Panasonic
ideas for life

Digital Signal Processing

CCD Color Micro-Camera Series

Head of the pack for industrial camera image quality and operationality

Finest in high image quality and easiest to use

This industrial camera series which features a slim, compact body and definitive image technology, covers a broad spectrum of innovative applications from production line monitoring to specialized effect roentgenography. The long-awaited new models Micro Camera Series are now on the market. For the first time in the industry, the series makes use of the new CCD drive system and new easy-to-use image conversion functions resulting in higher image quality. This high performance brought about by Panasonic technology promises to be a major breakthrough for business.

3CCD Color Micro-Camera Series

Camera Control Unit
GP-US742CU

1/2-type
3CCD Color Camera Head
GP-US522HB

1/3-type 3CCD Color Camera Head
GP-US732H (Lens: optional)

1. Improved image quality by using the progressive system

For the first time in the industry, the detachable CCD drive uses the progressive system. This drive creates a sharper image by controlling flickering (GP-US732H).

2. Realizing high sensitivity and high resolution

The GP-US522HB has over 800-line horizontal resolution, 5 lux minimum illumination, and in addition has a signal-to-noise ratio of 62 dB, and is equipped with a gamma correction function and 6-Axis color matrix control function, producing life-like sharp images.

3. Superior operationality

There is a screen menu showing the camera set-up and a scene (parameter) file that stores setting information for switching parameters. These advanced functions are easy to understand and use.

CCD Color Micro-Camera Series

Camera Control Unit
GP-KS822CU

1/2-type CCD Color Camera Head
GP-KS822H (Lens: optional)

1. Equipped with mirror, rotation and freeze-image functions

In addition to a mirror function that permits right to left image reversal, and a rotation function that permits moving the image right and left and up and down, cameras of this series are also equipped with a freeze-image function for image verification. This camera series has in mind user convenience and operationality.

2. Super compact and ultra-light weight

1/2-type CCD Color Camera Head GP-KS822H: weight, only 14 g*; diameter, 17 mm; length, 35.5 mm. This camera is designed to be a super compact, ultra-light camera.

* Excluding lens

3. Multiple adjustment functions

In addition to White Balance, AGC and ELC, the camera is equipped with a photometry area selection function enabling adjusting the image signal level to conform to the conditions where it is used.

Applications

Research equipment	• Microscopy for biological research
Production lines	• Production line monitoring
Special Roentgenography	• Photographing volcanic craters, sport events, etc.
Medical Equipment*	• Endoscope cameras • Retinal cameras • Dental cameras

*These products do not have a medical standards permit. It is necessary to confirm to the medical standards for the country in which they are to be used.

3CCD *Color Micro-Camera Series*

Unprecedented High Image Quality
## High Specification Models to Match Multiple Environments

While continuing to maintain the same superior sensitivity and signal-to-noise ratio, horizontal resolution and color reproduction capability as before, new camera heads have been added for use with this first in the industry CCD drive system. To meet the metal fatigue test required for imaging dark areas and miniscule differences in color shadings, appropriate solid images are provided for a wide variety of environments.

1/3-type 3CCD Color Camera Head
GP-US732H

1/2-type 3CCD Color Camera Head
GP-US522HB

Camera Control Unit
GP-US742CU

High image quality and high sensitivity

High image quality, high sensitivity and high signal-to-noise ratio

Uses the progressive system for the first time in the industry
Realizes sharp images with no flickering

For the first time in the industry, GP-US732H uses the progressive system with a separated camera head and control unit. The progressive system, compared to the former interlace scanning system which is divided into two steps, accomplishes the scanning in one step by dividing video images into even and odd fields. By so doing, the resulting image is sharper with less flickering, making this an ideal camera for use over a long period as a microscope camera for research. Furthermore, because it is possible to switch the interlace and progressive systems, when necessary, moving images can be captured by the progressive system and image subjects with little movement or where extra sensitivity is required can be captured by the interlace system.

Even numbers fields

Odd,numbers,fields
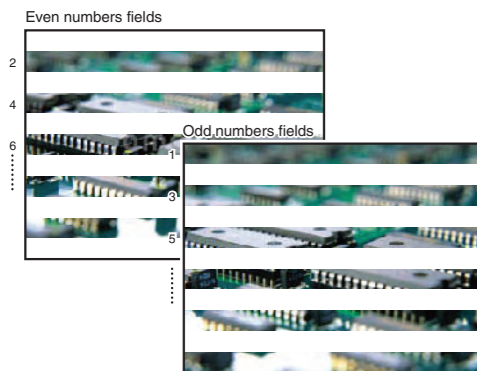
Interlace system
Video imaging* by scanning odd and even numbers* Excellent for freeze images or subjects with little movement.

Progressive system
Video imaging a scene by scanning once. Information volume is twice that of Interlace system*. This system is best for animation because there is less flickering.

* PAL: 25 frames, 50 fields
NTSC: 30 frames, 60 fields

Video image results are clearly shown in these image pictures.

High Sensitivity, Clear Photography of Dark Areas

Both GP-US522HB and GP-US732H have high sensitivity level. With sensitivity of F16 (2,000 lux), GP-US522HB can capture as scene with minimum illumination reduced to 5 lux. These new cameras produce clear images of areas that are typically lost in darkness because of metal fatigue, particularly during research.

S/N (signal-to noise) Ratio of over 62 dB for Better Picture Quality

The 3CCD Micro Camera Series has a high signal-to-noise ratio of over 62 dB.

Life-like Color reproduction

Gamma Correction, Improved Dynamic Range

The set-up menu includes the gamma correction function. You can select optimum contrast settings for both bright and dark areas. This function prevents blurring and thus provides a clearer picture even in bright or dark areas.

6-Axis Color Matrix Control
Function-Reproduction of Life-like Colors

Each color can be adjusted separately without changing the white balance of the whole image. For red colors, very fine adjustment is available, which is particularly useful for biological research. With this function, you can make optimum color adjustments for various systems and applications.

Conventional image   **GP-US522HB/732H**

High Resolution

#### Over 800-Line Horizontal Resolution

GP-US522HB: The 1/2-type 3CCD with super high sensitivity pixels provides the best picture quality. Horizontal resolution is more than 800 lines. The GP-US732H using a 1/3-type 3CCD has a horizontal resolution of 750 lines.

Upgraded Contour Correction

The high-band aperture function increases the resolution by amplifying the high frequency.
You can make horizontal and vertical contour adjustments separately to ensure clear images.

Red Enhancement

By switching the RED DTL in the set-up menu to ON, you can enhance only red colors; other details are adjusted as usual. Red colors are reproduced by means of high resolution. This function is particularly useful for biological research.
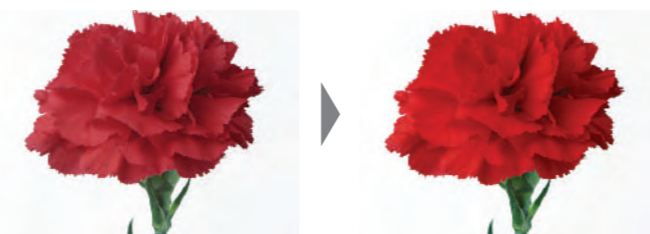
Conventional image   **GP-US522HB/732H**

Full-feature, easy-to-use Camera Control Unit (for two camera heads)

Flexible Camera Adjustment, Optimum Setting

On-Screen Menu to Simplify the Setting of Highly Advanced Functions

The on-screen menu facilitates simple and efficient adjustment operations.
You can make these adjustments while observing the object image. A list of the functions of each camera is displayed on the monitor screen. Simply select the appropriate presets and press the appropriate buttons to complete the setting of the Color Matrix Control, the Red Enhancement, the Gamma Correction and many other highly advanced functions.

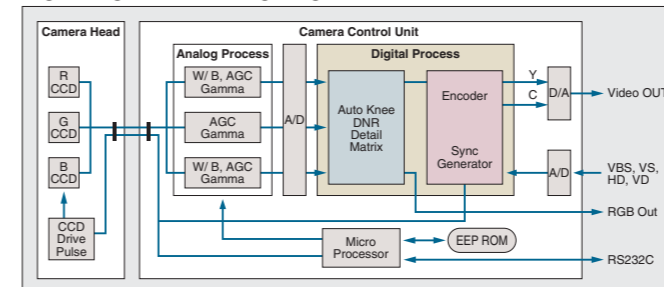#### A Scene File Function for Storing and Recalling Setting Information

You can store in the memory up to two different scene files containing the settings you have made in the on-screen menu. For example, you can store the setting for imaging bright subjects as Scene 1, the setting for imaging dark subjects as Scene 2 and either may be called up when needed.
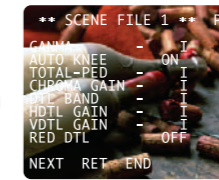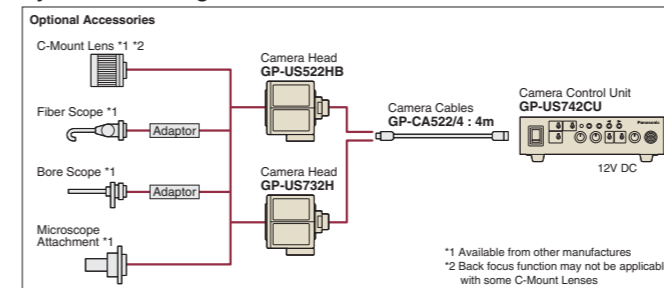
Sensing Area Selection to Ensure Correct Exposures

You can select a sensing area from five presets: ALL, CENTER, CIRCLE (Small), CIRCLE (Medium) and CIRCLE (Large), when AGC or ELC is selected. Otherwise, it can be set for automatic or manual operation.
This function is effective for microscopy or situations when you cannot illuminate the subject area uniformly.

Digital Signal Processing Diagram

Camera Head		Camera Control Unit	
R CCD	Analog Process	Digital Process	
G CCD	W/ B, AGC Gamma	Auto Knee DNR Detail Matrix	Encoder
B CCD	AGC Gamma		Sync Generator
CCD Drive Pulse	W/ B, AGC Gamma	Micro Processor — EEP ROM	

Y, C — D/A — Video OUT
A/D — VBS, VS, HD, VD
RGB Out
RS232C

System Block Diagram

Optional Accessories

C-Mount Lens *1 *2

Fiber Scope *1 — Adaptor — Camera Head GP-US522HB

Bore Scope *1 — Adaptor — Camera Head GP-US732H

Microscope Attachment *1

Camera Cables GP-CA522/4 : 4m

Camera Control Unit GP-US742CU

12V DC

*1 Available from other manufactures
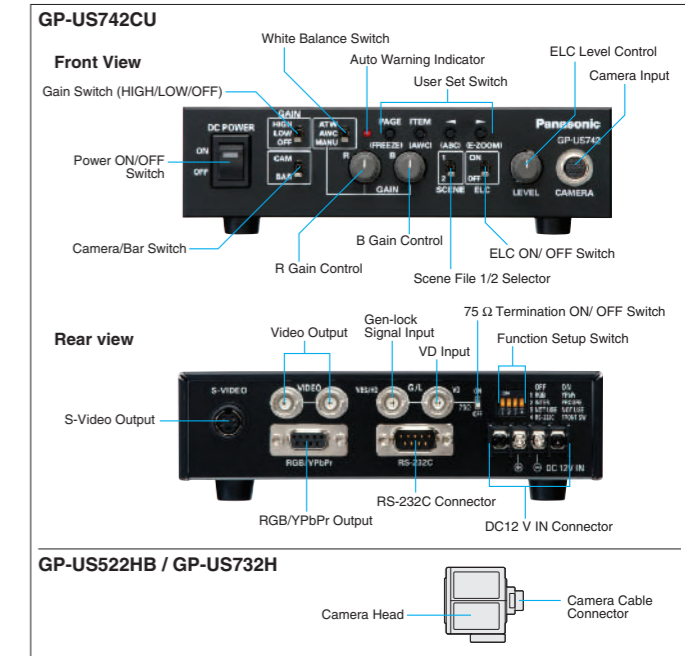*2 Back focus function may not be applicable with some C-Mount Lenses

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2-Dimensional Low-Pass Filter to Control Moire

The set-up menu includes a 2D Low-Pass Filter. You can turn ON or OFF this function from the menu. The 2D Low-Pass Filter prevents moire and improves image clarity.
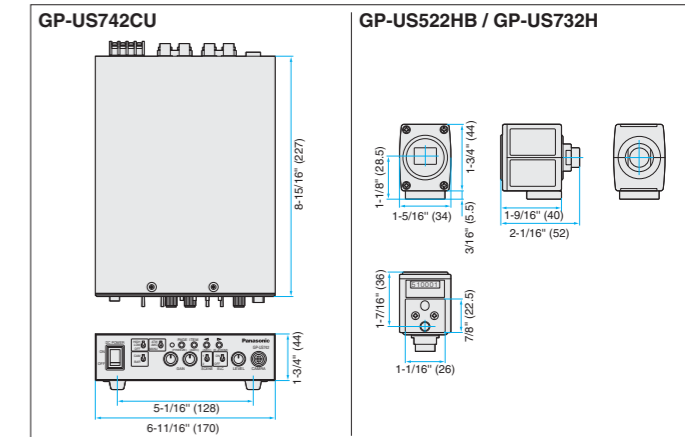
Other Functions

Syncro-Scan adjusts the shutter timing for synchronization with a computer display. Electronic Shutter (7 steps between 1/100 (PAL : 1/120) sec and 1/10,000 sec) ELC (Electric Light Control) Function. Other functions include the freeze-image capturing function and 2.5 x electronic zoom function. When the imaging subject is a moving object, imaging it by the progressive system produces a high resolution image that is free of blurs.

Major Operating Control & Switches

GP-US742CU

Front View
- White Balance Switch
- Auto Warning Indicator
- User Set Switch
- ELC Level Control
- Camera Input
- Gain Switch (HIGH/LOW/OFF)
- Power ON/OFF Switch
- Camera/Bar Switch
- B Gain Control
- R Gain Control
- Scene File 1/2 Selector
- ELC ON/ OFF Switch

Rear view
- Gen-lock Signal Input
- VD Input
- Video Output
- Function Setup Switch
- 75 Ω Termination ON/ OFF Switch
- S-Video Output
- RGB/YPbPr Output
- RS-232C Connector
- DC12 V IN Connector

GP-US522HB / GP-US732H
- Camera Head
- Camera Cable Connector

Dimensions

GP-US742CU
8-15/16" (227)
5-1/16" (128)
6-11/16" (170)

GP-US522HB / GP-US732H
1-1/8" (28.5)
1-3/4" (44)
1-5/16" (34)
1-9/16" (40)
3/16" (5.5)
2-1/16" (52)
1-7/16" (36)
1-1/16" (26)
7/8" (22.5)
1-3/4" (44)

CCD Color Micro-Camera Series

Super Compact and High Performance

The 1/2-type CCD Color Camera Head
GP-KS822H, weighing 14 g (excluding lens)
and capable of 480-line horizontal resolution, equipped with
a new function for rotating and reversing images in the camera control
unit GP-KS822CU, has succeeded in reaching a new level of high performance and microminiaturization.

Camera Control Unit
GP-KS822CU

1/2-type CCD Color Camera Head
GP-KS822H (Lens: optional)

Equipped with Mirror and Rotation Functions
The angle of photographed images can be altered to make them easier to observe.

Conventional image
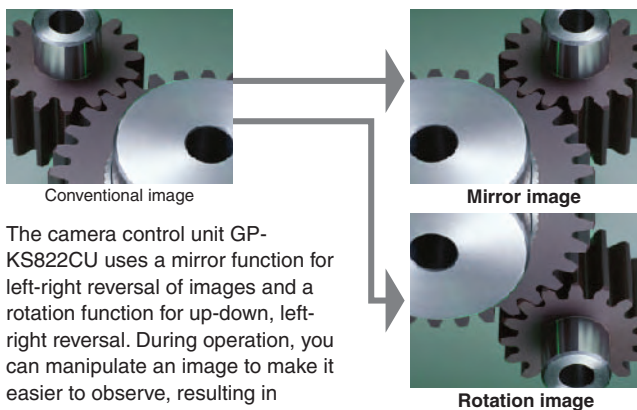
Mirror image

The camera control unit GP-KS822CU uses a mirror function for left-right reversal of images and a rotation function for up-down, left-right reversal. During operation, you can manipulate an image to make it easier to observe, resulting in improved work efficiency.

Rotation image

Equipped with Freeze-Image Function

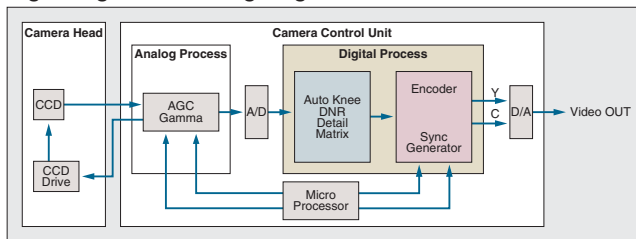When necessary, you can freeze moving images in order to confirm details.

Quality Engineering Features

- 1/2-type Interline Transfer CCD with 752(H) x 582(V) pixels at PAL, 768(H) x 494(V) at NTSC.
- 480-line horizontal resolution
- 50 dB signal-to-noise ratio
- Min. illumination: 6 lux at F 1.4
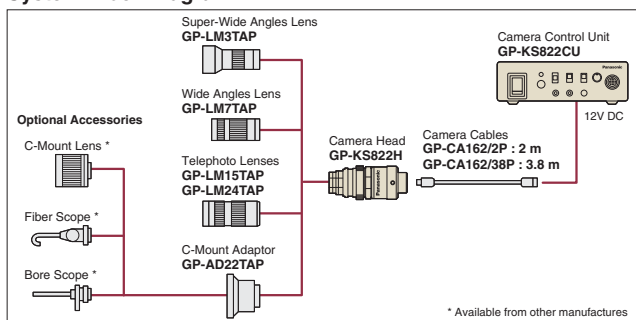- Full compatibility between camera head and CCU

Details may be adjusted using AWC/ATW

For your specific requirements, Camera Control Unit GP-KS822CU facilitates detailed color adjustment by engaging Auto White Control (AWC) or Auto Tracing White (ATW).

Digital Signal Processing Diagram

Camera Head	Analog Process	Digital Process		
CCD	AGC Gamma	A/D → Auto Knee DNR Detail Matrix	Encoder / Sync Generator	Y C → D/A → Video OUT
CCD Drive		Micro Processor		

System Block Diagram

Optional Accessories

Super-Wide Angles Lens
GP-LM3TAP

Wide Angles Lens
GP-LM7TAP

C-Mount Lens *

Telephoto Lenses
GP-LM15TAP
GP-LM24TAP

Fiber Scope *

Bore Scope *

C-Mount Adaptor
GP-AD22TAP

Camera Head
GP-KS822H

Camera Cables
GP-CA162/2P : 2 m
GP-CA162/38P : 3.8 m

Camera Control Unit
GP-KS822CU

12V DC

* Available from other manufactures

Sensing Area Selection (AGC/ELC)

The Camera Control Unit GP-KS822CU features a Sensing Area Selection function. This function has four image sensing patterns: ALL, small, wide and auto detection sensing zones.

Versatile output signals: composite x 2, Y/C x 1

To avoid cross color, the Camera Control Unit GP-KS822CU features Y/C (S-Video) output which provides well-balanced colors.
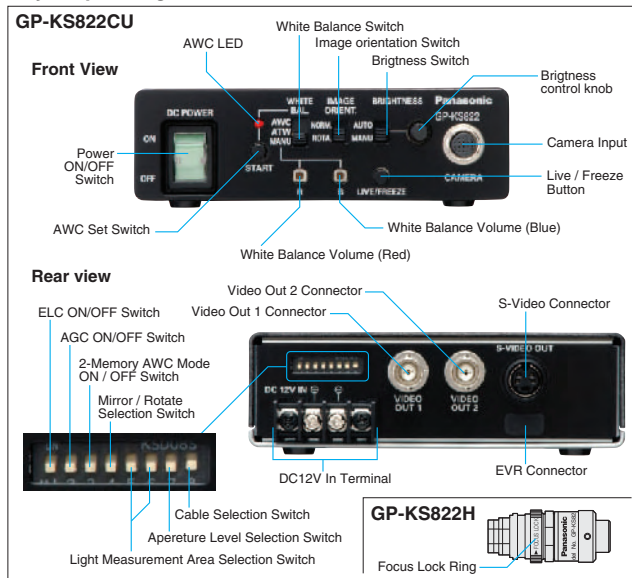
Cable length

Cable length between Camera Head GP-KS822H and Camera Control Unit GP-KS822CU with optical cables:
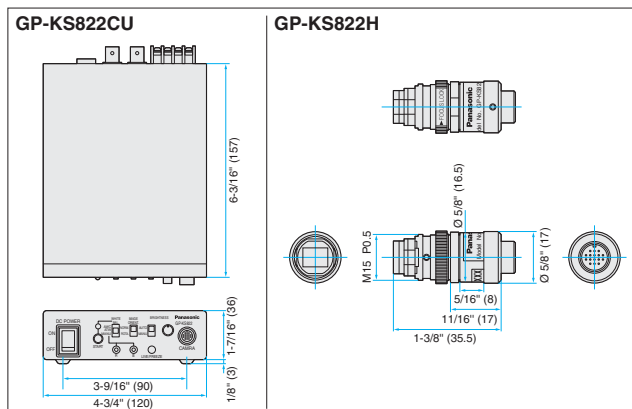GP-CA162/2P : 2 m, GP-CA162/38P : 3.8 m

Other Functions

The Brightness Control maintains a constant video signal level by automatically controlling AGC and ELC functions.
ELC function continuously controls light coming into the CCD.
AGC, reliable single-board designed CCU, easy key access, 2 memory AWC, Aperture level selection, manual White Balance

Major Operating Control & Switches

GP-KS822CU

Front View

White Balance Switch
AWC LED
Image orientation Switch
Brigtness Switch
Brigtness control knob
Power ON/OFF Switch
Camera Input
AWC Set Switch
Live / Freeze Button
White Balance Volume (Blue)
White Balance Volume (Red)

Rear view

Video Out 2 Connector
ELC ON/OFF Switch
Video Out 1 Connector
S-Video Connector
AGC ON/OFF Switch
2-Memory AWC Mode ON / OFF Switch
Mirror / Rotate Selection Switch
Cable Selection Switch
Apereture Level Selection Switch
Light Measurement Area Selection Switch
DC12V In Terminal
EVR Connector

GP-KS822H

Focus Lock Ring

Dimensions

GP-KS822CU	GP-KS822H

GP-KS822CU:
6-3/16" (157)
1-7/16" (36)
1/8" (3)
3-9/16" (90)
4-3/4" (120)

GP-KS822H:
Ø 5/8" (16.5)
Ø 5/8" (17)
M15 P0.5
5/16" (8)
11/16" (17)
1-3/8" (35.5)

SPECIFICATIONS

TV System		PAL			NTSC		
Model No.	Control Unit	GP-US742CUE		GP-KS822CUE	GP-US742CUP		GP-KS822CUP
	Camera Head	GP-US522HBE	GP-US732HE	GP-KS822HE	GP-US522HBP	GP-US732HP	GP-KS822HP
Pick-up System		Micro prism system		—	Micro prism system		—
Pick-up Device		752 (H) x 582 (V) Three 1/2-type interline transfer (IT) super high sensitivity CCDs	753 (H) x 582 (V) Three 1/3-type interline transfer (IT) super high sensitivity CCDs	752 (H) x 582 (V) 1/2-type interline transfer (IT) super high sensitivity CCDs	768 (H) x 494 (V) Three 1/2-type interline transfer (IT) super high sensitivity CCDs	771 (H) x 492 (V) Three 1/3-type interline transfer (IT) super high sensitivity CCDs	768(H) x 494 (V) 1/2-type interline transfer (IT) super high sensitivity CCDs
Scanning System		625 lines/ 50 fields/ 25 frames	625 lines/ 50 frames (Progressive drive) 625 lines/ 50 fields/ 25 frames (Interlace drive)	625 lines/ 50 fields/ 25 frames	525 lines/ 60 fields/ 30 frames	525 lines/ 60 frames (Progressive drive) 525 lines/ 60 fields/ 30 frames (Interlace drive)	525 lines/ 60 fields/ 30 frames
Synchronizing System		Internal or External (Gen-Lock), automatically switchable. Internal: CCIR standard. External (Gen-Lock) Input: VBS, VS, HD/VD is selectable. SC Phase for Gen-Lock (VBS): Free adjustable over 360˚. H Phase for Gen-Lock (VBS, VS): Adjustable		Internal	Internal or External (Gen-Lock), automatically switchable. Internal: EIA standard. External (Gen-Lock) Input: VBS, VS, HD/VD is selectable. SC Phase for Gen-Lock (VBS): Free adjustable over 360˚. H Phase for Gen-Lock (VBS, VS): Adjustable		Internal
Video Outputs	Video 1,2	VBS: 1.0 V [P-P] Composite signal level/ 75 Ω					
	S-Video (Y/C) Out	Y: 0.7 V [P-P] Luminance level/ 75 Ω C: 0.3 V [P-P] Burst level/ 75 Ω			Y: 0.714 V [P-P] Luminance level/75 Ω C: 0.286 V [P-P] Burst level/75 Ω		
	RGB/ YPbPr	R,G,B: 0.7 V [P-P] each/ 75 Ω Y: 0.7 V [P-P] Luminance level/ 75 Ω PbPr: 0.525 V [P-P] each/ 75 Ω SYNC: 0.3 V [P-P] Sync level/ 75 Ω		—	R,G,B: 0.7 V [P-P] each/75 Ω Y: 0.7 V [P-P] Luminance level/75 Ω PbPr: 0.525 V [P-P] each/ 75 Ω SYNC: 0.3 V [P-P] Sync level/75 Ω		—
Required Illumination		2000 lux at F16, 3200 K	2000 lux at F13, 3200 K (Interlace drive) 2000 lux at F 9, 3200 K (Progressive drive)	—	2000 lux at F16, 3200 K	2000 lux at F13, 3200 K (Interlace drive) 2000 lux at F 9, 3200 K (Progressive drive)	—
Minimum Illumination		5 lux (0.5 foot candle) at F2.8 with +12 dB gain without Sensitivity Up, 30 % level at center	7 lux (0.7 foot candle) at F 2.8 with +12 dB gain without Sensitivity Up, 30 % level at center (Interlace drive) 14 lux (1.4 foot candle) at F2.8 with +12 dB gain 30 % level at center (Progressive drive)	6 lux at F1.4	5 lux (0.5 foot candle) at F2.8 with +12 dB gain without Sensitivity Up, 30 % level at center	7 lux (0.7 foot candle) at F 2.8 with +12 dB gain without Sensitivity Up, 30 % level at center (Interlace drive) 14 lux (1.4 foot candle) at F2.8 with +12 dB gain 30 % level at center (Progressive drive)	6 lux at F1.4
Signal-to-Noise Ratio		62 dB (Typical, Y signal without Gain up, Enhance and Gamma)		50 dB or more for Y Signal with AGC off, Enhance in minimum setup	62 dB (Typical, Y signal without Gain up, Enhance and Gamma)		50 dB or more for Y Signal with AGC off, Enhance in minimum setup
Horizontal Resolution		800 lines at center (Y signal)	750 lines at center (Y signal)	480 lines or more at center	800 lines at center (Y signal)	750 lines at center (Y signal)	480 lines or more at center
White Balance		ATW (Automatic Tracing White Balance Control), AWC (Automatic White Balance Control) and Manual					
Black Balance		ABC (Automatic Black Balance) and Manual		—	ABC (Automatic Black Balance) and Manual		—
Color Bar		EBU color bar with 0 % set-up			SMPTE color bar with 7.5 % set-up		
Electronic Shutter:		AUTO:1/50 - 1/10000s STEP: Selectable 1/50(OFF),1/120, 1/250, 1/500, 1/1000, 1/2000,1/4000 and 1/10000s		AUTO (ON/OFF)	AUTO: Adjustable between 1/60 - 1/10000s STEP: Selectable 1/60(OFF),1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000 and 1/10000s		AUTO (ON/OFF)
Gain Selection		AGC and Gain Up (Selectable)		AGC (ON/OFF)	AGC and Gain Up (Selectable)		AGC (ON/OFF)
Controls		R Gain, B Gain and Brightness LEVEL		White Balance R /B Gain Control and Brightness control	R Gain, B Gain and Brightness LEVEL		White Balance R /B Gain Control and Brightness control
Computer Interface		RS-232C: D-SUB 9-pin Connector x 1		—	RS-232C: D-SUB 9-pin Connector x 1		—
Lens Mount		Special C-Mount	C-Mount	C-Mount (with Optional C-Mount adaptor) or Optional lens	Special C-Mount	C-Mount	C-Mount (with Optional C-Mount adaptor) or Optional lens
Power Source		12 V DC		—	12 V DC		—
Power Consumption		12 W		450 m A or less (at DC12V)	12 W		450 m A or less (at DC12V)
Ambient Operating Temperature		0 ℃ ~ 45 ℃		-10 ℃ ~ 45 ℃	0 ℃ ~ 45 ℃		-10 ℃ ~ 45 ℃
Ambient Operating Humidity		30 % ~ 90 %		30 % ~ 85 %	30 % ~ 90 %		30 % ~ 85 %
Dimensions	Camera Head (Excluding Mounting Adaptor)	34 (W) x 44 (H) x 52 (D) mm		Ø 17 x 35.5 mm (D)	1-5/16" (W) x 1-11/16" (H) x 2" (D)		Ø 11/16" x 1-3/8" (D)
	CCU (Excluding Rubber Foot and Connector)	170 (W) x 44 (H) x 227 (D) mm		120 (W) x 157 (D) x 36 (H) mm	6-45/64" (W) x 1-11/16" (H) x 8-15/16" (D)		6-3/4" (W) x 1-3/4" (D) x 9" (H)
Weights (Approx)	Camera Head (Excluding lens)	110 g {0.24 lbs}		14 g {0.03 lbs}	110 g {0.24 lbs}		14 g {0.03 lbs}
	CCU	1.2 kg {2.64 lbs}		530 g {1.17 lbs}	1.2 kg {2.64 lbs}		530 g {1.17 lbs}

Optional Accessories

Camera Cables

3CCD Color Micro-Camera Series

GP-CA522/4 : 4 m

CCD Color Micro-Camera Series

GP-CA162/2P : 2 m
GP-CA162/38P : 3.8 m

Wide line-up optical lenses

CCD Color Micro-Camera Series

Super-Wide Angles Lens **GP-LM3TAP**	Wide Angles Lens **GP-LM7TAP**	Telephoto Lenses **GP-LM15TAP** **GP-LM24TAP**	C-Mount Adaptor **GP-AD22TAP**

This lens accepts optional 3mm super-wide angles, 7.5 mm-wide angles, 15 mm/24 mm telephoto lenses.
An optical C-Mount adaptor GP-AD22TA enables use with C-Mount lenses.

Important — Safety Precaution: carefully read the operating instructions and installation manual before using this product.

• Weights and dimensions are approximate.
• Specifications are subject to change without notice.
• These products may be subject to export control regulations.

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