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**
- **CameraLink™ Data Format (Base Configuration)**
- **High Data Rate up to 60 Mpixels/s**
- **Flexible and Easy to Operate via Serial Control Lines:**
  - **Exposure Time: 1 to 32,000 µs**
  - **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.
- Atmel 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.

CameraLink™ Color Linescan Camera

AViiVA™ SC2

Preliminary

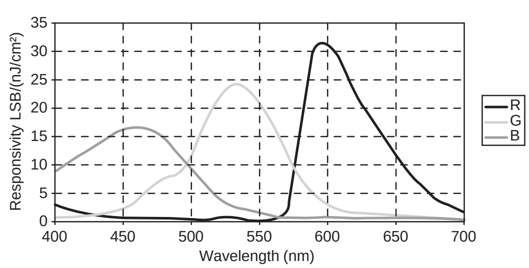
5373A–IMAGE–03/04

Typical Performances

Table 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 150			–
Radiometric Performances (Maximum Pixel Rate, Tamb = 25°C)				
Dynamic range	12 (also configurable in 8 or 10)			bit
Spectral range	250 – 1100			nm
Linearity (G = 0)	< 2			%
Gain range (steps of 0.035 dB)	Gmin -2	Gnom 0	Gmax 22	dB
Peak response (1)(2) Blue Green Red	 16.6 24.2 31.3	 21.5 31.5 41	 263 383 496	 LSB/(nJ/cm^2) LSB/(nJ/cm^2) LSB/(nJ/cm^2)
Output RMS noise SNR	 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 20)	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	< 6.5			W
Operating temperature (3)	0 to 65 (non-condensing)			°C
Storage temperature	-40 to 75 (non-condensing)			°C

Spectral Response (1)(2)



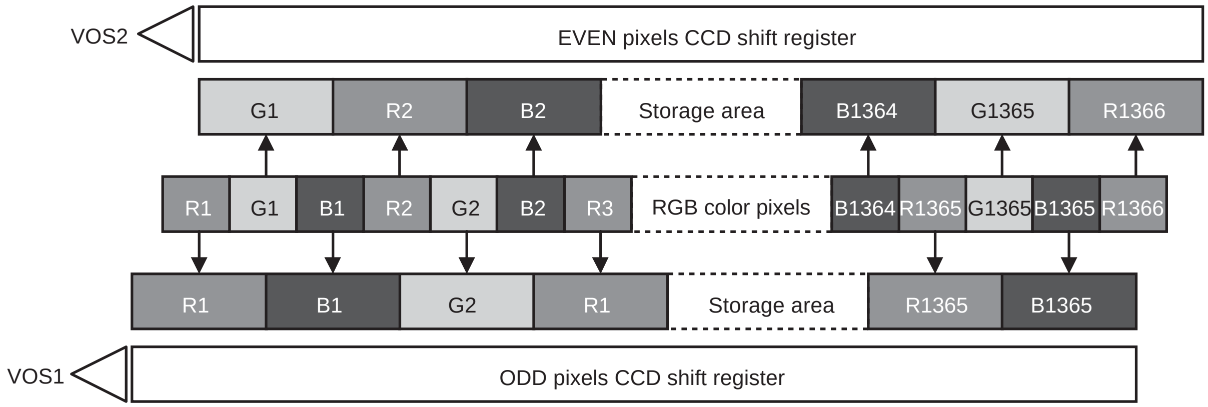
Notes:
1. LSBs are given for a 12-bit configuration (available in serial RGB)
2. nJ/cm² measured on the sensor with 2 mm BG38
3. Camera’s front face temperature

Color Principle

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 1. Color CCD Sensor Synoptic



IR Cut-off Filter

For calibrated color response, the AViiVA SC2 sensor should not be exposed to IR wavelengths (> 700 nm). Therefore, depending on the light source, one should decide whether or not to place an IR cut-off filter in front of the sensor. The AViiVA SC2 sensor has been calibrated with a 2 mm BG38. The AViiVA SC2 is available with or without a 2 mm BG38 (refer to “Ordering Codes” on page 21).

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.

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

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.

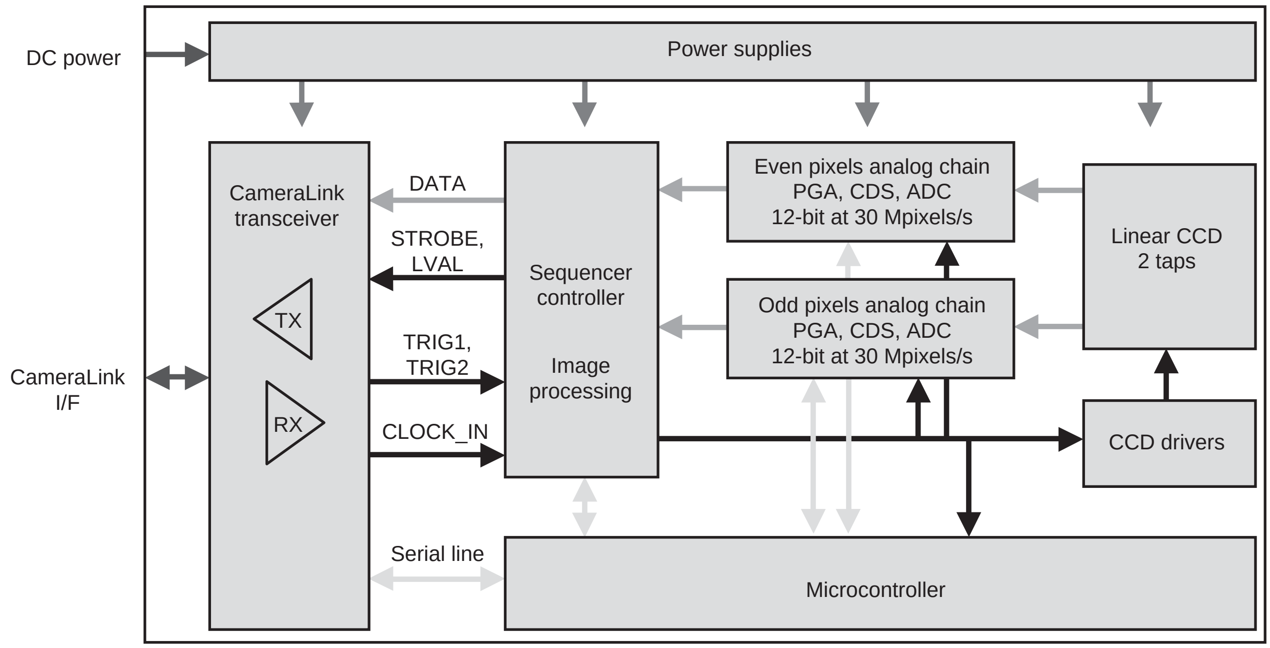
After white balance, the color space correction should be done to improve color response. This correction consists of a linear operation to convert the RGB triplet from the camera’s color space to the RGB triplet of the final color space. The final color space can be a monitor, a printer or another application’s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

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

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

Camera Description

Figure 2. 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 the CameraLink™ interface. The camera uses the base configuration of the CameraLink standard.

Note: FVAL = 0

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

Standard Conformity

The Aviiva cameras have been tested using the following equipment:

- A shielded power supply cable
- A CameraLink data transfer cable ref. 14B26-SZLB-500-OLC (3M™)
- A linear AC-DC power supply

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

CE Conformity

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

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.

Camera Command and Control

The camera is configured through the serial interface. Please refer to “Serial Communication” on page 15 for the serial line’s detailed protocol.

Table 2. 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(2)	H=	0 1 2 3 4 5 6	External clock (data rate = 2 x external clock)(7) 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(3)	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
Image source(4)	T=	0 1 2	Sensor raw image Test pattern Sensor corrected image (flat-field correction enabled)
Color matrix(8)	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

Table 2. Camera Command and Control (Continued)

Setting	Command	Parameter	Description
WB recall	+W=	1 to 4	Restores the white balance factors from WB banks 1 to 4
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 (µs) in free-run or external triggered mode
Trigger mode	M=	1 2 3 4	Free run with integration time setting (see Figure 3 on page 8) External trigger with integration time setting Trigger and integration time controlled Trigger and integration time controlled by two inputs
Even data offset[5]	O=	0 to 255	Even offset setting from 0 to 255 LSB[6]
Odd data offset[5]	P=	0 to 255	Odd offset setting from 0 to 255 LSB[6]
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[12]	WFP=		Send FPN valuess
Read FPN[13]	RFP=		Read FPN values
Write PRNU[12]	WPR=		Send PRNU values
Read PRNU[13]	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[9] Start PRNU calibration[10] Start “white balance” calibration[11] Software version readout Abort calibration
User camera ID	$=	String of Char.	Write user camera identification (50 characters maximum)

Notes:
1. The camera gain (dB) = G x 0.0353. A and B gain values are set during manufacturing but can be adjusted if necessary.
2. The CameraLink standard does not allow working below a 20 MHz clock frequency..
3. The pinout corresponding to this option is fully compatible with the CameraLink standard (See “Electrical Interface” on page 14.).
4. The test pattern is useful for checking if the device is correctly interfaced. The user should see a jagged image of 256 pixels steps.

5. 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).
6. LSBs are given for 12-bit configurations (available in serial RGB).
7. To be used for multi-camera synchronization. Refer to the “Output Timing Data” on page 10 for details.

8. Matrix coefficients

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

9. Switch off all lights before starting the FPN (dark) calibration. This calibration must be done before the PRNU calibration.
10. 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.
11. 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.
12. 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
13. Parameter format: <addr><size>

Timing

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. The master clock is either an external or internal clock. The timing is given for maximum frequency settings.

Free-run Mode with Integration Time Setting

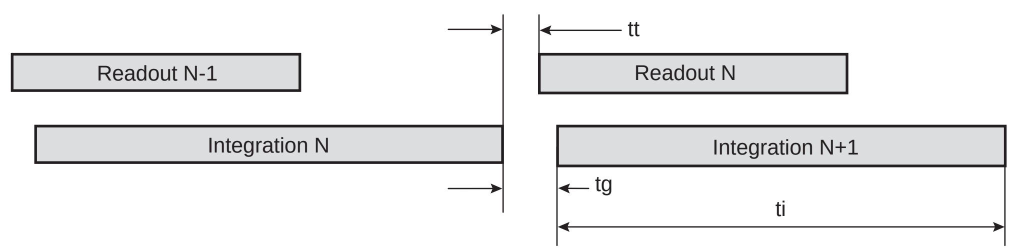
The integration and readout periods start automatically and immediately after the previous period. The readout time depends on the number of pixels and the pixel rate.

Table 3. Free Run Mode with Integration Time Setting

Label	Description	Min	Typ	Max
ti	Integration time duration	(1)	–	32 ms
tg	Consecutive integration period gap (at maximum frequency)	–	6 µs	–
tt	Integration period stop to readout start delay	–	1 µs	–

Note: 1. 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 3. Timing Diagram



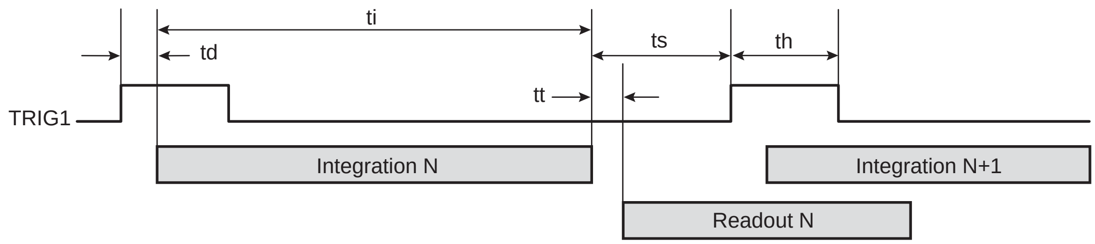
Triggered Mode with Integration Time Setting

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. The readout time depends on the number of pixels and the pixel rate.

Table 4. Triggered Mode with Integration Time Setting

Label	Description	Min	Typ	Max
ti	Integration time duration	1 µs	–	32 ms
td	TRIG1 rise to integration period start delay	–	<1 µs	–
tt	Integration period stop to readout start delay	–	1 µs	–
ts	Integration period stop to TRIG1 rise setup time	4 µs	–	–
th	TRIG1 hold time (high pulse duration)	0.1 µs	–	–

Figure 4. Timing Diagram



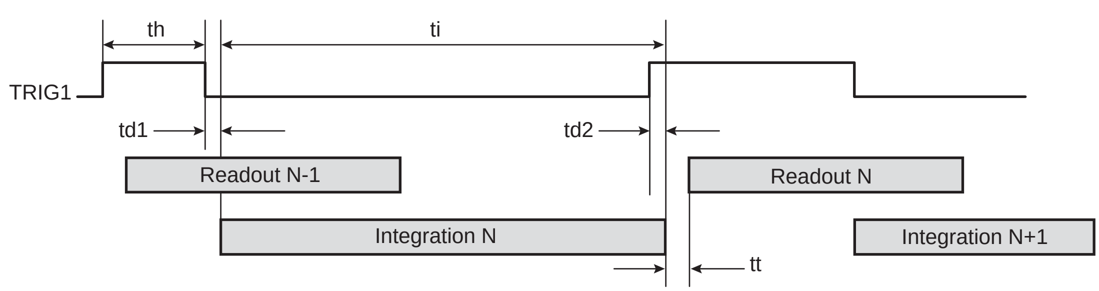
Trigger and Integration Time Controlled by One Input

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

Table 5. Trigger and Integration Time Controlled by One Input

Label	Description	Min	Typ	Max
ti	Integration time duration	1 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 readout start delay	–	1 µs	–
th	TRIG1 hold time (high pulse duration)	0.1 µs	–	–

Figure 5. Timing Diagram



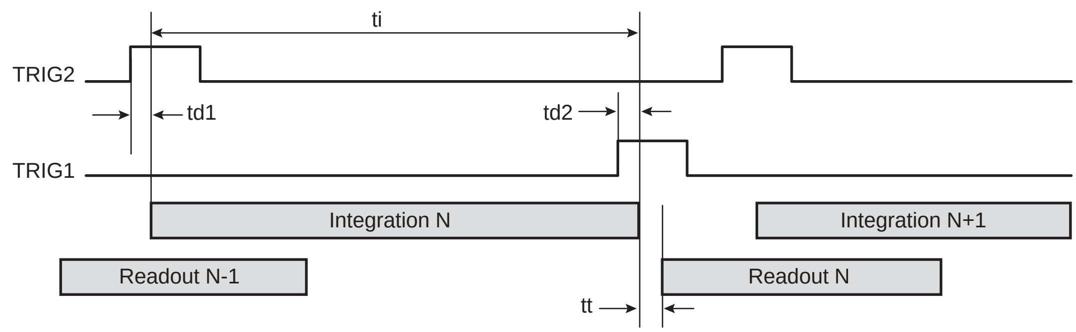
Trigger and Integration Time Controlled by Two Inputs

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.

Table 6. Trigger and Integration Time Controlled by Two Inputs

Label	Description	Min	Typ	Max
ti	Integration time duration	1 µs	–	–
td1	TRIG2 rise to integration period start delay	–	100 ns	–
td2	TRIG1 rise to integration period stop delay	–	1.3 µs	–
tt	Integration period stop to readout start delay	–	1 µs	–
th	TRIG1 and TRG2 hold time (high pulse duration)	0.1 µs	–	–

Figure 6. Timing Diagram



Output Timing Data

This timing data corresponds to the input data of the "Channel Link" interface. The camera's output data is not detailed here as it is fully compliant with the CameraLink standard (serial high-speed interface).

Serial RGB Mode

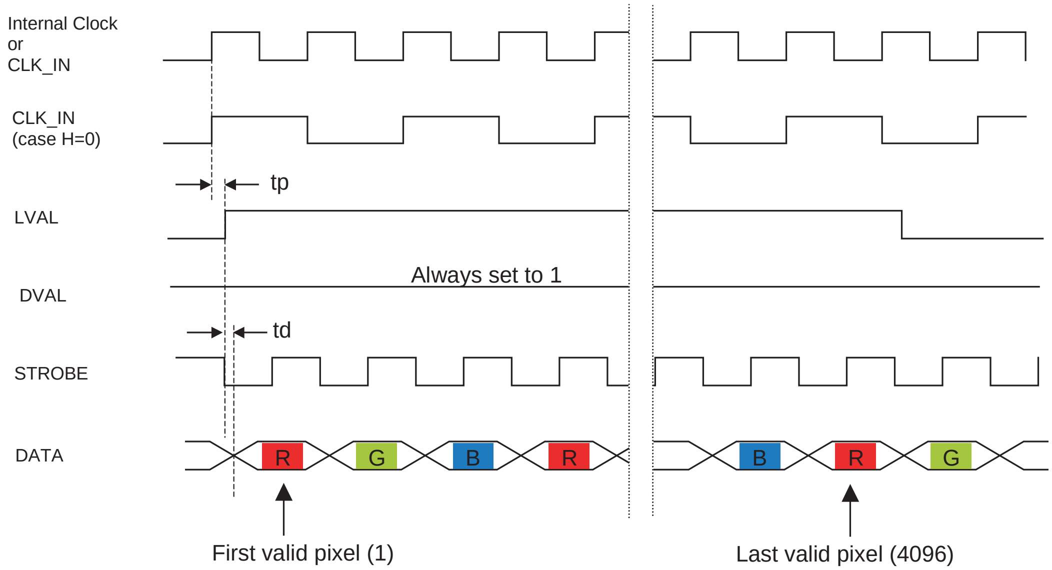
In this mode, the pixels are output on a single tap as they are implemented on the sensor. The data format can be configured in 12, 10 or 8 bits (Y command) and the test pattern can replace the CCD data (T command).

Table 7. 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

Note: The CLK_IN frequency must be in the range of 5 to 60 MHz. Outside this range, performances may be degraded.
In this mode, the STROBE frequency is equal to CLK_IN or to the internal clock frequency and DLVAL is always set to 1.

Figure 7. Timing Diagram



Parallel RGB Mode

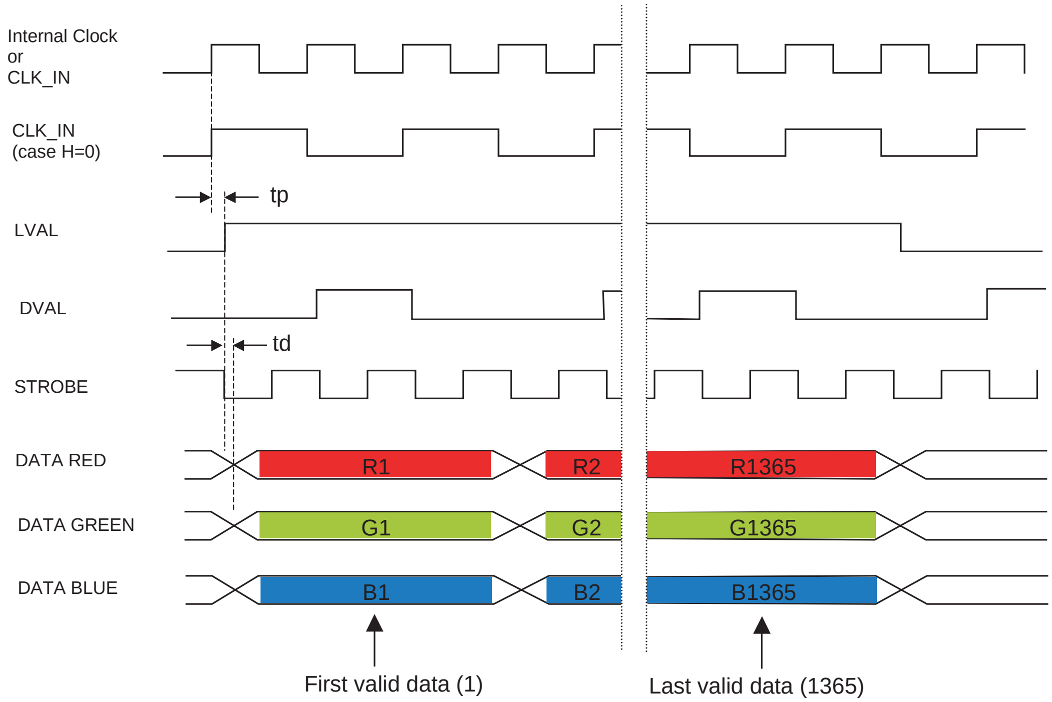
In this mode the color pixels are output in parallel. The data format is 8 bits for each color and the test pattern can replace the CCD data (T command). The "true" 1365 color pixels are provided.

Table 8. Parallel RGB Mode with 3 to 1 Interpolation

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 CLK_IN frequency must be in the range of 5 to 60 MHz. Outside this range, performances may be degraded. The STROBE frequency is equal to CLK_IN or to the internal clock's frequency. DVAL is used to select the RnGnBn triplet (number from 1 to 1365).

Figure 8. Timing Diagram



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 two 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 “trigged and controlled” integration times (M = 3 or M = 4) can be used. These modes ensure perfect initiation of each camera’s readout phase.

Electrical Interface

Power Supply

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

Table 9. 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 CameraLink interface provides three LVDS signals dedicated to camera control (CC1 to CC4). On the AViiVA, three of them are used to synchronize the camera with external events.

Table 10. Camera Control

Signal name	I/O	Type	Description
TRIG1	I	RS644	CC1 - Synchronization input (refer to “Synchronization Mode” on page 8)
TRIG2	I	RS644	CC2 - Start integration period in dual synchronization mode (refer to “Synchronization Mode” on page 8)
CLOCK_IN	I	RS644	CC4 - External clock for multi-camera synchronization (refer to “Synchronization Mode” on page 8)

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

Video Data

Table 11. Video Data

Signal name	I/O	Type	Description
ODD[11-0]	O	RS644	Odd pixel data (refer to “Output Timing Data” on page 10), ODD-00 = LSB, ODD-11 = MSB
EVEN[11-0]	O	RS644	Even pixel data (refer to “Output Timing Data” on page 10), EVEN-00 = LSB, EVEN-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
DVAL	O	RS644	Data valid (refer to “Output Timing Data” on page 10), active high signal

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

Note: FVAL as defined in the CameraLink standard, is not used. FVAL is permanently tied to 0 (low level). In the case of a single output, the multiplexed data is output instead of the odd data.

Serial Communication

The CameraLink interface provides two LVDS signal pairs for communication between the camera and the frame grabber. This is an asynchronous serial communication based on the RS-232 protocol.

The serial line's configuration is:

- Full duplex/without handshaking.
- 9600 bauds, 8-bit data, no parity bit, 1 stop bit.

Table 12. Serial Communication

Signal name	I/O	Type	Description
SerTFG	O	RS644	Differential pair for serial communication to the frame grabber
SerTC	I	RS644	Differential pair for serial communication from the frame grabber

Command Syntax

The valid syntax is “S=n(CR)””:

- S: command identification as per “Camera Command and Control” on page 6.
- 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 6 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

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)

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.

Connector Description

All connectors are on the rear panel.

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

Power Supply

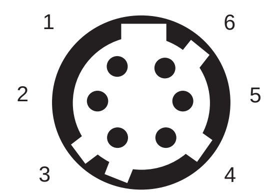
The camera connector type is a Hirose HR10A-7R-6PB (male).

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

Table 13. Power Supply Connector Pinout

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

Figure 9. Receptacle Viewed from Rear Face of Camera



CameraLink Connector

A standard CameraLink cable must be used to ensure full electrical compatibility.

The camera connector type is MDR-26 (female), ref. 10226-2210VE.

The recommended cable connector type is a standard CameraLink cable (3M - 14B26-SZLB-x00-OLC)

Table 14. CameraLink Connector Pinout

Signal	Pin	Signal	Pin	Signal	Pin
GND	1	CC2+	10	X3+	19
X0-	2	CC3-	11	SerTC-	20
X1-	3	CC4+	12	SerTFG+	21
X2-	4	GND	13	CC1+	22
Xclk-	5	GND	14	CC2-	23
X3-	6	X0+	15	CC3+	24
SerTC+	7	X1+	16	CC4-	25
SerTFG-	8	X2+	17	GND	26
CC1-	9	Xclk+	18	–	–

Bit Assignments

The following bit assignments are compliant with the CameraLink specification in the base configuration.

Table 15. Bit Assignments When Used in RGB Serial Mode with 12-bit Data

Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name
DATA-00	Tx0	DATA-07	Tx5	NC	Tx19	NC	Tx14
DATA-01	Tx1	DATA-08	Tx7	NC	Tx20	NC	Tx10
DATA-02	Tx2	DATA-09	Tx8	NC	Tx21	NC	Tx11
DATA-03	Tx3	DATA-10	Tx9	NC	Tx22	STROBE	TxCLK
DATA-04	Tx4	DATA-11	Tx12	NC	Tx16	LVAL	Tx24
DATA-05	Tx6	NC	Tx15	NC	Tx17	–	–
DATA-06	Tx27	NC	Tx18	NC	Tx13	–	–

Table 16. Bit Assignments When Used in RGB Serial Mode with 10-bit Data

Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name
DATA-00	Tx0	DATA-07	Tx5	NC	Tx19	NC	Tx14
DATA-01	Tx1	DATA-08	Tx7	NC	Tx20	NC	Tx10
DATA-02	Tx2	DATA-09	Tx8	NC	Tx21	NC	Tx11
DATA-03	Tx3	NC	Tx9	NC	Tx22	STROBE	TxCLK
DATA-04	Tx4	NC	Tx12	NC	Tx16	LVAL	Tx24
DATA-05	Tx6	NC	Tx15	NC	Tx17	–	–
DATA-06	Tx27	NC	Tx18	NC	Tx13	–	–

Table 17. Bit Assignments When Used in RGB Serial Mode with 8-bit Data

Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name
DATA-00	Tx0	DATA-07	Tx5	NC	Tx19	NC	Tx14
DATA-01	Tx1	NC	Tx7	NC	Tx20	NC	Tx10
DATA-02	Tx2	NC	Tx8	NC	Tx21	NC	Tx11
DATA-03	Tx3	NC	Tx9	NC	Tx22	STROBE	TxCLK
DATA-04	Tx4	NC	Tx12	NC	Tx16	LVAL	Tx24
DATA-05	Tx6	NC	Tx15	NC	Tx17	–	–
DATA-06	Tx27	NC	Tx18	NC	Tx13	–	–

Table 18. Bit Assignments When Used in RGB Parallel Mode (3 x 8-bit Data)

Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name	Bit	DS90CR285 Pin Name
RED-00	Tx0	RED-07	Tx5	BLUE-02	Tx19	GREEN-05	Tx14
RED-01	Tx1	GREEN-00	Tx7	BLUE-03	Tx20	GREEN-06	Tx10
RED-02	Tx2	GREEN-01	Tx8	BLUE-04	Tx21	GREEN-07	Tx11
RED-03	Tx3	GREEN-02	Tx9	BLUE-05	Tx22	STROBE	TxCLK
RED-04	Tx4	GREEN-03	Tx12	BLUE-06	Tx16	LVAL	Tx24
RED-05	Tx6	BLUE-00	Tx15	BLUE-07	Tx17	–	–
RED-06	Tx27	BLUE-01	Tx18	GREEN-04	Tx13	–	–

Mechanical Characteristics

Weight

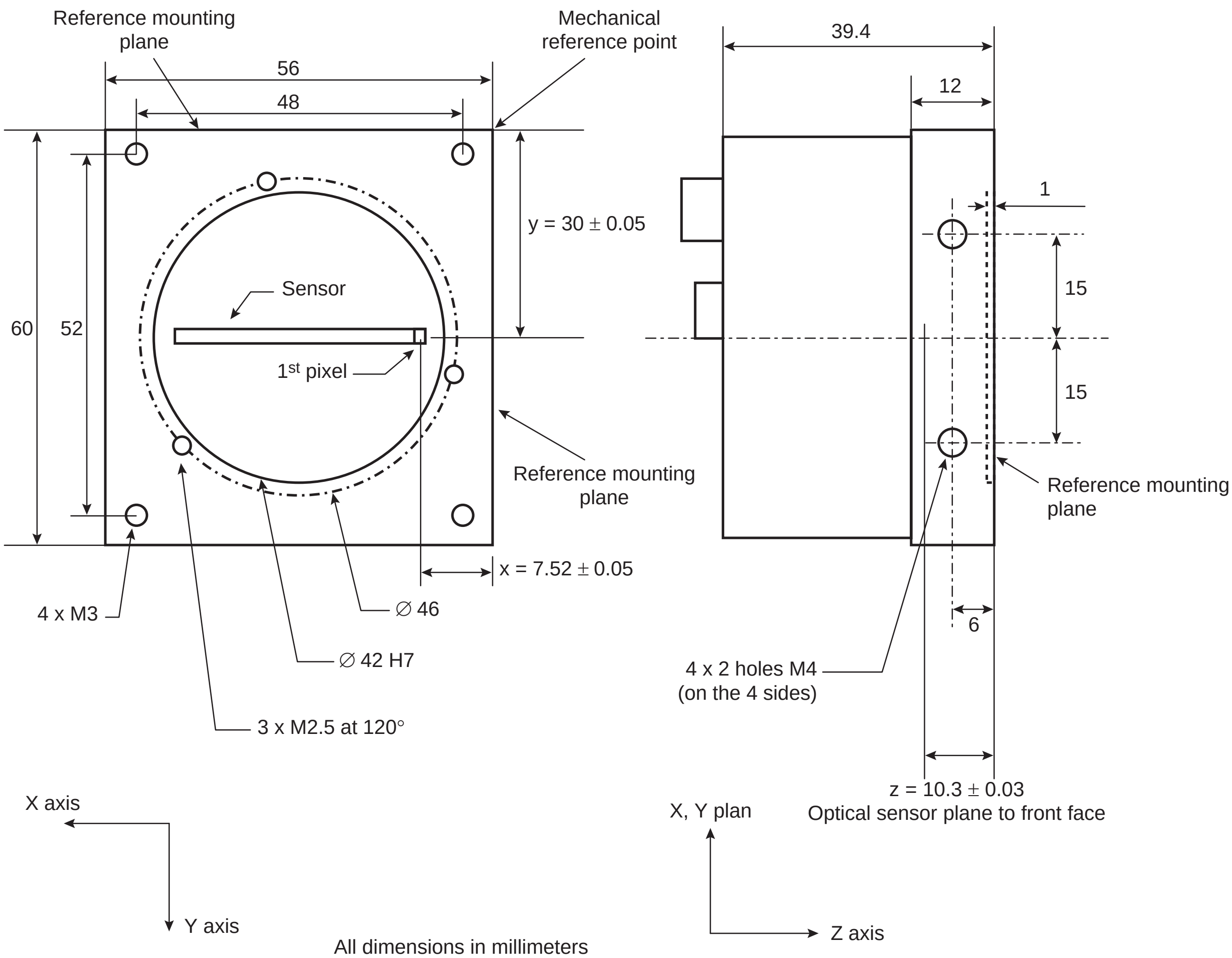
The camera's typical weight (without lens or lens adapter) is 220g or 7.7 ounces.

Dimensions

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

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

Figure 10. Mechanical Box Drawing and Dimensions

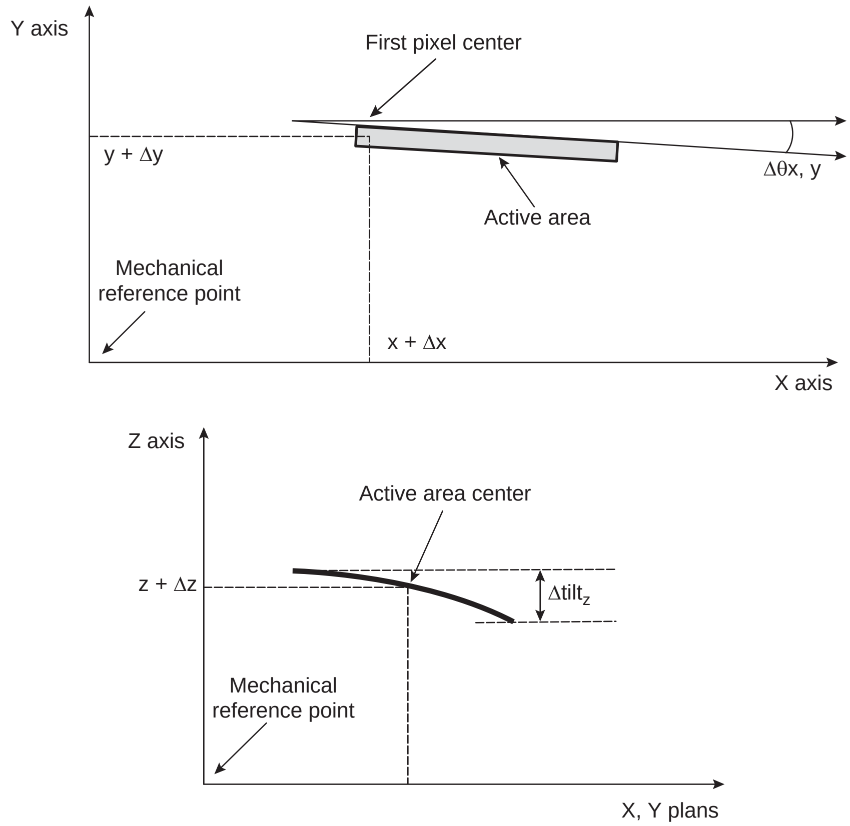


Mechanical Mounting Reference

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 ±50 µm).

Sensor Alignment

Figure 11. Sensor Alignment Diagram



Mounting of Lens (Lens not Supplied)

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

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.

Ordering Codes

Table 19. Ordering Code

Part Number	Resolution	Description
AT71SC2CL4010-BA0	4096	AViiVA SC2 CL 4010 without BG38 filter
AT71SC2CL4010-BA1	4096	AViiVA SC2 CL 4010 with BG38 filter
AT71KFPAVIVA-ABA	–	F mount (NIKON)
AT71KFPAVIVA-AKA	–	T2 mount (M42 x 0.75)
AT71KFPAVIVA-ADA	–	M42 x 1 mount
AT71KAVIVAP2C0D3A0	–	Cable kit: 10-meter power supply and 5-meter CameraLink cables

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Zone Industrielle
13106 Rousset Cedex, France
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Fax: (33) 4-42-53-60-01

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Fax: 1(719) 540-1759

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