Technical Information

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Technical Information

1. TECHNICAL INFORMATION

1.1 Image sensor – CMOS sensor

1） Overview

The 35mm, full-frame CMOS sensor (Fig. 001) developed and manufactured by Canon has enabled the camera to attain the top overall performance in its class. It features high resolution (approx. 12.8 effective megapixels), wide ISO speed range (ISO 50, 100-1600, 3200), low image noise (same level as the EOS-1Ds Mark II), high-speed signal reading (for approx. 3 fps continuous shooting), and low power consumption. Table 001 shows the major specifications.

Table 001 CMOS sensor specifications

Effective pixels (approx.)	12.80 million: 4384 × 2918
Total pixels (approx.)	13.30 million: 4480 × 2958
Effective sensor size (mm)	35.8 × 23.9
Pixel size (μm)	8.2 × 8.2
Color filter	RGB primary color filter
Aspect ratio	3 : 2

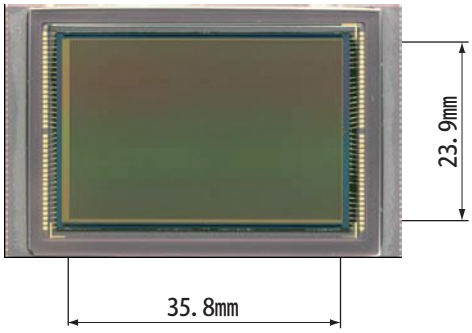


Fig. 001 CMOS sensor (actual size)

2） Wide ISO speed range and low noise

With the same technologies as the EOS 20D's CMOS sensor and the larger pixel size of 8.2 μm square (compared to EOS 20D's 6.4 μm square) to receive more light, the camera provides a wide ISO speed range of 100-1600 (L: 50, H: 3200) while minimizing image noise.

Table 002 Pixel Size and ISO Range

Camera	Pixel Size	ISO Speed
EOS 5D	8.2 × 8.2μm	50 • 100 - 1600 • 3200
EOS-1Ds Mark II	7.2 × 7.2μm	
EOS-1D Mark II	8.2 × 8.2μm	
EOS 20D	6.4 × 6.4μm	100 - 1600 • 3200
EOS Kiss Digital N	6.4 × 6.4μm	100 - 1600

- The large microlens gathers light highly efficiently for the photodiode.
- Optimum photodiode construction for the CMOS sensor.
- Improved dynamic range with a finer CMOS process and optimized photodiode construction.
- Second-generation, on-chip, noise reduction circuit for effectively minimizing random noise and eliminating fixed-pattern noise.

3） Four-channel reading

As with the EOS 20D, 4-channel reading is performed per line (Fig. 002) so that the continuous shooting speed can be as fast as 3 fps even with approx. 12.8 megapixels.

Also, the increase in power consumption caused by the 4-channel reading is held to an absolute minimum. As with the EOS 20D, power consumption is reduced by decreasing the output amp's power consumption, cutting off power to the output amp during long exposures, and cutting off the standard power current driving the circuitry.

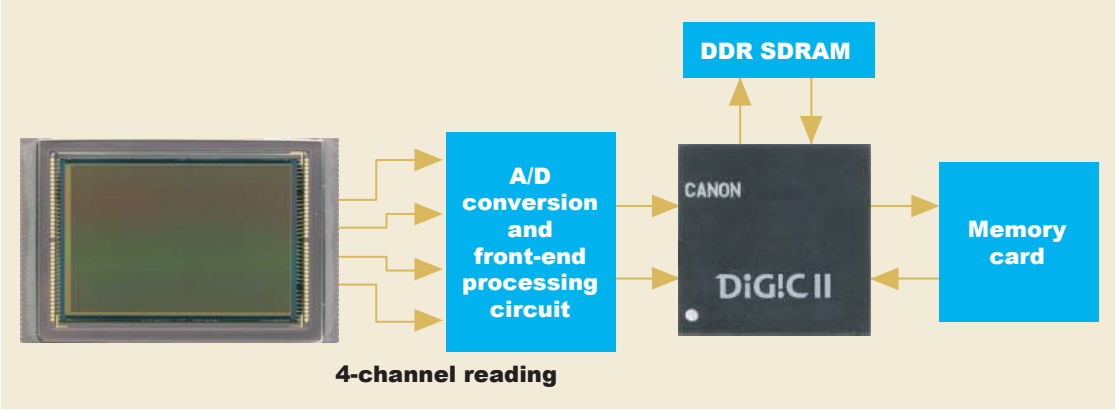


Fig. 002 Four-channel reading and image processing diagram

4） Infrared-blocking, low-pass filter

The infrared-blocking, low-pass filter basically consists of an infrared-blocking filter, low-pass filter, phase plate, and low-pass filter.

The EOS 20D's infrared-blocking, low-pass filter has the same basic construction with an infrared-absorbing glass and three crystal plates. However, the EOS 5D's filter has one independent crystal plate which also functions as the CMOS sensor package's cover glass (Fig. 003).

This makes it unnecessary to have a relatively expensive cover glass. Therefore, the cost is reduced without affecting the infrared-blocking, low-pass filter's performance.

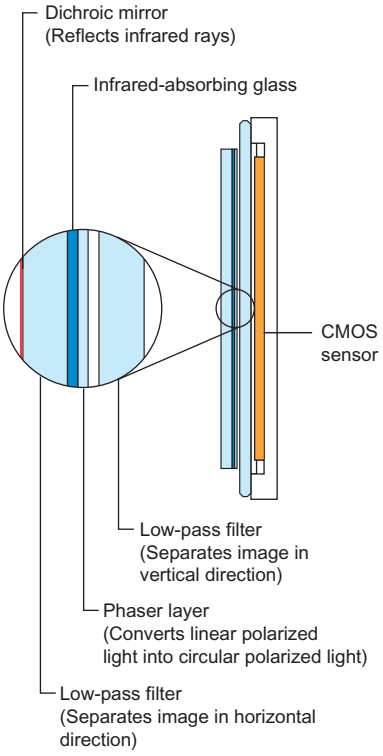


Fig. 003 Cross section of infrared cut, low-pass filter

1.2 Image recording and processing

1） Image processing by DIGIC II

As with the EOS-1Ds Mark II, high-speed and high-quality image processing is executed by DIGIC II (Fig. 004). Also, DIGIC II and the DDR SDRAM (EOS 20D: SDR SDRAM) buffer memory work together to attain a continuous shooting speed of approx. 3 fps and a maximum burst of 60 shots (Large/Fine).

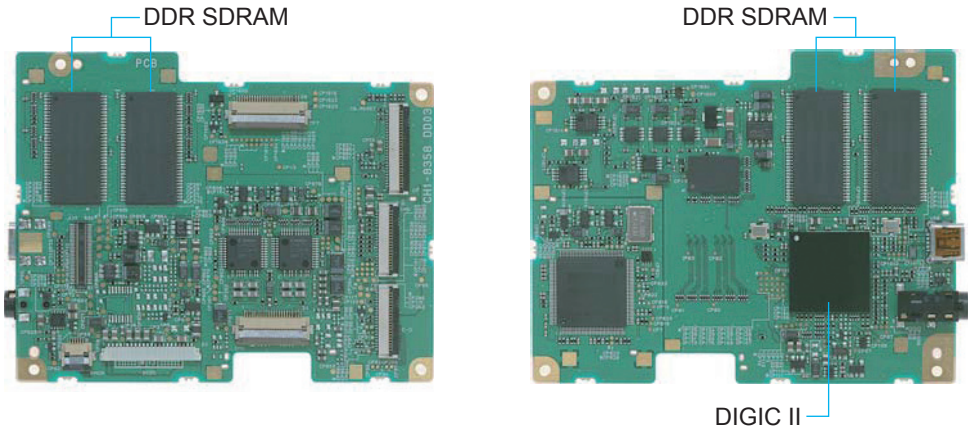


Fig. 004 Digital control circuit board

2） Picture Styles

Picture Styles consolidate the processing parameters and color matrix settings and take it a step further. It is a new feature enabling even the beginner digital photographer to select preset settings which match his or her photographic preferences to obtain the desired image effect (Fig. 005).

The basic elements for image creation, including the color tone, color saturation, sharpness, and contrast, are set differently to obtain a specific photographic effect. For example, the "Landscape" Picture Style tweaks the color tones and saturation for blue skies and green trees to make the image look more impressive. Also, the "Faithful" Picture Style, which is the same as Digital Photo Professional's Faithful setting of RAW image Editing, obtains a colormetric and natural color reproduction even with JPEG images.

Each Picture Style allows the user to adjust the sharpness by 8 levels (0 to 7), and contrast, color tone and color saturation by 9 levels (-4 to +4) (Fig. 006).

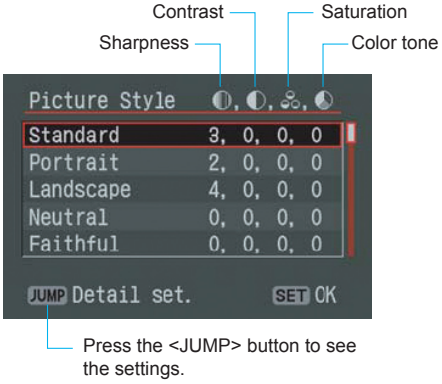


Fig. 005 Picture Style selection screen

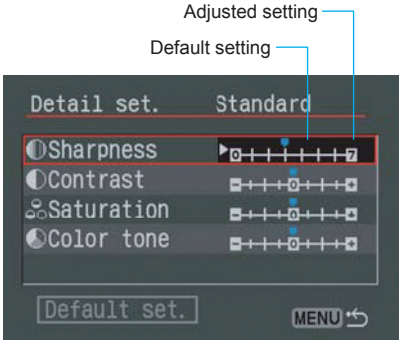


Fig. 006 Picture Style adjustment screen

3） Image-recording quality

Table 003 shows the correlation between the recording quality and file size. Specifications for RAW+JPEG simultaneous recording, color space (sRGB/Adobe RGB) RAW, Design rule for Camera File System, Exif, etc., are the same as the EOS 20D's.

Table 003 Recording Quality and File Size

Image-recording Quality		Pixels (Approx.)	Image Type	Compression Rate	Single Image Size (Approx. MB)	Possible Shots (Approx.)	Print Size
Large	Fine	4368 × 2912 (12.70 megapixels)	JPEG	Low compression	4.6	101	A3 or larger
	Normal			High compression	2.3	196	
Medium	Fine	3618 × 2112 (6.70 megapixels)		Low compression	2.7	168	A4 - A3
	Normal			High compression	1.4	319	
Small	Fine	2496 × 1664 (4.20 megapixels)		Low compression	2.0	233	A4 or smaller
	Normal			High compression	1.0	446	
RAW		RAW: 4368 × 2912 (12.70 megapixels)	RAW	RAW: Lossless Compression	12.9	29	A3 or larger
RAW+Large/Fine			RAW + JPEG		—	22	—
RAW+Large/Normal						25	
RAW+Medium/Fine						24	
RAW+Medium/Normal						26	
RAW+Small/Fine						25	
RAW+Small/Normal						27	

＊The number of possible shots apply to a Canon 512MB CF card.

＊The single image size and number of possible shots will vary depending on the subject, shooting mode, Picture Style, ISO speed, etc.

4） White balance

Specifications for the auto white balance, white balance correction, and white balance bracketing are the same as the EOS 20D's.

5） Long exposure noise reduction

C.Fn-2 for noise reduction of long exposures can be set to "Off" or "Auto noise reduction" or "On."

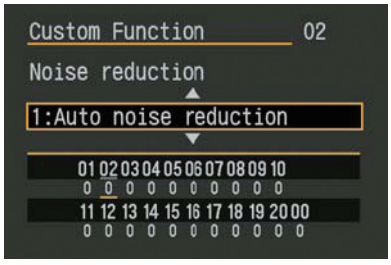


Fig. 007 C.Fn-2 setting screen

[Auto noise reduction]

For long exposures 1 sec. or longer, noise caused by a long exposure or high temperature (spotty noise or reddish corners) is detected. If it is determined to be noise, noise reduction is performed. Normally, this setting is most effective.

[On]

For long exposures 1 sec. or longer, noise reduction is always performed. This setting is effective for reducing noise generated (rarely) in low temperatures that cannot be detected automatically.

Note: With the "Auto noise reduction" and "On" setting, noise reduction will be performed according to the two conditions above regardless of the ISO speed.

Like the EOS-1Ds Mark II, the EOS 5D enables continuous shooting even while noise reduction is performed as long as the buffer memory is free. Also, when shutter speed-priority AE or manual exposure is set and continuous shooting is done at the same shutter speed, noise reduction will be performed in a single process on all the shots based on the first shot.

6） Image recording to CF card

(1)Writing to CF card

Thanks to DIGIC II and an improved card-writing process, high-speed data writing on par＊ with the EOS 20D is attained.

＊With a Canon 512MB CF card.

(2)Folder creation and selection

As with the EOS-1D-series cameras, the folder can be created automatically, manually (Fig. 008), or when the image file number is reset manually. A folder can also be created with a personal computer.

The folder created by the camera will be named ***EOS5D (where *** is the folder number). If the folder is created with a personal computer, the name will have five characters with a three-digit folder number followed by a half-width letter and underbar.

The user can select the folder where the captured images are to be saved. A folder can contain a maximum of 9999 images. If the selected folder reaches 9999 images, a new folder is created automatically for saving captured images.

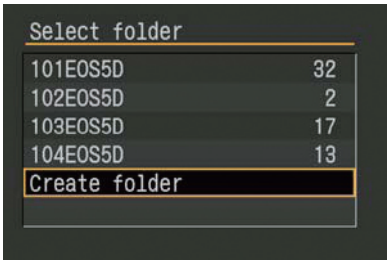


Fig. 008 Folder creation and selection screen

Note: For example, if there are folders 100 and 101 and folder 100 reaches image number 9999, folder 102 will be created automatically to save the images captured thereafter. This will occur even if folder 101 has room for more images. (This is to avoid confusion between the existing and new images in folder 101.)

(3)Image file number

As with EOS-1D-series cameras, the file numbering can be set to Continuous, Auto reset, or Manual reset. If Manual reset is set, a new folder will be created automatically and the image file number will start from 0001.

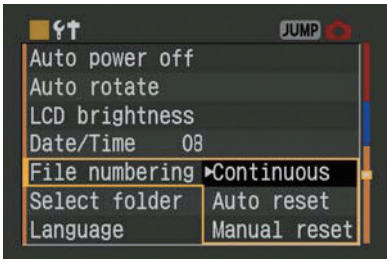


Fig. 009 Image file number setting screen

7） Startup time

Thanks to DIGIC II, an optimized system processing sequence for the startup, a revamped CF card access method, and faster startup processes, the startup time has been reduced to approx. 0.2 sec.

Note: From power off to power on when startup is completed and SW-1 ON functions (ready for shooting).

1.3 AF

1） AF system

The new AF system aims to improve the subject detection and focusing precision at the center which is used most often. It also aims to enhance subject tracking performance. As shown in Fig. 010, the AF points are concentrated at the center. The extreme left and right AF points are positioned at the same place as the EOS-1Ds Mark II's extreme left and right AF points. Subject framing can thereby be given priority.

The AF sensor (Fig. 011) on the CMOS sensor has nine AF points (plus 6 Assist AF points). They have been newly developed to greatly improve focusing performance at the center. The AF algorithm and AF circuitry also have a new, dedicated design to attain high-speed and high-precision AF.

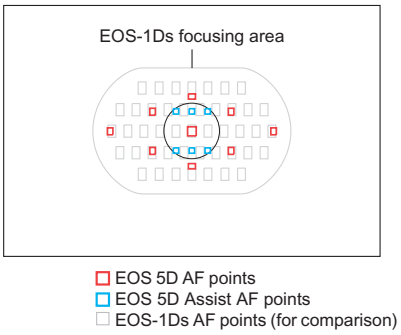


Fig. 010 Position of AF points in viewfinder

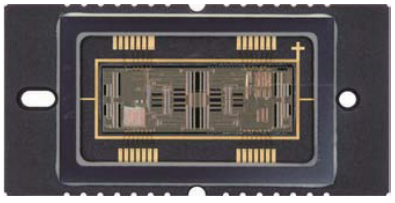


Fig. 011 AF sensor

(1)High-performance focusing at center

The following technologies have been incorporated so that the frequently-used center AF point can focus better:

- Extreme defocus detection sensor

  A subject way out of focus can be detected when the center AF point sensitive to horizontal lines at f/5.6 (Fig. 012) has a line twice as long. As a result, the lens focus driving for detecting the subject is shorter so that the AF is fast and easy.

- f/2.8-sensitive sensor

  With lenses brighter than f/2.8, the center AF point uses the f/2.8 light flux to focus. The base line of the f/2.8 and vertical line-sensitive sensor is about twice as long as the f/5.6-sensitive sensor. The focusing detection is thereby faster.*

  *Except with EF50mm f/2.5 MACRO and EF28-80mm f/2.8-4L USM.

- Four-line focusing with f/5.6-sensitive, cross-type center AF point

  The center AF point's f/5.6-sensitive, vertical/horizontal line-sensitive sensors each have two lines in a zigzag pattern for a total of four lines for cross-type focusing at the center. It reduces irregular focusing detection and increases the chances of focusing difficult subjects.

  If the lens is brighter than f/2.8, first the f/5.6-sensitive, cross-type center sensor is used to focus. When focus is almost achieved, it switches to the f/2.8-sensitive sensor for high-precision focusing. It is a two-step focusing control process.

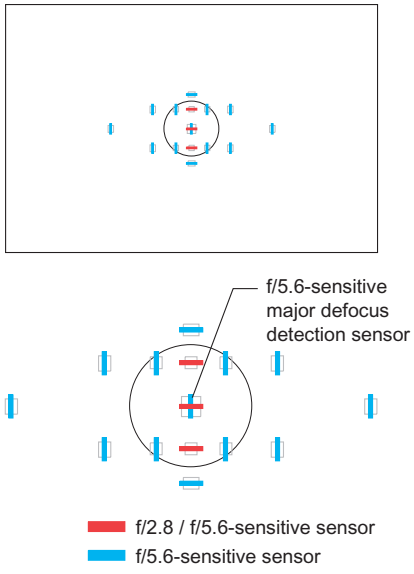


Fig. 012 AF sensor positions

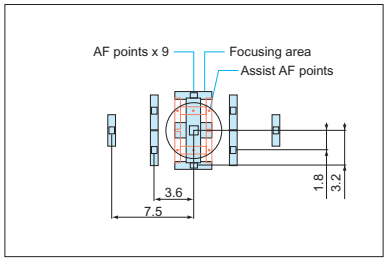


Fig. 013 Actual focusing area

In other words, the center AF point's vertical line-sensitive sensor has two types, one for f/2.8 and another for f/5.6. It enables cross-type focusing at the center with any EF lens.

(2)Outstanding AI SERVO AF subject tracking

Above and below the center AF point, are a total of six invisible Assist AF points (Fig. 014). They do an excellent job of tracking the subject in the AI SERVO AF mode as described below.

All six Assist AF points are f/5.6-sensitive. Two of them ■ are also f/2.8-sensitive when a lens brighter than f/2.8 is used. They use the f/2.8 light flux to detect the focus.*

*Except with the EF50mm f/2.5 MACRO and EF28-80mm f/2.8-4L USM.

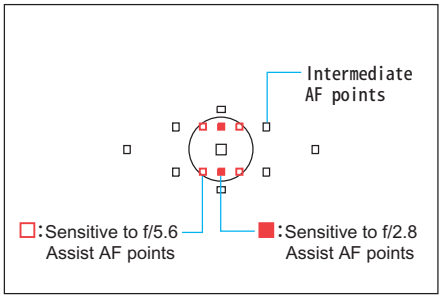


Fig. 014 Assist AF points

- Wide-area, automatically-selected, 15-point AI SERVO AF

  In the AI SERVO AF mode and automatic AF point selection set, a total of 15 AF points, including the six Assist AF points, will automatically function. This enhances the subject tracking performance and enables a smoother transition from the center AF point to adjacent AF points. As with previous cameras, the focusing starts with the center AF point, and if it cannot track the subject, the other AF points will help to track it.

- AI SERVO AF with 7 automatically-selected AF points at center

  With C.Fn-17-1 "AF point activation area", AI SERVO AF, and the center AF point, subject tracking at the center is enhanced with seven AF points including the Assist AF points.

(3)Intermediate AF points for superb focusing detection precision

Since the four f/5.6-sensitive, intermediate, vertical sensors have a long base line, the focusing detection is more precise. The left and right AF points have the same base line length as f/5.6-sensitive sensors in previous cameras.

2） AF unit

(1)Configuration of focusing optics

Fig. 015 shows the configuration of the focusing optics. After passing through the lens, the 19 (11 vertical and 8 horizontal) by 38 light flux are sampled individually. The image-formed on the primary image-formation surface (image plane) goes through the secondary image-formation lens for each focusing area before it forms again on the AF sensor. Six horizontal light flux at the center are set for f/2.8 for focusing. The other 32 light flux are set for f/5.6 (same as the focusing light flux of previous EOS cameras).

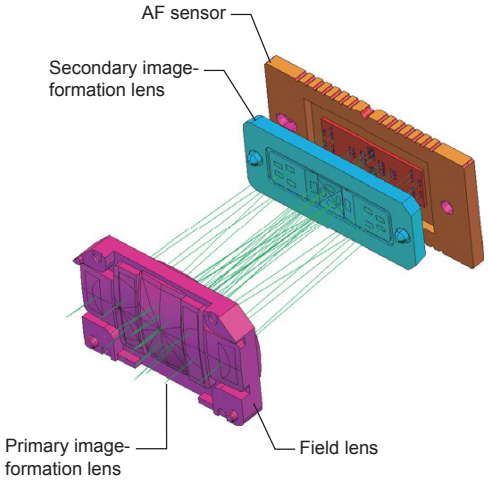


Fig. 015 Focusing optics

(2)Focusing principle

It is the same as the TTL-SIR (Through-The-Lens Secondary Imaged Registration) system used in previous EOS cameras.

(3)Actual focusing optics

Fig. 016 shows the actual focusing optics. The focusing light flux passes through the camera lens and half-silvered mirror (40%), then it is reflected downward by the secondary mirror (flat, fully reflective). It passes through the field-of-view aperture, field lens, AF mirror (fully reflective), infrared-blocking filter, fixed aperture, secondary image-formation lens, and reaches the focusing sensor.

Fig. 017 shows the AF unit's basic construction. The unit is designed to create no ghosting. It also uses materials which can withstand changes in the temperature and humidity, for more stable AF performance.

Note 1: Ghosting countermeasures: The field-of-view aperture eliminates stray light, and the separators use a low-reflectance material.

Note 2: Temperature/humidity countermeasures: The focusing optics and chassis use materials having a low-line expansion coefficient and low absorption coefficient.

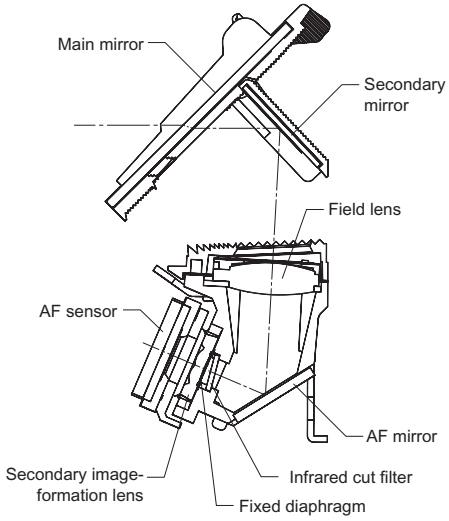


Fig. 016 Actual AF optics

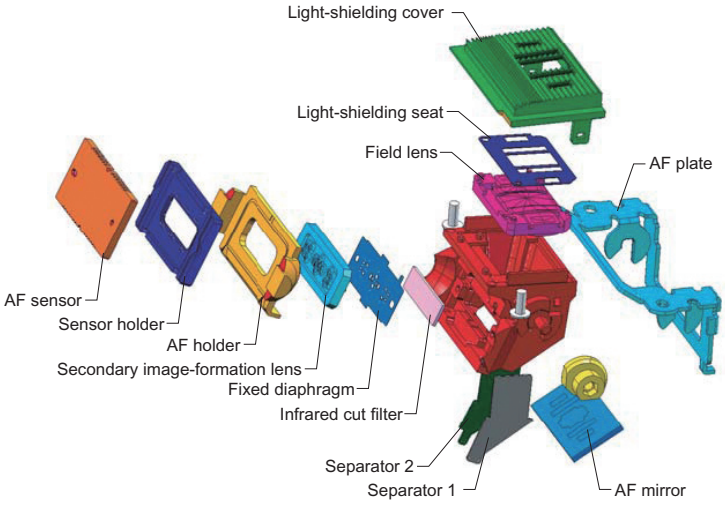


Fig. 017 AF unit construction

3） AF mode and AF point selection

The One-Shot AF, AI SERVO AF, and AI Focus AF modes are provided. In the Full Auto mode, AI SERVO AF is set automatically. In other shooting modes, the user can set any of the three AF modes. Specifications for AF point selection are the same as with the EOS 20D.

4） Focusing computation

The AF-dedicated, 32-bit RISC (main clock speed 32MHz) microcomputer enables high-speed computing. Also, the parallel processing of the AF sequence (SI display and metering at the same time as the lens driving and mirror reflex) helps to attain the same AF speed as the EOS 20D.

5） AI SERVO AF

(1)Predictive AF computation

Predictive AF can focus track a subject approaching at 50 kph up to 8 meters away with an EF300mm f/2.8L IS USM.

As with the EOS-1Ds Mark II, the EOS 5D's predictive AF computation uses statistical prediction that incorporates the focusing data of past focusing operations. Since it can repeat more focusing operations in a short length of time, the predictive AF control can effectively operate from the first shot even for a subject moving erratically.

Also, even if the subject movement changes right before the shot is taken, the predictive AF control will have a good chance of catching it.

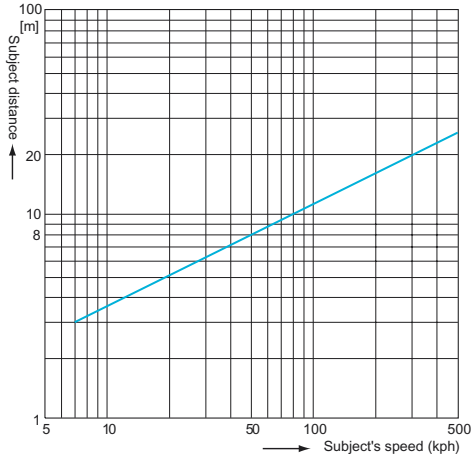


Fig. 018 Predictive subject tracking with AI SERVO AF

(2)For still subjects

Even for still subjects in the AI SERVO AF mode, the focus control is stable so that the lens drive does not move minutely. If the subject has major movement, the focus detection is always active to enable subject tracking.

(3)Single-stroke, complete pressing of shutter button

As with the EOS-1D Mark II, when focusing is possible, the lens drive is executed based on the focusing result right before shutter release.

6） Automatic AF point selection

Automatic AF point selection uses a new algorithm designed for the wide-area, 9-point, One-Shot AF and wide-area, 15-point and 7-point center AI SERVO AF. The automatic AF point selection speed and the AF point selection accuracy (matching the user's intended subject) are as good as or better than the EOS 20D's.

1.4 Viewfinder

1） Viewfinder optics

The viewfinder optics are newly developed. Except for the viewfinder coverage, the basic performance is on par with the EOS-1Ds Mark II's (Table 004).

Fig. 020 shows a cross section at the center.

Table 004 Major Specifications of Viewfinder

Item	EOS 5D	EOS-1D Mark II
Coverage (Approx.)	96%	100%
Magnification	0.71×	0.7×
Eyepoint	20mm	
Dioptric Adjustment	-3 - +1dpt	

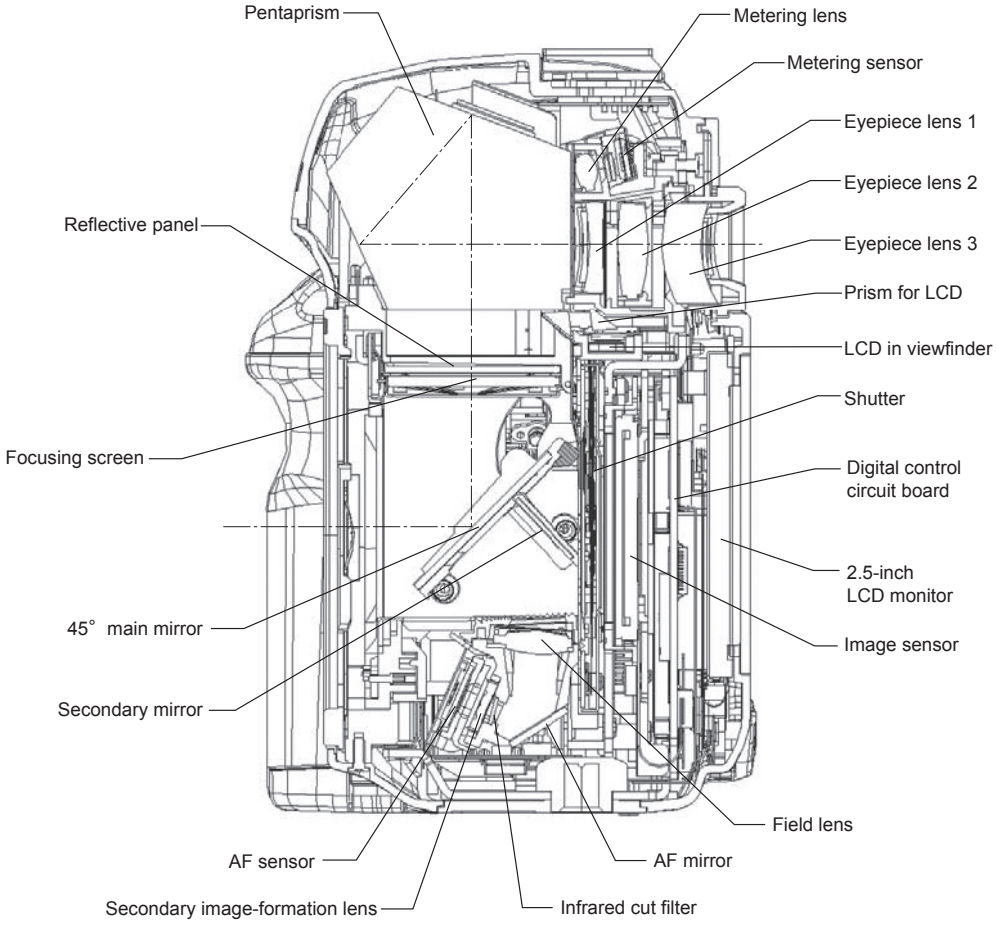


Fig. 019 Cross section at center

2） Superimposition display

The superimposition display optics consists of the SI-LED, SI lens, and SI prism. They are in front of the pentaprism. The SI-LED's light beam goes through the pentaprism and it is projected onto the reflective panel that has the AF points' reflective areas. The light path is shown in Fig. 021.

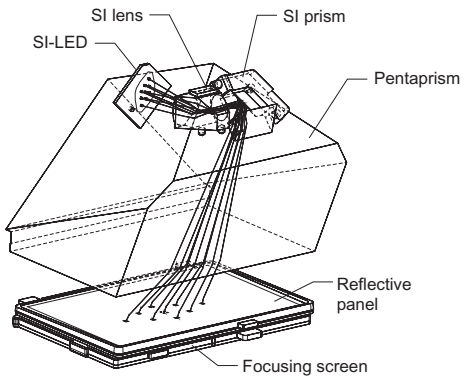


Fig. 020 SI optics

3） Focusing screen

The focusing screens are all Precision Matte. The Ee-A standard focusing screen and Ee-D (with grid) focusing screen have almost the same characteristics as the EOS 20D's focusing screen. The Ee-S focusing screen, which makes manual focusing easier, is also available. The focusing screen is interchangeable by using the special tool provided with the focusing screen.

The Ee-S focusing screen's matte has finer microlenses than the other two types. With f/2.8 or brighter lenses, the characteristics of the wide-area light distribution angle is controlled (Fig. 022). The bokeh characteristic for the defocus near the point of focus is very different compared to the other two types. This makes it easier to see the point of focus during manual focusing.

Standard Precision Matte

Super Precision Matte

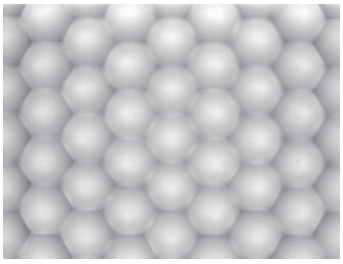


Fig. 021 Focusing screen enlargement

1.5 Exposure control

1） Metering

(1)Metering optics and metering sensor

The metering optics has the metering lens and 35-zone metering sensor (Fig. 023) positioned behind the pentaprism. For the 9 AF points, the metering lens magnification has been set to obtain an optimum correlation between the metering sensor zone areas.

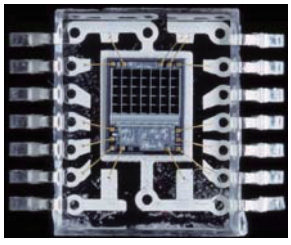


Fig. 022 Metering sensor

(2)Metering modes

Evaluative, partial, spot, and centerweighted average metering are provided. Partial metering uses approx. 8% of the viewfinder area at the center, and spot metering uses approx. 3.5% of the viewfinder area.

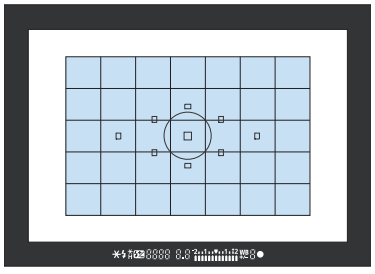


Fig. 023 Metering zones

(3)Evaluative metering/E-TTL II algorithm

The basic characteristics of evaluative metering/ E-TTL II autoflash have been adjusted to make them the same as with the EOS 20D that has the same 35-zone metering sensor and One-Shot AF with 9 AF points.

2） Exposure control

Besides the P, Tv, Av, M, and B modes found in EOS-1D-series cameras, the Full Auto mode is also provided for quick and easy snapshooting.

3） Shutter

A high-speed, highly durable shutter unit for the 35mm full-size sensor has been newly developed (Fig. 025).

Fig. 024 Shutter unit

(1)High-speed 1/8000 sec.

With the high-torque, shutter-cocking mechanism and slit-type shutter curtains made of lightweight and strong ultra-duralumin material, a high shutter speed of 1/8000 sec. (X-sync 1/200 sec.) is attained.

(2)Highly durable with 100,000 shutter cycles

High durability of 100,000 shutter cycles is achieved with the shutter plate and lever made of metal, a high-strength cocking gear, and a cocking motor using carbon brush.

Also, with the electronic X-contact added to the sync contacts, the shutter unit's X-sync function uses an optically-detected, contactless switch instead of a mechanical switch. This contributes to high durability and high reliability when a Speedlite is used. Table 005 shows the shutter design specifications.

Table 005 Shutter Design Specifications

Item	Specification
1. Type	Vertical-travel, focal-plane shutter
2. Shutter curtain type	Parallelogram link type
3. Shutter curtain blades	1st curtain: 4 blades 2nd curtain: 4 blades, total 8
4. Shutter curtain material	1st curtain: 3 blades made of KN Mylar, one blade made of Duralimin 2nd curtain: 3 blades made of KN Mylar, one blade made of Duralimin
5. Drive system	1st curtain: Dedicated torsion spring 2nd curtain: Dedicated torsion spring
6. Speed control method	All speeds electronically controlled with the electrical conduction interval of the 1st curtain's dedicated magnet and the 2nd curtain's dedicated magnet. (The magnet attracts the curtain when turned on, and releases when turned off.)
7. Curtain speed	Approx. 3.77 ms/24 mm
8. Shutter speed range	1/8000 sec. - 30 sec., bulb
9. Max. flash sync	1/200 sec.
10. Signals	1. X-sync (electronic X), 2. 2nd curtain travel-completed signal

4）ISO speed

ISO 100-1600 can be set in 1/3-stop increments. With C.Fn-08-1 (ISO speed extension), ISO 50 or 3200 (H) can also be set.

Table 006 shows the ISO speed set in the Full Auto mode.

Table 006 ISO Speed in Full Auto Mode

Shooting Setting	ISO Speed
AE, slower than 1/500	400
AE, 1/500 or faster	100-400 (1/8-stop increments)
With Flash	400

1.6 Drive

1）Continuous shooting speed

With a CMOS sensor enabling 4-channel signal reading, DIGIC II for high-speed image processing, and DDR SDRAM, the continuous shooting speed in both the One-Shot AF and AI SERVO AF modes is approx. 3 fps.

With the BATTERY GRIP BG-E4 battery grip and size-AA batteries, the continuous shooting speed is approx. 2.5 fps in the AI SERVO AF mode.

2）Maximum burst

With the DDR SDRAM buffer memory enabling high-speed data transfers and a memory capacity the same as the EOS-1Ds Mark II's, a maximum burst of approx. 60 shots in JPEG Large/Fine or approx. 17 shots in RAW is attained. (The maximum burst is higher because the pixel size is a little bit smaller and the continuous shooting speed is slower than with the EOS-1Ds Mark II.)

Table 007 Maximum burst during continuous shooting

Image-recording Quality	L/F	L/N	M/F	M/N	S/F	S/N	RAW	RAW+JPEG
Max. Burst [Approx.]	60	150	120	319	200	446	17	12

＊With a Canon 512MB CF card (Super High-speed type).

＊The maximum burst during continuous shooting in JPEG varies depending on the shooting conditions, processing conditions, and CF card type.

＊For Middle/Normal and Small/Normal, continuous shooting is possible until the CF card becomes full.

1.7 Basic operation concept and LCD monitor

1） Basic operation concept

The basic operation for selecting and setting various functions with the Main Dial, Quick Control Dial, multicontroller, and various operation buttons is the same as with the EOS 20D.

As with previous EOS Digital cameras, you can instantly return to shooting by pressing the shutter button during any camera operation (except during direct printing).

2） LCD monitor

This is a 2.5-inch, polysilicon TFT LCD color monitor with 230,000 pixels. It has a wide viewing angle, and the display area is about double that of the EOS 20D's 1.8-inch screen.

Previous LCD monitors had a narrow, vertical viewing angle. The screen would lose the picture brightness if you looked at it from even a slight vertical angle. However, the EOS 5D's LCD monitor retains the same picture and brightness from any viewing angle (Fig. 026, Fig. 027).

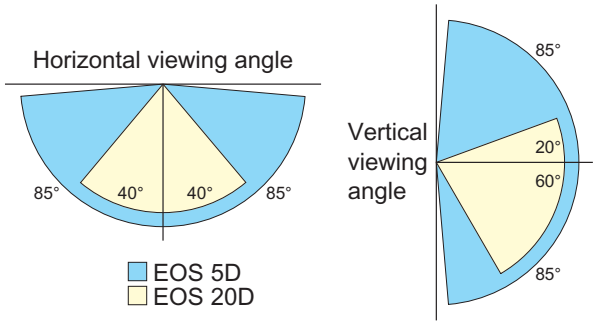


Fig. 025 Actual LCD monitor viewing angle

The backlight uses six LED modules that illuminate the large LCD monitor evenly. (The 1.8-inch monitor uses 3 LED modules.)

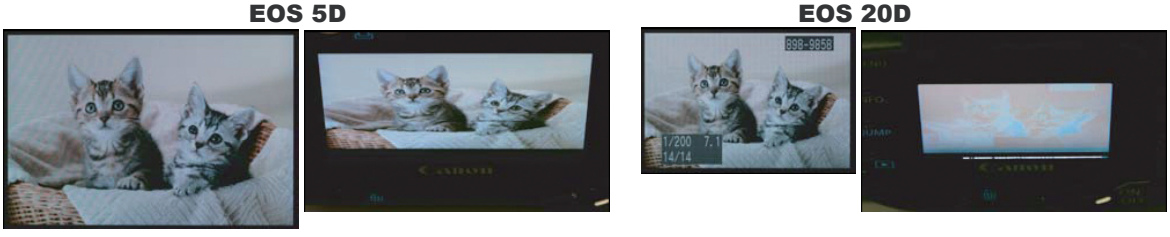


Fig. 026 LCD monitor viewing angle comparison

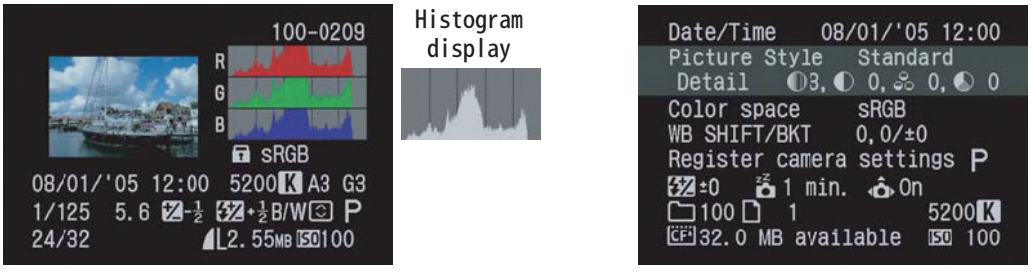
3） Image playback

Single image, shooting information display, 9-image index, magnified view, jump display, auto playback, image protection, and image rotation are possible (same specifications as the EOS 20D).

With the single-image display, jumping by 10 or 100 images or by folder or date is possible. This makes it faster to find an image among many images (Fig. 028).

Fig. 027 Jump menu

Fig. 029 shows the information screen. The shooting information includes the file size, brightness or RGB histogram (switchable), and AF point(s) used. The camera setting information screen mainly shows the shooting-related information.



Shooting information

Camera settings

Fig. 028 Information screen

4）Customization

With the "Register camera settings" in the Setup menu, you can save the current camera settings (Table 008) to the Mode Dial's <C> (Camera settings) setting. Even at the <C> setting, you can still change the shooting functions and menu settings. Any changed settings can be saved by following the procedure for "Register camera settings" in the Setup menu.

Table 008 Camera setting registration

Shooting Settings	Menu Settings
Shooting mode and settings / AF mode / AF point selection / Metering mode / ISO speed / Drive mode / Exposure compensation / Flash exposure compensation / White balance	Quality / Beep / Shoot w/o card / AEB / WB SHIFT/BKT / Custom WB / Color temp. / Color space / Picture Style (excluding user defined) / Review time / AF points / Histogram / Auto power off / Auto rotate / LCD brightness / File numbering (method) / Custom Functions (C.Fn)

1.8 Camera direct printing/Print ordering (DPOF)

Other than the added features described in the General Information, the specifications are the same as with the EOS 20D's.

1.9 Interface

It is the same as the EOS 20D.

1.10 Power source

With a power-saving circuit design, DIGIC II with low power consumption, and a power-saving CMOS sensor, approx. 800 shots can be taken at 20ºC / 68ºF or approx. 400 shots at 0ºC / 32ºF.

Note 1: Shooting capacity of EOS 5D is less than the EOS20D (approx. 1000 shots), due to EOS 5D's full size 35mm CMOS sensor, DDR SDRAM and backlit LCD monitor illuminated with 6 LED modules that consume larger power source.

Note: 2 With a fully-charged BP-511A according to CIPA testing standards.

Bulb exposures can be as long as approx. 1.5 hours with a fully-charged BP-511A battery.

1.11 Exterior and internal construction

1) Exterior and internal construction

The top, front, and rear covers are made of magnesium alloy known for light weight and high strength (Fig. 030). Also, the USB port, video terminal, and other external interface connectors concealed under the left cover use special engineering plastic having excellent electromagnetic shielding properties.

The camera body consists of a stainless steel chassis and mirror box made of high-strength engineering plastic. Also, the mirror box, to which the mount and imaging element are attached, is very securely attached to the chassis to prevent the flange focal distance from changing due to static pressure on the attached lens. Since the grip and front cover are one piece, the body rigidity is excellent. (Fig. 031)

The exterior surface finish is a high-quality, black satin finish with a leathery touch. The satin, leathery finish with finer graininess feels smoother in the hands.

Fig. 029 Magnesium alloy exterior

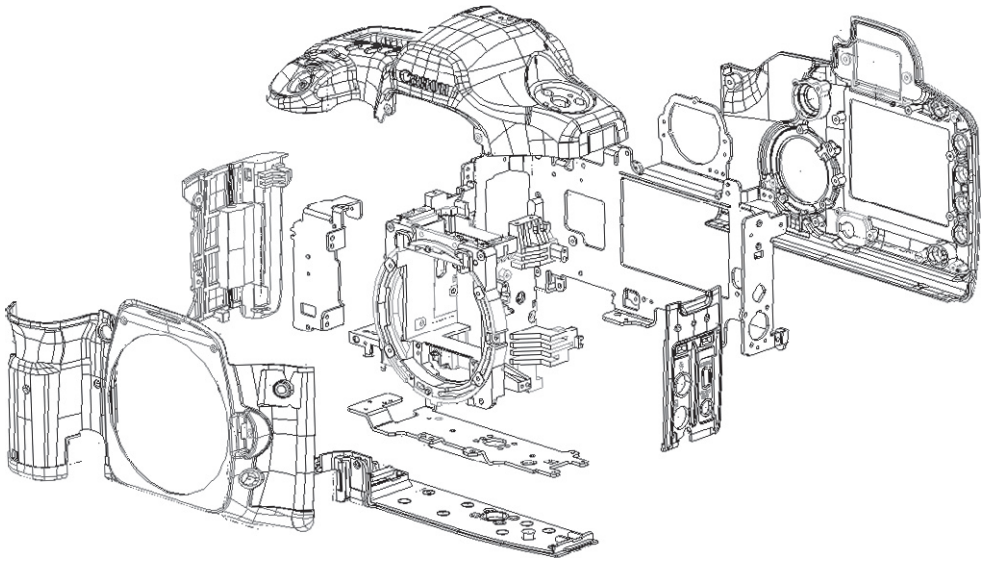


Fig. 030 Exterior covers and internal construction

2） Internal construction and major parts configuration

The EOS 5D's basic internal construction and major parts configuration are the same as the EOS 20D's. Thanks to the design and manufacturing know-how accumulated with previous EOS Digital cameras and the low-pass filter integrated with the CMOS cover glass, the EOS 5D could be made more compact at lower cost.

Table 009 shows the parts count.

Table 009 Parts Count

Item	EOS 5D	EOS 20D
Optics	20	20
Mechanical parts	321	301
Electrical parts	1110	826
Circuit boards	24	27
Lead wires	7	19
Total (Official)	1482	1193
Screws and washers	162	167
Total	1644	1360

＊The shutter unit is counted as one part.
＊The DC/DC converter is counted as one part.
＊The E-ring is counted as a washer.
＊The official total excludes the screws and washers.

3） Shutter-release mechanism

The shutter-release mechanism is basically the same as the EOS-1D-series cameras. The shutter-release time lag from SW-1 ON is approx. 75 ms (maximum aperture to f/3.5 or less). The viewfinder blackout time is approx. 145 ms.

Table 010 Shutter-release stroke and pressure

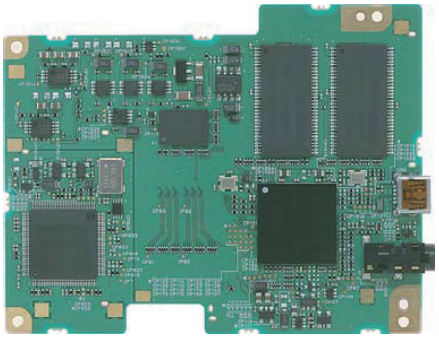
State	Stroke	Pressure
Shutter button protrusion	1.3 mm	—
Standby position to SW-1 ON	0.6 mm	85 g
SW-1 ON to SW-2 ON	0.25 mm	350 g

Note: Stroke adjustment is not possible by a service center.

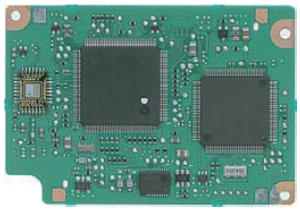
4） Electrical components

The EOS 5D's circuit board configuration consists of four hard boards consisting of the digital control circuit board, camera control circuit board, display control circuit board, and power source circuit board (Fig. 032). Through various connectors, these boards are connected to 20 flexible circuit boards.

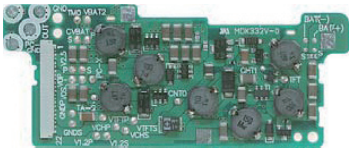
On page 21, Fig. 033 shows the location of the major mechanical components, Fig. 034 shows the location of major circuit boards, and Fig. 035 shows a cross section at the center.



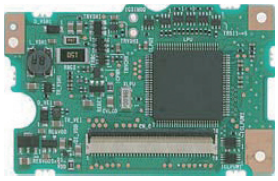
Digital control circuit board



Camera control circuit board



Power source circuit board



Display control circuit board

Fig. 031 Major circuit boards

(1)Digital control circuit board

This board is a highly-integrated, 10-layer (3-4-3) board. It contains the following: The ADIC that converts the output from the CMOS sensor into digital signals, the imaging signal processing circuit which includes the TG IC that generates the CMOS sensor's drive pulse, the digital image processing circuit that includes DIGIC II, the memory circuit that includes the DDR SDRAM for the image buffer memory, the USB port, and the video OUT terminal.

The board's number 2 and 9 layers are basically GND layers to prevent signal interference between the top and bottom patterns and internal layers and to prevent misoperation caused by noise.

(2)Camera control circuit board

This board has four layers fitted with the following: The microcomputer IC which controls the camera operation by controlling the various sensors and mechanical components, the AFcontrol IC, the flash-control IC, and EEPROM that retains various adjustment data (AE, AF, etc.).

(3)Display control circuit board

This board has four layers fitted with the following: LCD panel, viewfinder display, display IC that drives and controls the superimposed display, motor driver IC, and power source circuit to supply power to the camera control circuit board.

(4)Power source circuit board

This board has four layers fitted mainly with a power source circuit to supply power to the digital control circuit board.

5） Compliance to RoHS directive (Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment)

The RoHS directive will ban the use of the following six toxic substances in any electrical and electronic equipment: Lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyl, and polybrominated diphenyl ether. It will take effect from July 1, 2006 and be applied to products sold in the EU. The EOS 5D meets this directive.

Note: RoHS directive: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment.

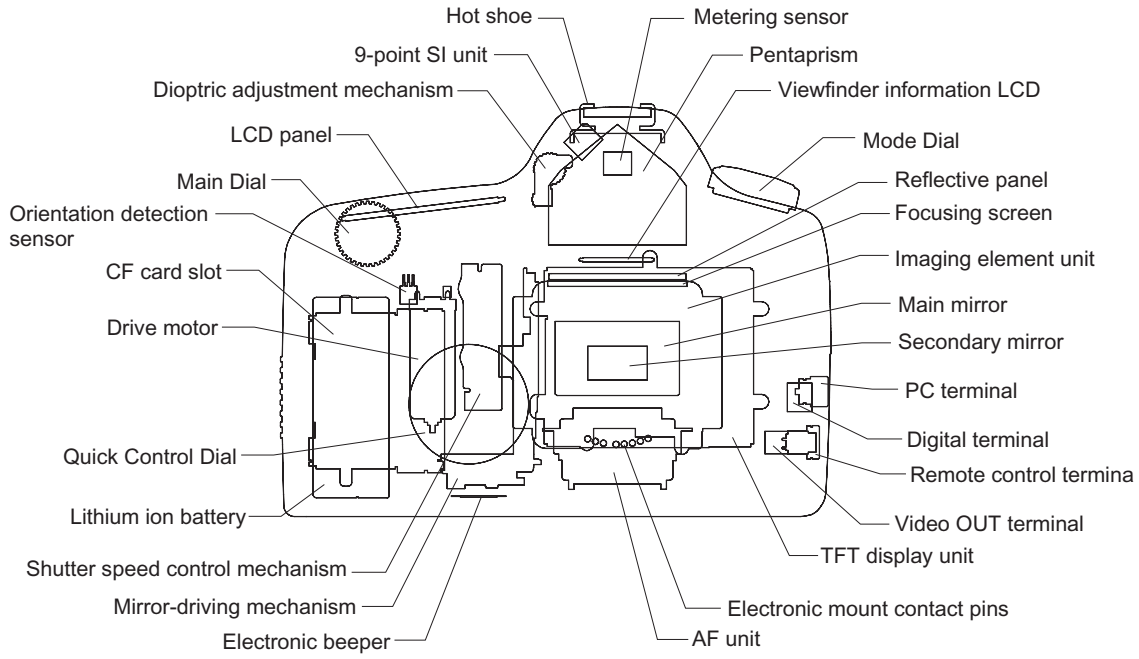


Fig. 032 Location of major mechanical components

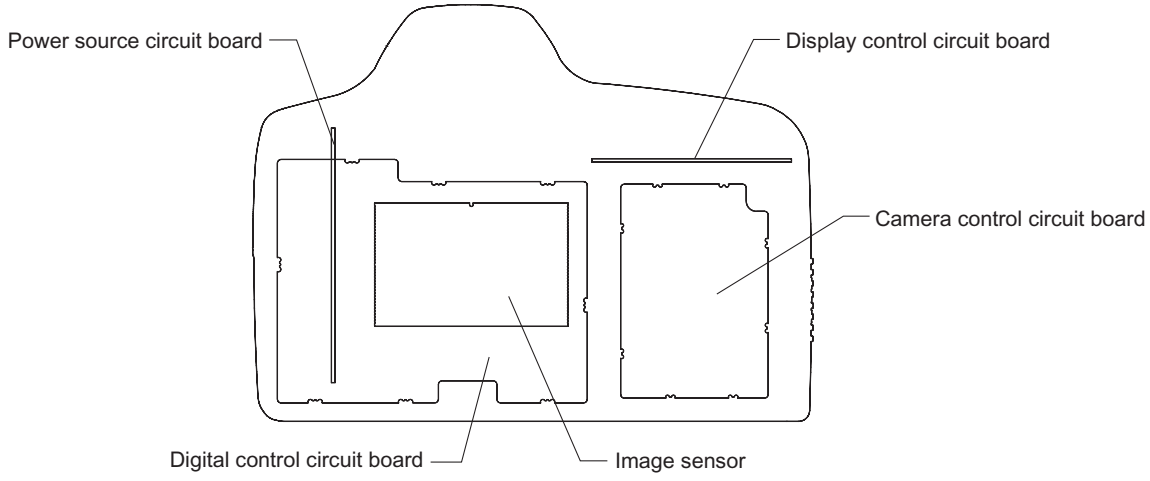


Fig. 033 Location of major circuit boards

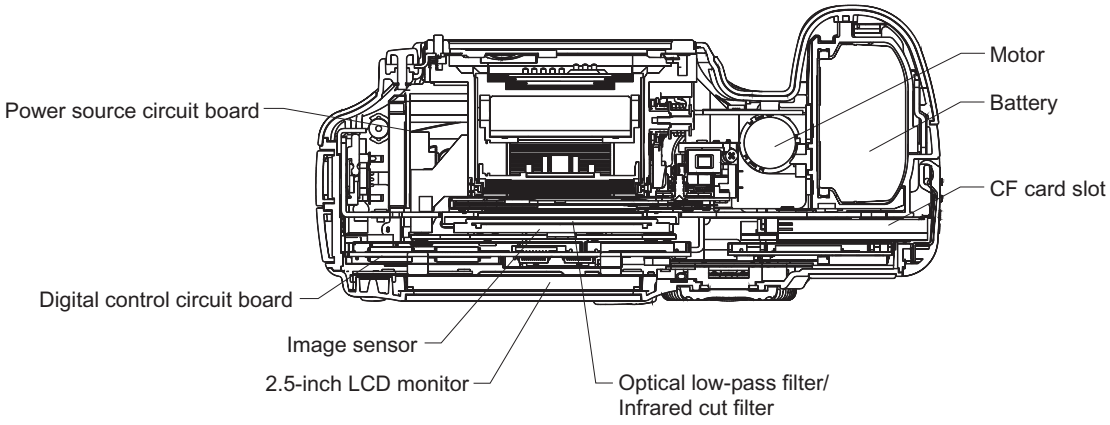


Fig. 034 Cross section at center