

SENTECH

STC-AF134DV **Product Specification**

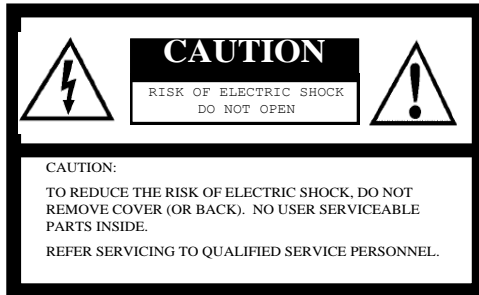
16:9 Format 1.3 MegaPixel
11x Zoom Auto Focus Camera

For design help, accessories or pricing, please contact:
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Safety Precautions



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For U.S.A.

Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, i.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

For Canada

Warning:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Product Precautions

- Handle the camera with care. Do not abuse the camera. Avoid striking or shaking it. Improper handling or storage could damage the camera.
- Do not pull or damage the camera cable.
- During camera use, do not wrap the unit in any material. This will cause the internal temperature of the unit to increase.
- Do not expose the camera to moisture, or do not try to operate it in wet areas.
- Do not operate the camera beyond its temperature, humidity and power source ratings.
- While the camera is not being used, keep the lens or lens cap on the camera to prevent dust or contamination from getting in the CCD or filter area and scratching or damaging this area.
- Do not keep the camera under the following conditions:
 - In wet, moist, and high humidity areas
 - Under hot direct sunlight
 - In high temperature areas
 - Near an object that releases a strong magnetic or electric field
 - Areas with strong vibrations
- Use a soft cloth to clean the camera. Use pressured air spray to clean the surface of the glass. DO not scratch the surface of the glass.

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Content

I. Specifications	5-10
A. Electronic Specifications / Mechanical Specifications / Environmental Specifications.....	5
B. Connector Specifications	6
1. Mechanical Drawings.....	6
2. Connector-A: Video Output (DVI)	6
3. Connector-B: Video Output (DVI, CN207).....	7
4. Connector-C: Video Output (LVDS, CN204)	7
5. Connector-D: HD/VD signal output (CN206).....	8
6. Connector-E (CN303): Power Input	8
7. Connector-F (CN305): External Switch Connection	9
8. Connector-G (CN304): UART Communication	9
C. Output timing.....	10
II. Camera Operations	11-16
A. ALC Operations	11
B. Shutter Settings.....	11
C. External Switch Assignable Functions.....	12
D. User Configurable Functions.....	13-16
III. Dimensions	17

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I. Specifications

A. Electronic Specifications / Mechanical Specifications / Environmental Specifications

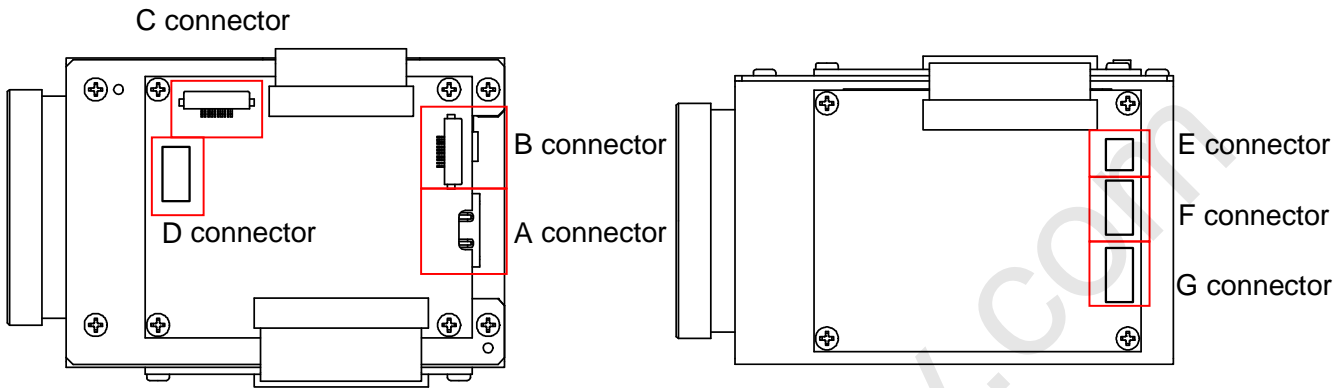
Product		STC-AF134DV		
Electronic Specifications	Imager	1/4" SXGA CMOS: IMX076 (SONY)		
	Effective Picture Elements	1392 (H) x 1076 (V)		
	Active Picture Elements	1280 (H) x 720 (V)		
	Chip Size	6.05 (H) x 5.4 (V) mm		
	Cell Size	2.8 (H) x 2.8 (V) μm		
	Minimum Scene Illumination	13.0 Lux at F1.6 (at zoom out position) at 50% IRE, AGC ON and 1/60 seconds shutter speed with IR cut filter		
	Sync System	Internal		
	Video Output	DVI 1.0 Conformity RGB, 1280 (H) x 720 (V), 60 Hz / 50 Hz		
	Camera Functions	ALC	Can be configured via the UART communication With optical iris, auto electronic shutter and AGC Adjustable shutter speed via the UART communication	
		Shutter Speed	Extended	Available up to 0.5 seconds
			High Speed	Up to 1/100,000 seconds at 60 Hz or up to 1/83,333 seconds at 50Hz
		Gain	AGC	AGC or Fixed Gain selectable via the UART communication 0 to 24 dB
			Fixed Gain	0 to 24 dB
		Digital Gain	Up to 12.0242 dB	
		Gamma	1.0, 0.9, 0.8, 0.7, 0.6, 0.5, 0.45, 0.3 or manual gamma Selectable gamma via the UART communication	
		White Balance	Auto white balance / manual white balance / push-to-set white balance White balance selectable via the UART communication	
		Mirror Image	Horizontal and vertical flip are selectable via UART communication	
		Picture Modes	3 picture modes: Picture, Bright and Pseudo Color (includes 30 pseudo colors) Picture mode selectable via the UART communication	
		Line Generator	Both horizontal and vertical with all available colors Thickness adjustable via the UART communication	
		Shadow Mask Generator	Horizontal and vertical w/ shading level adjustment via the UART communication	
Motion Detection		ON/OFF selectable via the UART communication		
Digital Zoom		x1 to x 128 digital zoom Digital pan and tilt is available on still images		
Freeze Image		Live or freeze image is selectable via UART communication Digital pan and tilt is available on still images		
Communication		UART communication via C304 (S4B-ZR-SM4A, JST) connector		
Character Generator	Built-in character generation function via the UART communication			
Lens Control Functions	Optical Zoom	Manual zoom position control via UART communication		
	Focus	Auto focus / manual focus / push set focus Focus mode selectable via the UART communication		
	Iris	Auto iris / manual iris / push-set iris Selectable iris control mode via the UART communication		
Power	Input Voltage	8Vdc to 15Vdc (Typically: 12Vdc)		
	Consumption	< 4.5 W		
Mechanical Specifications	Dimensions	55.5 (W) x 48.5 (H) x 76 (D) mm		
	Auto Focus Lens	11x auto focus zoom lens (Tamron) Optical zoom range: from 5.2 mm to 58.8 mm Aperture: F1.6 at f = 5.2 mm to F3.0 at f = 58.8 mm		
	Close-up Lens	Does not include close-up lens		
	Optical Filter	IR cut filter ON; IR cut filter ON/OFF selectable via the UART communication		
	Interface Connector	Video Output (DVI)	Mini-HDMI connector / CN207, SSL00-10L3 (KEL)	
		Power Input (LVDS)	CN204, SSL00-10L3 (KEL)	
		HD/VD signal output	CN206, SM05B-SRSS (JST)	
		Power input	CN303, S2B-ZR-SM4A (JST)	
		External Control	CN305, SM06B-SRSS (JST) 6-pin connector header for connectivity of up to nine external switches	
	Communication	CN304, S4B-ZR-SM4A (JST)		
Weight	Approximately 150 g			
Environmental Specifications	Temperature	Operational	0 to 45°C	
		Storage	-30 to 65°C	
	RoHS	RoHS Compliant		

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B. Connector Specifications

1. Mechanical Drawings

The camera is equipped with the following four connectors (Connector-A through G).



2. Connector-A: Video Output (DVI)

The connector type: Mini-HDMI Connector

Pin Assignment:

No.	Signal Type
1	TMDS Data2 Shield
2	TMDS Data2+
3	TMDS Data2-
4	TMDS Data1 Shield
5	TMDS Data1+
6	TMDS Data1-
7	TMDS Data0 Shield
8	TMDS Data0+
9	TMDS Data0-
10	TMDS CLK Shield
11	TMDS CLK+
12	TMDS CLK-
13	DDC/CEC Ground
14	CEC
15	SCL
16	SDA
17	Reserved
18	+5V Power
19	Hot Plug Detect

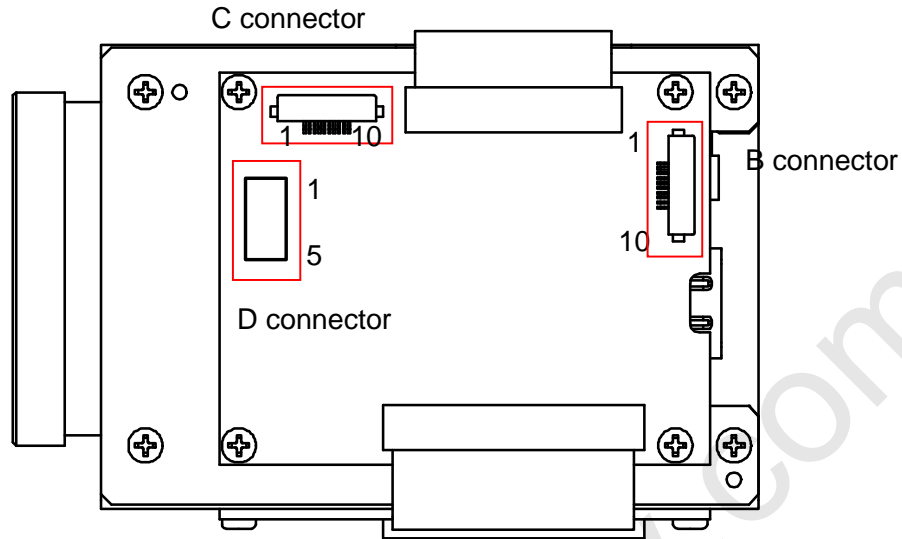
The cable requirements:

The camera connects to the HDMI port on the monitor:

1. Mini-HDMI – HDMI cable
2. HDMI cable with the Mini-HDMI to HDMI adaptor

The camera connects to the DVI port on the monitor:

1. Mini-HDMI – HDMI cable with a HDMI to DVI adaptor
2. HDMI cable with a Mini-HDMI to HDMI adaptor and a HDMI to DVI adaptor



3. Connector-B: Video output (DVI, CN207)
The connector type: SSL00-10L3 (KEL)

Pin Assignment:

No.	Signal types
1	TMDS_TxOUT2+
2	TMDS_TxOUT2-
3	TMDS_TxOUT1+
4	TMDS_TxOUT1-
5	TMDS_TxOUT0+
6	TMDS_TxOUT0-
7	TMDS_TxCLK+
8	TMDS_TxCLK-
9	N.C.
10	+5V

4. Connector-C: Video output (LVDS, CN204)
The connector type: SSL00-10L3 (KEL)

Pin Assignment:

No.	Signal types
1	LVDS_TxOUT0-
2	LVDS_TxOUT0+
3	LVDS_TxOUT1-
4	LVDS_TxOUT1+
5	LVDS_TxOUT2-
6	LVDS_TxOUT2+
7	LVDS_TxCLK-
8	LVDS_TxCLK+
9	LVDS_TxOUT3-
10	LVDS_TxOUT3+

This LVDS signal converts 28 bit TTL signals with the LVDS receiver (DS90CR288AMTDX, National semiconductor).

Pin Assignment of DS90CR288AMTDX

Input signal	No.
LVDS_TxOUT0-	9
LVDS_TxOUT0+	10
LVDS_TxOUT1-	11
LVDS_TxOUT1+	12
LVDS_TxOUT2-	15
LVDS_TxOUT2+	16
LVDS_TxCLK-	17
LVDS_TxCLK+	18
LVDS_TxOUT3-	19
LVDS_TxOUT3+	20

Output signal	No.	Output signal	No.
Y0	2	Pr0	37
Y1	1	Pr1	35
Y2	55	Pr2	34
Y3	54	Pr3	33
Y4	53	Pr4	32
Y5	51	Pr5	30
Y6	50	Pr6	29
Y7	49	Pr7	27
Pb0	47	FLD	6
Pb1	46	VD	5
Pb2	45	HD	3
Pb3	43	CLK	26
Pb4	42		
Pb5	41		
Pb6	39		
Pb7	38		

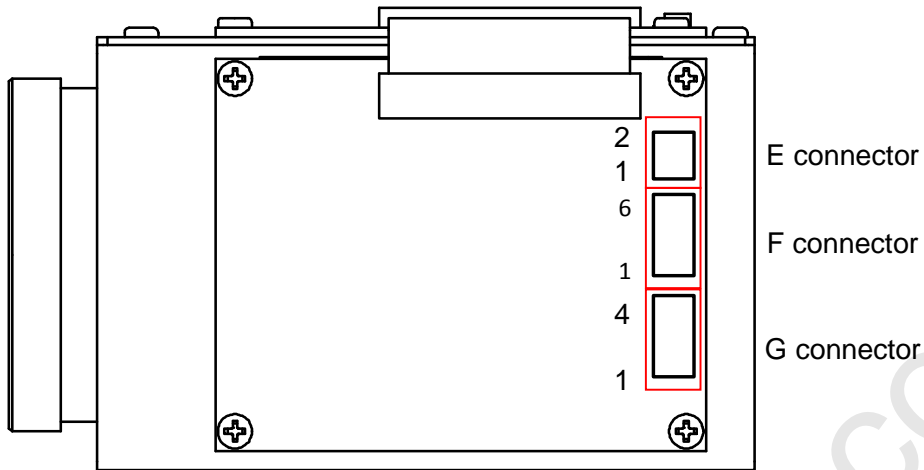
5. Connector-D: HD/VD signal output (CN206)

The connector type: SM05B-SRSS (JST)

Note: Mating connector housing: ZHR-05 manufactured by JST

Pin Assignment:

No.	Signal Type	Voltage
1	TBD	
2	TBD	
3	TBD	
4	TBD	
5	GND	



6. Connector-E (CN303): Power input

The connector type: S2B-Zr-SM4A (Right angle connector, JST)

Note: Mating connector housing: ZHR-02 manufactured by JST

Pin Assignment

No.	Signal types
1	Power In
2	GND

7. Connector F (CN305): External switch connection

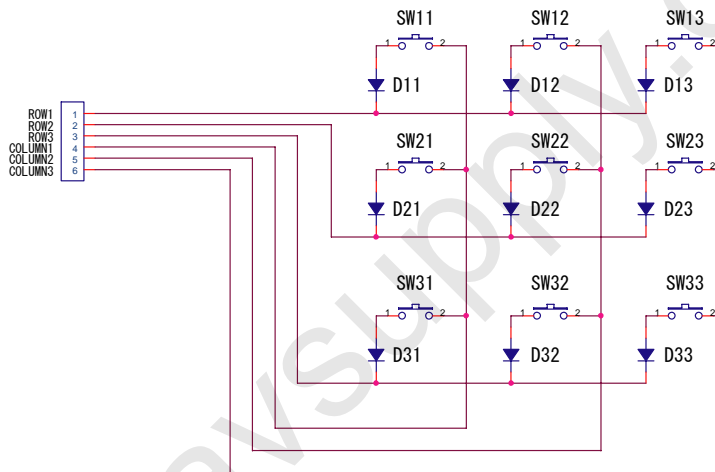
The connector type: SM06B-SRSS (right angle connector, JST)

Note: Mating connector housing: SHR-06 manufactured by JST

Pin Assignment

No.	Signal types
1	ROW1
2	ROW2
3	ROW3
4	COLUMN1
5	COLUMN2
6	COLUMN3

According to the diagram below, a total of 9 switches can be connected to connector CN305. The switches are arranged as row/column matrix and this enables the user to connect 9 switches on 6 conductors.



8. Connector G (CN304): UART communication

The connector type: S4B-ZR-SM4A (Right angle connector, JST)

Note: Mating connector housing: ZHR-04 manufactured by JST

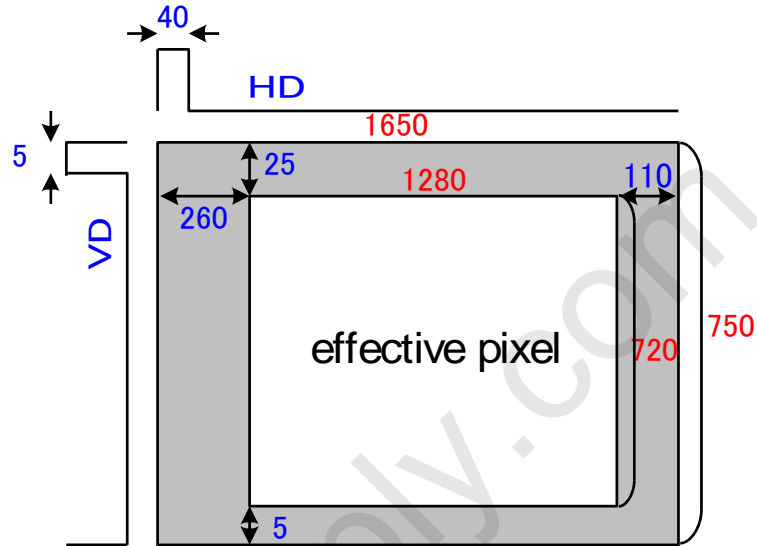
Pin Assignment

No.	Signal types	Voltage
1	+3.3V Out	3.3V
2	TX	3.3V
3	GND	
4	RX	3.3V

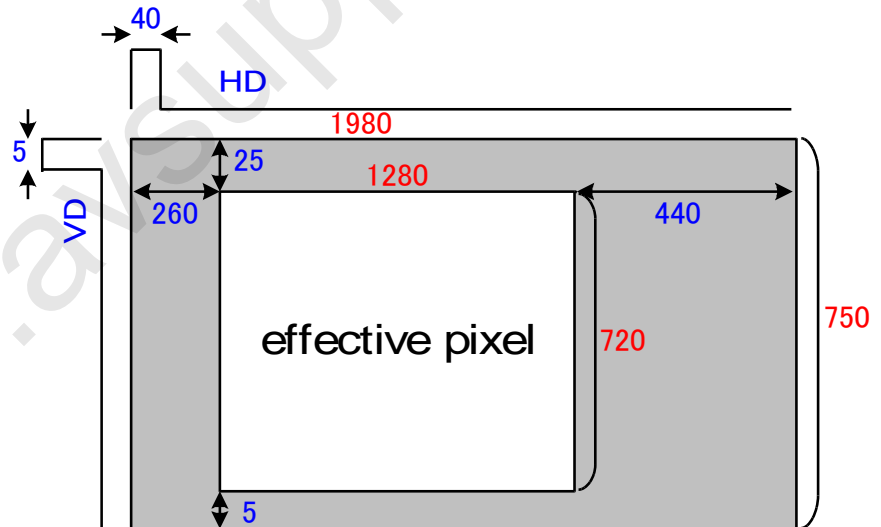
C. Output Signal Timing

		720P 60Hz	720P 50Hz
Parameter	Unit		
H-Resolution	Pixels	1280	1280
V-Resolution	Lines	720	720
H Frequency	kHz	45.00	37.50
V Frequency	Hz	60.00	50.00
Scan Type	-	NI	NI
Pixel Frequency	MHz	74.25	74.25
Pixel Time	nsec	13.5	13.5
Line time	usec	22.2	26.7
Frame Time	msec	16.7	20.0
H Addressable	Pixels	1280	1280
H Front Porch	Pixels	110	440
H Sync	Pixels	40	40
H Back Porch	Pixels	220	220
H Total	Pixels	1650	1980
V Addressable	Lines	720	720
V Front Porch	Lines	5	5
V Sync	Lines	5	5
V Back Porch	Lines	20	20
V Total	Lines	750	750
H Addressable	usec	17.239	17.239
H Front Porch	usec	1.485	5.926
H Sync	usec	0.539	0.539
H Back Porch	usec	2.963	2.963
V Addressable	msec	16.000	19.200
V Front Porch	msec	0.111	0.133
V Sync	msec	0.111	0.133
V Back Porch	msec	0.444	0.533

60Hz



50Hz



Note: These timings are the output signal timing before converting to the DVI signal.

II. Camera Operations

A. ALC Operations

ALC (Automatic Light Compensation) is configured by the user by enabling or disabling the optical iris, auto electronic shutter and/or the AGC (Automatic Gain Control). The camera provides flexible priority settings as described below. The setting parameters in the table are defined in the protocol document and the Sentech control software.

Scene Illumination	Electronic Shutter Parameters	Optical Iris Parameters	AGC Parameters
Bright	AEE minimum exposure time	Auto minimum open ratio	AGC Minimum Gain
	Change		
	AEE middle exposure time (minimum side)	Change	
	Change	Auto maximum open ratio	Change
	AEE middle exposure time (maximum side)		AGC Middle Gain
	Change		Change
Dark	AEE maximum exposure time		AGC Maximum Gain

B. Shutter Settings

The camera offers both high-speed shutter and extended shutter settings as described below:

720P – 60Hz Operations:

Value	High speed shutter		Value	Extended shutter	
0	16.7ms	1/60s	-64	33.3ms	1/30s
375	8.3ms	1/120.1s	-128	66.7ms	1/15s
562	4.2ms	1/239.7s	-192	133.3ms	2/15s
656	2.1ms	1/480.3s	-256	266.7ms	4/15s
703	1.0ms	1/963.6s	-320	533.3ms	8/15s
726	526.7us	1/1,898.7s	-384	1.07s	16/15s
738	260.0us	1/3,846.2s	-448	2.13s	32/15s
744	126.7us	1/7,894.7s	-512	4.27s	64/15s
749	15.6us	1/64,283.9s	-576	8.53s	128/15s
			-640	17.1s	256/15s

The extended shutter can be set up to 17.1 seconds. Therefore, when it is set to be more than 0.5 seconds, noise will appear on the image. Please check the image when the extended shutter is set greater than 0.5 seconds.

720P – 50Hz Operations:

Value	High speed shutter		Value	Extended shutter	
0	20.0ms	1/50s	-64	40.0ms	1/25s
375	10.0ms	1/100.1s	-128	80.0ms	2/25s
562	5.01ms	1/199.8s	-192	160.0ms	4/25s
656	2.50ms	1/400.2s	-256	320.0ms	8/25s
703	1.25ms	1/803.0s	-320	640.0ms	16/25s
726	625.0us	1/1,582.3s	-384	1.28s	32/25s
738	312.0us	1/3,205.1s	-448	2.56s	64/25s
744	152.0us	1/6,578.9s	-512	5.12s	128/25s
749	18.67us	1/53,570.5s	-576	10.2s	256/25s
			-640	20.5s	512/25s

The extended shutter can be set up to 20.5 seconds. Therefore, when it is set to be more than 0.5 seconds, noise will appear on the image. Please check the image when the extended shutter is set greater than 0.5 seconds.

C. External Switch Assignable Functions

The external control switches (up to nine switches) can be connected on the CN305 connectors. The functions below can be assigned on each switch independently and this enables the external switch controls without UART communication.

Functin	Function
1	Display Menu
2	Zoom (TELE)
3	Zoom (WIDE)
4	Focus (NEAR)
5	Focus (FAR)
6	Push to set focus
7	Auto focus OFF
8	Auto focus ON
9	Push to set iris
10	Auto iris OFF
11	Auto iris ON
12	Iris (Open)
13	Iris (Close)
14	Picture mode (+)
15	Picture mode(-)
16	Contrast (+)
17	Contrast (-)
18	Shadow mask shading level (+)
19	Shadow mask shading level (-)
20	Shadow mask top (+)
21	Shadow mask top (-)
22	Shadow mask bottom (+)
23	Shadow mask bottom (-)
24	Shadow mask top / bottom (+)
25	Shadow mask top / bottom (-)
26	Shadow mask left (+)
27	Shadow mask left (-)
28	Shadow mask right (+)
29	Shadow mask right (-)
30	Shadow mask left / right (+)
31	Shadow mask left / right (-)
32	Horizontal line maker color (+)
33	Horizontal line maker color (-)
34	Horizontal line maker size (+)
35	Horizontal line maker size (-)
36	Horizontal line maker position (+)
37	Horizontal line maker position (-)
38	Vertical line maker color (+)
39	Vertical line maker color (-)
40	Vertical line maker size (+)
41	Vertical line maker size (-)
42	Vertical line maker position (+)
43	Vertical line maker position (-)
44	Mirror OFF
45	Horizontal mirror
46	Upside down
47	Rotation 180 degree
48	Still image OFF
49	Still image ON
50	Manual white balance
51	Auto white balance
52	Push to set white balance
53	Auto focus OFF/ON
54	Auto iris OFF/ON
55	Mirror OFF / Horizontal mirror
56	Mirror OFF / Upside down
57	Mirror OFF / Rotation 180 degree
58	Horizontal mirror / Upside down
59	Horizontal mirror / Rotation 180 degree
60	Upside down / Rotation 180 degree
61	Still image OFF / ON
62	Manual white balance / Auto white balance

D. User Configurable Functions

The functions in the table below are available through the UART communication for users. The communication is done through the CN304 connector.

	Function
Zoom	Master zoom control
	Optical zoom out limiter
	Optical zoom in limiter
	Digital zoom link
	Fixed digital zoom
	Digital zoom tilt
	Digital zoom pan
	Digital zoom start position
	Digital zoom end position
	Minimum digital zoom
	Maximum digital zoom
	Digital zoom speed
	Focus
Push to set focus	
Focus distance	
Motion detection	
Iris	Iris mode
	Push to set iris
	Iris open ratio
	Auto iris Min. open ratio
	Auto iris Max. open ratio
	Auto iris tolerance
	Auto iris threshold
	Auto iris step (MUL)
	Auto iris step (DIV)
	Auto iris max. step
Push button	Push button
	Push button initial function SW11
	Push button initial function SW12
	Push button initial function SW13
	Push button initial function SW21
	Push button initial function SW22
	Push button initial function SW23
	Push button initial function SW31
	Push button initial function SW32
	Push button initial function SW33
	Push button polarity SW11
	Push button polarity SW12
	Push button polarity SW13
	Push button polarity SW21
	Push button polarity SW22
	Push button polarity SW23
	Push button polarity SW31
	Push button polarity SW32
	Push button polarity SW33
	Min number of color modes
	Max number of color modes
	Contrast Min. limiter
	Contrast Max. limiter
	Shadow mask Min. shading level
	Shadow mask Max. shading level
	Marker horizontal Min. position
	Marker horizontal Max. position
	Marker horizontal Min. size
	Marker horizontal Max. size
	Marker vertical Min. position
	Marker vertical Max. position
	Marker vertical Min. size
	Marker vertical Max. size

	Function
Color mode	Picture mode
	Pseudo00 back color
	Pseudo00 front color
	Pseudo01 back color
	Pseudo01 front color
	Pseudo02 back color
	Pseudo02 front color
	Pseudo03 back color
	Pseudo03 front color
	Pseudo04 back color
	Pseudo04 front color
	Pseudo05 back color
	Pseudo05 front color
	Pseudo06 back color
	Pseudo06 front color
	Pseudo07 back color
	Pseudo07 front color
	Pseudo08 back color
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Pseudo23 back color	
Pseudo23 front color	
Pseudo24 back color	
Pseudo24 front color	
Pseudo25 back color	
Pseudo25 front color	
Pseudo26 back color	
Pseudo26 front color	
Pseudo27 back color	
Pseudo27 front color	
Pseudo28 back color	
Pseudo28 front color	
Pseudo29 back color	
Pseudo29 front color	
Pseudo color threshold	
Pseudo color slope	

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	Function
Shadow mask	Shadow mask shading level
	Horizontal shadow mask top position
	Horizontal shadow mask bottom position
	Vertical shadow mask left position
	Vertical shadow mask right position
Line marker	Horizontal line marker color
	Horizontal line marker position
	Horizontal line marker thickness
	Vertical line marker color
	Vertical line marker position
	Vertical line marker thickness
User color	User defined color 0 R
	User defined color 0 G
	User defined color 0 B
	User defined color 1 R
	User defined color 1 G
	User defined color 1 B
	User defined color 2 R
	User defined color 2 G
	User defined color 2 B
	User defined color 3 R
	User defined color 3 G
	User defined color 3 B
	User defined color 4 R
	User defined color 4 G
	User defined color 4 B
	User defined color 5 R
	User defined color 5 G
	User defined color 5 B
	User defined color 6 R
	User defined color 6 G
	User defined color 6 B
	User defined color 7 R
	User defined color 7 G
User defined color 7 B	
UART	UART baud rate
	UART short reply for write
	UART check sum

	Function
Blemish pixel	Blemish pixel correction
	Display blemish pixel correction
	White blemish pixel threshold
	Black blemish pixel threshold
	Blemish pixel 00 horizontal position
	Blemish pixel 00 vertical position
	Blemish pixel 01 horizontal position
	Blemish pixel 01 vertical position
	Blemish pixel 02 horizontal position
	Blemish pixel 02 vertical position
	Blemish pixel 03 horizontal position
	Blemish pixel 03 vertical position
	Blemish pixel 04 horizontal position
	Blemish pixel 04 vertical position
	Blemish pixel 05 horizontal position
	Blemish pixel 05 vertical position
	Blemish pixel 06 horizontal position
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Blemish pixel 20 horizontal position	
Blemish pixel 20 vertical position	
Blemish pixel 21 horizontal position	
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Blemish pixel 28 horizontal position	
Blemish pixel 28 vertical position	
Blemish pixel 29 horizontal position	
Blemish pixel 29 vertical position	
Blemish pixel 30 horizontal position	
Blemish pixel 30 vertical position	

	Function
Blemish pixel	Blemish pixel 31 horizontal position
	Blemish pixel 31 vertical position
	Blemish pixel 32 horizontal position
	Blemish pixel 32 vertical position
	Blemish pixel 33 horizontal position
	Blemish pixel 33 vertical position
	Blemish pixel 34 horizontal position
	Blemish pixel 34 vertical position
	Blemish pixel 35 horizontal position
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	Blemish pixel 40 horizontal position
	Blemish pixel 40 vertical position
	Blemish pixel 41 horizontal position
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	Blemish pixel 42 horizontal position
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	Blemish pixel 60 horizontal position
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	Blemish pixel 61 vertical position
	Blemish pixel 62 horizontal position
Blemish pixel 62 vertical position	
Blemish pixel 63 horizontal position	
Blemish pixel 63 vertical position	

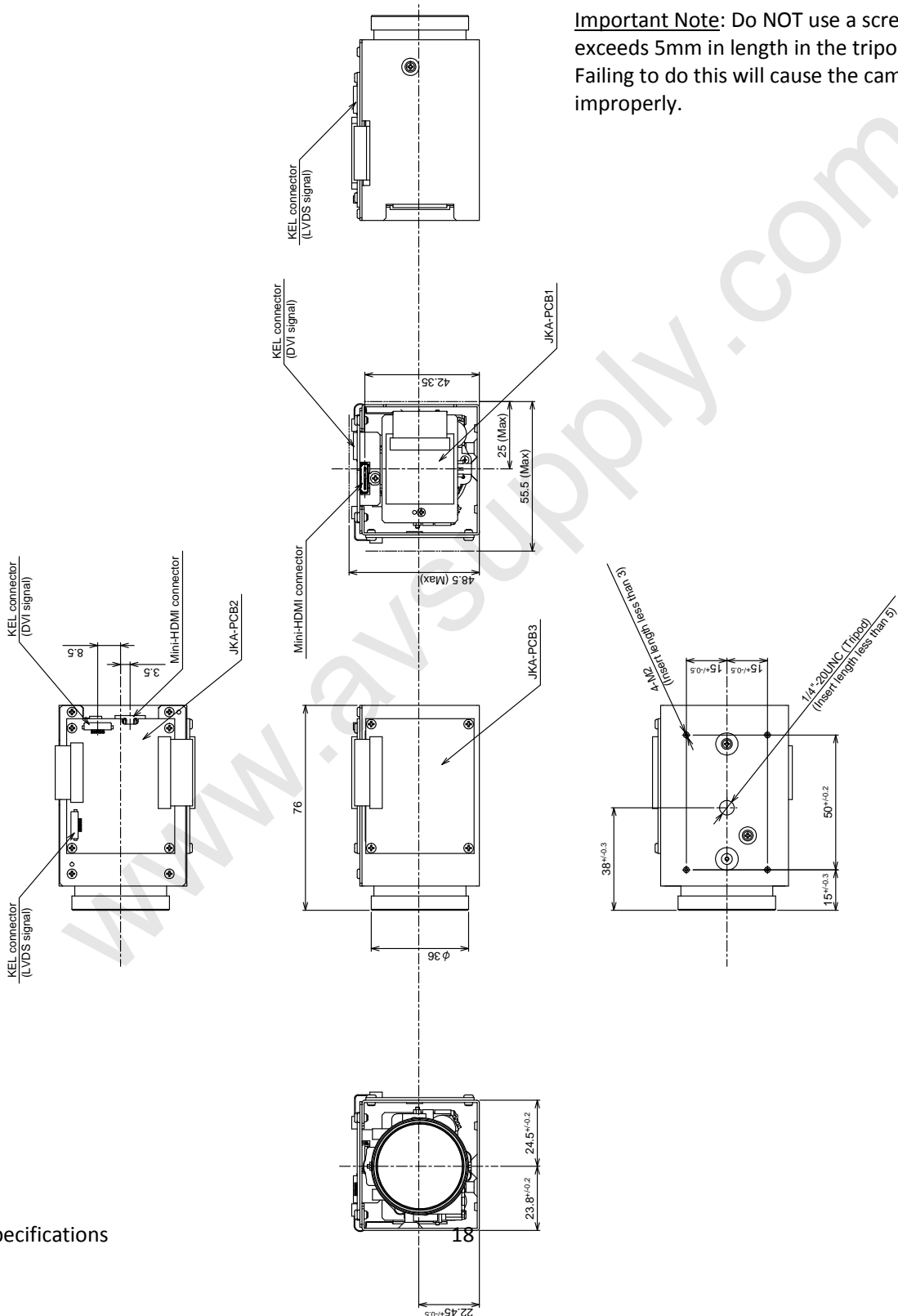
	Function
OSD	OSD character size
	OSD H position
	OSD V position
Still image	Still image
60 / 50 fps	60/50FPS
Test pattern	Test pattern (Gray scale)
ALC	ALC target level
	Edge ALC weight
	Center ALC weight
	ALC peak
	ALC average integration frames
	ALC single-frame quantity
Shutter	Exposure control
	Exposure time
	AEE minimum exposure time
	AEE middle exposure time (minimum side)
	AEE middle exposure time (maximum side)
	AEE maximum exposure time
	AEE tolerance
	AEE threshold
	AEE speed
Gain	Gain control
	Gain
	AGC minimum gain
	AGC middle gain
	AGC maximum gain
	AGC tolerance
	AGC threshold
	AGC speed
	Gain value for disabling motion detection
	Digital gain
White balance	White balance mode
	Push to set white balance
	White balance R gain
	White balance G gain
	White balance B gain
	Auto white balance tolerance
	Auto white balance threshold
	Auto white balance average integration frames
	Auto white balance single-frame process quantity
	Auto white balance R change limit
Auto white balance B change limit	
Gamma	Gamma mode
	Preset gamma
	Manual gamma control point 0
	Manual gamma control point 1
	Manual gamma control point 2
	Manual gamma control point 3
	Manual gamma control point 4
	Manual gamma control point 5
	Manual gamma control point 6
	Manual gamma control point 7
Manual gamma control point 8	
Manual gamma control point 9	
Color	Color correction matrix RR
	Color correction matrix RG
	Color correction matrix RB
	Color correction matrix GR
	Color correction matrix GG
	Color correction matrix GB
	Color correction matrix BR
	Color correction matrix BG
Color correction matrix BB	

	Function
YUV	B-Y gain
	B-Y hue
	R-Y gain
	R-Y hue
High luminance chrome suppress	High luminance chrome suppress threshold
	High luminance chrome suppress slope
Aperture	Front aperture control horizontal gain
	Front aperture control vertical gain
	Front aperture control coring
	Back aperture control horizontal gain
	Back aperture control vertical gain
Other	Back aperture control coring
	Horizontal flip
	Vertical flip
	Contrast
OSD command	RGB offset
Field table	

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III. Dimensions (unit mm)



Important Note: Do NOT use a screw that exceeds 5mm in length in the tripod screw hole. Failing to do this will cause the camera to work improperly.

Revisions

Rev	Date	Changes	Note
1.0	2011/11/22	New document	
	Mar. 29, 2012	Corrected zoom on title page 18x → 11x	no rev. change
1.01	May 25, 2012	Added LVDS signal settings	revision 1.01
1.02	July 3, 2012	Updated 2D Dimensions	

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