 49 8.2	 37 6.2	 dB bit
PRNU (Photo Response Non Uniformity	± 4 (± 15 max)			%
Mechanical and Electrical Interface				
Size (w x h x l)	56 x 60 x 39.4			mm
Lens mount	F, T2, M42 x 1			–
Sensor alignment (See “Sensor Alignment” on page 21)	Δx,y = ±50 – Δz = ±30 – $\Delta tilt_z$ = 0-35 $\Delta\theta$x,y = ±0.2			µm °
Power supply	DC, single 12 to 24			V
Power dissipation	< 8			W
Operating temperature(3)	0 to 65 (non condensing)			°C
Storage temperature	-40 to 75 (non condensing)			°C
Spectral Response(1)(2)				



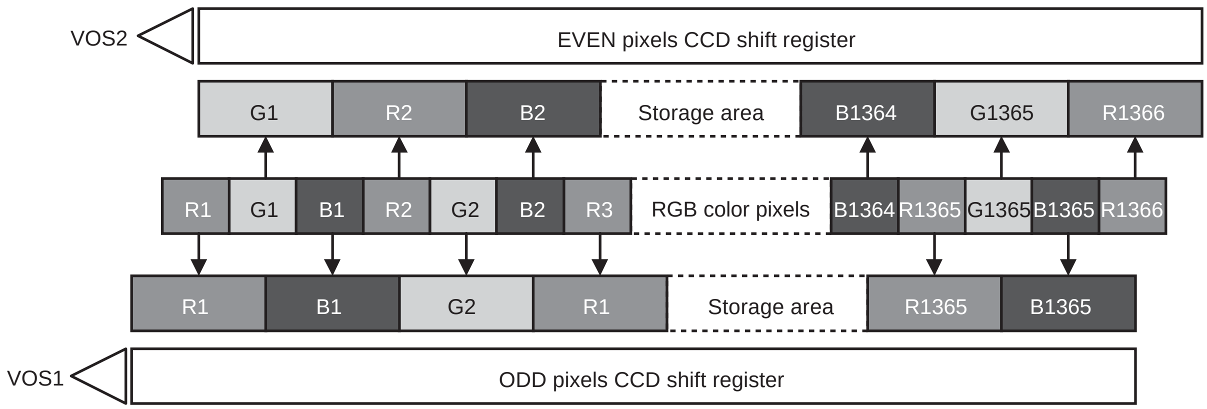
Notes:
1. LSB are given for 12-bit configuration (available in serial RGB)
2. nJ/cm² measured on the sensor with BG38 2 mm
3. Camera front face temperature

Color Principle

CCD Description

The color CCD sensor is based on a 2 taps, 4096 pixels linear sensor with RGB color filter. It results 1365 RGB patterns (+1 extra red pixel).

Figure 1. Color CCD Sensor Synoptic



IR Cut-Off Filter

For calibrated color response, the AViiVA C2 sensor shall not be exposed to IR wavelength (> 700 nm). Therefore depending of the ligth source, the user shall place or not a IR cut-off filter in front of the sensor. The AViiVA C2 sensor has been calibrated with a BG38 2 mm. The AViiVA C2 is available with or without BG38 2 mm (refer to the ordering code).

White Balance

The white balance function is not included in the camera. It shall be done by software or hardware at application level.

The color filters are balanced for a typical 5500°K light source with BG38 2 mm. For each light source, the white balance shall be done. For example, at 3200°K with BG38 2 mm, the following typical gains must be applied to white balance the images.

$$\begin{bmatrix} R' \\ G' \\ B' \end{bmatrix} = \begin{bmatrix} 1 \\ 1.8 \\ 2.5 \end{bmatrix} \times \begin{bmatrix} R & G & B \end{bmatrix}$$

Color Space Correction

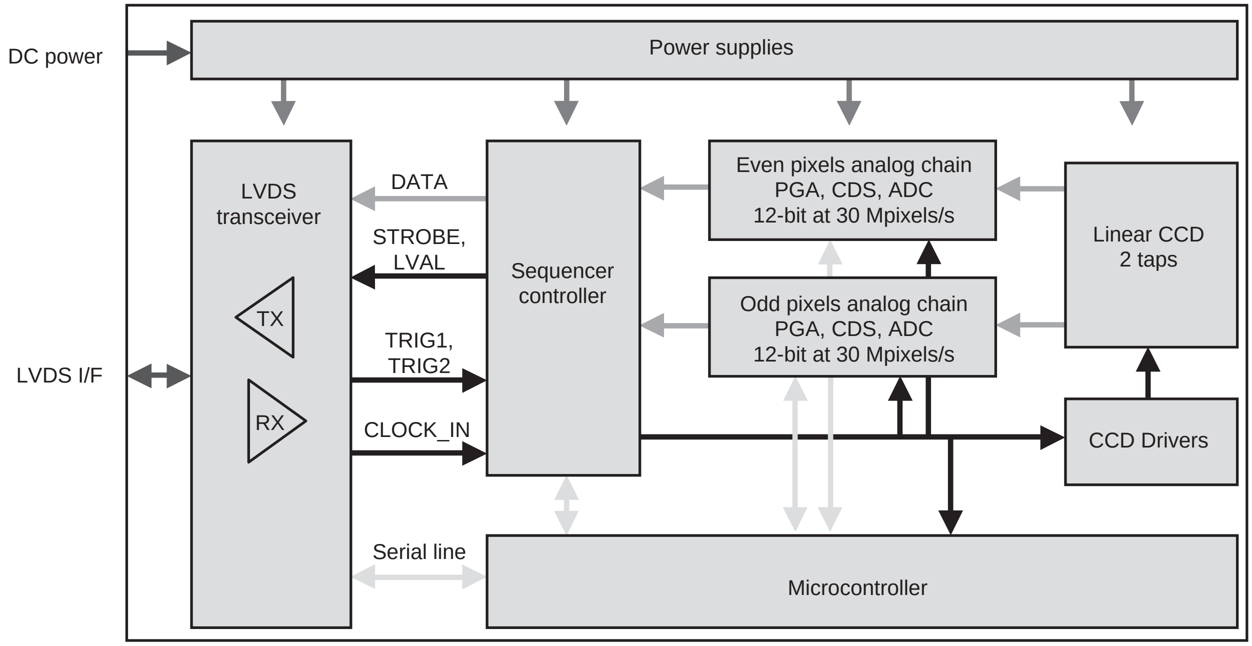
The color space correction function is not included in the camera. It shall be done by software or hardware at application level.

After white balance, the color space correction shall be done to improved the color response. This correction consists in a linear operation to convert the RGB triplet form the camera color space to the RGB triplet of the final color space. The final color space can be a monitor, a printer or others application specific color space. For some specific applications where "absolute" color value is not mandatory the color space correction can by bypassed.

At 3200K with BG38 2 mm and for a standard PC screen, this typical matrix must be applied to correct the colors.

Camera Description

Figure 2. Camera Synoptic



The camera is based on a two-tap linear CCD. Therefore, two analog chains process odd and even pixel outputs of the linear sensor. The CCD signal processing encompasses the correlated double sampling (CDS), the dark level correction (dark pixel clamping), the gain (PGA) and offset correction and finally the analog to digital conversion on 12-bit.

Note: PGA stands for Programmable Gain Array.

The camera is powered by a single DC power supply from 12V to 24V.

The functional interface (data and control) is provided with LVDS transceivers.

In RGB serial mode, the data can be delivered eitheir on two channels or on a single multiplexed channel. The data format can be configured in 8-or 12-bit, See “Output Data Timing” on page 9.

In RGB parallel mode, the data are provided on three channels corresponding to red, green and blue information. The data format is only on 8-bit. In this mode two interpolation mechanisms can be selected, See “Output Data Timing” on page 9.

The camera can be used with external triggers (TRIG1 and TRIG2 signals) in different trigger modes (see “Synchronization Mode” on page 7). The camera can be also clocked externally, allowing system synchronization and/or multi-camera synchronization.

The camera configuration and settings are performed via a serial line.

This interface is used for:

- Gain, offset setting.
- Dynamic range, data rate setting.
- Trigger mode setting: free run or external trigger modes.
- Integration time setting: in free running and external trigger mode.

Standard Conformity

The cameras have been tested in the following conditions:

- Shielded power supply cable.
- Shielded and twisted pairs data transfer cable.
- Linear AC-DC power supply.

Atmel recommends using the same configuration to ensure the compliance with the following standards.

CE Conformity

AViiVA Cameras comply with the requirements of the EMC (European) directive 89/336/CEE (EN 50081-2, EN 61000-6-2)

FCC Conformity

AViiVA Cameras comply with Part 15 of FCC rules.

Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Camera Command and Control

Camera configuration is set through the serial interface. Please refer to "Serial Communication" on page 15 for the detailed protocol of the serial line.

Table 2. Camera Command and Control

Setting	Command	Parameter	Description
Configuration record[1]	E=	0 1	The camera configuration is recorded on each change The camera configuration is recorded only on request (! = 4)
Gain[2]	G=	0 to 851	Gain setting from 0 to 40 dB (~0.047dB steps)
Even Gain[2]	A=	0 to 20	Even pixels gain adjustment (odd – even mismatch adjustment)
Odd Gain[2]	B=	0 to 20	Odd pixels gain adjustment (odd – even mismatch adjustment)
Data transfer	H=	0 1 2 3 4 5 6 7 8 9 10	Two outputs on external clock (CLK_IN) One output (multiplexed) on external clock (CLK_IN) Two outputs at 10 MHz data rate One output (multiplexed) at 20 MHz data rate Two outputs at 15 MHz data rate One output (multiplexed) at 30 MHz data rate Two outputs at 20 MHz data rate One output (multiplexed) at 40 MHz data rate Two outputs at 30 MHz data rate One output (multiplexed) at 60 MHz data rate One output (multiplexed) on external clock (data frequency/2)[7]
Output format[3]	S=	0 1 2	RGB serial mode (8-or 12-bit) RGB parallel mode with interpolation 1 -> 1 (3 x 8-bit) RGB parallel mode with interpolation 3 -> 1 (3 x 8-bit)
Pattern[4]	T=	0 1	Standard Test pattern
Resolution	Y=	0 1	12-bit (only for RGB serial mode) 8-bit (only for RGB serial mode)
Integration Time	I=	5 to 13000	Integration time (µs) in free run or external triggered mode
Trigger mode	M=	1 2 3 4	Free run with integration time setting (see Timing Diagram) External trigger with integration time setting (see Timing Diagram) Trigger and Integration time controlled Trigger and integration time controlled by two inputs
Even data Offset[5]	O=	0 to 15	Even Offset setting from 0 to approx. 200 LSB[6]
Odd data Offset[5]	P=	0 to 15	Odd Offset setting from 0 to approx. 200 LSB[6]
Special commands	!=	0 1 2 3 4 5	Camera identification readout User camera identification readout Software version readout Camera configuration readout Current camera configuration record Default camera configuration restoration
User camera ID	$=	String of Char.	Writing and record of the user camera identification

Notes:
1. ATMEL recommends to use E = 1 because of the limited EEPROM write cycles, refer on page 15.
2. Camera gain (dB) = G x 0.047. A and B gain value are set in manufacturing but can be adjust if necessary.
3. Corresponding pinout in “Connector Description” on page 16. If 8-or 10-bit are needed, the user can also select “S = 0” and make the cable for using the MSB.
4. The test pattern is useful to check if the interfacing is well done. You should see a jagged image of 256 pixels steps.

5. The offset is set in manufacturing to balance both the channels. The initial setting is about 8 (~ 130 LSB). In some cases, the user may have to change it (for example if the ambient temperature is very high).
6. LSB are given for 12-bit configuration (available in serial RGB).
7. To be used for multi-camera synchronization. Refer to the "output data timing" paragraph for details.

Timing

Synchronization Mode

Four different modes may be defined under user control. The TRIG1 and TRIG2 signals may be used to trigger external events and to control the integration time. The Master clock is either external or internal clock.

Free Run Mode with Integration Time Setting

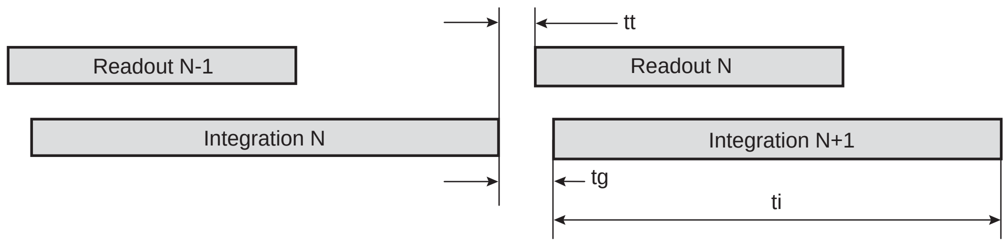
The integration and readout periods start automatically and immediately after the previous period. The read-out time depends on pixel number and pixel rate.

Table 3. Free Run Mode with Integration Time Setting

Label	Description	Min	Typ	Max
ti	Integration time duration	(1)	–	13 ms
tg	Consecutive integration period gap (at maximum frequency)	–	6 µs	–
tt	Integration period stop to read-out start delay	–	1 µs	–

Note: 1. The integration time is set by the serial line and should be higher than the read-out time (otherwise it is adjusted to the readout time).

Figure 3. Timing Diagram



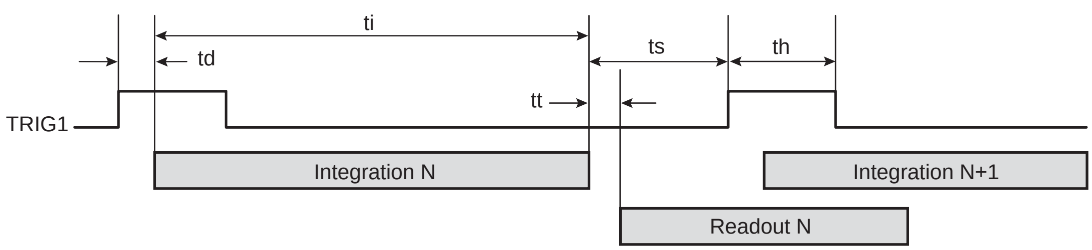
Triggered Mode with Integration Time Setting

The integration period starts immediately after the rising edge of TRIG1 input signal. The Integration time is set by the serial line. This integration period is immediately followed by a readout period. The read-out time depends on pixel number and the pixel rate.

Table 4. Triggered Mode with Integration Time Setting

Label	Description	Min	Typ	Max
ti	Integration time duration	5 µs	–	13 ms
td	TRIG1 rising to integration period start delay	–	5.5 µs	–
tt	Integration period stop to read-out start delay	–	1 µs	–
ts	Integration period stop to TRIG1 rising set-up time	4 µs	–	–
th	TRIG1 hold time (pulse high duration)	1 µs	–	–

Figure 4. Timing Diagram



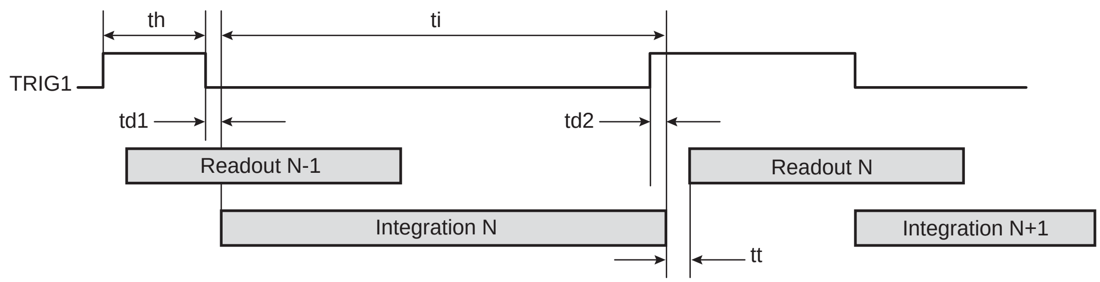
Trigger and Integration Time Controlled by One Input

The integration period starts immediately after the falling edge of TRIG1 input signal.
The integration period stops immediately after the rising edge of TRIG1 input signal.
This integration period is immediately followed by a readout period.
The read-out time depends on pixel number and pixel rate.

Table 5. Trigger and Integration Time Controlled by One Input

Label	Description	Min	Typ	Max
ti	Integration time duration	5 µs	–	–
td1	TRIG1 falling to integration period start delay	–	100 ns	–
td2	TRIG1 rising to integration period stop delay	–	1.3 µs	–
tt	Integration period stop to read-out start delay	–	1 µs	–
th	TRIG1 hold time (pulse high duration)	1 µs	–	–

Figure 5. Timing Diagram



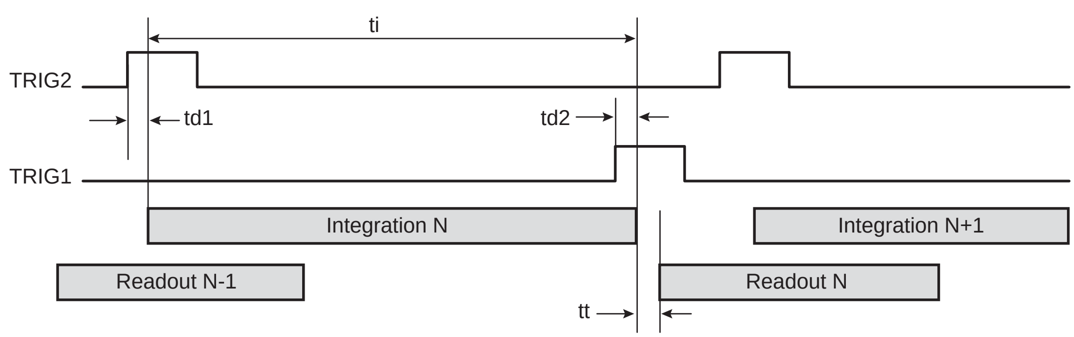
Trigger and Integration Time Controlled by Two Inputs

TRIG2 rising edge start the integration period. TRIG1 rising edge stop the integration period. This period is immediately followed by a readout period.

Table 6. Trigger and Integration Time Controlled by Two Inputs

Label	Description	Min	Typ	Max
ti	Integration time duration	5 µs	–	–
td1	TRIG2 rising to integration period start delay	–	100 ns	–
td2	TRIG1 rising to integration period stop delay	–	1.3 µs	–
tt	Integration period stop to read-out start delay	–	1 µs	–
th	TRIG1 and TRG2 hold time (pulse high duration)	1 µs	–	–

Figure 6. Timing Diagram



Output Data Timing

Serial RGB Mode with Two Outputs: (H = 0, 6, 8; S = 0; Y = 0/1; T = 0/1)

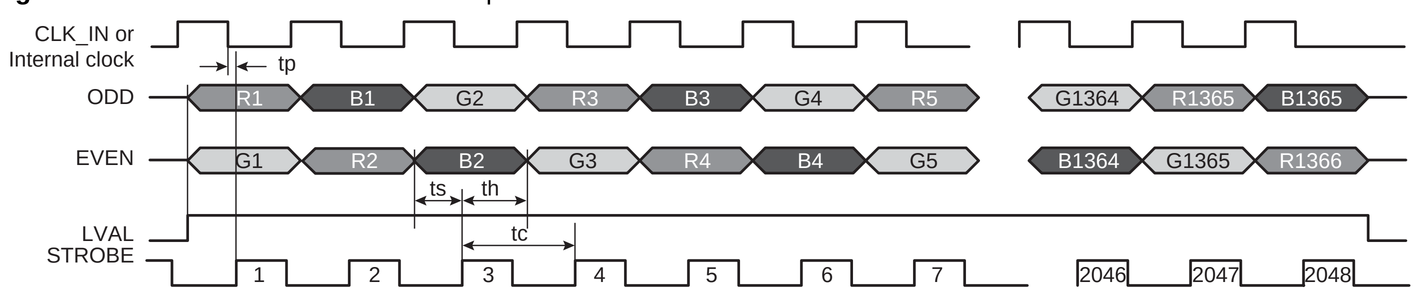
In this mode the pixels are output on two taps as they are implemented on the sensor. The data format can be configured in 12-or 8-bit (Y command), and the test pattern can replace the CCD data (T command).

Table 7. Serial RGB Mode with Two Outputs

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
ts	Data to STROBE set-up time	9 ns	–	–
th	Data to STROBE hold time	13 ns	–	–
tc	STROBE period	33 ns	–	400 ns
	STOBE duty cycle	–	50%/50%	–

Note: CLK_IN frequency must be in the range 2.5 to 30 MHz. Out of this range, the performances may be degraded.
In this mode, STOBE frequency is equal to CLK_IN or internal clock frequency.

Figure 7. Serial RGB Mode with Two Outputs



Serial RGB Mode with One Output (multiplexed data): (H = 1, 3, 5, 7, 9; S = 0; Y = 0/1; T = 0/1)

In this mode the pixels are output on a single tap as they are implemented on the sensor. The data format can be configured in 12-or 8-bit (Y command), and the test pattern can replace the CCD data (T command)

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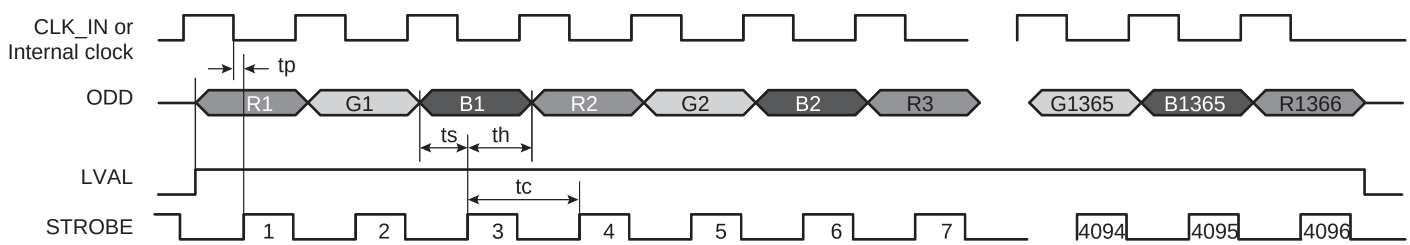
Table 8. Serial RGB Mode with One Output

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
ts	Data to STROBE set-up time	6 ns	–	–
th	Data to STROBE hold time	7 ns	–	–
tc	STROBE period	16 ns	–	200 ns
	STOBE duty cycle	–	50%/50%	–

Note: CLK_IN frequency must be in the range 5 to 60 MHz. Out of this range, the performances may be degraded.
In this mode, STOBE frequency is equal to CLK_IN or internal clock frequency.

Figure 8. Serial RGB Mode with One Output



Parallel RGB Mode with 1 to 1 Interpolation: (H = 1, 3, 5, 7, 9; S = 1; Y = x; T = 0/1)

In this mode the color pixels are output in parallel. The data format is 8-bit for each color and the test pattern can replace the CCD data (T command). The pixels are interpolated to provided 4094 color pixels.

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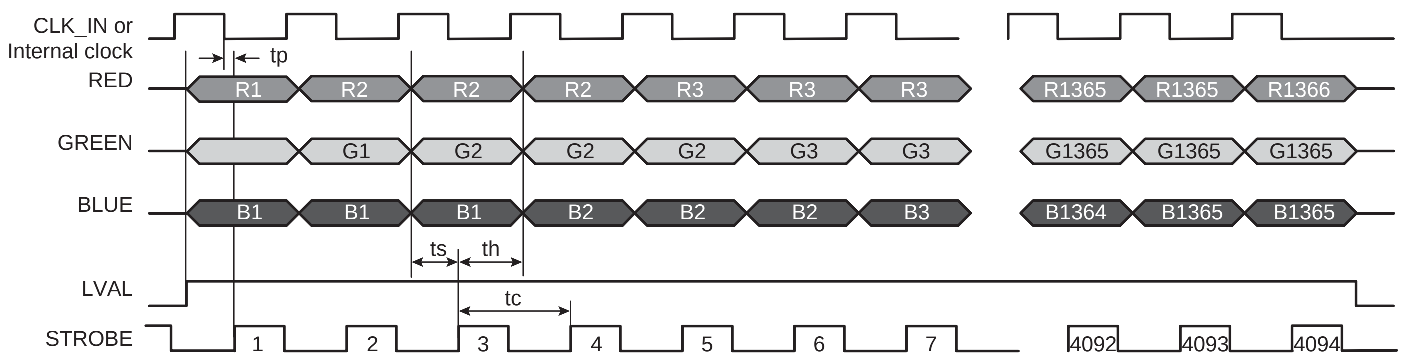
Table 9. Parallel RGB Mode with 1 to 1 Interpolation

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
ts	Data to STROBE set-up time	6 ns	–	–
th	Data to STROBE hold time	7 ns	–	–
tc	STROBE period	16 ns	–	200 ns
	STOBE duty cycle	–	50%/50%	–

Note: CLK_IN frequency must be in the range 5 to 60 MHz. Out of this range, the performances may be degraded.
In this mode, STOBE frequency is equal to CLK_IN or internal clock frequency.

Figure 9. Parallel RGB Mode with 1 to 1 Interpolation



Parallel RGB Mode with 3 to 1 Interpolation: (H = 1, 3, 5, 7, 9; S = 2; Y = x; T = 0/1)

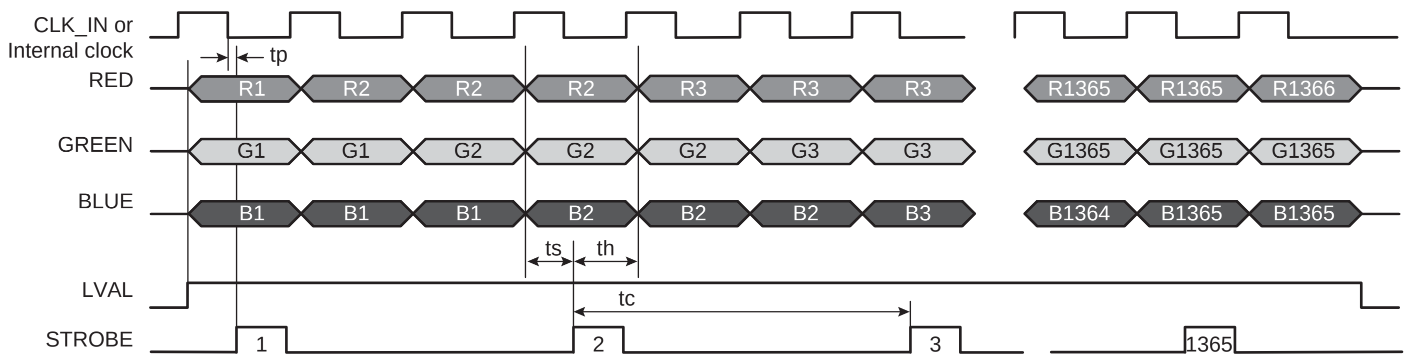
In this mode the color pixels are output in parallel. The data format is 8-bit for each color and the test pattern can replace the CCD data (T command). In this mode the "true" 1365 color pixels are provided.

Table 10. Parallel RGB Mode with 3 to 1 Interpolation

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
ts	Data to STROBE set-up time	6 ns	–	–
th	Data to STROBE hold time	7 ns	–	–
tc	STROBE period	50 ns	–	600 ns
	STOBE duty cycle	–	17%/83%	–

Note: CLK_IN frequency must be in the range 5 to 60 MHz. Out of this range, the performances may be degraded.
In this mode, STOBE frequency is equal to CLK_IN or internal clock frequency. DVAL is used to select the RnGnBn triplet (n from 1 to 1365).

Figure 10. Parallel RGB Mode with 3 to 1 Interpolation



Camera Synchronization

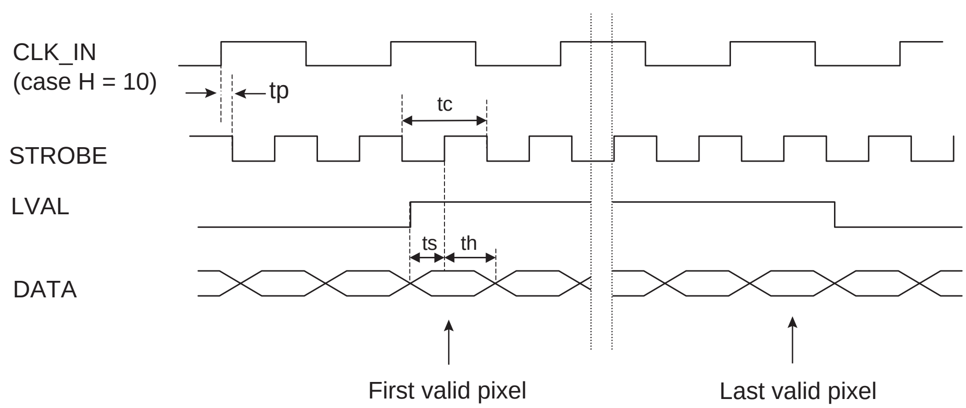
In case of multi-cameras synchronization (means more than one camera on one acquisition board):

- the "master" camera will provide DATA, STROBE and LVAL signals to the acquisition board. The others will only provide DATA.
- the external clock CLK_IN must be input on each cameras to guaranty perfect data synchronization.
- the trigger(s) input (TRIG1 and/or TRIG2) must be input on each cameras. It is recommended to synchronize the rising edge of these signals on the CLK_IN falling edge.
- cables must be balanced between each cameras (same quality, same length) to ensure perfect cameras synchronization.
- the CLK_IN frequency must be equal to the two CCD register frequency. It means that the user shall use either H=2 (Serial RGB 2 taps at CLK_IN data rate (if S=0)) or H=10 (Serial RGB 1 tap at 2xCLK_IN data rate (if S=0), Parallel RGB 3 taps at 2xCLK_IN (if S=1) or 2/3xCLK_IN (if S=2)).
- Using H=1 clock mode will provide LVAL jitter on the "slave" camera.
- Only "trigged and integration time controlled" (M=3 or M=4) can be used. These modes ensure perfect readout phase starting for each cameras.

Table 11. Output Data Timing

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
ts	Data to STROBE set-up time	6 ns	–	–
th	Data to STROBE hold time	7 ns	–	–
tc	STROBE period	50 ns	–	600 ns

Figure 11. Timing Diagram



Electrical Interface

Power Supply

It is recommended to insert a 1A fuse between the power supply and the camera.

Table 12. Power Supply

Signal Name	I/O	Type	Description
PWR	P	–	DC power input: +12V to +24V (±0.5V)
GND	P	–	Electrical and Mechanical ground

I = input, O = output, IO = bi-directional signal, P = power/ground, NC = not connected

Camera Control

The Camera interface provides three LVDS signals dedicated to camera control.

Table 13. Camera Control

Signal Name	I/O	Type	Description
TRIG1	I	RS644	Synchronization input (refer to "Synchronization Mode" on page 7)
TRIG2	I	RS644	Start Integration period in dual synchro mode (refer to "Synchronization Mode" on page 7)
CLOCK_IN	I	RS644	External clock for (multi-)camera synchronization (refer to "Synchronization Mode" on page 7)

I = input, O = output, IO = bi-directional signal, P = power/ground, NC = not connected

Video Data

Table 14. Video Data

Signal Name	I/O	Type	Description
ODD[11-0]	O	RS644	Odd pixel data (refer to "Output Data Timing" on page 9), ODD-00 = LSB, ODD-11 = MSB
EVEN[11-0]	O	RS644	Even pixel data (refer to "Output Data Timing" on page 9), EVEN-00 = LSB, EVEN-11 = MSB
STROBE	O	RS644	Output data clock (refer to "Output Data Timing" on page 9), data valid on the rising edge
LVAL	O	RS644	Line valid (refer to "Output Data Timing" on page 9), active high signal

I = input, O = output, IO = bi-directional signal, P = power/ground, NC = not connected

Note: In case of Single output, the data (multiplexed) are output in place of Odd data.

Serial Communication

The RS-232 interface allows to parameter the camera.

The RS-232 configuration is:

- Full duplex/without handshaking. The camera is configured in DCE/Modem
- 9600 bauds, 8-bit data, no parity bit, 1 stop bit.

Table 15. Serial Communication

Signal name	I/O	Type	Description
TX	O	RS232	Transmitted data
RX	I	RS232	Received data

Command Syntax

The valid syntax is "S = n(CR)" with:

- S: command identification as per “Camera Command and Control” on page 5. S is a single character in upper case.
- n: setting value.
- (CR): means "carriage return".

no space, nor tab may be inserted between S, =, n and (CR).

Example of a valid command:

- G = 3(CR): sets the camera to gain 3 (refer to “Camera Command and Control” on page 5 for exact value calculation).

Example of non valid commands:

- G = 3(CR): spaces.
- g = 3(CR): g instead of G.
- G = 1040(CR): 1040 is outside of range.

Command Processing

Each command received by the camera is processed:

- If the command is valid:
  – the setting is done in case of a write command.
  – the camera returns the data separated by (CR) in case of the read command.
  – the camera returns: >OK(CR).
- If the command is not valid:
  – nothing is done.
  – the camera returns: >1 = out of range; >2 = syntax error; >3 = command too long; >4,>6,>7 = internal error; >5 undefined function.

Example: when receiving "! = 3(CR)’’ the camera returns its current settings:

- A = 0(CR); B = 0(CR); ....; E = 0(CR); >OK(CR).

Storage of the Settings in EEPROM

ATMEL recommends to use "E = 1" for settings that are often changed (check the maximum number of write cycles above) and when the time required by the camera to process a command is critical. The maximum number of write cycles allowed for the EEPROM is: 100 000.

Connector Description

All connectors are on the rear panel.

Note: Cables for digital signals shall be shielded twisted pairs.

Power Supply

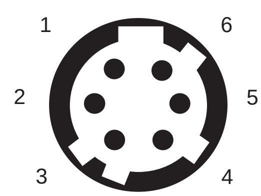
Camera connector type: Hirose HR10A-7R-6PB (male).

Cable connector type: Hirose HR10A-7P-6S (female).

Table 16. Power Supply Connector Pin-out

Signal	Pin		Signal	Pin
PWR	1		GND	4
PWR	2		GND	5
PWR	3		GND	6

Figure 12. Receptacle Viewed from Camera Back



RS232 Connector

Camera connector type: D-Sub 9-pin female.

RTS (pin 4) and CTS (pin 6) are connected together inside the camera.

DTR (pin 7) and DSR (pin 8) are connected together inside the camera.

Table 17. RS232 Connector Pin-out

Signal	Pin		Signal	Pin		Signal	Pin
NC	1		RTS	4		DTR	7
TX	2		GND	5		DSR	8
RX	3		CTS	6		NC	9

44-pin Data and Synchro Connector

Camera connector type: D-Sub HD 44-pin female.

Warning: **Unused pins must be kept open.**

When used in Single (multiplexed) output, the multiplexed data are output in place of ODD data.

Table 18. 44-pin Data and Synchro Connector: Used in RGB Serial Mode and 12-Bit Output Format (S = 0 and Y = 0)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	12	–	23	ODD-03+	34	ODD-06-
2	CLOCK_IN+	13	–	24	ODD-08+	35	ODD-07+
3	ODD-04-	14	LVAL+	25	ODD-10-	36	ODD-01+
4	ODD-05-	15	STROBE+	26	ODD-11-	37	ODD-02+
5	ODD-07-	16	CLOCK_IN-	27	–	38	ODD-03-
6	ODD-00+	17	TRIG1+	28	–	39	ODD-09+
7	ODD-02-	18	TRIG1-	29	LVAL-	40	ODD-10+
8	ODD-08-	19	ODD-05+	30	STROBE-	41	–
9	ODD-09-	20	ODD-06+	31	TRIG2-	42	–
10	ODD-11+	21	ODD-00-	32	TRIG2+	43	–
11	–	22	ODD-01-	33	ODD-04+	44	GND

Table 19. 44-pin Data and Synchro Connector: Used in RGB Serial Mode and 8-Bit Output Format (S = 0 and Y = 1)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	12	EVEN-06-	23	ODD-03+	34	ODD-06-
2	CLOCK_IN+	13	EVEN-07-	24	EVEN-00+	35	ODD-07+
3	ODD-04-	14	LVAL+	25	EVEN-02-	36	ODD-01+
4	ODD-05-	15	STROBE+	26	EVEN-03-	37	ODD-02+
5	ODD-07-	16	CLOCK_IN-	27	EVEN-05+	38	ODD-03-
6	ODD-00+	17	TRIG1+	28	EVEN-06+	39	EVEN-01+
7	ODD-02-	18	TRIG1-	29	LVAL-	40	EVEN-02+
8	EVEN-00-	19	ODD-05+	30	STROBE-	41	EVEN-04-
9	EVEN-01-	20	ODD-06+	31	TRIG2-	42	EVEN-05-
10	EVEN-03+	21	ODD-00-	32	TRIG2+	43	EVEN-07+
11	EVEN-04+	22	ODD-01-	33	ODD-04+	44	GND

Table 20. 44-pin Data and Synchro Connector: Used in RGB Parallel Modes (S = 1 or S = 2)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	12	GREEN-06-	23	RED-03+	34	RED-06-
2	CLK_IN+	13	GREEN-07-	24	GREEN-00+	35	RED-07+
3	RED-04-	14	LVAL+	25	GREEN-02-	36	RED-01+
4	RED-05-	15	STROBE+	26	GREEN-03-	37	RED-02+
5	RED-07-	16	CLOCK_IN-	27	GREEN-05+	38	RED-03-
6	RED-00+	17	TRIG1+	28	GREEN-06+	39	GREEN-01+
7	RED-02-	18	TRIG1-	29	LVAL-	40	GREEN-02+
8	GREEN-00-	19	RED-05+	30	STROBE-	41	GREEN-04-
9	GREEN-01-	20	RED-06+	31	TRIG2-	42	GREEN-05-
10	GREEN-03+	21	RED-00-	32	TRIG2+	43	GREEN-07+
11	GREEN-04+	22	RED-01-	33	RED-04+	44	GND

26-pin Data Connector

Camera connector type: D-Sub HD 26-pin female.

In case of single (multiplexed) or special 2-x 8-bit mode, the output on this connector are all fixed to low level.

Table 21. 26-pin Data Connector: Used in RGB Serial Mode and 12-Bit Output Format (S = 0 and Y = 0)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	8	EVEN-10+	15	EVEN-07+	22	EVEN-05+
2	EVEN-01-	9	EVEN-11-	16	EVEN-08+	23	EVEN-06+
3	EVEN-03+	10	EVEN-00-	17	EVEN-10-	24	EVEN-08-
4	EVEN-04+	11	EVEN-01+	18	EVEN-11+	25	EVEN-09-
5	EVEN-06-	12	EVEN-02+	19	EVEN-00+	26	GND
6	EVEN-07-	13	EVEN-04-	20	EVEN-02-	–	–
7	EVEN-09+	14	EVEN-05-	21	EVEN-03-	–	–

Table 22. 26-pin Data Connector: Not Used in RGB Serial Mode and 8-Bit Output Format (S = 0 and Y = 1)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	8	–	15	–	22	–
2	–	9	–	16	–	23	–
3	–	10	–	17	–	24	–
4	–	11	–	18	–	25	–
5	–	12	–	19	–	26	GND
6	–	13	–	20	–	–	–
7	–	14	–	21	–	–	–

Table 23. 26-pin Data Connector: Used in RGB Parallel Modes (S = 1 or S = 2)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	8	–	15	BLUE-07+	22	BLUE-05+
2	BLUE-01-	9	–	16	–	23	BLUE-06+
3	BLUE-03+	10	BLUE-00-	17	–	24	–
4	BLUE-04+	11	BLUE-01+	18	–	25	–
5	BLUE-06-	12	BLUE-02+	19	BLUE-00+	26	GND
6	BLUE-07-	13	BLUE-04-	20	BLUE-02-	–	–
7	–	14	BLUE-05-	21	BLUE-03-	–	–

Mechanical Characteristics

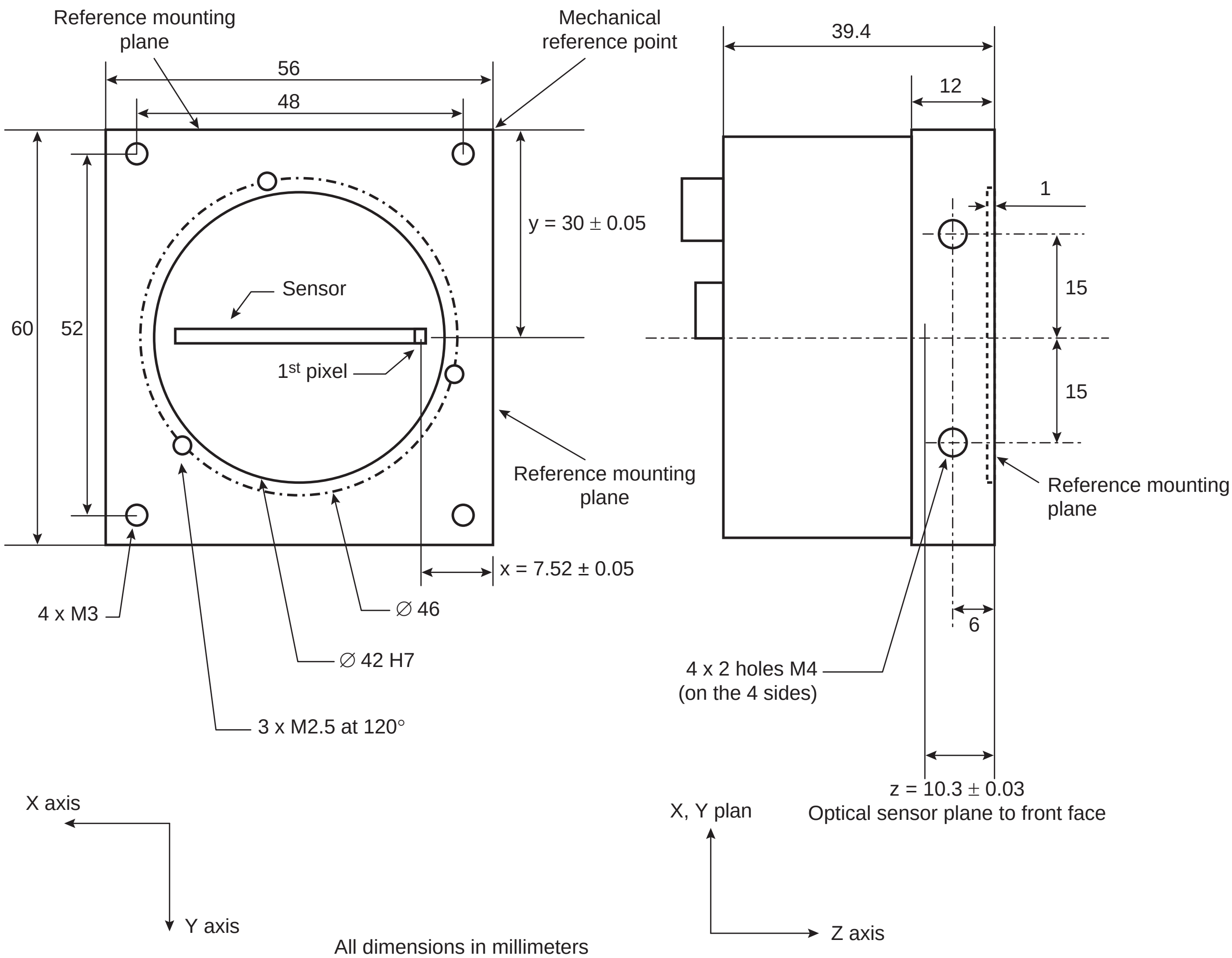
Weight

The camera typical weight (without lens nor lens adapter) is 220 g/7.7 ounces (typical).

Dimensions

The camera dimensions (without lens) are W = 56 mm, H = 60 mm, L = 39.4 mm.

Figure 13. Mechanical Box Drawing and Dimensions

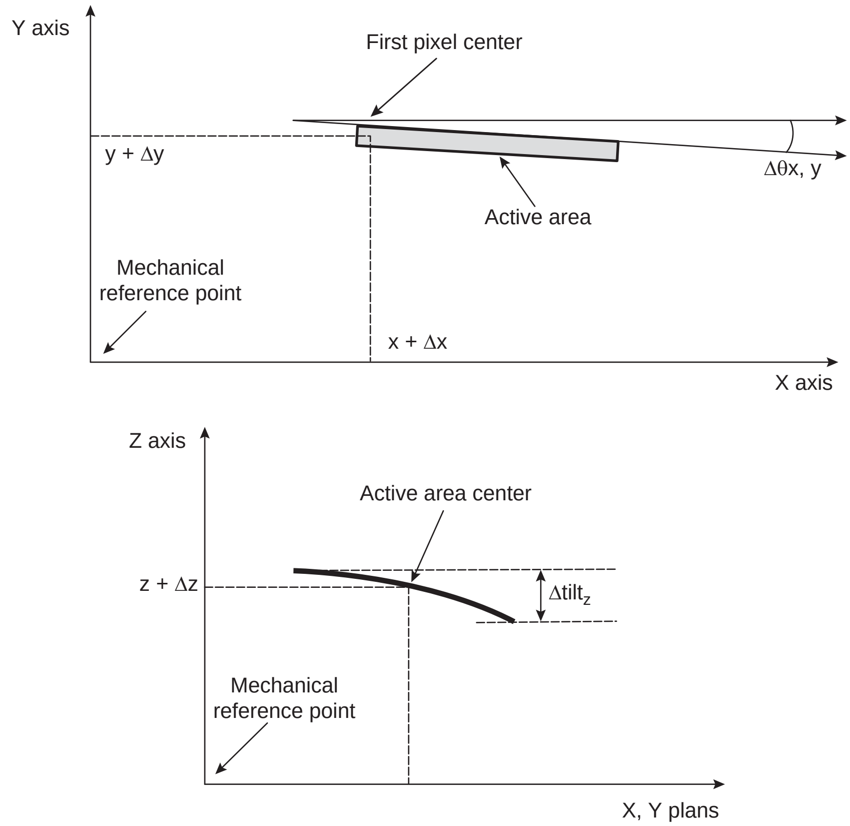


Mechanical Mounting Reference

The front panel mechanical part is designed to support the mounting of the camera. On this mechanical part, three surfaces are considered as mounting reference surface: i.e. the distance between these surfaces and the first active pixel are known very precisely (better than ±50 µm).

Sensor Alignment

Figure 14. Sensor Alignment Diagram



Lens Mounting (Lens Not Supplied)

The camera can be provided with the Nikon F mount.

Heat-sink Mounting

In order to improve the power dissipation, the camera can be delivered with heat-sink to be mounted by the user on the side faces of the camera. The delivery of the heat-sinks corresponds to a dedicated option.

Ordering Code

Table 24. Ordering Code

Part Number	Resolution	Description
AT71C2LV4010-BA0	4096	AViiVA C2 LV 4010 (without any accessories)
AT71C2CL4010-BA1	4096	AViiVA C2 CL 4010 with BG38 2 mm (without any other accessories)
AT71KFPAVIVA-ABA	–	F mount (NIKON)
AT71KFPAVIVA-AKA		T2 mount (M42 x 0.75)
AT71KFPAVIVA-ADA	–	M42 x 1 mount
AT71KAVIVAP2C0D4A0	–	Cables kit for RGB serial mode 10 m power supply and 10 m LVDS data transmission cables
TBD	–	Cables kit for RGB parallel mode 10 m power supply and 10 m LVDS data transmission cables

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