Lenses Conceived for Photographic Perfection

Canon
FD
LENSES
English Edition

Canon

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Canon FD LENSES

When the Canon F-1 was first conceived, the ultimate objective was not simply the development of a new camera, but the design of a complete system that would be able to successfully meet future developments.

For this reason, the Canon F-1 system incorporates the ability to "anticipate" new photographic accessories and attachments yet to be developed.

An example of this adaptability is the complete interchangeability of the components now in the system. All attachable and detachable parts have been designed with extreme care and forethought in anticipation of future development.

In building the F-1 system, which includes 10,000 parts, accuracy to 1/100mm was set as a standard in establishing increased reliability, complete interchangeability, automatic operation and improved image delineation.

The FD interchangeable lens system plays a major role in the F-1 system. In order to maintain superior optical performance in the lens field during the 1970's, development of a series of lenses matching the 1/100mm accuracy of the F-1 body was established as the goal.

Development of the F-1 system was the result of mobilizing the efforts and cooperation of the design, production, research, survey and computer departments.

Basically, high quality and high performance were the objectives, but in more concrete terms, the following goals were set.

1. Wide range of interchangeable lenses.
2. Compact lens design.
3. Image sharpness throughout entire focusing range.
4. Adoption of a newly designed mechanism...Floating System.
5. New processing techniques.
6. Practical application of the newest materials.
7. Development of special lenses.
8. Practical use of multi-layer anti-reflection coating.
9. High resolving power and high contrast.

These challenges were successfully met with the development of the FD series of lenses, with new lenses still under intense, continuous development.

1 Wide range of interchangeable lenses

With the distortion-free FD 17mm f/4 S.S.C. super wide-angle lens heading the list, FD 20mm f/2.8 S.S.C., FD 24mm f/2.8 S.S.C., FD 28mm f/3.5 S.C, FD 35mm f/2 S.S.C., and f/3.5 S.C. lenses have been added to completely equip the super wide and wide-angle lens series for approximately every 10 degrees of angle-of-view.

In the telephoto range, lenses are available for approximately every 100mm of focal length. These include the popular telephoto lens group comprised of the FD 85mm f/1.8 S.S.C., the FD 100mm f/2.8 S.S.C., the FD 135mm f/2.5 S.C. and f/3.5 S.C., the FD 200mm f/4 S.S.C. and the FD 300mm f/5.6 S.C. Four front convertible type compact telephoto lenses, the FL 400mm f/5.6, the FL 600mm f/5.6, the FL 800mm f/8, and the FL 1200mm f/11 S.S.C. have also been added to the telephoto series. Three artificial fluorite lenses, the FL 300mm f/2.8 S.S.C. FLUORITE with Extender 2x (available by special order), the FL 300mm f/5.6 FLUORITE and the FL 500mm f/5.6 FLUORITE, have further extended the Canon interchangeable lens system.

The aspherical lens FD 55mm f/1.2 S.S.C. ASPHERICAL has been developed as the standard lens. Special lenses include the Fish-eye 7.5 mm f/5.6 S.S.C., FD 15mm f/2.8 S.S.C. and the tilt/shift lens TS 35 mm f/2.8 S.S.C. There is also a Canon Macro lens FD 50mm f/3.5 S.S.C. and a Bellows Lens FLM 100 mm f/4.

There are three zoom lenses: the FD 35–70mm f/2.8–3.5 S.S.C., the FD 100–200mm f/5.6 S.C., and the FD 85–300mm f/4.5 S.S.C.

2 Compact lens design

Canon SLR cameras are designed with a short back focus. For this reason, it has been possible to design lenses that have the advantage of being more compact and higher performing. In addition, adoption of new lens materials has further contributed to developing compact lenses from super wide-angle to super telephoto, i.e., the Fish-eye 7.5mm f/5.6 S.S.C. and Fish-eye FD 15mm f/2.8 S.S.C. which do not require upward adjustment of the mirror, and four front convertible type of telephoto lenses, the FL 400 mm f/5.6, FL 600mm f/5.6, the FL 800mm f/8 and the FL 1200mm f/11 S.S.C.

3 Image sharpness throughout entire focusing range

One of the outstanding features of the FD lenses is their sharpness throughout the entire focusing range, from minimum subject distance to infinity.

Generally, spherical aberration tends to become greater during close distance photography with use of standard lenses. This defect hitherto could not be overcome, especially with wide-angle and special lenses. Also, in telephoto lenses, various aberrations tend to increase, according to the photographic distance.

However, these problems have been completely overcome in Canon's FD lens series.

4 Adoption of new Floating System

Generally speaking, photographic lenses produce spherical aberration in close distance photography. This is especially true with reversed telephoto type of lenses. For this reason, the Floating System has been adopted in the FD series of lenses, the reversed telephoto type wide-angle lenses and the FD 55mm f/1.2 S.S.C. ASPHERICAL lens, which makes possible aberration-free shooting at close subject distance.

In this system, the distance between front component and rear component changes with the focusing. Because of the construction, the spherical aberration that occurs in the front component is satisfactorily compensated for by that which occurs in the rear component, precluding any additive aberration when focusing at close subject distance.

As a result, the FD series of lenses deliver high resolving power and high contrast, even in copy work and close-up photography.

5 New processing techniques

The addition of an aspherical surface to the composition of a lens requires a manufacturing error of less than one micron. Because of this requirement, it has heretofore been extremely difficult to achieve such a surface. Canon has succeeded in designing and manufacturing an original aspherical lens measuring apparatus and perfecting a unique aspherical surface polishing method. Thus, Canon has been able to introduce a lens system that includes as aspherical surface, the large aperture standard lens, FD 55mm f/1.2 S.S.C. ASPHERICAL. The aspherical lens is now playing an important role in improving image delineation at minimum subject distance. Also an aspherical lens is very effective in preventing flare.

Canon is now planning practical application of the asperical lens in super wide-angle, zoom, and large aperture lenses.

6 Practical application of the newest materials

The development of new materials was aggressively pursued to achieve revolutionary lens performance. This resulted in the development of the artificial fluorite lens element, the outstanding feature of which is its ability to compensate for chromatic and secondary spectrum. When used in telephoto lenses, it greatly increases lens performance. The telephoto ratio of these lenses has been markedly reduced, which greatly increases their portability and ease of operation.

Examples of the use of artificial fluorite lens are the FL 300mm f/5.6 FLUORITE and the FL 500mm f/5.6 FLUORITE telephoto lenses. These lenses were awarded the 1969 international Camera Special Award and have since received international recognition.

7 Development of special lenses

In addition to the aspherical lenses and artificial fluorite lenses, Canon has developed two special lenses: A fisheye lens which can be attached onto the camera body without fixing the mirror upward and a tilt/shift lens with a special function that permits tilting and shifting. Canon is scheduled to continue developing special lenses to meet the growing demands for diversified lens performance with the F-1, FTb and TLb cameras.

8 Practical use of multi-layer anti-reflection coating

About the middle of the 1950's, color photography began to suddenly increase in popularity. To meet growing needs, a high-performance lens with excellent color balance was required. Canon undertook intensive studies of the relation between the lens light transmission factor and the chromatic characteristics of color film. As a result, the Spectra Coating theory and application technique were developed. This theory is based on the fact that if the coating thickness on each of the lens elements varies, the color balance will change. This, in turn, gave the lens outstanding color transmission, a development which was highly acclaimed throughout the world. Although Spectra Coating is a single layer coating, it is of such a stabilized nature that the light transmission factor is approximately equal to that of ordinary multi-layer coating.
At the same time, Canon also took the initiative in conducting research into multi-layer anti-reflection coating for TV zoom lenses to increase light transmission factor through the lenses composed of many elements. This became a reality in the 1960's and Canon applied this technique to TV zoom lenses and to large aperture zoom lenses for 8mm movie cameras.

9 High resolving power and high contrast

To obtain a high resolving power of 100 lines per millimeter when used at full aperture opening or when used at closing down the diaphragm by one f/stop, and to obtain high contrast throughout the entire image, the FD series of lenses satisfactorily compensate for various aberrations, eliminating ghost images and flare. Thus these lenses provide excellent image delineation throughout the entire focusing range.

Full Use of Computer

Canon's optical design techniques, which include computer processing of a huge volume of design data, of original optical theories, and of performance appraisals, were drawn upon heavily in developing the new lenses.

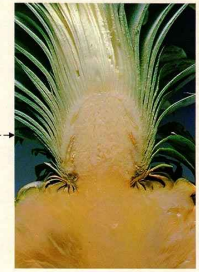
Lens Mount and Lens Changing

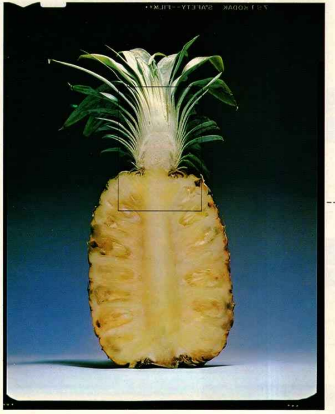
Canon SLR cameras have adopted the bayonet type of mount since the introduction of the Canonflex in 1959. Attaching and detaching the lens is very easy and takes only one third the time that is required for changing a lens on a screw-in type of mount. The lens is attached by aligning the red dot on the lens to the red dot on the camera body, then turning the bayonet ring to the right. All necessary coupling mechanisms are automatically adjusted.

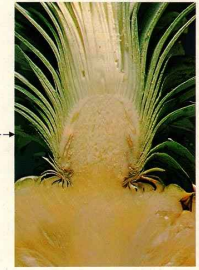
Performing Full-Aperture and Stopped-down Metering

Full-aperture metering in the F-1 and FTb is of the matching needle type. Proper exposure is obtained by matching the meter needle with the aperture needle by turning the preset aperture ring or the shutter speed dial.
Stopped-down metering can also be performed by only pushing down the stopped-down functioning lever.

Canon FD lenses provide sharp images even in close-up photography







Signal Transmission and Function of the FD Lenses

The FD series lenses can be used for full-aperture metering when mounted on the F-1, FTb, and TLb cameras, and for stopped-down metering when mounted on the FT QL and other SLR cameras.

1. Automatic/Manual Aperture Lever

This is the conventional stopped-down coupling lever which automatically resets to full aperture opening position after shutter release. This lever also couples with stopped-down functioning/self-timer lever on the camera body. By turning stopped-down functioning lever, stopped-down metering can be possible.

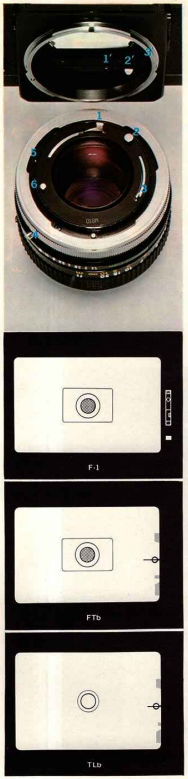
2. Full-Aperture Signal Pin

It is used to compensate for the metering error at full-aperture f/stop, when using a large aperture lens.
In order to correct this error, the full-aperture signal pin plays a role to adjust the matching needle position.

3. Aperture Signal Lever

This lever is a coupling lever that plays three important functions in full-aperture metering.

First function is the aperture transmission signal in full-aperture metering. It is coupled with the preset aperture ring to move on a synchronized one-to-one ratio and transmits the preset f/stop position to the exposure meter of the camera body. At this time, of course, light metering is full-aperture method. As soon as the shutter is released, the aperture closes down to the preset f/stop by this lever and the proper exposure is obtained.
Second function transmits the automatic setting of the full aperture opening f/stop to the exposure meter.
Even if a lens with a different lens speed is used, the aperture signal lever is in the same position at full aperture opening f/stop. When a lens is mounted on the camera body, the full aperture opening f/stop is transmitted to the exposure meter and the aperture needle is set at a fixed position. Therefore adjustment for the full aperture opening f/stop is not required.



Third function is the inner setting of the preset f/stop for servo EE photography with F-1. When the preset aperture ring is set at the green mark, located outside the scale, this lever is automatically disconnected from the preset aperture ring and can be freely moved. This function is made possible in servo EE photography by using the optional Servo EE Finder.
In other words, this lever is turned to the proper position for closing down the aperture upon information received from the Servo EE Finder. Thus the proper exposure can be obtained and unmanned EE photography is possible. Lenses other than Canon FD lenses cannot be freely changed the aperture diaphragm like this way. Therefore, it is very clear that these lenses cannot be performed EE photography.

4. EE Lock Pin

A safety lock pin to prevent accidental movement of the aperture ring over to the green mark. When this pin is pressed, the lock is released and the aperture ring can be turned.

5. EE Switch Pin

When the preset aperture ring is set at the green mark for EE use, the lens can be attached only to the Canon F-1. If the lens is attached to the FTb or TLb, it cannot be set at the green mark.

6. Spare Signal Pin

Reserved pin for developing System Accessory for the F-1.

Manually Operated Aperture

When the automatic/manual aperture lever is turned all the way, it is clamped and stops. By mounting a lens in this condition, manually operated aperture can be used. This function is used when an intermediate tube or other accessory is connected in between the camera body and the lens.
However, in ordinary photography using an F-1, FTb, FT QL or Pellix QL, this function is not required because of closing down aperture of the lens through stopped-down metering operation.

1 Automatic/Manual Aperture Lever
2 Full Aperture Signal Pin
3 Aperture Signal Lever
4 EE Lock Pin
5 EE Switch Pin
6 Spare Signal Pin

Lens	Type	Angle of View	Aperture Diaphragm Control	Minimum Aperture	Distance Scale In meters	Distance Scale In feet	Attachment Filter	Attachment Cap	Hood	Length (mm)	Length (in.)	Weight (g)	Weight (lb.-oz.)
Fish-eye 7.5mm f/5.6 S.S.C.	Special	180°	Manual	22	Fixed	Focus	Built-in	Exclusive	—	62.0	2 3/8	380	13 3/8
Fish-eye FD15mmf/2.8 S.S.C.	Special	180°	Automatic	16	3–0.3	10–1	Built-in	Exclusive	Built-in	60.5	2 3/8	485	1-1 1/8
FD 17mm f/4 S.S.C.	Super-wide-angle	104°	Automatic	22	3–0.25	10–0.9	72	75	—	56.0	2 3/8	450	15 7/8
FD 20mm f/2.8 S.S.C.	Super-wide-angle	94°	Automatic	22	3–0.25	10–0.9	72	75	—	58.0	2 1/4	345	12 3/8
FD 24mm f/2.8 S.S.C.	Super-wide-angle	84°	Automatic	16	3–0.3	10–1	55	C-55	†BW-55B	52.5	2 1/8	330	11 5/8
***FD 24mm f/1.4 S.S.C. ASPHERICAL	Super-wide-angle	84°	Automatic	16	0.3	1	72	Exclusive	—	68	2 5/8	500	1-2
FD 28mm f/3.5 S.S.C.	Wide-angle	75°	Automatic	16	3–0.4	10–1.5	55	C-55	†BW-55B	43.0	1 3/4	250	8 7/8
***FD 28mm f/2.8 S.S.C.	Wide-angle	75°	Automatic	22	0.3	1	55	C-55	†BPW-55B	49	1 5/8	280	0-10
*FD 35mm f/3.5 S.S.C.	Wide-angle	64°	Automatic	16	3–0.4	10–1.5	55	C-55	†BW-55A	49.0	1 5/8	280	9 7/8
TS 35mm f/2.8 S.S.C.	Special (Tilt & Shift)	64°/79°	Manual	22	3–0.3	10–1	58	C-58	Exclusive	74.5	2 5/8	545	1-3 1/4
*FD 35mm f/2 S.S.C.	Wide-angle	64°	Automatic	16	3–0.3	10–1	55	C-55	†BW-55A	60.0	2 3/8	370	13 1/8
FD 50mm f/3.5 S.S.C.	Macro	46°	Automatic	22	3–20.5(cm)	10–8.4(in)	55	C-55	—	59.5	2 3/8	310	10 5/8
*FD 50mm f/1.8 S.C.	Standard	46°	Automatic	16	10–0.6	30–2	55	C-55	†BS-55	44.5	1 3/4	255	9
*FD 50mm f/1.4 S.S.C.	Standard	46°	Automatic	16	10–0.45	30–1.5	55	C-55	†BS-55	49.0	1 5/8	305	11
FD 55mm f/1.2 S.S.C.	Standard	43°	Automatic	16	10–0.6	30–2	58	C-58	†BS-58	52.5	2 1/8	510	1-2
FD 55mm f/1.2 S.S.C. ASPHERICAL	Standard	43°	Automatic	16	10–0.6	30–2	58	C-58	†BS-58	55.0	2 3/8	575	1-4
FD 85mm f/1.8 S.S.C.	Telephoto	29°	Automatic	16	10–0.9	30–3	55	—	†BT-55	57.0	2 1/4	430	15
FLM 100mm f/4	Macro	24°	Automatic	22	—	—	48	50	—	43	1 5/8	220	7 1/2
FD 100mm f/2.8 S.S.C.	Telephoto	24°	Automatic	22	10–1	30–3.5	55	C-55	†BT-55	57.0	2 1/4	360	12 3/4
FD 135mm f/3.5 S.C.	Telephoto	18°	Automatic	22	30–1.5	100–5	55	C-55	†BT-55	83.0	3 1/4	465	1-3 3/4
FD 135mm f/2.5 S.C.	Telephoto	18°	Automatic	22	30–1.5	100–6	58	C-58	Built-in	91.0	3 5/8	630	1-6 1/4
FD 200mm f/4 S.S.C.	Telephoto	12°	Automatic	22	30–2.5	100–8	55	C-55	Built-in	133.0	5 1/4	675	1-7 7/8
***FD 200mm f/2.8 S.S.C.	Telephoto	12°	Automatic	22	1.8	6	72	—	Built-in	140.5	5 1/2	700	1-8
FD 300mm f/5.6 S.C.	Telephoto	8°	Automatic	22	50–4	200–13	58	C-58	Built-in	173.0	6 7/8	1125	2-7 7/8
FD 35–70mm f/2.8–3.5 S.S.C.	Zoom	64°–32°	Automatic	22	10–1	30–3.5	58	—	Exclusive	120	4 3/4	575	1-4
FD 100–200mm f/5.6 S.C.	Zoom	24°–12°	Automatic	22	30–2.5	100–8	55	C-55	Built-in	173.0	6 7/8	765	1-11
FD 85–300mm f/4.5 S.S.C.	Zoom	29°– 8°	Automatic	22	30–2.5	100–8	Series IX	—	Built-in	243.5	9 3/4	1695	3-7 3/4
FL 300mm f/5.6 FLUORITE	Telephoto	8°	Automatic	22	50–4	200–13	58	60	Built-in	168.0	6 5/8	850	1-13 7/8
FL 500mm f/5.6 FLUORITE	Super-telephoto	5°	Automatic	22	200–10	600–33	95	106	Built-in	300.0	11 3/8	2700	5-15 1/4
■ FL 300mm f/2.8 S.S.C. FLUORITE	Telephoto	8°	Manual	32	50–3.5	200–12	Exclusive	—	Built-in	231.0	9 1/8	2340	5-2
**FL 400mm f/5.6	Super-telephoto	6.2°	Automatic	32	30–4.5	100–15	††48	90	Exclusive	338.0	1'1 3/8	3890	8-9 3/8
**FL 600mm f/5.6	Super telephoto	4.1°	Automatic	32	100–10	300–35	††48	125	Built-in	448.0	1'5 5/8	5000	11-3/8
**FL 800mm f/8	Super-telephoto	3.1°	Automatic	32	100–18	300–60	††48	125	Built-in	508.0	1'8	5360	11-13 1/8
**FL 1200mm f/11 S.S.C.	Super-telephoto	2.1°	Manual	64	300–40	1000–130	††48	125	Built-in	853.0	2'9 5/8	6200	13-11

* Equipped with a coupling pin to Canon Automatic Tuning System.
** Front component interchangeable type. Focusing adapter (1-component, 2-element. FL automatic diaphragm, with A-M ring).
*** Will be marketed in the near future.

† FD lens hoods are of bayonet mount.
†† Filter is of insertion type with holder.
■ Available by special order.


Canon
Canon
FLUORITE

Change in Angle of View

Fisheye 7.5mm

35mm

135mm

500mm

17mm

50mm

200mm

600mm

24mm

85mm

300mm

800mm

28mm

100mm

400mm

1200mm

Change in Perspective

17mm

50mm

24mm

100mm

35mm

200mm

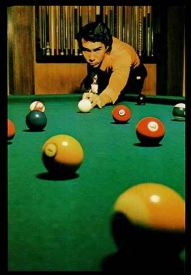
Angle of View and Perspective

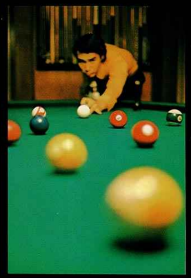
When different kinds of interchangeable lenses are used, photographic differences are due mostly to the differences in their focal length. Generally, this difference is understood to mean changes in the angle of view and differences in perspective.

A wide-angle lens covers a wider angle of view, and has a characteristic of exaggerating the perspective, while telephoto lenses cover a narrower angle of view and provide a telephoto effect which blurs the background.

When shooting a subject from the same distance, there is no difference in the perspective between a wide-angle lens and a telephoto lens. However, if the photographic distance changes, the perspective will also change, if using the same lens. In this case, the subject will sometimes be partly cut off and the degree of the blurring in the background will also change.

When an interchangeable lens is used and shooting distance is changed, the same size of the main subject is obtained with perspective in the background.





Depth-of-Field

The specific range in which everything is in sharp focus behind and in front of the subject is called the depth-of-field. In this case, the depth-of-field behind of the subject is deeper than that in front of subject. Moreover, this range will vary with the following factors: The depth-of-field will be deeper, the larger the f/stop number, the further the distance of the subject, and/or the shorter the focal length of the lens. The depth-of-field will be shallower, the smaller the f/stop number, the nearer the distance of the subject, and/or the longer the focal length of the lens.

Super-Wide-and Wide-Angle Lenses

Super-wide-and wide-angle lenses have a shorter focal length than standard lenses and their angle-of-view covers more than 46° degrees, which gives a much wider field-of-view. Their deep depth-of-field makes these lenses indispensable for taking snapshots, news and sports events, shooting where there is limited room to back up, photographing large groups of people, and for taking pictures of buildings. Super-wide- and wide-angle lenses have an optical performance of exaggerating perspective, but this feature can be used to advantage in creating special effects photography.

The FD super wide- and wide-angle lenses are as follows:

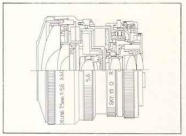
Fish-eye 7.5mm f/5.6 S.S.C., Fish-eye FD 15mm f/2.8 S.S.C., FD 17 mm f/4 S.S.C., FD 20mm f/2.8 S.S.C., FD 24mm f/2.8 S.S.C., FD 28mm f/3.5 S.C., FD 35mm f/3.5 S.C., FD 35mm f/2 S.S.C. and TS 35mm f/2.8 S.S.C.

The FD super-wide- and wide-angle lenses are designed for superior image delineation throughout the entire focusing range. This optical design features a spherical aberration-free mechanism called the Floating System, particularly significant in the distortion-free FD 17mm f/4 S.S.C. lens.

The Fish-eye 7.5mm f/5.6 S.S.C. delivers a different effect than wide-angle lenses. Newly designed Fish-eye FD 15mm f/2.8 S.S.C. is a fish-eye lens for general photography with an angle of view of 180°. Additionally, the TS 35mm f/2.8 S.S.C. also has a special feature for controlling perspective and depth-of-field.

All the FD wide-angle lenses allow the entire field-of-view to be seen through the viewfinder without having to fix the mirror upward. Because the FD wide-angle lenses are of the reversed telephoto type.

Canon Lens Fish-eye 7.5mm f/5.6 S.S.C.

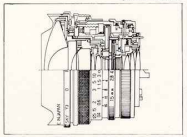


This is a newly developed equidistant projection type of fish-eye lens which expands the use of the FD series of lenses and the Canon F-1 system. A 180° angle-of-view is taken in a 23mm diameter circle in the 24mm x 35mm picture frame. An 11-element, 8-component construction, it has six built-in filters. Its reduced size is the same as that of standard lenses.

Because it is equipped with an equidistant projection mechanism, it is ideal for photographing astronomical and azimuth phenomena. When used in ordinary photography, it is particularly suitable in achieving special effects.

It can be used to see the field-of-view through the viewfinder without fixing the mirror upward.

Canon Lens Fish-eye FD 15mm f/2.8 S.S.C.



This is a fish-eye lens for general photography developed to follow the 7.5mm one. It is the smallest fish-eye lens in the world.

It was developed as one of the FD lenses and consequently it has an extremely high quality of performance. It covers a diagonal angle of 180°.

Because of its retrofocus design, the mirror does not have to be set upward. From the point of view of light metering, as well as photography in general, it operates as well as a standard lens.

Its f/2.8 brightness ranks well above the best, and it has full compensation of every aberration in the total 180° area. Special effort was done to enable it to avoid the aberration of magnification, and it has a sharp delineation up to the corner areas.

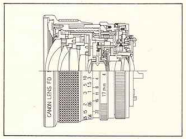
Furthermore, in order to solve the problem of ghost and flare which tend to occur with this type of lens, the procedure of multiple coating was employed.

Meeting Place in a Village Samoa
Canon F-1, Fish-eye 7.5mm f/5.6 S.S.C., 1/125 of a seco at f/8, ASA 25.

Merry-Go-Round
Canon F-1, Fish-eye FD 15m f/2.8 S.S.C., 1/15 of a secon at f/8, ASA 25.

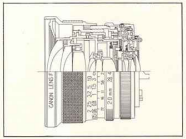
New Lens
FD 24mm f/1.4 S.S.C. ASPHERICAL
(Will be marketed in the near future)

Canon Lens FD 17mm f/4 S.S.C.



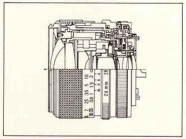
In general, lenses of this class are of the fisheye type. This lens, however, is classified as a normal delineation type of super-wide-angle lens because its distortion is satisfactorily compensated. Since astigmatism compensation has been provided, average image delineation from the center to the corner areas is guaranteed. To prevent field curvature aberration which is likely to occur because of the flare in the lens center when shooting at close distance, the Floating System has been adopted. Therefore there is no added aberration during focusing. In spite of angle-of-view of 104°, extremely sharp and clear pictures can be obtained throughout the entire focusing range.
The value of this optical feature is immediately evident in the very high quality of copy work that can be performed with this lens.
This lens can be attached to the camera body without fixing the mirror upward.

Canon Lens FD 20mm f/2.8 S.S.C.



Despite its short focal length of only 20mm, it is a typical wide angle lens with a brightness of f/2.8 which is the highest available anywhere.
This lens is of the retrofocus type and has been developed in compliance with the basic conception of the FD lenses that they must be able to render a sharp image from minimum subject distance to infinity. The floating mechanism has been used for focus control and the design of the lens as a whole is very compact.
It has the normal delineation power of the wide angle lenses in general and its distortion is satisfactorily compensated, but, on the other hand, due to its large aperture, when its angle of view of 94° is used effectively, it shows its forcefulness in wide angle photography whether it be indoors or shooting buildings.
It can also be applied successfully to photography in which perspective is emphasized.

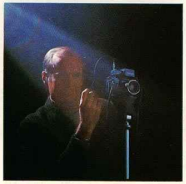
Canon Lens FD 24mm f/2.8 S.S.C.



This has a very fast lens speed for a super-wide-angle lens. The front component of the FD 24mm f/2.8 lens houses two large diameter glasses. These serve to prevent reduction of light volume in the corner areas of the lens, to eliminate coma and astigmatism, and to completely compensate for distortion.
The built-in Floating System makes possible aberration-free shooting at minimum object distance.
Its fast lens speed of f/2.8 is effective in focusing in low light level photography. Thus, it provides high contrast and high resolution pictures even at full aperture opening.

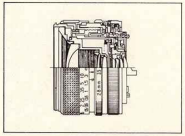
Ice-clad pines on the famous Shirane Mountains, Japan Canon FTb, FD 17mm f/4 S.S.C., 1/125th sec., at f/16.

New Lens
FD 28mm f/2.8 S.C.
(Will be marketed in the near future)



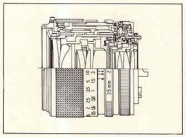
Hong Kong Harbor from Victoria Peak Canon F-1, FD 35mm f/2 S.S.C., 8 minutes at f/8.

Canon Lens FD 28mm f/3.5 S.C.



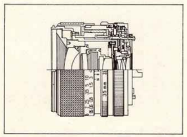
Although this is a reversed telephoto type of lens, its overall length has been shortened to 43mm. It is therefore compact in size and provides the advantage of easy-to-operate hand-hold shooting. This lens was designed to prevent at decrease of light transmission in the corner areas of the lens.

Canon Lens FD 35mm f/2 S.S.C.

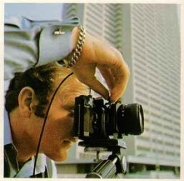


Having the fastest lens speed in Canon's wide-angle series of lenses, this lens achieves outstanding image delineation at full-aperture opening. This lens can be used as frequently as ordinary standard lenses. Thorough compensation has been provided to eliminate various aberrations, including spherical and comatic aberrations.
This lens features minimized flare and superior color balance. The Floating System plays an important role in making this lens ideal for shooting subjects in close distance photography.
The FD 35mm F 2 has a distance coupling pin for use with the Speedlite 133D for CAT matching needle-type automatic flash photography.

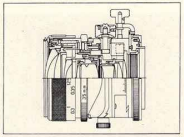
Canon Lens FD 35mm f/3.5 S.C.



This lens is an easy-to-use, compactly designed, wide-angle lens for snapshot shooting. This lens provides high resolving power and image delineation achieved through the use of new type of glasses, and its optical design. Because of compensation for various aberrations, its optical speciality is further strengthened. Therefore, it offers sharp images throughout the entire focusing range even at full aperture opening.
It has a distance coupling pin to permit CAT system.



Canon Lens TS 35 mm f/2.8 S.S.C.



In this newly designed lens, both the tilt and shift adjusting mechanism are built in which alters the optical axis of the lens to obtain special effects.

The tilt adjustment device sets the lens aslant to the film surface, and alters the focusing plane on the subject, so the depth-of-field is increased.

The shift adjustment device consists in moving the optical axis of the lens while it remains perpendicular to the film surface to compensate perspective.

The tilt adjustment is used when walls or trains are shot obliquely and the shift adjustment is used for shooting a tall building without perspective distortion.

These devices can be used in any direction by adjusting the lens with the camera in a fixed position.

The image circle has been increased from 43 ϕmm to 58 ϕmm to cover the entire negative at maximum tilt and shift.

Canon F-1, Canon Lens TS 35mm f/2.8 S.S.C., 1/30th sec., at f/8. (Left, ordinary ; right, shifting)

A detail of the Yomei Gate in Nikko
Canon F-1, Canon Lens TS 35mm f/2.8 S.S.C., 1/30th sec., at f/2.8. (Left, ordinary ; right, tilting)

A view of the Kasumigaseki Building in downtown Tokyo Canon F-1, Canon Lens TS 35mm f/2.8 S.S.C., 1/30th sec., at f/8.

Standard Lenses

Standard lenses have a focal length of 50mm or 55mm, and usually cover a 46° angle-of-view. Because they deliver natural perspective, these lenses have the widest range of application.

They are ideal not only for snapping people and scenery, but also for low light level photography because of its large aperture.

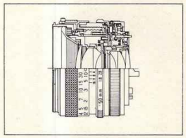
The standard FD lenses include : FD 50mm f/1.8 S.C., FD 50mm f/1.4 S.S.C., FD55mm f/1.2 S.S.C. There is a special lens group that includes the FD 55mm f/1.2 S.S.C. ASPHERICAL lens and Canon Macro lens FD 50mm f/3.5 S.S.C.

Lenses with a fast lens speed transmit a clear sharp image even under low light level photographic conditions. Under these conditions. the FD55mm f/1.2 S.S.C. and FD55mm f/1.2 S.S.C. ASPHERICAL lenses are the most suitable to use for night and indoor shooting. The FD 55mm f/1.2 S.S.C. ASPHERICAL is a specially developed large aperture standard lens that uses an aspherical surface glass. It provides the highest contrast, even in the corner areas.

Although close distance photography such as copy work, can be accomplished with the FD 55mm f/1.2 S.S.C. ASPHERICAL, there is a special lens particularly suited to this type of work, the Canon Macro Lens FD 50mm f/3.5 S.S.C. for close-up and macrophotography. When used with Canon system accessories, it makes possible an extended range of photography.

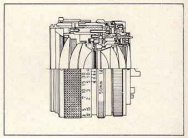
Furthermore, the popular FD 50mm f/1.8S.C. and FD 50mmf/1.4 S.S.C. lenses have a distance coupling pin to a Flash-Auto Ring for CAT matching needle-type automatic flash photography, when used with the Speedlite 133D.

Canon Lens FD 50mm f/1.8 S.C.



This is a standard lens which is an advanced adaptation based on the optical system of Canon's most popular standard FL 50mm f/1.8 lens. It has superior high contrast and image delineation qualities from the center to the corner areas, particularly in stopped-down metering. It is an all-round lens with stabilized delineation power even during close distance photography.

Canon Lens FD 50mm f/1.4 S.S.C.

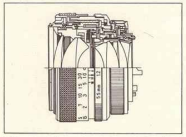


This is an advanced standard lens based on the reputed FL 50mm f/1.4 lens system. Clear images are obtained not only in stopped-down metering but also during full aperture metering.

It has a distance coupling pin to permit CAT system.

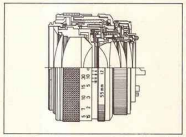
A Charming Socialite Canon F-1, FD 50mm f/1.4 S.S.C., CAT automatic flash control using Canon Speedlite 133D

Canon Lens FD 55mm f/1.2 S.S.C.

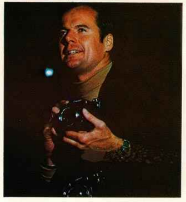


This is a large aperture standard lens based on the optical system of the FL 55mm f/1.2. Despite its large aperture lens, it is highly reputed for its high contrast and stabilized image delineation at full aperture opening. Because of its fast f/1.2 lens speed, it provides high image qualities in low light level photography.
Its optical performance is similar to but more advanced than the FD 50mm f/1.4 S.S.C. because of its faster lens speed. Moreover, Canon has compensated for various aberrations, i.e., spherical aberration and coma. Its marginal shading performance is outstanding.

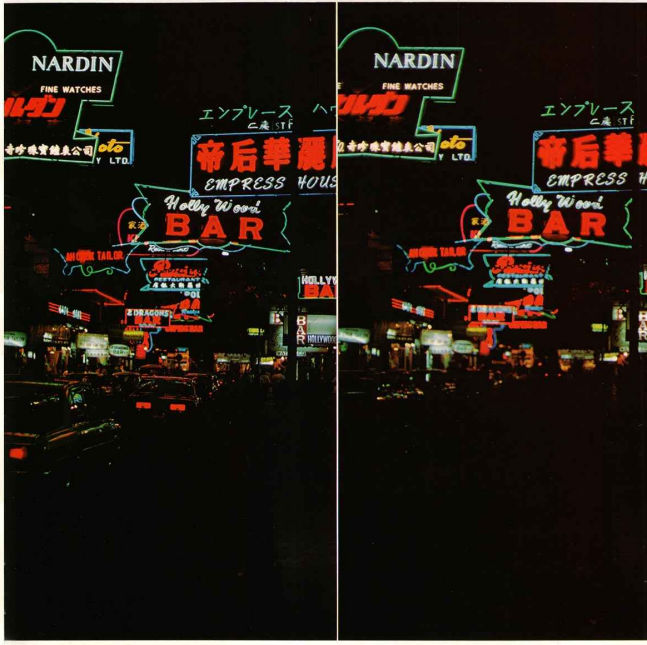
Canon Lens FD 55mm f/1.2 S.S.C. ASPHERICAL



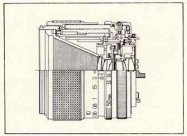
This is a large aperture standard lens using an aspherical surface, which provides highest image delineation even at full-aperture opening under dim light conditions. Additionally, this lens incorporates the Floating System which enables aberration-free shooting at close subject distance. Thus, a stabilized image is obtained through the entire focusing range. Therefore, the focused image through the viewfinder can be reproduced just as it is.
For further perfection, the Super Spectra Coating is applied to this lens to maintain clearness without ghosts.
Canon calls this lens the "perfect lens" because it provides sharpness under all photographic conditions.



Night scene of Hong Kong Canon F-1, FD 55mm f/1.2S.S.C. ASPHERICAL, 1/125th sec., at f/1.2. (left) Ordinary standard 55mm f/1.2 lens, 1/125th sec., at f/1.2.

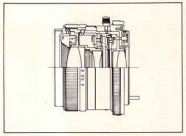


Canon Macro Lens FD50mm f/3.5 S.S.C.



This lens has extremely high resolving power and is used for photography at very close distance. It will replace the conventional FL 50mm f/3.5 Macro lens.
By means of a newly designed optical system, its performance has been considerably improved.
This lens is certain to fulfill all serious photographer's expectations for a truly incredible macro lens.

Bellows Lens FLM 100mm f/4



The FLM 100mm f/4 lens is designed exclusively for use with a bellows. When used with a bellows, photographic capability can be expanded from general and close-up photography to macrophotography.
Its 5-element, 3-component construction gives high resolving power. Its highly corrected aberration and perfect color balance deliver high contrast and sharp images through the entire image plane.
As its focal length is double that of a standard lens, greater working space is available for lighting, etc., without disturbing the shooting operation. Additionally, its 100mm focal length delivers natural perspective.

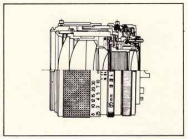
Parakeet portrait using macrophotography
Canon FTb, Canon Bellows Lens FLM 100mm f/4, with Bellows FL, 1/125th sec., at f/5.6.

Thanks to macrophotography, evanescent beauty is greeted by the camera eye.
Canon F-1, Canon Macro Lens FD 50mm f/3.5 S.S.C., with Life Size Adapter, 1/60th sec., at f/16.

Telephoto Lenses

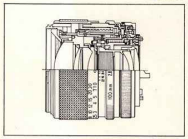
Canon telephoto lenses bring distant subjects right up close. These sharp lenses compress space in front of and behind the main subject, making everything seem much closer together. With focal lengths from 85mm to 300mm and magnifications from 1.4X to 6X, Canon's superb telephotos are specifically designed for photography of especially difficult subjects. Telephoto lenses have a narrow angle of view and shallow depth-of-field. They produce flattened perspective which makes them useful in portrait photography. They have high resolving power to keep the image perfectly sharp from the center all the way out to the edges of the frame. And because Canon telephotos use the unique Super Spectra coating, chromatic aberration and astigmatism are reduced to an absolute minimum.

Canon Lens FD 85mm f/1.8 S.S.C.



The FD 85mm f/1.8 S.S.C. is a telephoto lens with precise natural perspective. It is perfect for portraiture, when faithful reproduction of the subject is absolutely necessary. Canon's FD 85mm completely eliminates circumferential astigmatism and comatic aberration. Color balance is excellent, with all ghost and flare suppressed by the use of Super Spectra multi-layer coating. To aid in handling, the FD 85mm is very short (57mm), approximately the size of a 50mm standard lens.

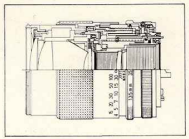
Canon Lens FD 100mm f/2.8 S.S.C.



Based on the conventional FL 100mm f/3.5 lens, this is a large aperture telephoto lens with a fast lens speed of f/2.8. Its telephoto ratio of 1 : 0.93 makes possible an overall length of 57mm, the size of standard lenses. It is one of the easiest-to-shoot lenses, with an added advantages of being lightweight and compact in size.

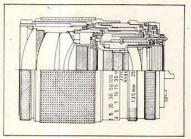
Pensive young miss at Mexican festival Canon FTb, FD 100mm f/2.8 S.S.C., 1/60th sec., at f/5.6.

Canon Lens FD 135mm f/3.5 S.C.



This is a very popular telephoto lens with superior telephoto effects. In spite of a focal length of 135mm, its overall length is only 83mm. It is, therefore, a very compact lens and convenient to operate. Its high resolving power provides clear images from the center to the corner areas. It is ideal for shooting sports events, portrait and mountain scenes.

Canon Lens FD 135mm f/2.5 S.C.

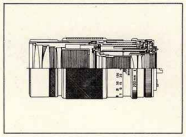


This lens has the fastest lens speed of all the FD telephoto lenses.
It is very compactly designed, having a short telephoto ratio of 1 : 0.98. Compared with the FD 135mm f/3.5 S.C., this lens speed approximately two times as fast.
Moreover, the aberration fluctuation arising from the photographing distance, is decreased to improve the performance of the lens. Flare is eliminated perfectly, moreover the secondary spectrum of the chromatic aberration was greatly reduced.
Furthermore, image delineation at full aperture opening has been greatly improved by minimizing field curvature.

Portrait study
Canon F-1, FD 135mm f/2.5 S.C., 1/250th sec., at f/5.6.

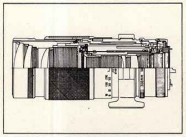
New Lens
FD 200mm f/2.8 S.S.C.
(Will be marketed in the near future)

Canon Lens FD 200mm f/4 S.S.C.



In spite of its 200mm focal length, its short telephoto ratio of 1 : 0.86 is the shortest of any telephoto lens with an f/4 lens speed. Its chromatic aberration, especially its secondary spectrum, and other aberration fluctuations, have been optically solved for obtaining high contrast and stable image delineation throughout the entire focusing range.

Canon Lens FD 300mm f/5.6 S.C.



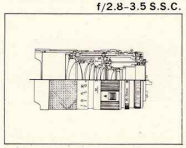
This lens has been developed to turn a 300mm long focal length lens into a high performance, compact lens.
Its telephoto ratio has been reduced to 1 : 0.72, even with the use of ordinary optical glasses. With the exception of the FL-F 300mm f/5.6 lens, this lens is the shortest in its class, being approximately the same length as ordinary 200mm lenses.
For the sake of convenience, a tripod attachment holder and a lens hood are built in. In order to compensate the movement of the focal point due to temperature changes, allowance was made in the protrusion length so that corrections down to −30°C can be made.

Sequence shooting of formation flying
Canon F-1, FD 200mm f/4 S.S.C., with Motor Drive Unit, 1/60th sec., at f/8.

Zoom Lenses

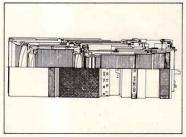
In the field, a good photographer oftens needs a special effect to perfectly capture the essence of a special subject. Perhaps he needs a sudden change of focal length, a deeper depth-of-field, a blurring of his telephoto image, maybe even a unique exaggeration of the photographic perspective. Zoom lenses can provide these effects instantly because their flexible focal lengths can accommodate a wide variation of image presentation.
Canon's zoom lens series includes: the FD 35–70mm f/2.8–3.5 S.S.C., the FD 100–200mm f/5.6 S.C., and the FD 85–300mm f/4.5 S.S.C.
Zoom lenses found in this series are particularly well suited for shooting on an impulse, for capturing moving subjects, and when an alternation of overall and close-up shots is necessary.

Canon Lens FD 35–70mm f/2.8–3.5 S.S.C.



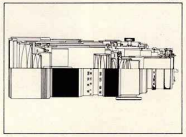
The FD 35–70mm f/2.8–3.5 S.S.C. is an ideal general lens for a good variety of effects, from wide-angle to moderate telephoto. It was specially designed to correct for all aberrations, eliminating distortion and field curvature. This superbly constructed lens can also perform close-up photography to a distance of 30cm (1 ft) from the film plane when using the FD 35–70mm's built-in macro-shooting capacity. Canon engineers consider this lens one of the finest zoom lenses they have ever made.

Canon Lens FD 100–200mm f/5.6 S.C.

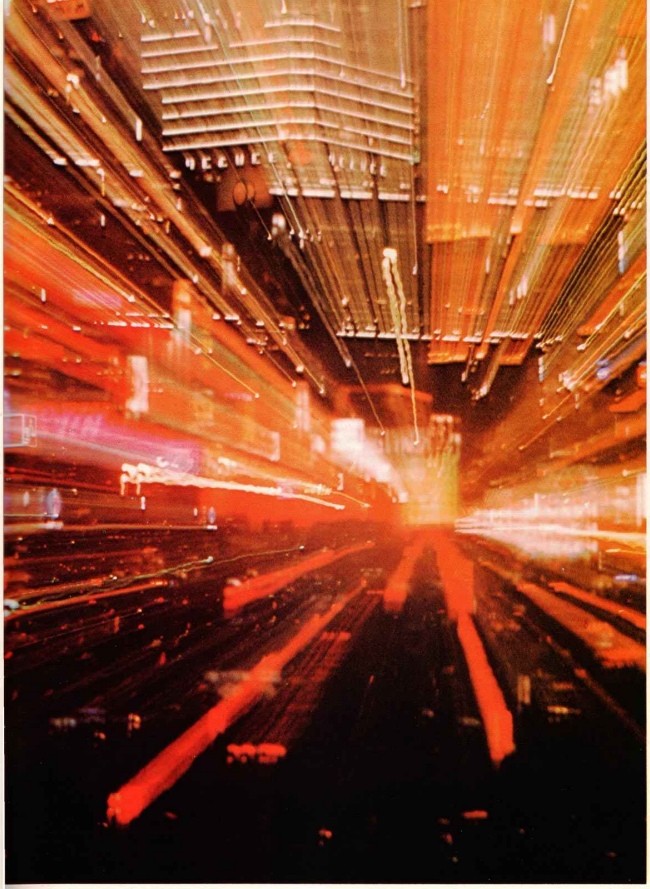


This is a small, lightweight zoom lens for photographing scenery and for snapshot shooting.
Because of various aberration compensations, i.e., distortion and spherical aberration, and its automatic aperture diaphragm, superior image delineation is obtained.
To facilitate convenient operation, its telephoto ratio is adjusted to 1 : 2.

Canon Lens FD 85–300mm f/4.5 S.S.C.



The FD 85–300mm f/4.5 S.S.C. is a telephoto lens which offers a quite extraordinary range of focal lengths. Although it has a minimum focusing distance of 2.5 meters, it can also zoom in on subjects which are very far away. This can mean excellent shots of people, animals, sporting events, or other distant action. The FD 85–300mm has features a large maximum aperture to assure the clearest, brightest image possible in a camera's viewfinder.



Zooming turns Ginza night scene into abstract art. Canon F-1, FD 100-200mm f/5.6 S.C., 1 sec., at f/8.

Available by special order.

Telephoto shot of zebras Canon FTb, FL 300mm f/5.6, 1/250th sec., at f/5.6.

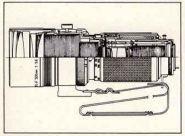
FLUORITE Lenses

Canon FLUORITE lenses derive their superb optical qualities from an optimum utilization of the unique properties of artificial fluorite crystals. The performance of these lenses is so extraordinary that they were awarded the International Camera Special Award in 1969. There are three FLUORITE lenses, the 300mm f/2.8 S.S.C., the 300 mm f/5.6 and the 500mm f/5.6. Because they incorporate a fluorite element they give absolutely true color balance when used in teleploto shooting. The fine instruments completely eliminate the chromatic aberration and the entire secondary spectrum which so often mar the performance of conventional telephoto lenses. FLUORITE lenses also have a superior apochromatic quality which results in good resolution and excellent contrast. And most important, despite their long focal lengths, FLUORITE lenses are portable, light, and easy to operate. Their reduced telephoto ratio means that the FLUORITE lenses are less bulky and cumbersome than conventional all-glass telephoto lenses.

Canon Lens FL 300mm f/5.6 FLUORITE

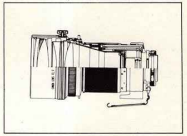
Having an 8° angle of view and 6x magnification, this lens incorporates one element made from artificial fluorite into its compact design, and produces images with truly outstanding sharpness, contrast and color balance. Because of its light weight (830g.), this lens is ideal for shooting sports, widelife, or candids. Supplied with its own built-in lens hood, rotating tripod collar, and deluxe carrying case.

Canon Lens FL 500mm f/5.6 FLUORITE



Similar in design to the 300mm, this lens also uses one fluorite element in its design. It has a 5° angle of view and 10x magnification, so that even distant subjects can be brought up close. Resolution, contrast, and color balance are outstanding and on a par with lenses much shorter in focal length. Supplied with its own built-in lens hood and tripod socket, plus a convenient carrying case.

Canon Lens The FL 300mm f/2.8 S.S.C. FLUORITE



This is a new fluorite telephoto lens with a very wide f/2.8 maximum aperture. It is especially useful for photography at indoor sporting events or at theatrical performances where available light alone must be used. By attaching the special Canon Extender 2x to the rear of this lens, you have a very small and light-weight 600mm f/5.6 super-telephoto which focuses up to 3.5m (12ft.). And the image stays sharp because the lens was designed with the Extender 2x as an integral part of its optical formula,so there is no image degradation. This fine lens is available on special order.

Super Telephoto Lenses

The ultimate objective of using a super telephoto lens is to photograph subjects at a great distance in close-up with sharp image delineation through the entire image.

Super telephoto lenses are indispensable for shooting sports and news events, and even for recording wild life, difficult-to-approach subjects. Generally, lenses with focal lengths of 400mm or more have long overall length, making operation and portability inconvenient. In order to eliminate this disadvantage, Canon systematically developed four super telephoto lenses, FL 400mm f/5.6, FL 600mm f/5.6, FL 800mm f/8 and FL 1200mm f/11 S.S.C., which are of front convertible types.

With the intensive use of a computer, the anticipated aims such as easy operation, their reduced sizes and portability have been achieved. In their optical performance, these FL super telephoto lenses provide the high resolving power and superior image delineation because of compensation of various aberrations, i.e., chromatic aberration, secondary spectrum and field curvature.

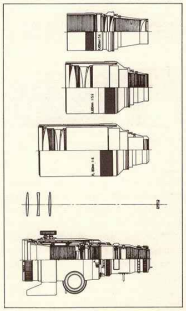
Also included in the above category of super telephoto lenses is the FL-F 500mm f/5.6.

FL 400mm f/5.6, FL 600mm f/5.6, FL 800mm f/8 and FL 1200mm f/11 S.S.C.

The Canon lenses FL 400mm F 5.6, FL 600mm F 5.6, FL 800mm F 8 and FL 1200mm F 11 S.S.C. are newest additions to Canon super telephoto lens series. These lenses are front convertible types, which are front component unit with front components of the lens.

The rear components, automatic aperture diaphragm mechanism and focusing adjusting device are built into the optional Canon Focusing Unit. Therefore, by simply changing the front convertible lens, focal length can be adjusted to 400mm, 600mm, 800mm or 1200mm.

The FL 800mm f/8, in particular, is the world's shortest super telephoto lens in its class. It provides high contrast, even in picture taken at long distances because chromatic aberration is completely eliminated.



Hawaiian sunset Canon F-1, FL 800mm f/8, with Focusing Unit, 1/30th sec., at f/8.