

Datasheet

Features

- High Sensitivity and High SNR Performance Linear CCD Sensor
- Monoline 1365 RGB Patterns (Total of 4096 Active Pixels)
- Built-in Anti-blooming, No Lag
- EIA-644 (LVDS) Data Format
- High Data Rate up to 60 Mpixels/s
- Flexible and Easy to Operate via RS-232 Control:
 - Exposure Time: 1 to 32 ms
 - Gain: -2 dB to 22 dB by Steps of 0.035 dB
 - Color Correction
 - Trigger Mode: Free Run or External Trigger Modes
 - Output Format: Serial (8/10/12 Bits) or Parallel RGB
 - Digital Offset and Gain (for Contrast Expansion)
- Flat-field Correction (Lens and Light Non-uniformity, FPN and PRNU Correction)
- Multi-camera Synchronization
- Single Power Supply: DC 12 to 24V
- Very Compact Design: 56 x 60 x 39.4 mm (w, h, l)
- High Reliability – CE and FCC Compliant
- F (Nikon), T2 or M42 x 1 Mount Adapter (Lens Not Supplied)



Description

This smarter C2 is the perfect alternative for users looking for a cost-effective color linescan camera. The AViiVA® SC2 takes advantage of all the features that made the success of the AViiVA family: accuracy, versatility and easy implementation:

- Flat-field correction and contrast expansion functions
- Embedded white balance and color space correction
- A very compact mechanical design that incorporates a 4k color linear sensor
- e2v manages the entire manufacturing process from the sensor to the camera. The result is a camera able to operate in 8, 10 or 12 bits with dedicated electronics offering an excellent signal-to-noise ratio
- Programmable settings let the user work at different integration times, gains and offsets. The external clock and trigger allow synchronization of several cameras

Applications

The performance and reliability of this camera make it suitable for machine vision applications requiring low-cost color capture. Such applications can include print, packaging inspection or part sorting. With this camera, one avoids the usual problems observed with tri-linear sensors on optical alignment and object synchronization.

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1. Typical Performances

Table 1-1. Typical Performances

Parameter	Value			Unit
Sensor Characteristics at Maximum Pixel Rate				
Resolution	1365 RGB patterns or 4096 pixels			pixels
Pixel pitch	10			µm
Maximum line rate	14			kHz
Anti-blooming	x 100			–
Radiometric Performances (Maximum Pixel Rate, Tamb = 25°C)				
Dynamic range	12 (also configurable in 8 or 10)			bit
Linearity (G = 0)	< 2			%
Gain range (steps of 0.035 dB)	Gmin -2	Gnom 0	Gmax 22	dB
Peak response ⁽¹⁾⁽²⁾				
Blue	16.6	21.5	263	LSB/(nJ/cm ²)
Green	24.2	31.5	383	LSB/(nJ/cm ²)
Red	31.3	41	496	LSB/(nJ/cm ²)
Output RMS noise				
Dynamic Range	66	64	42	dB
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 19)	Δx,y = ±50 – Δz = ±30 – Δtilt _z = 0-35 Δθ _{x,y} = ±0.2			µm °
Power supply	DC, single 12 to 24			V
Power dissipation	< 8.5			W
Operating temperature ⁽³⁾	0 to 65 (non-condensing)			°C
Storage temperature	-40 to 75 (non-condensing)			°C
Spectral Response⁽¹⁾⁽²⁾				
(at Gmin)				
<p>The graph plots Responsivity (LSB/(nJ/cm²)) on the y-axis (0 to 35) against Wavelength (nm) on the x-axis (400 to 700). Three curves are shown: Red (R, solid black), Green (G, dashed grey), and Blue (B, solid grey). The Red curve peaks at approximately 31.3 LSB/(nJ/cm²) at 600 nm. The Green curve peaks at approximately 24.2 LSB/(nJ/cm²) at 530 nm. The Blue curve peaks at approximately 16.6 LSB/(nJ/cm²) at 460 nm.</p>				

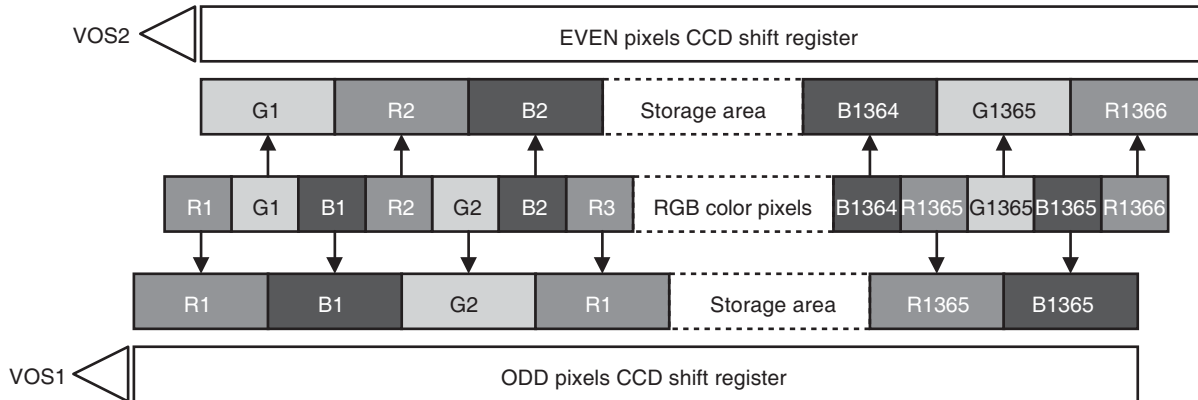
- Note:
1. LSBs are given for a 12-bit configuration (available in serial RGB)
 2. nJ/cm² measured on the sensor with 2 mm BG38
 3. Camera’s front face temperature

2. Color Principle

2.1 CCD Description

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

Figure 2-1. Color CCD Sensor Synoptic



2.1.1 IR Cut-off Filter

For calibrated color response, the AViVA SC2 sensor should not be exposed to IR wavelengths (> 700 nm). The AViVA SC2 is delivered with 2 mm BG38 IR cut-off filter in front of the sensor (refer to “[Ordering Codes](#)” on page 20).

2.2 White Balance

A white balance function is implemented in the camera. White balance can be performed automatically (white balance calibration) or manually.

The color filters are balanced for a typical 5500°K light source with a 2 mm BG38. White balance should be performed for each light source. For example, with a 3200°K light source and with a 2 mm GB38, the following typical gains must be applied to white balance the image.

$$\begin{bmatrix} R' \\ G' \\ B' \end{bmatrix} = \begin{bmatrix} 1 \\ 1.64 \\ 2.89 \end{bmatrix} \times [R \ G \ B]$$

2.3 Color Space Correction

A color space correction function is also implemented in the camera. The nine coefficients can be input manually or chosen in a typical matrix.

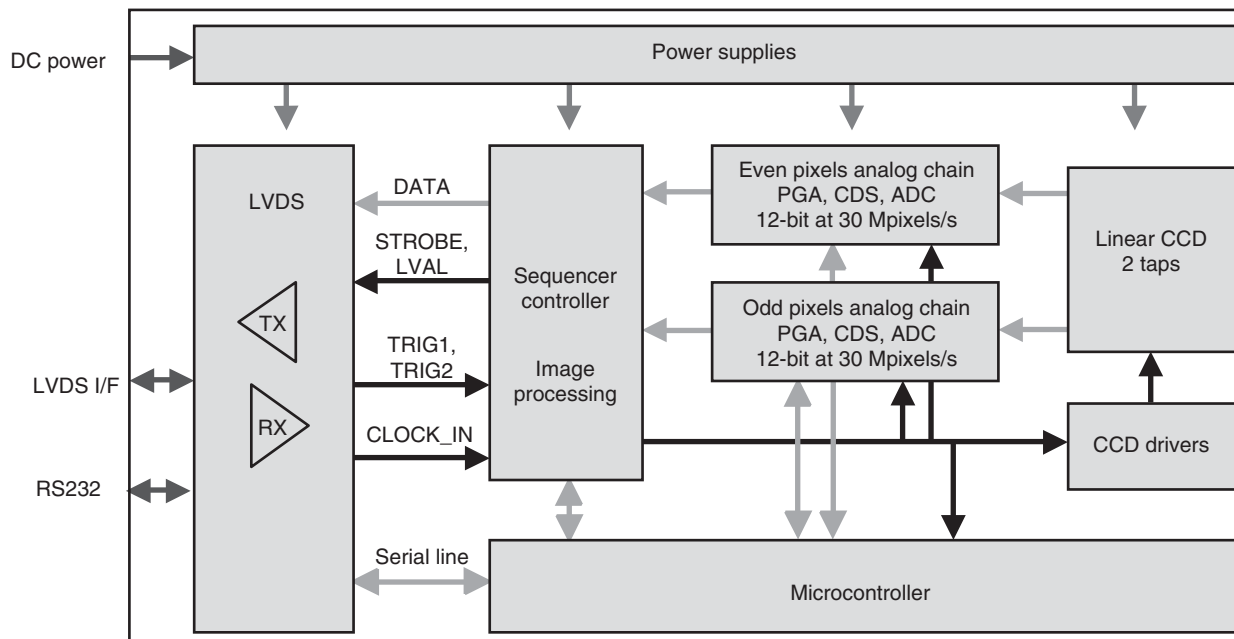
After white balance, the color space correction should be done to improve color response. This correction consists of a linear operation to convert the RGB triplet from the camera’s color space to the RGB triplet of the final color space. The final color space can be a monitor, a printer or another application’s specific color space. For some specific applications where an “absolute” color value is not mandatory, the color space correction can be bypassed.

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

$$\begin{bmatrix} R'' \\ G'' \\ B'' \end{bmatrix} = \begin{bmatrix} 1.14 & 0.26 & -0.4 \\ -0.19 & 1.71 & -0.52 \\ -0.45 & -0.65 & 2.1 \end{bmatrix} \times \begin{bmatrix} R' \\ G' \\ B' \end{bmatrix}$$

3. Camera Description

Figure 3-1. Camera Synoptic



The camera is based on a two-tap linear CCD. Therefore, two analog chains process the 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), gain (PGA) and offset correction and finally the analog-to-digital conversion in 12 bits. An FPGA has been implemented for image processing (flat-field correction, dynamic selection, test pattern generation and color correction).

Note: PGA stands for Programmable Gain Array.

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

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

In RGB serial mode, the data format can be configured in 8, 10 or 12 bits. See [“Output Timing Data” on page 10](#).

In RGB parallel mode, data is provided on three channels corresponding to red, green and blue information. The data format is output in 8 bits only.

The camera can be used with external triggers (TRIG1 and TRIG2 signals) in different trigger modes (see [“Synchronization Mode” on page 8](#)). The camera can also be clocked externally, enabling system synchronization and/or multi-camera synchronization.

The following configurations and settings are done via a serial line.

- Gain and offset
- Dynamic range, data rate setting and RGB mode
- Trigger mode setting: free-run or external trigger modes
- Integration time setting: in free-run and external trigger modes
- FFC, color correction, contrast expansion

4. Standard Conformity

The AViiVA cameras have been tested using the following equipment:

- A shielded power supply cable
- Shielded and twisted pairs data transfer cable
- A linear AC-DC power supply

e2v recommends using the same configuration to ensure compliance with the standards described hereafter.

4.1 CE Conformity

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

4.2 FCC Conformity

All AViiVA cameras further comply with part 15 of the FCC rules, which state that:

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.

5. Camera Command and Control

The camera is configured through the serial interface. Please refer to [“Serial Communication” on page 13](#) for the serial line's detailed protocol.

Table 5-1. Camera Command and Control

Setting	Command	Parameter	Description
Gain ⁽¹⁾	G=	-65 to 643	Gain setting from -2 to 22 dB (~0.035 dB steps)
Even gain ⁽¹⁾	A=	0 to 56	Even pixels gain adjustment (odd – even mismatch adjustment)
Odd gain ⁽¹⁾	B=	0 to 56	Odd pixels gain adjustment (odd – even mismatch adjustment)
Red gain	J=	0 to 63	Red gain setting from 0 to 12 dB (~0.19 dB steps)
Green gain	K=	0 to 63	Green gain setting from 0 to 12 dB (~0.19 dB steps)
Blue gain	L=	0 to 63	Blue gain setting from 0 to 12 dB (~0.19 dB steps)
Data transfer	H=	0 1 2 3 4 5 6	External clock (data rate = 2 x external clock) ⁽⁵⁾ External clock (data rate = external clock) External clock (data rate = external clock/2) 20 MHz data rate 30 MHz data rate 40 MHz data rate 60 MHz data rate
Output format	S=	0 1 2 3	RGB parallel mode (3 x 8 bits) RGB serial mode/8 bits RGB serial mode/10 bits RGB serial mode/12 bits
C2 compatible timing	Y=	0 1	Standard timing AViVA C2 parallel mode compatible timing (for AViVA C2 replacement)
Image source ⁽²⁾	T=	0 1 2	Sensor raw image Test pattern Sensor corrected image (flat-field correction enabled)
Color matrix ⁽⁶⁾	CRR= CRG= CRB= CGR= CGG= CGB= CBR= CBG= CBB=	-512 to +511 -512 to +511 -512 to +511 -512 to +511 -512 to +511 -512 to +511 -512 to +511 -512 to +511 -512 to +511	Correspond to a (-4) - (+4) gain coefficient (gain coefficient = parameter/128)
Color matrix storage	-M=	1 to 4	Stores the active matrix in the “user matrix 1 to 4”
Configuration recall	+C=	0 1 to 4	Restores the default configuration Restores the user configuration 1 to 4
Configuration storage	-C=	1 to 4	Stores the user configuration 1 to 4
FPN recall	+F=	1 to 4	Restores the FPN factors from the FPN banks 1 to 4
FPN storage	-F=	1 to 4	Stores the active FPN factors in FPN banks 1 to 4
PRNU recall	+P=	1 to 4	Restores the PRNU factors from the PRNU banks 1 to 4
PRNU storage	-P=	1 to 4	Stores the active PRNU factors in the PRNU banks 1 to 4
WB recall	+W=	1 to 4	Restores the white balance factors from WB banks 1 to 4

Table 5-1. Camera Command and Control (Continued)

Setting	Command	Parameter	Description
WB storage	-W=	1 to 4	Stores the active white balance factors in WB banks 1 to 4
Color matrix recall	+M=	1 to 4 5 6 7 8	Apply “user matrix 1 to 4” Apply typical matrix for 3200K light Apply typical matrix for 5500K light Apply typical matrix for 6400K light Apply typical matrix for “white LED” light
Color space correction matrix	N=	0 1	Disable Enable
Integration time	I=	1 to 32768	Integration time (μ s) in free-run or external triggered mode
Trigger mode	M=	1 2 3 4	Free run with integration time setting (see Figure 6-1 on page 9) External trigger with integration time setting (see Figure 6-2 on page 9) Trigger and integration time controlled (see Figure 6-3 on page 9) Trigger and integration time controlled by two inputs (see Figure 6-4 on page 10)
Even data offset ⁽³⁾	O=	0 to 255	Even offset setting from 0 to 255 LSB ⁽⁴⁾
Odd data offset ⁽³⁾	P=	0 to 255	Odd offset setting from 0 to 255 LSB ⁽⁴⁾
Contrast expansion	Q= R=	-4096 to 4095 0 to 255	Digital offset in LSB/12 bits Digital gain x1 to x33 (0.125 steps)
Write FPN ⁽¹⁰⁾	WFP=		Send FPN values
Read FPN ⁽¹¹⁾	RFP=		Read FPN values
Write PRNU ⁽¹⁰⁾	WPR=		Send PRNU values
Read PRNU ⁽¹¹⁾	RPR=		Read PRNU values
Special commands	!=	0 1 2 3 4 5 6 7 8 9	Camera identification readout User camera identification readout Software version readout Camera configuration readout Status readout Start FPN calibration ⁽⁷⁾ Start PRNU calibration ⁽⁸⁾ Start “white balance” calibration ⁽⁹⁾ Software version readout Abort calibration
User camera ID	\$=	String of Char.	Write user camera identification (50 characters maximum)

Note: 1. The camera gain (dB) = $G \times 0.0353$. A and B gain values are set during manufacturing but can be adjusted if necessary.
2. The test pattern is useful for checking if the device is correctly interfaced. The user should see a jagged image of 512 pixel steps.



3. The offset is set during manufacturing to balance both channels. The initial setting is about 13 LSB. In some cases, the user may have to change this setting (for example if the ambient temperature is very high).
4. LSBs are given for 12-bit configurations (available in serial RGB).
5. To be used for multi-camera synchronization. Refer to the “[Output Timing Data](#)” on page 10 for details.

6. Matrix coefficients

$$\begin{bmatrix} R'' \\ G'' \\ B'' \end{bmatrix} = \begin{bmatrix} CRR & CRG & CRB \\ CGR & CGG & CGB \\ CBR & CBG & CBB \end{bmatrix} \times \begin{bmatrix} R' \\ G' \\ B' \end{bmatrix}$$

7. Switch off all lights before starting the FPN (dark) calibration. This calibration must be done before the PRNU calibration.
8. Place a white reference in front of the camera before starting the PRNU (white light) calibration. The light level must be between half and full dynamic range.
9. Place a white reference in front of the camera before starting the white balance calibration. This calibration must be done before FPN and PRNU calibrations.
10. Parameter format: <addr><size><value><value>...
 <addr> = pixel number
 <size> = amount of data sent
 <value> = parameter value (0 to 255 for FPN [0 to 255 LSB]; 0 to 16383 for PRNU [x1 to x2 gain])
 Parameters are sent from <addr> to <addr> + 5 pixels maximum
11. Parameter format: <addr><size>

6. Timing

6.1 Synchronization Mode

Four different modes may be defined by the user. The TRIG1 and TRIG2 signals may be used to trigger external events and control the integration time. A missing trigger is indicated by a rear face DEL flickering.

Table 6-1. Timing Specifications

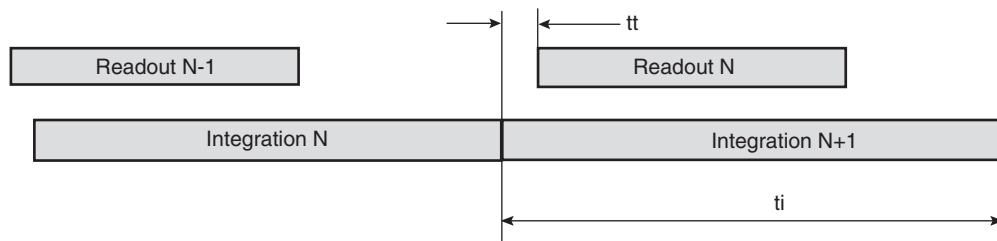
Label	Description	Min	Typ	Max
ti	Integration time duration	1 μs	–	–
td	TRIG1 rising to integration period start delay	–	300 ns	–
tt	Integration period stop to readout start delay	37/data rate		
ts	Integration period stop to TRIG1 rising set-up time	1 μs	–	–
th	TRIG1 or TRIG2 hold time (high pulse duration)	0.1 μs	–	–
td1	Integration start delay		200 ns	
td2	Integration stop delay	68/data rate		
	Line frequency	Data rate/4196		

6.1.1 Free Run Mode with Integration Time Setting

The integration and readout periods start automatically and immediately after the previous period.

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

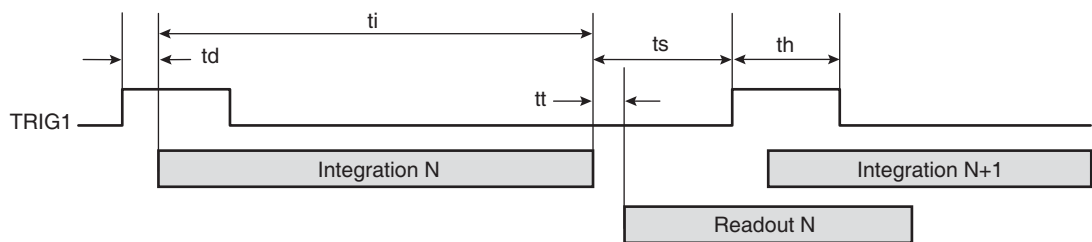
Figure 6-1. Timing Diagram



6.1.2 Triggered Mode with Integration Time Setting

The integration period starts immediately after the rising edge of the TRIG1 input signal and is set by the serial line. This period is immediately followed by a readout period..

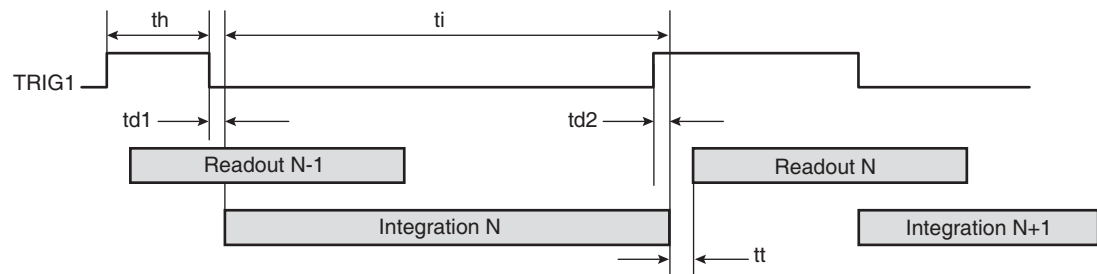
Figure 6-2. Timing Diagram



6.1.3 Trigger and Integration Time Controlled by One Input

The integration period starts immediately after the falling edge of the TRIG1 input signal, stops immediately after the rising edge of TRIG1 input signal, and is immediately followed by a readout period.

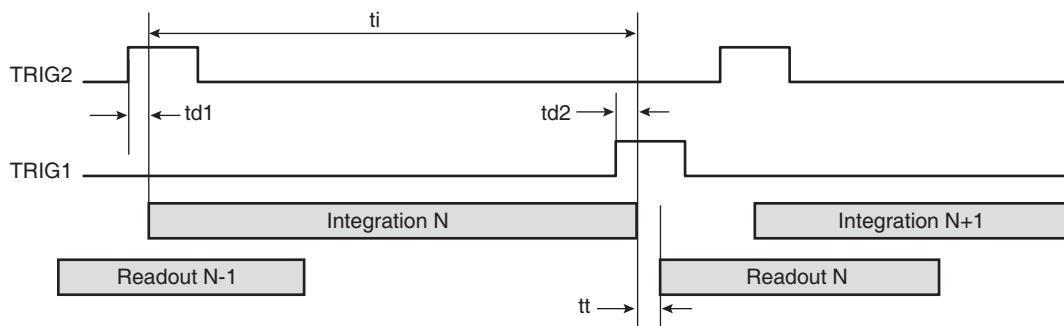
Figure 6-3. Timing Diagram



6.1.4 Trigger and Integration Time Controlled by Two Inputs

The TRIG2 signal's rising edge starts the integration period and the TRIG1 signal's rising edge stops the integration period. This period is immediately followed by a readout period.

Figure 6-4. Timing Diagram



6.2 Output Timing Data

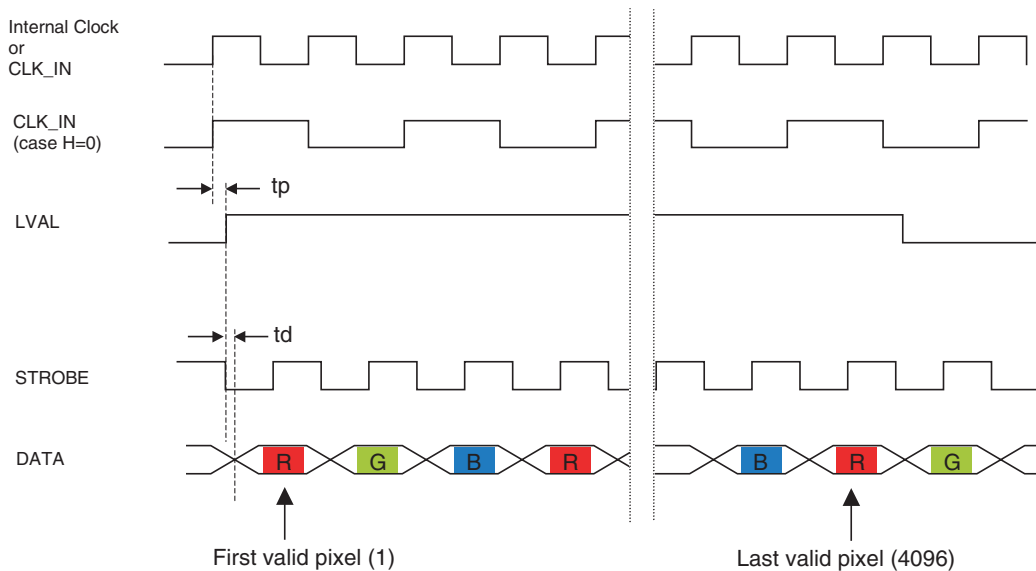
6.2.1 Serial RGB Mode

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, 10 or 8 bits and the test pattern can replace the CCD data (T command).

Table 6-2. Serial RGB Mode

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	-	7 ns	-
td	STROBE to synchronized signal delay	-5 ns	-	+5 ns

Figure 6-5. Timing Diagram



Note: The data rate frequency must be in the range of 5 to 60 MHz. Outside this range, the performances may be degraded.

6.2.2 Parallel RGB Mode

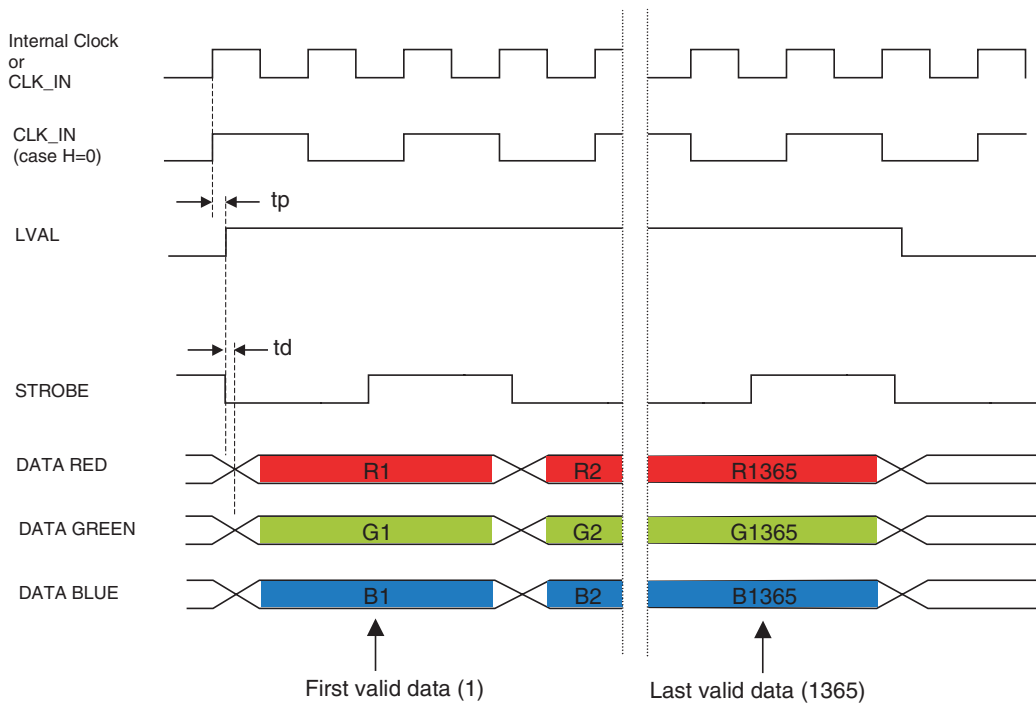
In this mode the color pixels are output in parallel. The data format is 8 bits for each color and the test pattern can replace the CCD data (T command). The “true” 1365 color pixels are provided.

Table 6-3. Parallel RGB Mode

Label	Description	Min	Typ	Max
tp	Input falling edge to output clock propagation delay	–	7 ns	–
td	STROBE to synchronized signals delay	-5 ns	–	+5 ns

Note: The data rate must be in the range of 1 to 20 MHz. Outside this range, performances may be degraded.

Figure 6-6. Timing Diagram



6.2.3 Camera Synchronization

If multiple cameras are synchronized (there is more than one camera on one acquisition board):

- The “master” camera provides DATA, STROBE and LVAL signals to the acquisition board. The other cameras only provide DATA.

- The external clock CLK_IN must be input on each camera to guarantee perfect data synchronization.
- The trigger input(s) (TRIG1 and/or TRIG2) must be input on each camera. We recommend synchronizing the rising edge of these signals on the CLK_IN falling edge.
- Cables must be balanced between each camera (same quality and same length) to ensure perfect synchronization of all the cameras.
- The CLK_IN frequency must be equal to the CCD register frequencies. This means that the user should use H = 0. Using H = 1 or H = 2 clock modes provides LVAL jitters on the “slave” camera.
- Only “triggered and controlled” integration times (M = 3 or M = 4) can be used. These modes ensure perfect initiation of each camera’s readout phase.

7. Electrical Interface

7.1 Power Supply

We recommend inserting a 1A fuse between the power supply and the camera.

Table 7-1. Power Supply

Signal name	I/O	Type	Description
PWR	P	–	DC power input: +12V to +24V ($\pm 0.5V$)
GND	P	–	Electrical and mechanical ground

I = Input, O = Output, I/O = Bi-directional signal, P = Power/ground, NC = Not connected

7.2 Camera Control

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

Table 7-2. Camera Control

Signal name	I/O	Type	Description
TRIG1	I	RS644	Synchronization input (refer to “Synchronization Mode” on page 8)
TRIG2	I	RS644	Start integration period in dual synchronization mode (refer to “Synchronization Mode” on page 8)
CLK_IN	I	RS644	External clock for multi-camera synchronization (refer to “Synchronization Mode” on page 8)

I = Input, O = Output, I/O = Bi-directional signal, P = Power/ground, NC = Not connected

7.3 Video Data

Table 7-3. Video Data

Signal name	I/O	Type	Description
DATA[11-0]	O	RS644	Pixel data DATA-00 = LSB, DATA-11 = MSB
STROBE	O	RS644	Output data clock (refer to “ Output Timing Data ” on page 10), data valid on the rising edge
LVAL	O	RS644	Line valid (refer to “ Output Timing Data ” on page 10), active high signal

I = Input, O = Output, I/O = Bi-directional signal, P = Power/ground, NC = Not connected

7.4 Serial Communication

The RS-232 interface enables you to define the camera’s parameters.

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 7-4. Serial Communication

Signal name	I/O	Type	Description
TX	O	RS-232	Transmitted data
RX	I	RS-232	Received data

7.4.1 Command Syntax

The valid syntax is “S=n(CR)”:

- S: command identification as per “[Camera Command and Control](#)” on page 5.
- n: setting value
- (CR) means “carriage return”

No space or tab should be inserted between S, =, n and (CR).

Example of a valid command:

- G=3(CR): this 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 the valid range

It is recommended to wait for the “>OK” camera return before sending a new command.

7.4.2 Command Processing

All commands received by the camera are processed:

- If the command is valid:
 - and it is a write command, the setting is performed
 - and it is a read command, the camera returns the data separated by (CR)
 - the camera returns: >OK(CR)
- If the command is not valid:
 - nothing happens
 - the camera returns: >1 = out of range; >2 = syntax error; >4 = invalid command; others = internal error;

Example: when receiving “!=3(CR)”, the camera returns its current settings:

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

7.5 Storage of the Settings in EEPROM

The current settings must be saved in EEPROM before the camera is switched off. The maximum number of write cycles allowed for EEPROM is 100 000.

8. Connector Description

All connectors are on the rear panel.

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

8.1 Power Supply

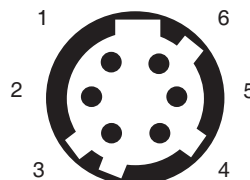
The camera connector type is a Hirose HR10A-7R-6PB (male).

The cable connector type is a Hirose HR10A-7P-6S (female).

Table 8-1. Power Supply Connector Pinout

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

Figure 8-1. Receptacle Viewed from Rear Face of Camera



8.2 RS-232 Connector

The camera connector type is 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 also connected together inside the camera.

Table 8-2. RS-232 Connector Pinout

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

8.3 44-Pin Data and Synchro Connector

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

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

Table 8-3. 44-pin Data and Synchro Connector when Used in 12-bit Output Format (S = 3)

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

Table 8-4. 44-pin Data and Synchro Connector when Used in 10-bit Output Format (S = 2)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	12	–	23	DATA-03+	34	DATA-06-
2	CLK_IN+	13	–	24	DATA-08+	35	DATA-07+
3	DATA-04-	14	LVAL+	25	–	36	DATA-01+
4	DATA-05-	15	STROBE+	26	–	37	DATA-02+
5	DATA-07-	16	CLK_IN-	27	–	38	DATA-03-

Table 8-4. 44-pin Data and Synchro Connector when Used in 10-bit Output Format (S = 2)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
6	DATA-00+	17	TRIG1+	28	–	39	DATA-09+
7	DATA-02-	18	TRIG1-	29	LVAL-	40	–
8	DATA-08-	19	DATA-05+	30	STROBE-	41	–
9	DATA-09-	20	DATA-06+	31	TRIG2-	42	–
10	–	21	DATA-00-	32	TRIG2+	43	–
11	–	22	DATA-01-	33	DATA-04+	44	GND

Table 8-5. 44-pin Data and Synchro Connector when Used in 8-bit Output Format (S = 1)

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

Table 8-6. 44-pin Data and Synchro Connector: Used in RGB Parallel Modes (S = 0)

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	CLK_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+

Table 8-6. 44-pin Data and Synchro Connector: Used in RGB Parallel Modes (S = 0)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
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

8.4 26-pin Data Connector

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

When in RGB serial mode, the outputs on this connector are all set to low.

Table 8-7. 26-pin Data Connector: Used in RGB Parallel Modes (S = 0)

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-	–	–

9. Mechanical Characteristics

9.1 Weight

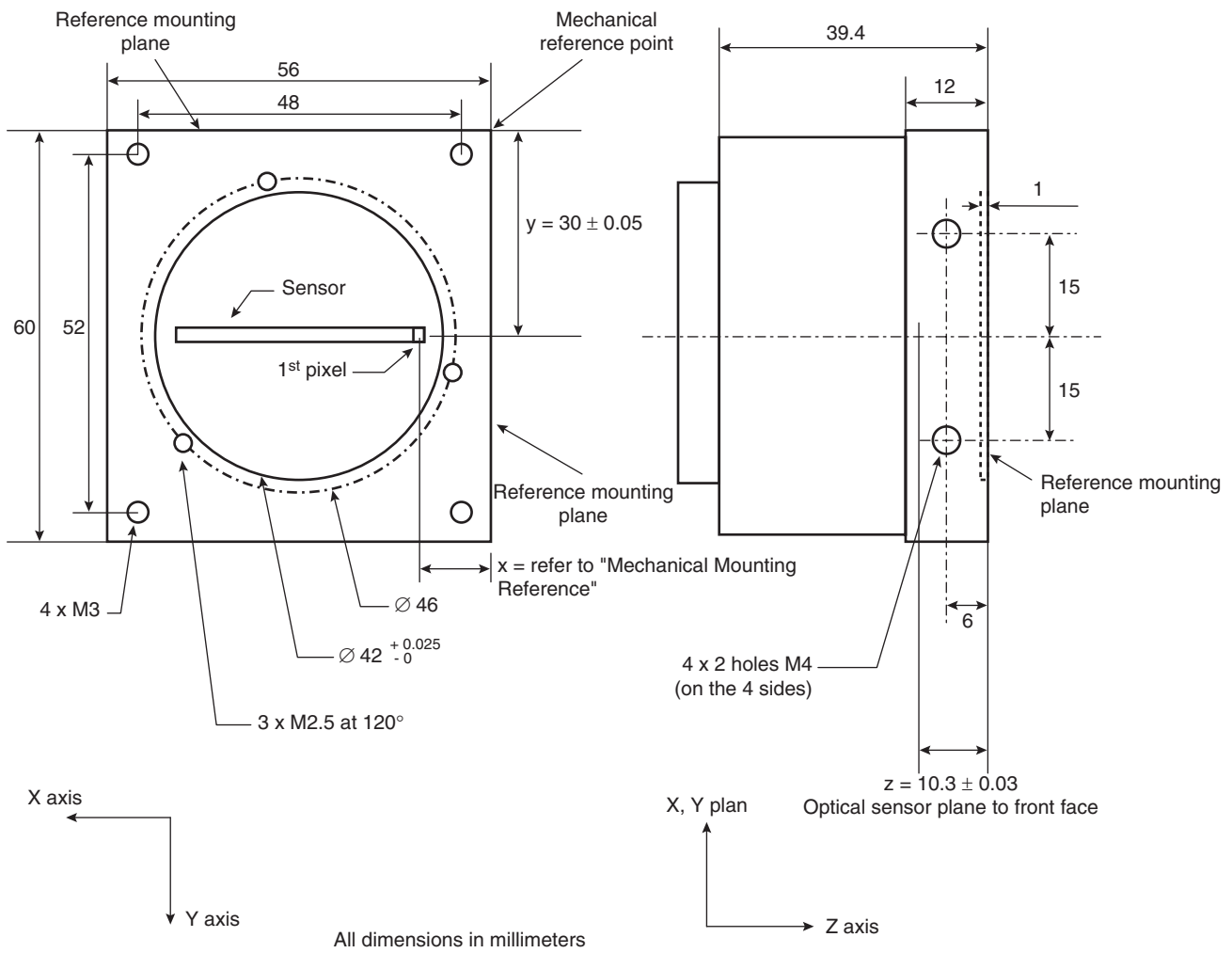
The camera's typical weight (without lens or lens adapter) is 220g or 7.7 ounces.

9.2 Dimensions

The camera's dimensions, without the lens, are:

- 56 mm width
- 60 mm height
- 39.4 mm length

Figure 9-1. Mechanical Box Drawing and Dimensions

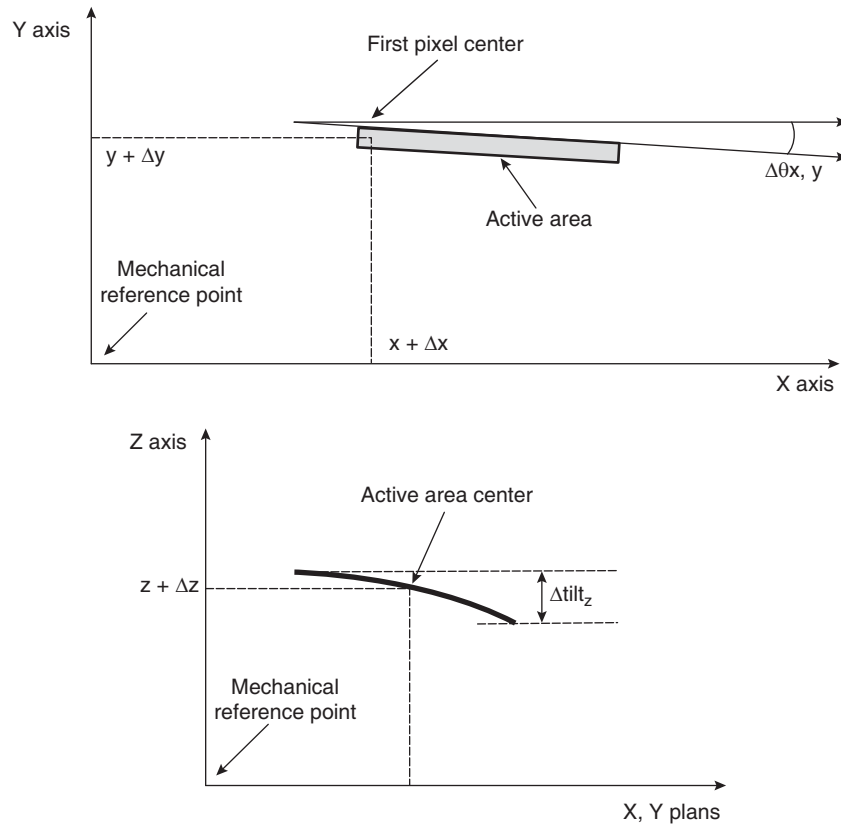


9.3 Mechanical Mounting Reference

The front panel's mechanical area is designed to support mounting of the camera. Three surfaces on this mechanical area are considered as appropriate mounting reference surfaces. This implies that the distances between these surfaces and the first active pixel are very precise (better than $\pm 50 \mu\text{m}$).

9.4 Sensor Alignment

Figure 9-2. Sensor Alignment Diagram



9.5 Mounting of Lens (Lens not Supplied)

The camera can be provided with a Nikon F, T2 or M42 x 1 mount.

9.6 Heat Sink Mounting

To improve power dissipation, the camera can be delivered with a heat sink to be mounted by the user on the side faces of the camera. The heat sink is an option.

10. Ordering Codes

Table 10-1. Ordering Code

Part Number	Resolution	Description
AT71-SC2LV4010-BA1	4096	AViVA SC2 LV 4010 with BG38 filter
AT71KFPVIVA-ABA	–	F mount (NIKON)
AT71KFPVIVA-AKA	–	T2 mount (M42 x 0.75)
AT71KFPVIVA-ADA	–	M42 x 1 mount
AT71KAVIVAP2C0D4A0	–	Cable kit: 10-meter power supply and 5-meter LVDS cables



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