



English

FULL HD
FULL HD Color MOS
Camera Module
VPC-HD20

Product Specification
& Operational Manual

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1. Scope of Application

This is to describe VPC-HD20, Full HD camera module. All specifications contained herein are subject to change without prior notice. Reproduction in whole or in part is prohibited.

2. Handling Precautions

The camera module must not be used for any nuclear equipments or aerospace equipments with which mechanical failure or malfunction could result in serious bodily injury or loss of human life. Our warranty does not apply to damages or defects caused by irregular and/or abnormal use of the product..

Please observe all warnings and cautions stated below.

Our warranty does not apply to damages or malfunctions caused by neglecting these precautions.

- Do not use or store the camera module in the dusty or humid places.
- Do not apply excessive force or static electricity that could damage the camera module.
- Do not shoot direct images that are extremely bright (e.g., light source, sun, etc). When the camera is not in use, please put the protection cap on.
- Follow the instructions in Chapter 7, "External Connector Pin Assignment" for connecting the camera module. Improper connection may cause damages not only to the camera module but also to the connected devices. t
- Confirm the mutual ground potential carefully and then connect the camera module to monitors or computers. AC leaks from the connected devices may cause damages or destroy the camera module.
- Do not apply excessive voltage. (Use only the specified voltage.) Unstable or improper power supply voltage may cause damages or malfunction of the camera assembly.
- Since VPC-HD20 is a highly-dense camera module, appropriate heat dissipation shall be considered. We recommend using a metal base or others to install the camera. Operating this camera assembly without appropriate heat dissipation considered may cause damages or malfunction.

3. Product Outline

VPC-HD20 is a full HD color camera module utilizing a 1/3 type MOS image sensor. 1080 60p/59.94p/50p (3G-SDI), 1080 60i/59.94i/50i (HD-SDI), 720 60p/59.94p/50p (HD-SDI) is corresponded.

Key Features

- Features original ISP, state-of-the-art "Clairvu™" engine for superb imaging quality.
- Small foot print: 29mm × 29mm × 77mm (without protruding portion)..
- Camera can be controlled by RS-232C or USB 2.0 Full Speed (12Mbps).

*This model uses μ T-Kernel source code based on μ T-License of T-Engine Forum (www.t-engine.org).

4. Bundled Items

4.1. Standard Bundled Items

- Camera module, VPC-HD20
- 6pins connector for power

4.2. Packaging

- Individual carton
- Master carton (10pcs/carton)

*Master carton may change depends on the quantity to be shipped per delivery.

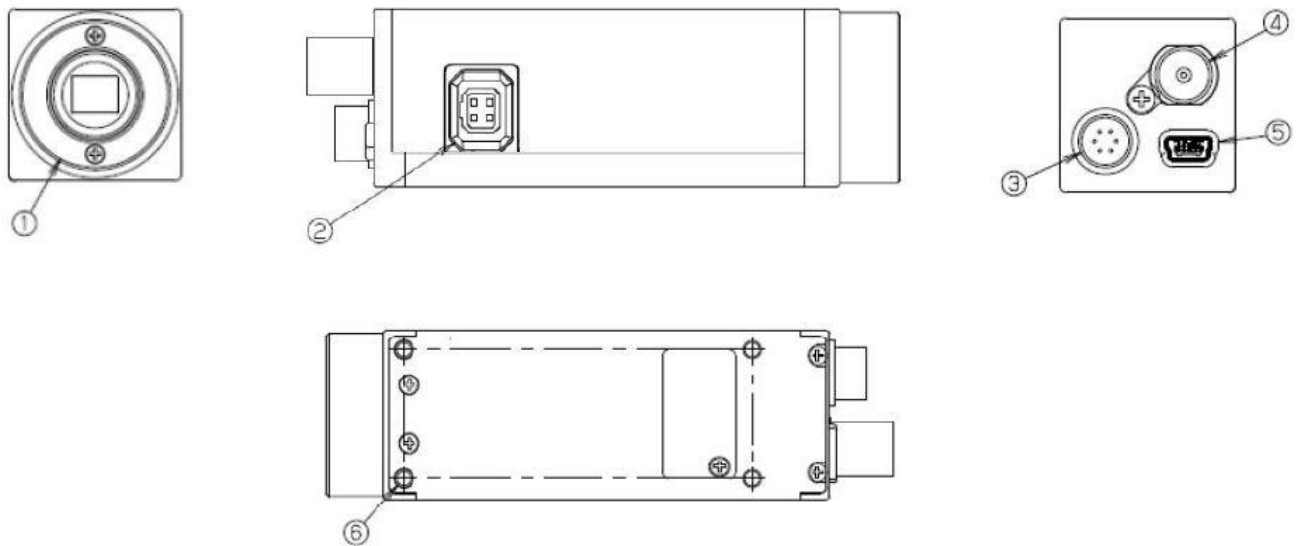
5. Specification

5.1. General Specification

(1)	Pick up device	Device Type	1/3 type MOS sensor (color)
		Effective Pixel Numbers	1944(H) × 1092(V)
		Unit Cell Size	2.75μm(H) × 2.75μm(V)
		Chip Size	5.346mm(H) × 3.003mm(V) (Effective Pixels)
(2)	Resolution	1080p,1080i :	1920(H) × 1080(V)
		720p :	1280(H) × 720(V)
(3)	Aspect Ratio	16 : 9	
(4)	Video Output Format	1920 x 1080p @60fps(Class A)	3G-SDI
		1920 x 1080p @60fps(Class B)	3G-SDI
		1920 x 1080p @59.94fps(Class A)	3G-SDI
		1920 x 1080p @59.94fps(Class B)	3G-SDI
		1920 x 1080p @50fps(Class A)	3G-SDI
		1920 x 1080p @50fps(Class B)	3G-SDI
		1920 x 1080i @60fps	HD-SDI
		1920 x 1080i @59.94fps	HD-SDI
		1920 x 1080i @50fps	HD-SDI
		1280 x 720p @60fps	HD-SDI
		1280 x 720p @59.94fps	HD-SDI
1280 x 720p @50fps	HD-SDI		
(5)	Sync. System	Internal Sync.	
(6)	Video Output Standard	3G-SDI/HD-SDI : Y/Pb/Pr(4:2:2 10bit) BNC 75Ωterminal	
(7)	Sensitivity	F5.6 2000lx	
(8)	Minimum illumination	F1.4 1.2lx	
		Conditions : VIDEO 50%, AGC 30dB, Electric Shutter OFF	
(9)	Dust or stains in optical systems	No dust or stain shall be detected on the testing screen with setting the camera aperture at F16.	
(10)	Power Requirements(*1)	DC+9~+15V	
(11)	Power Consumption(*1)	4.0W at DC+12V IN	
(12)	Dimensions	Refer to overall dimension drawing	
(13)	Weight	Approx. 95g	
(14)	Lens Mount	C mount	
(15)	Gain Setting	AGC (Max. Gain : 0dB~30dB)	
		MANUAL : 0dB~30dB	
(16)	Shutter Speed Variable Range	OFF : 1/60(60fps, 59.94fps), 1/50(50fps)	
		MANUAL : 1/8k, 1/4k, 1/2k, 1/1k, 1/500, 1/250, 1/120, 1/100, 1/60, Open	
		AUTO : 1/8k s~Open (Upper limit and lower limit can be set.)	
(17)	White Balance Adjustment Range	AUTO, AUTO(Outdoor), Preset 7 different kinds, User Preset 1~5, One Push Preset:	
		Daylight(5500K), Cloudy(6500K), Shade(8000K), Tungsten(3200K), Fluorescent(White), Fluorescent(Neutral White), Fluorescent(Daylight) 6500K	
(18)	DC IRIS output(*1)	Auto/Open Selectable. Can be used with electric shutter (With priority to electric shutter).	
(19)	Auto Exposure Detection	Average/Center-Weight/Spot(1/256)/Backlight Compensation	
(20)	Edge Enhancement	OFF, 1, 2, 3, 4, 5 (typ.3)	
(21)	Color Saturation Adjustment	0%(B/W)~100%(typ.)~200%	

(22)	Gamma Compensation	Auto Gamma Compensation OFF($\gamma \approx 0.45$) , ON, ON[Strong]
(23)	Contrast Adjustment	-2, -1, 0, 1, 2 Selectable (typ.0)
(24)	Color Balance	Blue/Red : -100~0~100(typ.0) , Green/Magenta : -100~0~100(typ.0)
(25)	Black Level Adjustment	Level:0~127(typ.0)
(26)	Pixel Defect (White spot) Correction	Corrected at factory setting.
(27)	Remote Control Operation	The camera can be controlled via RS-232C communications or USB 2.0 Full Speed (12Mbps). Camera settings can be controlled by control software via PC. When communicating the camera via USB, a USB cable, USB(A)-(mini B), is needed. When communicating the camera via RS-232C, 6pins connector shall be connected.
(28)	Safety/Quality standards	UL: Conform to UL Standard including materials and others RoHS: Conform to RoHS CE: To be applied for EN55022: 2010 (Class B) for Emission. To be applied for EN61000-6-2: 2005 for Immunity. FCC: To be applied for Class A Digital Device This device complies with Part 15 of the FC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
(29)	Durability	Vibration Acceleration : 98m/s ² (10G) Frequency : 20~200 Hz Direction : X,Y, and Z, 3 directions Testing time : 120min for each direction
		Shock No malfunction shall be occurred with 980m/s ² (100G) for $\pm X, \pm Y$, and $\pm Z$, 6 directions.
(30)	Operation environment	Performance guaranteed 0 ~ +40°C Humidity 20 ~ 80%RH with no condensation
		Operation guaranteed -5 ~ +45°C Humidity 20 ~ 80%RH with no condensation
		※Performance guaranteed: All the specifications specified in this manual is guaranteed under performance guaranteed temperature. ※Operation guaranteed : All the camera functions operate normally under operation guaranteed temperature.
(31)	Storage Environment	Storage Temperature: -25 ~ +60°C Humidity 20 ~ 80%RH with no condensation

6 Part Names and Functions



① C Mount

To mount a C mount lens.

Screw length from the lens mount surface shall be less than 6mm. And protruding portion of the lens shall be less than 8mm. When lens is not mounted, please put the attached lens mount cap on.

② DC IRIS Connector

To connect a DC IRIS lens.

③ Connector for Power input and RS-232C

Please refer to the external connector pin assignment.

RS-232C and USB cannot be used at one time. (USB connection has priority.)

④ Video Signal Output

With BNC cable, connect to a 3G-SDI input monitor or HD-SDI input monitor. (Analog monitors cannot be connected.)

BNC cables with high frequency characteristic correspond to 3G-SDI or HD-SDI shall be used.

⑤ USB Connector

USB connector for camera control.

Standard USB(A)-(mini B) cable shall be used to connect to a PC.

Please refer to the other materials for the details.

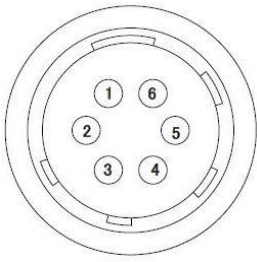
⑥ Screw Holes for camera installation

4 screw holes to install the camera.

Please be noted that the depth of the front screw holes and the rear screw holes are different.

7. External Connector Specifications

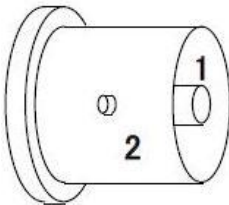
7.1 6pins Circular Connector



Model Name HR10-7R-6PA (HIROSE)

Pin No.	
1	Power IN DC+12V
2	N/A
3	RS-232C_RXD
4	RS-232C_TXD
5	GND(RS-232C)
6	GND(Power)

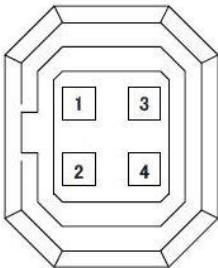
7.2 BNC



Model Name BCJ-BPLHA (CANARE)

Pin No.	
1	3G-SDI/HD-SDI output
2	GND

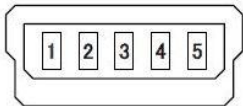
7.3 DC IRIS Connector



Model Name D4-156N-200A
(TECHNICAL ELCTRON CO., LTD)

Pin No.	
1	DAMP-
2	DAMP+
3	DRIVE+
4	DRIVE-(GND)

7.4 USB Connector



Model Name 500075-1517(MOLEX)

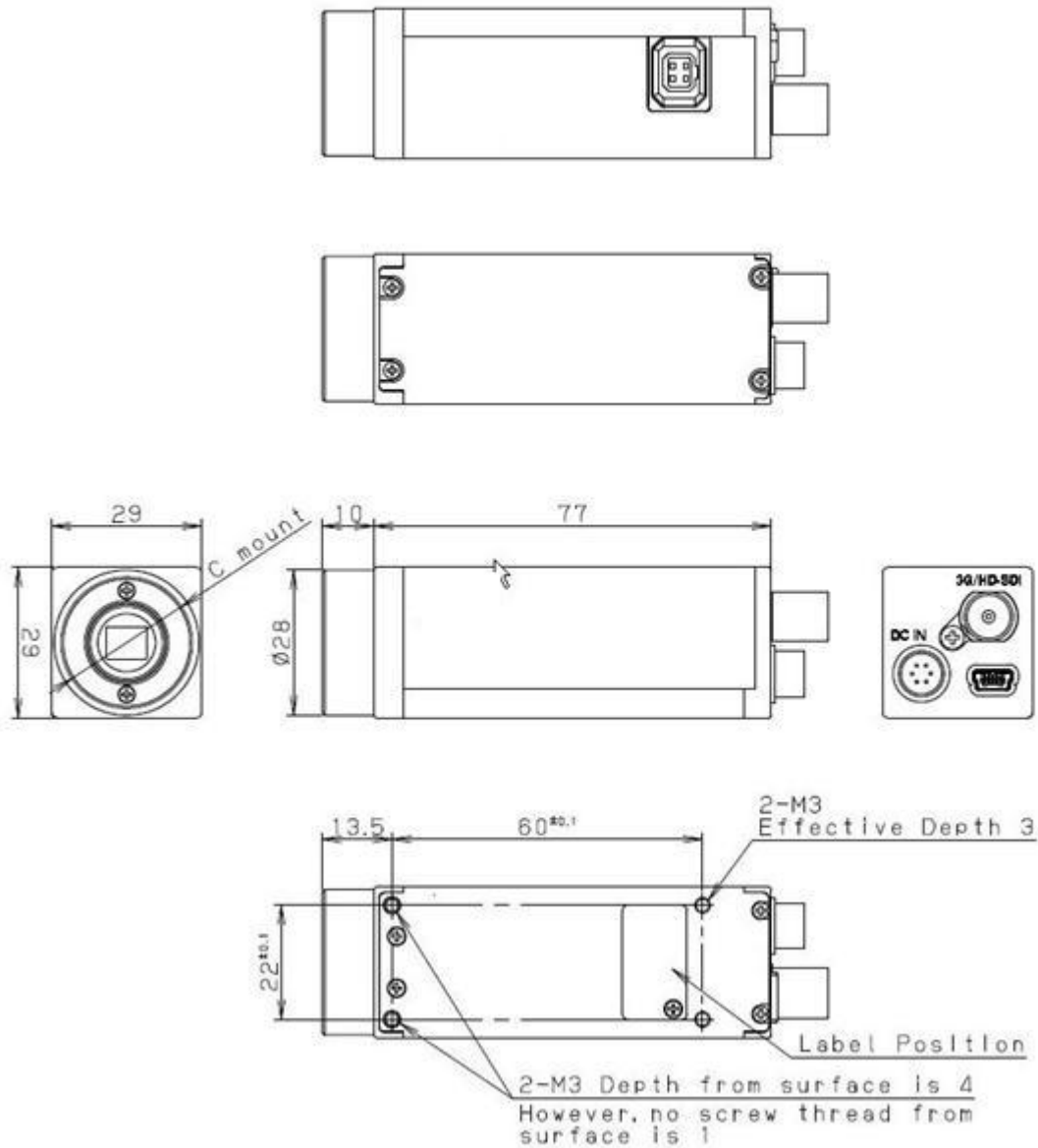
Pin No.	
1	VBUS
2	D-
3	D+
4	N/A
5	GND

8. Factory Setting

		Factory Settings
Video Format Settings	1920 x 1080p @60fps(Level A)	1920 x 1080i @60fps
	1920 x 1080p @60fps(Level B)	
	1920 x 1080p @59.94fps(Level A)	
	1920 x 1080p @59.94fps(Level B)	
	1920 x 1080p @50fps(Level A)	
	1920 x 1080p @50fps(Level B)	
	1920 x 1080i @60fps	
	1920 x 1080i @59.94fps	
	1920 x 1080i @50fps	
	1280 x 720p @60fps	
	1280 x 720p @59.94fps	
	1280 x 720p @50fps	
Gain Mode	Auto, Manual	Auto
Manual Gain	0dB~30dB	0dB
Max Gain	0dB~30dB	30dB
Shutter Mode	Auto, Manual	Auto
Shutter Limit Max	Open ~ < Shutter Limit Min	Open
Shutter Limit Min	Shutter Limit Max < ~ 1/8000	1/8000
Manual Shutter	Open~1/8000	Open
Iris	Open, Auto	Open
AE Mode	Average	Center-Weight
	Center-Weight	
	Spot	
	Backlight Compensation	
Spot Block	X=0~15 , Y=0~15	X=8, Y=8
AE Level	0(%)~100(%)	50(%)
White Balance Settings	Auto	Auto
	Auto(Outdoor)	
	Daylight(5500K)	
	Cloudy(6500K)	
	Shade(8000K)	
	Tungsten(3200K)	
	Fluorescent(White)	
	Fluorescent(Neutral White)	
	Fluorescent(Daylight)	
	OnePush	
	Manual	
	Preset 1~5	
Manual R Gain	0(%)~800(%)	100(%)
Manual B Gain	0(%)~800(%)	100(%)
Noise Reduction	OFF, ON	OFF
Edge Enhancement	OFF, 1, 2, 3, 4, 5	OFF
Color Saturation	0(%)~200(%)	100(%)
Color Balance Blue/Red	-100~100	0
Color Balance Green/Magenta	-100~100	0

Pedestal	OFF/ON	OFF
Pedestal Level	0~127	0
Contrast	-2, -1, 0, 1, 2	0
Auto Gamma	OFF, ON, ON[Strong]	OFF

9. Dimensions



- 1) Screw length from the lens mount surface shall be less than 6mm and protruding portion of the C-mount lens shall be less than 8mm
- 2) C-mount screws comply with ANSI/ASME B1.1. 1-32UN (2B)

10. Case for Indemnity (Limited Warranty)

We shall be exempted from taking responsibility and held harmless for damage or losses incurred by the user in the following cases.

- In case damage or losses are caused by fire, earthquake, or other acts of God, acts by third party, deliberate or accidental misuse by the user, or use under extreme operating conditions.
- In case indirect, additional, consequential damages (loss of business interests, suspension of business activities) are incurred as result of malfunction or non-function of the equipment, we shall be exempted from responsibility for such damages.
- In case damage or losses are caused by failure to observe the information contained in the instructions in this product specification & operation manual.
- In case damage or losses are caused by use contrary to the instructions in this product specification & operation manual.
- In case damage or losses are caused by malfunction or other problems resulting from use of equipment or software that is not specified.
- In case damage or losses are caused by repair or modification conducted by the customer or any unauthorized third party (such as an unauthorized service representative).
- Expenses we bear on this product shall be limited to the individual price of the product.

11. MOS Pixel Defect

MOS pixel defects might be noted with time of usage of the products.

The cause of the MOS pixel defects is the characteristic phenomenon of MOS itself and Pacific Corp is exempted from taking any responsibilities for them.

12. Product Support

When defects or malfunction of our products occur, and if you would like us to investigate on the cause and repair, please contact your distributors you purchased from to consult and coordinate.

- Camera control software is possible to supply but we shall be exempted from taking responsibility and held harmless for damage or malfunction of your hardware and software caused by using this control software.

The purpose of the control software prepared is for you to check operation and evaluate our products. Please be noted that Pacific Corp does not customize the program nor provide source code.