# Clifton Cameras Product Specification

## Panasonic Lumix DMC-GH5 Camera Full Spec

**TYPE** Digital Single Lens Mirrorless camera

**Recording media** SD Memory Card, SDHC Memory Card, SDXC Memory Card (Compatible with UHS-I / UHS-II UHS Speed Class 3 standard SDHC / SDXC Memory Cards)

**Image sensor size** 17.3 x 13.0 mm (in 4:3 aspect ratio)

**Lens mount** Micro Four Thirds mount

**IMAGE SENSOR** Live MOS Sensor

**Total pixels** 21.77 Megapixels

**Camera effective pixels** 20.30 Megapixels

**Color filter** Primary color filter

**Dust reduction system** Supersonic wave filter

**IMAGE STABILIZATION SYSTEM**

Image sensor shift type (5-axis / 5-stop\*), Dual I.S. (Dual I.S. 2 compatible)

\* Based on the CIPA standard [Yaw/Pitch direction: focusing distance f=60mm (35mm camera equivalent f=120mm), when H-FS12060 is used.

**RECORDING SYSTEM** Recording file format

**Still image** JPEG (DCF, Exif 2.31), RAW

**6K PHOTO\* / 4K PHOTO**

6K PHOTO: MP4 (H.265/HEVC, Audio format: AAC (2ch))

4K PHOTO:MP4 (H.264/MPEG-4 AVC, Audio format: AAC (2ch))

**Motion picture**

MOV: H.264/MPEG-4 AVC (Audio format: LPCM (2ch 48kHz/16-bit, 48kHz/24-bit\*, 96kHz/24-bit\*)) \*When attaching DMW-XLR1 (sold separately).

MP4: H.264/MPEG-4 AVC

AVCHD Progressive, AVCHD (Audio format: Dolby Audio 2ch)

**System frequency** 59.94Hz, 50.00Hz, 24.00Hz

**Aspect ratio** 4:3, 3:2, 16:9, 1:1

**Image quality** RAW, RAW+Fine, RAW+Standard, Fine, Standard

**Color space** sRGB, AdobeRGB

**File size (Pixels) Still image**

4:3 5184x3888(L) / 3712x2784(M) / 2624x1968(S) / 4992x3744(6K PHOTO) / 3328x2496(4K PHOTO)

3:2 5184x3456(L) / 3712x2480(M) / 2624x1752(S) / 5184x3456(6K PHOTO) / 3504x2336(4K PHOTO)

16:9 5184x2920(L) / 3840x2160(M) / 1920x1080(S) / 3840x2160(4K PHOTO)

1:1 3888x3888(L) / 2784x2784(M) / 1968x1968(S) / 2880x2880(4K PHOTO)

**Motion picture**

MOV\*\*

High-res audio is selectable only when using the DMW-XLR1 (sold separately). 59.94Hz [C4K] 4096x2160 23.98p, 150Mbps (4:2:2 10-bit LongGOP) (LPCM, High-Res Audio) / 100Mbps (4:2:0 8-bit LongGOP) (LPCM, High-Res Audio)

[4K] 3840x2160 59.94p, 150Mbps (4:2:0 8-bit LongGOP) (LPCM, High-Res Audio)

29.97p, 400Mbps (4:2:2 10-bit ALL-Intra) (LPCM, High-Res Audio) \*The firmware will be released in second half of 2017.

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**AVCHD Progressive\*\***

AVCHD\*\* 59.94Hz [Full HD] 1920x1080 59.94p, 28Mbps (LongGOP) (Dolby)

59.94i, 24Mbps (LongGOP) (Dolby) (Sensor output is 29.97fps)

59.94i, 17Mbps (LongGOP) (Dolby) (Sensor output is 59.94fps)

23.98p, 24Mbps (LongGOP) (Dolby)

50.00Hz [Full HD] 1920x1080 50.00p, 28Mbps (LongGOP) (Dolby)

50.00i, 24Mbps (LongGOP) (Dolby) (Sensor output is 25.00fps)

50.00i, 17Mbps (LongGOP) (Dolby) (Sensor output is 50.00fps)

**Continuous recordable time (Motion picture)**

AVCHD [FHD/60p]: Approx. 150 min (rear monitor), 150 min (LVF) with H-ES12060, Approx. 160 min (rear monitor), 150 min (LVF) with H-HSA12035 / H-FS12060

AVCHD [FHD/60i]: Approx. 150 min (rear monitor), 150 min (LVF) with H-ES12060, Approx. 160 min (rear monitor), 160 min (LVF) with H-HSA12035 / H-FS12060

MP4 [4K/60p]: Approx. 100 min (rear monitor), 100 min (LVF) with H-ES12060 / H-HSA12035 / H-FS12060

MP4 [4K/30p]: Approx. 110 min (rear monitor), 110 min (LVF) with H-ES12060 / H-HSA12035 / H-FS12060

**Actual recordable time (Motion picture)**

AVCHD [FHD/60p]: Approx. 75 min (rear monitor), 75 min (LVF) with H-ES12060, Approx. 80 min (rear monitor), 75 min (LVF) with H-HSA12035 / H-FS12060

AVCHD [FHD/60i]: Approx. 75 min (rear monitor), 75 min (LVF) with H-ES12060, Approx. 80 min (rear monitor), 80 min (LVF) with H-HSA12035 / H-FS12060

MP4 [4K/60p]: Approx. 50 min (rear monitor), 50 min (LVF) with H-ES12060 / H-HSA12035 / H-FS12060

MP4 [4K/30p]: Approx. 55 min (rear monitor), 55 min (LVF) with H-ES12060 / H-HSA12035 / H-FS12060

**WIRELESS**

Wi-Fi IEEE 802.11a/b/g/n/ac \* 5GHz Wi-Fi is not available in some countries.

Please refer to "Wi-Fi" Sheet

Bluetooth Bluetooth® v4.2 (Bluetooth Low Energy (BLE))

QR Code Connection Yes

Password-less connection Yes (ON / OFF selectable)

**VIEWFINDER**

Type OLED Live View Finder (3,680k dots)

Field of view Approx. 100%

Magnification Approx. 1.52x / 0.76x (35mm camera equivalent) with 50 mm lens at infinity; -1.0 m-1

Eye point Approx. 21 mm from eyepiece lens

Diopter adjustment -4.0 - +3.0 (dpt)

Eye sensor Yes

Eye sensor adjustment High / Low

**FOCUS**

Type Contrast AF system

DFD technology Yes

Post Focus Yes

Focus Stacking Yes

Focus mode AFS (Single) / AFF (Flexible) / AFC (Continuous) / MF

AF mode Face/Eye Detection / Tracking / 225-Area / Custom Multi / 1-Area / Pinpoint

(Full area touch is available) (Scalable AF frame size (by Joystick) and flexible AF position (by front/rear dial))

AF detective range EV -4 - 18 (ISO100 equivalent)

AF assist lamp Yes

AF lock Yes (AF/AE LOCK button)

AF custom setting AF Sensitivity, AF Area Switching Sensitivity, Moving Object Prediction

Others One Shot AF, Shutter AF, Half Press Release, Quick AF, Continuous AF (during motion picture recording), Eye Sensor AF, AF+MF, MF Assist, Touch MF Assist, Focus Peaking, Touch AF/AE Function, Touch Pad AF, Touch Shutter

**EXPOSURE CONTROL**

Light metering system 1,728-zone multi-pattern sensing system

Light metering mode Multiple / Center Weighted / Spot

Metering range EV0-18 （F2.0 lens, ISO100 equivalent)

Exposure mode Program AE, Aperture Priority AE, Shutter Priority AE, Manual

ISO sensitivity (Standard output sensitivity) Still image: Auto / Intelligent ISO / 100 (Extended) / 200 / 400 / 800 / 1600 / 3200 / 6400 / 12800 / 25600 (Changeable to 1/3 EV step)

Creative Video Mode: Auto / 100 (Extended) / 200 / 400 / 800 / 1600 / 3200 / 6400 / 12800 (Changeable to 1/3 EV step)

Exposure compensation 1/3 EV step ±5EV (±3EV for motion picture)

AE lock Yes (AF/AE LOCK button)

**WHITE BALANCE**

White balance AWB / AWBc / Daylight / Cloudy / Shade / incandescent / Flash / White Set 1, 2, 3, 4 / Color temperature setting 1, 2, 3, 4

White balance adjustment Blue/Amber bias, Magenta/Green bias

Color temperature setting 2500-10000K in 100K

**SHUTTER**

Type Focal-plane shutter

Shutter speed Still image: Bulb (Max. 30 minutes), 1/8,000 - 60

Electronic first curtain shutter: Bulb (Max. 30 minutes), 1/2,000 - 60

Electronic shutter: 1/16,000 - 1

Motion picture: 59.94Hz: 1/16,000 - 1/30, 50.00Hz: 1/16,000 - 1/25, 23.98Hz: 1/16,000 - 1/24 (When using Synchro Scan)

Shutter life Approx. 200,000 images

Self timer 10sec, 3 images / 2sec / 10sec

Remote control Remote control with Bulb function by DMW-RSL1 (sold separately)

**BRACKET**

AE bracket 3, 5, 7 images in 1/3, 2/3 or 1 EV step, max. ±3 EV, single/burst

Aperture Bracket 3, 5 or all positions in 1 EV step

Focus Bracket 1 to 999 images, focus steps can be set in 5 levels

White balance bracket 3 exposures in blue/amber axis or in magenta/green axis, color temperature setting

**BURST SHOOTING**

Burst speed [Mechanical shutter]

AFS/MF: H: 12 frames/sec, M: 7 frames/sec (with Live View), L: 2 frames/sec (with Live View)

AFF/AFC: H: 9 frames/sec, M: 7 frames/sec (with Live View), L: 2 frames/sec (with Live View)

[Electronic shutter]

AFS/MF: H: 12 frames/sec, M: 7 frames/sec (with Live View), L: 2 frames/sec (with Live View)

AFF/AFC: H: 9 frames/sec, M: 7 frames/sec (with Live View), L: 2 frames/sec (with Live View)

Number of recordable images More than approx. 60 images (when there are RAW files with the particular speed) (TBD)

More than approx. 600 images (when there are no RAW files)

(depending on memory card size, battery power, picture size, and compression)

**6K PHOTO\* / 4K PHOTO**

Burst speed [6K PHOTO] 30 frames/sec

[4K PHOTO] 60 frames/sec, 30 frames/sec

Exif information Yes (Each JPEG image cropped out of the 4K burst file complies with EXIF.)

Marking function Yes (in 6K/4K Burst (S/S) mode)

Loop Rec function Yes (in 6K/4K Burst (S/S) mode)

**FLASH**

Flash type TTL External Flash (sold separately)

Flash mode Auto\*, Auto/Red-eye Reduction\*, Forced On, Forced On/Red-eye Reduction, Slow Sync., Slow Sync./Red-eye Reduction, Forced Off \* For iA, iA+ only.

Synchronization speed Less than 1/250 second

Flash output adjustment 1/3EV step ±3EV

Flash synchronization 1st. Curtain Sync, 2nd Curtain Sync.

Synchronization for flash dimming and exposure compensation Yes

Wireless control Yes (When using DMW-FL200L / FL360L / FL580L (sold separately)), Wireless Channel: 1ch/2ch/3ch/4ch

Flash sync socket Yes

**REAR MONITOR**

Type TFT LCD monitor with static touch control

Monitor size Free-angle 3.2-inch (8.0cm) / 3:2 aspect / Wide viewing angle

Pixels Approx. 1,620k dots

Field of view Approx. 100%

Monitor adjustment Brightness, Contrast, Saturation, Red-Green, Blue-Yellow

**LIVE VIEW**

Digital zoom 2x, 4x

Extra Tele Conversion Still image: Max. 2x

4K PHOTO: 1.6x (4:3), 1.5x (3:2), 1.4x (16:9, 1:1)

Motion picture: 2.7x (FHD), 1.4x (4K)

Other functions Level Gauge, Real-time Histogram, Guide Lines (3 patterns), Center Marker, Highlight display (Still image / motion picture), Zebra pattern (Still image / motion picture)

**DIRECTION DETECTION FUNCTION** Yes

**FUNCTION BUTTON**

Fn1-20 Wi-Fi / Q.MENU / LVF/Monitor Switch / LVF/Monitor Disp. Style / AF/AE LOCK / AF-ON / Preview / One Push AE / Touch AE / Level Gauge / Focus Area Set / Zoom Control / 1 Shot RAW+JPG / 1 Shot Spot Metering / Cursor Button Lock / Dial Operation Switch / Photo Style / Filter Select / Aspect Ratio / Picture Size / Quality / AFS/AFF / Metering Mode / Burst Rate / 6K/4K Photo / Self Timer / Bracket / Highlight Shadow / i. Dynamic / i. Resolution / HDR / Shutter Type / Flash Mode / Flash Adjust. / Wireless Setup (Flash) / Ex. Tele Conv. / Digital Zoom / Stabilizer Sensitivity / ON/OFF of each item in White Balance / ON/OFF of each item in Photo Style / AF Mode/MF / Rec/Playback Switch / Off / 4K Live Crop / Motion Pic. Set / Picture Mode / Variable Frame Rate / Picture Mode / Synchro Scan / Time Code Display / Mic. Directivity Adjust / Color Bars / WFM/Vector Scope / LUT Monitor Display\* / LUT HDMI Display\* / Focus Transition / Silent Mode / Peaking / Histogram / Guide Line / Zebra Pattern / Monochrome Live View / Rec Area / Video-Priority Display / Step Zoom / Zoom Speed / Restore to Default

\*Upgrade Software Key DMW-SFU1 (sold separately) is required.

**PHOTO STYLE**

Standard / Vivid / Natural / Monochrome / L. Monochrome / Scenery / Portrait / Custom 1, 2, 3, 4 / Cinelike D / Cinelike V / Like709\* / V-LogL\*/\*\*

\*When Creative Video Mode is selected. \*\*Upgrade Software Key DMW-SFU1 (sold separately) is required.

**CREATIVE CONTROL**

Expressive / Retro / Old Days / High Key / Low Key / Sepia / Monochrome / Dynamic Monochrome / Rough Monochrome\* / Silky Monochrome\* / Impressive Art / High Dynamic / Cross Process / Toy Effect / Toy Pop / Bleach Bypass / Miniature Effect\*\* / Soft Focus\* / Fantasy / Star Filter\* / One Point Color / Sunshine\*

\*For photos only. \*\*Not available in 4:2:2 10-bit video or 4K video recording.

**CREATIVE VIDEO MODE**

Exposure mode Program AE/ Aperture-Priority / Sutter-Priority / Manual Exposure

Variable frame rate 59.94Hz MOV/MP4(LPCM)/FHD/59.94p

2, 30, 56, 58, 60, 62, 64, 90, 120, 150, 180 fps

MOV/MP4(LPCM)/4K/29.97p, AVCHD/FHD/29.97p

2, 15, 26, 28, 30, 32, 34, 45, 60 fps

MOV/MP4(LPCM)/FHD/29.97p

2, 15, 26, 28, 30, 32, 34, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180 fps

MOV/MP4(LPCM)/4K/23.98p, AVCHD/FHD/23.98p

2, 12, 20, 22, 24, 26, 28, 36, 48, 60 fps

MOV/MP4(LPCM)/FHD/23.98p

2, 12, 20, 22, 24, 26, 28, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 168, 180 fps

50.00Hz MOV/MP4(LPCM)/FHD/50.00p

2, 25, 46, 48, 50, 52, 54, 75, 100, 150, 180 fps

MOV/MP4(LPCM)/4K/25.00p, AVCHD/FHD/25.00p

2, 12, 21, 23, 25, 27, 30, 37, 60 fps

MOV/MP4(LPCM)/FHD/25.00p

2, 12, 21, 23, 25, 27, 30, 37, 50, 62, 75, 87, 100, 125, 150, 175, 180 fps

24.00Hz MOV/MP4(LPCM)/C4K/24.00p, MOV/MP4(LPCM)/4K/24.00p

2, 12, 20, 22, 24, 26, 28, 36, 48, 60 fps

MOV/MP4(LPCM)/FHD/24.00p

2, 12, 20, 22, 24, 26, 28, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144, 156, 168, 180 fps

**ANAMORPHIC MODE**

Anamorphic 4K mode (4:3) MOV\*\*

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23.98p, 100Mbps (4:2:0 8-bit LongGOP) (LPCM)

50.00Hz 50.00p, 150Mbps (4:2:0 8-bit LongGOP) (LPCM)

25.00p, 400Mbps (4:2:2 10-bit ALL-Intra) (LPCM) \*The firmware will be released in second half of 2017.

25.00p, 150Mbps (4:2:2 10-bit LongGOP) (LPCM) \*The firmware will be released in April 2017.

25.00p, 100Mbps (4:2:0 8-bit LongGOP) (LPCM)

24.00Hz 24.00p, 400Mbps (4:2:2 10-bit ALL-Intra) (LPCM) \*The firmware will be released in second half of 2017.

24.00p, 150Mbps (4:2:2 10-bit LongGOP) (LPCM) \*The firmware will be released in April 2017.

24.00p, 100Mbps (4:2:0 8-bit LongGOP) (LPCM)

**MOTION PICTURE FUNCTION**

Master pedestal level 31 steps

Luminance level 8-bit: 0-255 / 16-235 / 16-255

10-bit: 0‒1023 / 64‒940 / 64‒1023

Wave form monitor / Vectorscope Selectable

LUT display LUT Monitor Display / LUT HDMI Display \*Upgrade Software Key DMW-SFU1 (sold separately) is required.

Synchro scan Yes

Time code Count Up: Rec Run/Free Run selectable, Time Code Mode: Drop frame/Non-drop frame selectable (When system frequency [59.94Hz] is selected.)

SS/Gain operation Shutter Duration/ISO / Angle/ISO / Shutter Duration/dB

Color bars / 1kHz test tone Yes (SMPTE / EBU / ARIB) / Yes

Photo style for motion picture Cinelike D / Cinelike V / Like709\* / V-LogL\*/\*\*

\*When Creative Video Mode is selected. \*\*Upgrade Software Key DMW-SFU1 (sold separately) is required.

**Knee control** Yens (in Like709 mode)

**PLAYBACK**

Playback mode 30-thumbnail display, 12-thumbnail display, Calendar display, Zoomed playback (Max. 16x), Slideshow (All / Picture Only / Video Only, duration & effect is selectable), Playback Mode (Normal / Picture Only / Video Only), Location Logging, RAW Processing, 4K PHOTO Bulk Saving, Light Composition, Clear Retouch, Title Edit, Text Stamp, Video Divide, Time Lapse Video, Stop Motion Video, Resize, Cropping, Rotate, Rotation Display, Favorite, DPOF Print Set, Protect, Face Recognition Edit, Picture Sort, Creating Still Pictures from a Motion Picture

**IMAGE PROTECTION / ERASE** Protection Single / Multi or Cancel

**Erase** Single / Multi / All / Except Favorite

**PRINT** Direct print PictBridge compatible

**INTERFACE** USB USB Type-C, Super Speed USB3.1 GEN1

**HDMI\*\*\***

**Monitor-through**

4:2:2 8-bit

4:2:2 10-bit (When [4K/60p] [4K/50p] mode is selected, it is not possible to record motion picture or still picture on the SD memory card in the camera unit.)

Auto / C4K / 4K / 1080p

Information display ON/OFF (selectable)

Automatic down-conversion (4K --> 1080p only)

**Playback**

HDMI TypeA / VIERA Link, Audio: Stereo

59.94Hz: Auto / 4K/60p / 4K/30p / 1080p / 1080i / 720p / 480p

50.00Hz: Auto / 4K/50p / 4K/25p / 1080p / 1080i / 720p / 576p

24.00Hz: Auto / C4K / 4K/24p / 1080p

**Audio video output** No

**Remote input** φ2.5mm for remote

**External microphone input** φ3.5mm for external microphone

Stereo/Lens Auto/Shotgun/Super Shotgun/Manual is selectable when attaching DMW-MS2 (sold separately).

**Headphone output** φ3.5mm for headphone

**Microphone** Stereo, Wind Noise Canceller: OFF / Low / Standard / High / AUTO

**High-res audio recording** Yes with DMW-XLR1 (sold separately)

**Speaker Monaural**

**SD card slot** Slot 1, Slot 2

**LANGUAGE** OSD language Please refer to "OSD" Sheet

**POWER** Battery Li-ion Battery Pack (7.2V, 1860mAh, 14Wh) (included)

Battery life (CIPA standard) Approx. 410 images (rear monitor), 400 images (LVF), 1,000 images (Power Save LVF mode\*) with H-FS12060

Approx. 410 images (rear monitor), 390 images (LVF), 1,000 images (Power Save LVF mode\*) with H-HSA12035

Approx. 400 images (rear monitor), 380 images (LVF), 1,000 images (Power Save LVF mode\*) with H-ES12060

\*Under the test conditions specified by Panasonic based on CIPA standard. When the time to get in the sleep mode is set to 3 sec.

 **Battery grip** DMW-BGGH5 (sold separately)

**DIMENSIONS / WEIGHT** Dimensions (W x H x D) 138.5 x 98.1 x 87.4 mm / 5.45 x 3.86 x 3.44 inch (excluding protrusions)

Weight Approx. 725g / 1.60 lb (SD card, Battery, Body)

Approx. 645g / 1.42 lb (Body only)

Approx. 935g / 2.06 lb (SD card x 1, Battery, H-FS12060 lens included)

Approx. 1030g / 2.27 lb (SD card x 1, Battery, H-HSA12035 lens included)

Approx. 1045g / 2.30 lb (SD card x 1, Battery, H-ES12060 lens included)

**OPERATING ENVIRONMENT**

Operating temperature\*\*\*\* -10oC to 40oC (14oF to 104oF)

Operating humidity 10%RH to 80％RH

**STANDARD ACCESSORIES**

Software ・ The software to edit and playback images on computer is not bundled with this camera. To do this, PHOTOfunSTUDIO 10.0XE is available for download at Panasonic website using computer connected to the Internet.

http://panasonic.jp/support/global/cs/soft/download/d\_pfs99pe.html (For Windows)

・ The software to process RAW file on computer is not bundled with this camera. To do this, SILKYPIX Developer Studio is available for download at Ichikawa Soft Laboratory's website using computer connected to the Internet.

http://www.isl.co.jp/SILKYPIX/english/p/ (For Windows / Mac)

**Standard accessories**

Battery Charger (AC Cable included), Battery Pack, Body Cap, Hot Shoe Cover, Eye Cup, Flash Syncro Socket Cap, Cover for the Battery Grip Connector, USB Connection Cable, Shoulder Strap, Cable Holder, Lens Cap\*, Lens Hood\*, Lens Rear Cap\* \*Included with DC-GH5L kit, DC-GH5A kit and DC-GH5M kit.

**Coming Soon:**

An additional ALL-Intra Video Recording mode

4K HDR video recording

Enhancement of the Anamorphic video recording mode

Improved auto focus performance

Compatibility with ‘LUMIX Tether’ PC software

Enhancement of Body I.S. (Image Stabilizer)

Improved performance in (6K PHOTO) and (4K PHOTO)

Improved usability of Time Lapse Shot

Improved usability of Power Save LVF

Correction of white balance setting

Wireless functions