

Nikon

N4004

DECISION MASTER SYSTEM

Technical Guide

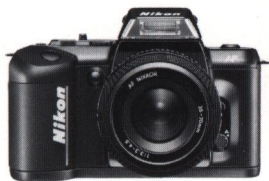
The all-automatic autofocus single-lens reflex
featuring Nikon's exclusive Decision Master System

**DECISION
MASTER
SYSTEM**



AF

- Superior Autofocus Even in Dim Candlelight
- Advanced Auto Exposure with Unique Triple-Sensor Metering
- Built-in Auto TTL Flash with Balanced Fill-Flash Capability



Nikon

N4004

The Nikon N4004 autofocus SLR, with its point-and-shoot simplicity plus its selection of high-performance features, appeals to a very broad market segment.

The latest autofocus technology enables the N4004 to autofocus even in dim candlelight and to discern even minute details for fast and accurate operation. Combined with the alternative of manual focus, this enables the N4004 to assure super-sharp pictures – quickly, easily and consistently.

Point-and-shoot programmed exposure automation appeals not only to beginners but anyone who wants to take superior pictures – quickly, easily and automatically.

The N4004's high-performance features, including shutter-priority auto, aperture-priority auto, and manual exposure modes, appeal to more advanced photographers, giving them opportunities for creative control.

Built-in accessories such as auto TTL flash and motor drive provide added convenience that anyone will appreciate.

Using AF Nikkor lenses, the N4004 produces high-quality pictures second to none! It even enables use of AI series lenses for manual operation.

To create the N4004, Nikon designed a completely new high-performance system, different from all other autofocus SLRs. Nikon calls it **Decision Master System**. And it sets new standards for both automatic and creative photography.

Please read through this Nikon Technical Guide. It includes all the information you need to thoroughly understand how the N4004 operates and why it will become one of the most important cameras in today's market.

Decision Master System

Nikon's new Decision Master System assures total camera control – and no other camera has it. This unique optoelectronic system integrates advanced camera and lens computers for fully automatic control of all camera and lens operations. Even such advanced techniques as exposure compensation and balanced fill-flash are carried out automatically! With automatic controls taking care of complex calculations, Decision Master System makes picture-taking easier, more fun, more rewarding and mistake-proof.

With all its automation, the Nikon N4004 offers many high-performance features that enhance personal creativity, from a choice of three auto exposure modes plus manual exposure to automatic or manual focusing with electronic confirmation.

At the core of Decision Master System is a high-technology autofocus breakthrough: Nikon's newly developed AM200 sensor module with 200 CCDs (Charge Coupled Devices) – more than any other autofocus SLR. The AM200 assures quick, precise focusing, even at low light levels, pinpointing details even the human eye finds difficult to detect.

Add to this Nikon's advanced auto exposure innovation – the unique triple-sensor light meter – which assures optimum exposure even under difficult conditions. Plus – for the first time in any camera – a built-in auto TTL flash with balanced fill-flash capability that makes professional results available to everyone automatically.

WHAT KIND OF CUSTOMER

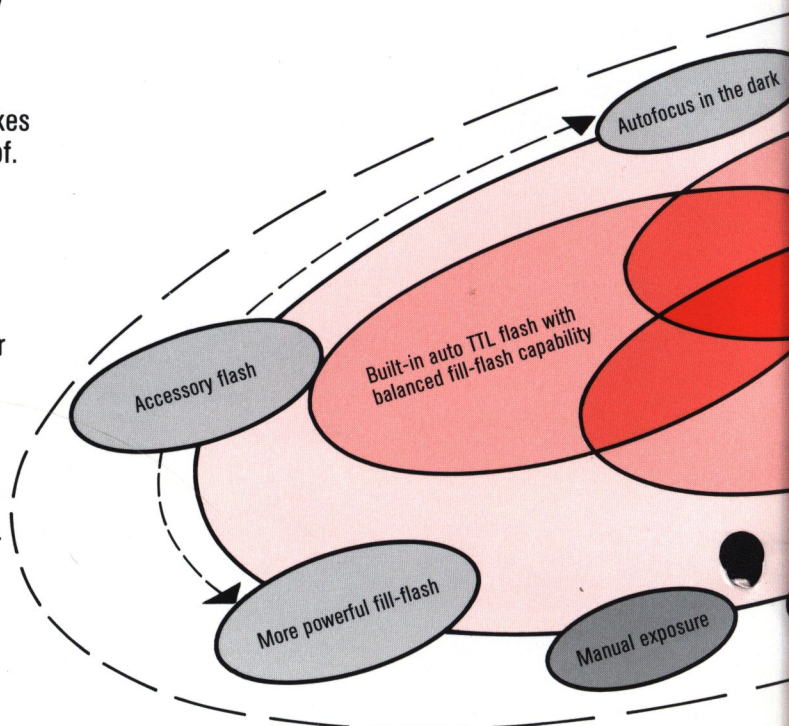
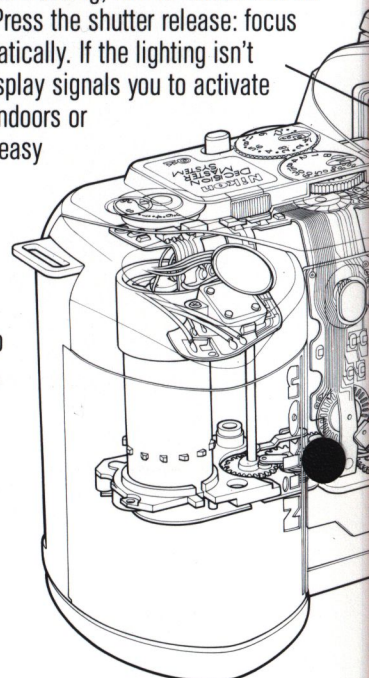
Amateurs who want simple operation

The Nikon N4004 is the first fully featured automatic single-lens reflex camera that is just as easy to use as any point-and-shoot compact autofocus. Yet it provides all the potential for the creativity and better pictures of an SLR.

In the most automatic mode, program auto exposure with autofocus operation, you can just point-and-shoot. The N4004 won't let you take a bad picture. The built-in motor and the power rewind take care of film operation. Film speed is set via the DX coding; film is loaded and advanced to frame #1 automatically. Press the shutter release: focus is automatic, exposure is set automatically. If the lighting isn't right, the N4004 finder's graphic display signals you to activate the built-in flash. Daylight or flash, indoors or out, everything is automatic and as easy as a compact autofocus camera!

More advanced photographers

With dual program auto, aperture-priority auto, shutter-priority auto and manual control, there's literally no scene a photographer can't capture.



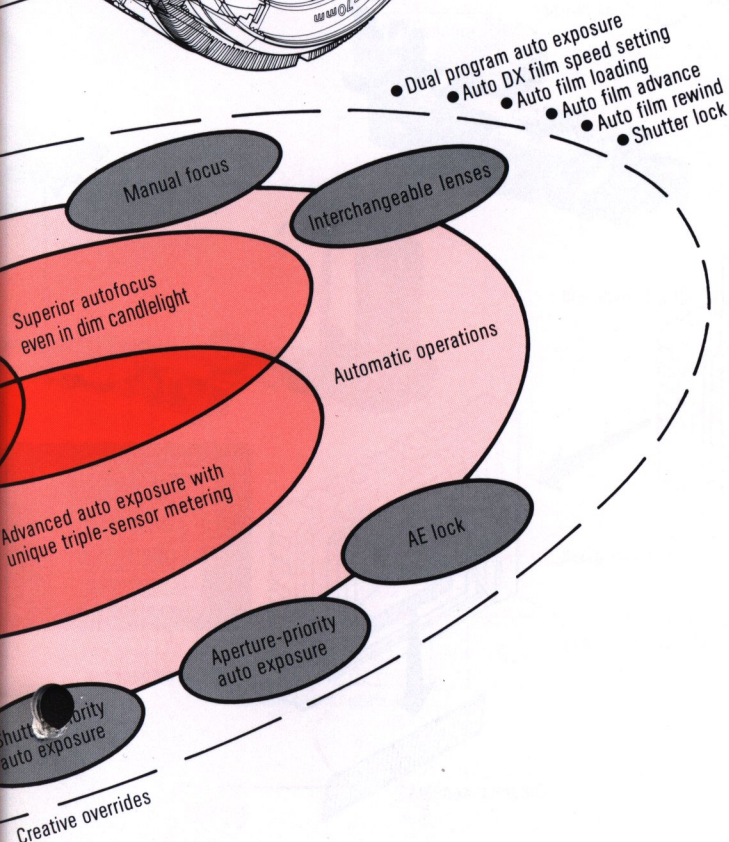
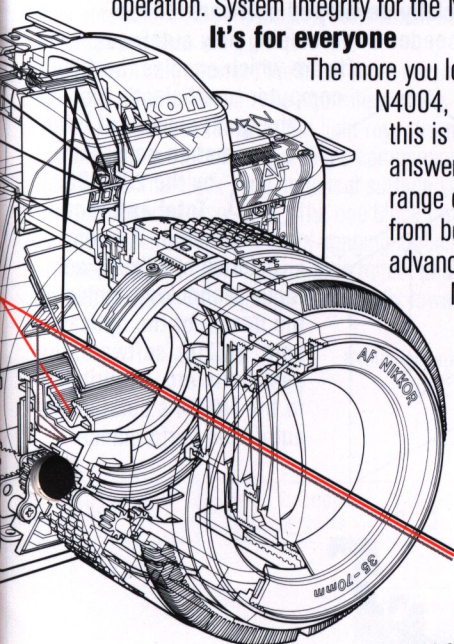
WILL WANT THE N4004?

A choice of autofocus or manual focus adds to the N4004's potential. The built-in auto TTL flash is fast and convenient. The built-in hot shoe lets you expand flash photography with Nikon's optional speedlights, providing bounce flash, selectable flash coverage angle, more powerful balanced fill-flash, and an AF illuminator for autofocus in the dark!

Interchangeable lenses, using the fast-expanding line of superb quality AF Nikkor autofocus lenses, provide complete automation with picture quality of Nikon renown. You can even use AI-type lenses for manual operation. System integrity for the Nikon owner is maintained!

It's for everyone

The more you look at and use the Nikon N4004, the more you realize that this is the first SLR that completely answers the needs of the broadest range of photographic interest; from beginners to amateurs to advanced enthusiasts, the Nikon N4004 provides it all, from enjoyable simplicity to creative excellence. It's for everyone!



1. Superior Autofocus

The N4004 with Decision Master System uses an all-new, Nikon-designed autofocus sensor, the AM200, that is so advanced and so sensitive, it detects minute details other autofocus SLRs have a hard time focusing — even in dim candlelight.

The N4004 autofocus is super fast thanks to its enhanced total autofocus system, and mistake-proof because Decision Master System releases the shutter only when the subject is in focus.

2. Triple-sensor auto exposure metering

Dividing the scene into three segments for measurement, Decision Master System computes the optimum exposure value for every lighting condition. This results in superbly exposed pictures everytime.

3. Built-in auto TTL flash

The N4004's built-in auto TTL flash is very convenient. It's always there when you need it, and it's powerful enough for typical indoor pictures and outdoor portraits and group shots; up to about 14 feet at ISO 100 with an f/2.8 or faster AF Nikkor lens. Flash sync speed and aperture are automatically set in the program exposure mode. Auto TTL (through-the-lens) flash control assures accurate flash exposures.

4. Balanced fill-flash capability

The N4004 makes this complicated and time-consuming professional technique automatically available to beginners, thanks to its triple sensor and built-in auto TTL flash. Decision Master System sets the correct lens aperture and shutter speed and controls the flash output to ensure optimum exposure for **both** the background and subject. This works very well in high-contrast scenes.

5. Dual Program auto exposure

In this auto exposure setting, the N4004 automatically adjusts the shutter speed and lens aperture for optimum exposure. It also automatically selects High-Speed Program for lenses 135mm in focal length or longer — effectively preventing blur due to camera shake — or Normal Program for shorter lenses.

6. Automatic film operation

From loading to advance to rewind, film operation is all automatic. Film speed is automatically set with all DX-coded films (ISO 25–5000). An LED lights up at the end of a roll; then after a simple manual operation, power rewind starts and stops automatically.

7. Creative exposure options (A, S, M, AEL)

In addition to fully automatic dual program, the photographer can choose aperture-priority auto exposure, shutter-priority auto exposure or manual exposure modes. AE-lock (automatic exposure lock) is also available. In the manual exposure and AE lock modes, centerweighted metering is employed.

8. Shutter speeds (1 – 1/2000 sec.)

With shutter speeds ranging from 1/2000 sec. down to 1 sec., and with B (bulb), the N4004 is capable of handling exposure control for virtually any situation.

9. New BriteView screen

The new BriteView focusing screen for the N4004 viewfinder permits more light to be deflected to the autofocus sensor for superior autofocus, without compromising finder image quality or manual focusing characteristics.

10. Easy-to-see viewfinder

All necessary LED information alerts for autofocus, exposure and flash appear in the viewfinder in simple, easy-to-understand graphic symbols.

11. Shutter lock for mistake-proof photography

The N4004 prevents bad pictures by locking the shutter automatically, not only until the focus is correct, but also in a variety of situations, for example, when the lens is set incorrectly.

12. Manual focus capability

Manual control of the lens focus ring is possible. In-focus status is electronically confirmed by a viewfinder LED.

13. Autofocus lens interchangeability

More than a dozen interchangeable AF Nikkor autofocus lenses, with more to come, provide complete automation.

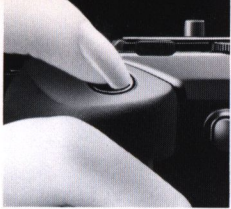
(Current Nikon F-mount lenses other than AF Nikkors use the same bayonet mount and may be used on the N4004 without TTL exposure metering.)

14. Accessory flash attachable

Fully dedicated Nikon SB-22 and SB-20 speedlights can be used for automatic photography and provide the added benefits of autofocus illuminator, bounce flash, wider angle coverage and multiple flash capability. Their additional power also gives greater flash range.

15. Four AA-Size batteries

The most universally available batteries.



SUPERIOR AUTOFOCUS

The user can count on Nikon's many years of experience in the development and advance of SLR autofocus technology. The Nikon F3AF, the first Nikon autofocus SLR, has been highly appreciated by professional photographers because it ushered in the age of state-of-the-art autofocus technology. The F3AF was followed by the Nikon N2020 featuring dual autofocus — Single-Servo and Continuous.

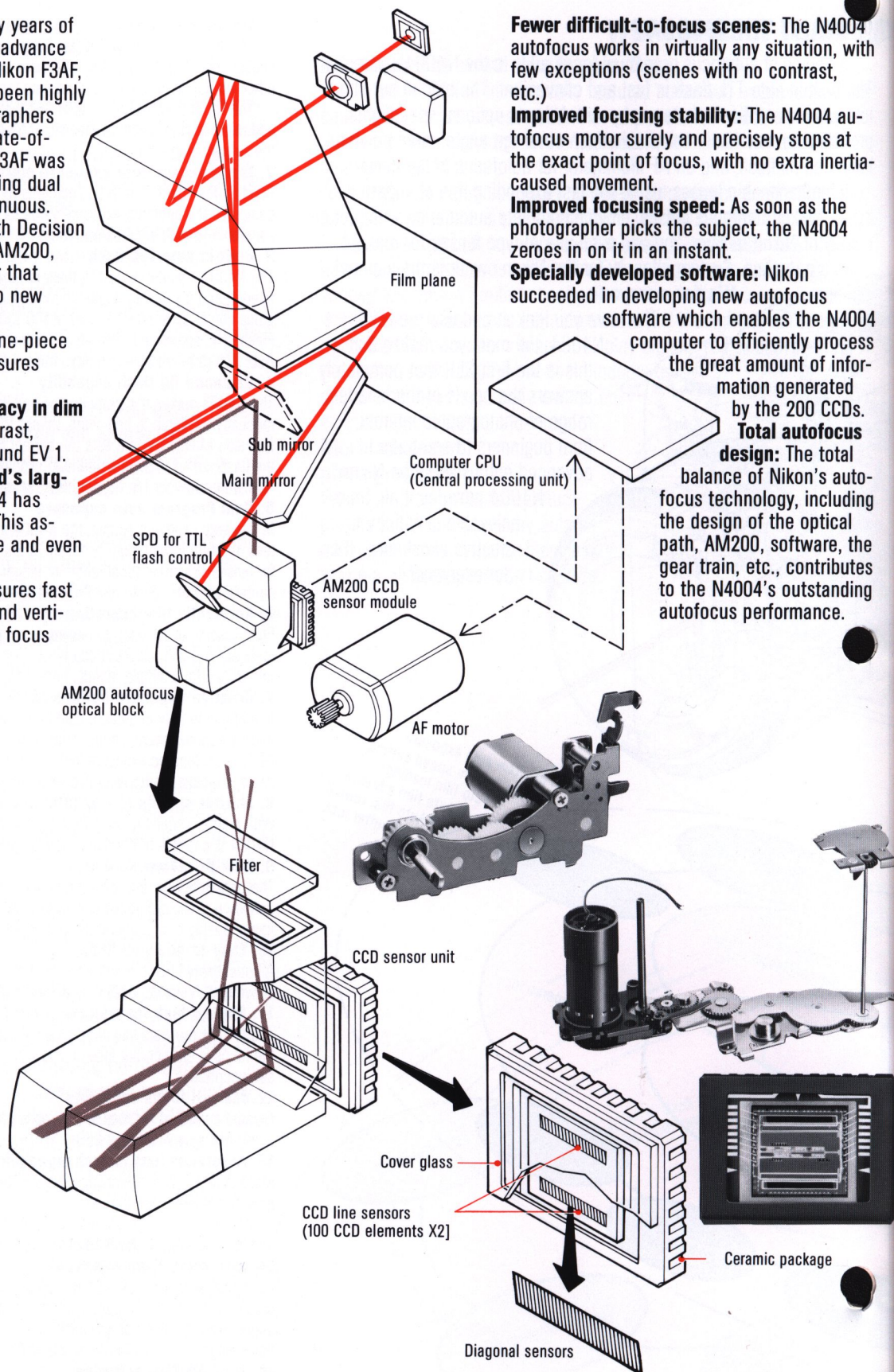
Now there's the Nikon N4004 with Decision Master System which features the AM200, Nikon's innovative autofocus sensor that takes SLR autofocus photography to new heights in sensitivity and accuracy.

Nikon's unique AM200 system: One-piece autofocus sensor module design assures improved stability and accuracy.

Superb autofocus detection accuracy in dim light : Depending on subject's contrast, autofocus detection works even around EV 1.

AM200 with 200 CCDs — the world's largest number (in AF SLR): The N4004 has more CCDs than any other AF SLR. This assures that focusing is more accurate and even minute patterns are detected.

Slanted configuration of CCDs: Assures fast intersection of curves, horizontals and verticals, resulting in increased ability to focus even minute patterns.



Fewer difficult-to-focus scenes: The N4004 autofocus works in virtually any situation, with few exceptions (scenes with no contrast, etc.)

Improved focusing stability: The N4004 autofocus motor surely and precisely stops at the exact point of focus, with no extra inertia-caused movement.

Improved focusing speed: As soon as the photographer picks the subject, the N4004 zeroes in on it in an instant.

Specially developed software: Nikon succeeded in developing new autofocus software which enables the N4004 computer to efficiently process the great amount of information generated by the 200 CCDs.

Total autofocus design: The total balance of Nikon's autofocus technology, including the design of the optical path, AM200, software, the gear train, etc., contributes to the N4004's outstanding autofocus performance.

Optical path

The light rays of an image come through the camera's taking lens, and part of the light passes through the main mirror's semi-transparent area. The sub-mirror behind the main mirror deflects the optical path downward, so the light reaches the N4004's autofocus sensor module AM200.

The AM200 autofocus system consists of two parts: the optical block and the CCD package.

AM200 autofocus sensor module

The light rays coming through the camera's taking lens enter the AM200 through a filter which stops infrared rays from entry.

They converge toward the focal point around the filter, which is the geometric equivalent of the film plane. From this focal point the light rays diverge, coming into contact with the single-component optical block. The block's top spherical surface serves as the field condenser lens. (The one-block transparent plastic design enhances imaging stability.)

The divergent light rays are then reflected at the slanted surface; they then go horizontally toward

the two spherical surfaces A and B at the end of the optical block.

These spherical surfaces serve as the separator lens, from which the light rays converge toward the line sensor package. There, they reach the CCD line sensors.

Surface A makes the light converge at the upper CCD line sensor and surface B makes the light converge at the lower CCD line sensor.

Through this process, the image as seen in the focusing frame marks of the viewfinder is duplicated and each of the two images is projected onto each line CCD sensor.

AF line sensor package

This package consists of autofocus sensors incorporating a pair of CCD line sensors with 100 elements each. All in all, 200 CCD elements are used, the largest number among SLR cameras. The more CCD elements there are, the more information can be collated; focus detection becomes more precise because judgment is based on the amount of information.

Phase detection autofocus system

The CCD sensors generate an electric output in accordance with the brightness of the image. The computer analyzes the output from the CCDs and determines the amount of defocus to control lens movement through the AF mechanism.

Electronically controlled AF motor

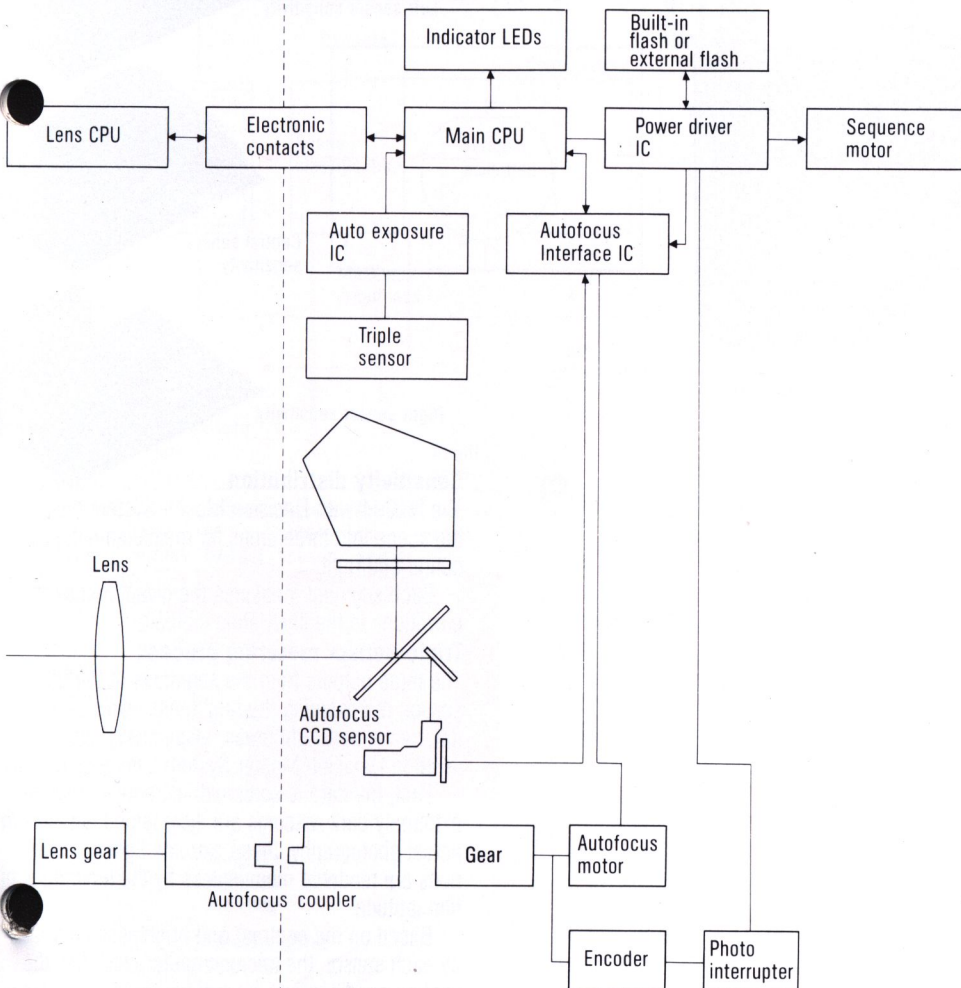
The computer monitors the AF motor electronically. The digital encoder outputs 14.5 pulse signals per revolution of the motor. The calculated defocus amount is then compared to this signal by the computer. Motor movement is controlled with a 5-step driving force that accurately moves the lens towards and stops it at the exact in-focus point.

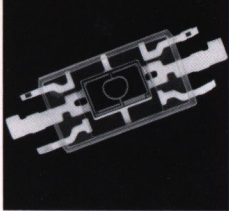
Improved total optical performance

The autofocus sensor of an autofocus SLR camera requires as much light as possible. The more light there is that comes through the camera taking lens, the easier it is to increase autofocus detection capability. But there are other factors such as the light that reaches the exposure metering sensor and the light that reaches the viewfinder eyepiece.

To meet the need for maximum available light for the autofocus system, Nikon developed a new BriteView focusing screen for the N4004 viewfinder. It permits more light to be deflected to the autofocus sensor for superior autofocus, without compromising finder image quality or manual focusing characteristics.

AF Nikkor lens N4004 camera body



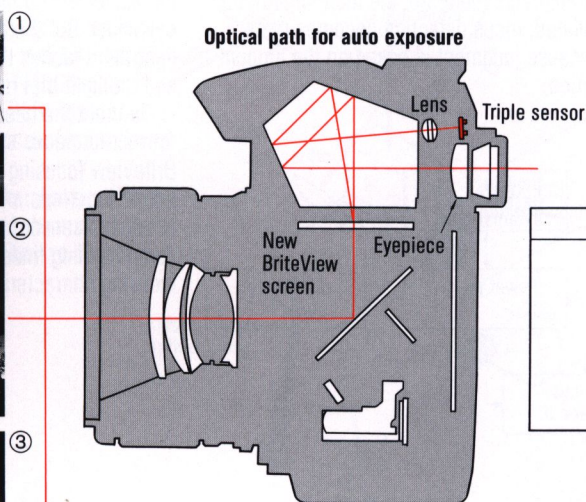
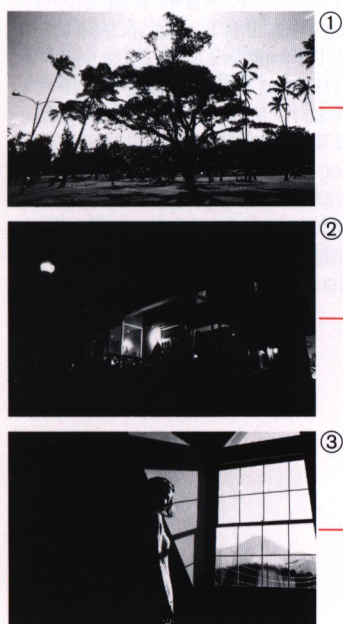


TRIPLE-SENSOR LIGHT METER

Nikon pioneered multi-pattern evaluative exposure metering technology with the world's first such system in the Nikon FA. The new N4004 with Decision Master System advances multi-pattern evaluative metering to new applications, now including both available light and flash photography.

Other systems tend to require a high level of photographic skill. The N4004's Decision Master System is designed for ultimate simplicity and automation.

Image Master Control's triple-sensor meter is designed for easy use while maintaining advanced capability for even the most enthusiastic photographer.

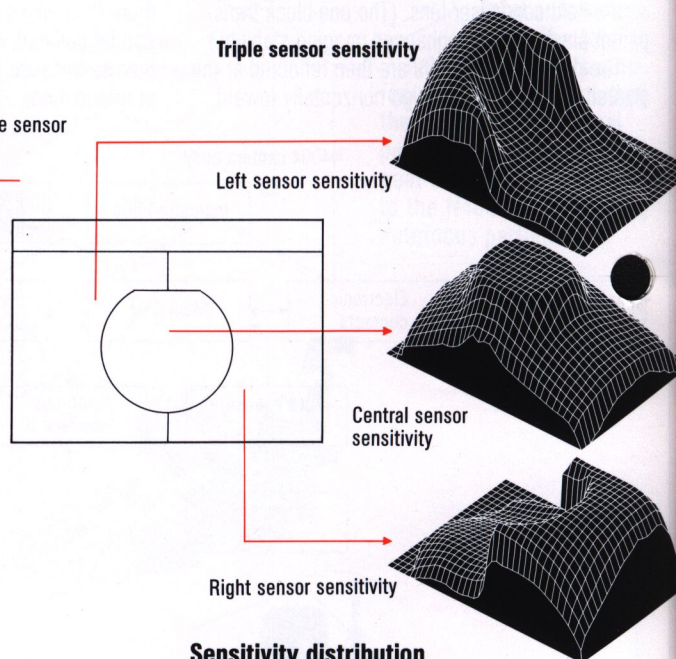


The advantages of the N4004 triple sensor are summarized as follows:

- Optimum exposure in most lighting situations: hundreds of thousands of photos were taken and analyzed in perfecting the N4004's computer program software for Decision Master System.
- No need for manual exposure compensation even in difficult lighting conditions.
- Subject position in the composition is not restricted for optimum exposure to be achieved automatically.
- Harmful brightness information (too bright or too dark) is controlled automatically for better exposure results.

Triple sensor

The triple sensor is positioned just above the eyepiece lens. It consists of one sensor device with three segments and a lens.



Sensitivity distribution

The N4004 with Decision Master System divides the scene into three areas for measurement: left, center and right.

Each segment measures the given area as the elevations in the illustration indicate.

Triple-sensor metering process

The three outputs from the segments of the triple sensor, representing the brightness levels of the left, center and right areas, respectively, are relayed to Decision Master System's microcomputer.

First, the data is screened; extremely bright or extremely dark readings are disregarded because in actual photography, these extreme lighting conditions are rendered meaningless by the limitations of film latitude.

Based on the contrast and brightness data read by each sensor, the microcomputer classifies the lighting condition into several groups. An exposure value for an optimum photograph is then computed according to a formula assigned to each lighting classification.

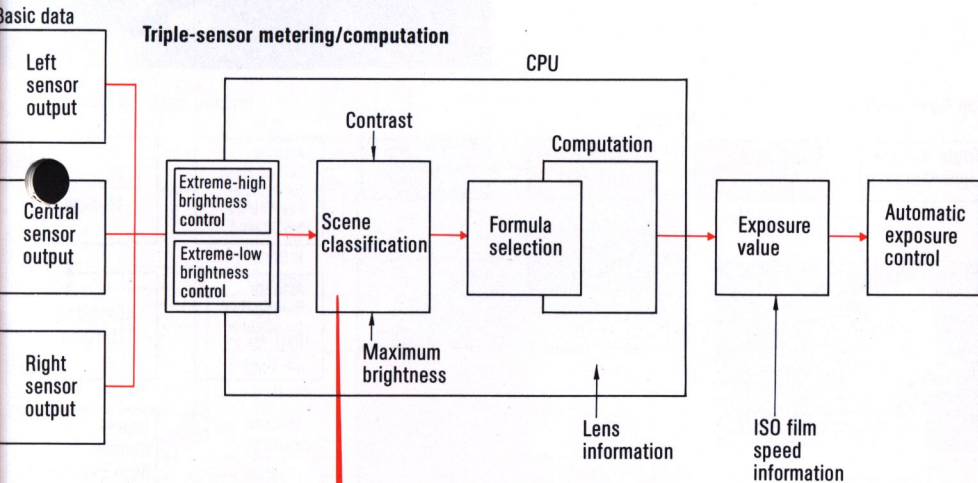
Scene classification pattern

According to the brightness and contrast of the scene as measured by the triple sensor, Decision Master System determines which of the three different ways of computation should be applied: centerweighted average, dim-light weighted, or averaged.

The decision is based on Nikon's analysis of a great number of sample photographs; this assures that the expert know-how built in enables the N4004 to offer the best exposures to everybody — automatically.

Triple-sensor auto exposure VS. conventional centerweighted metering

- ① The sun in the picture may mislead other cameras, but the N4004 with triple-sensor metering disregards harmful brightness information for a balanced picture.
- ② This night scene in available light comes out artistically thanks to triple-sensor metering.
- ③ This high-contrast scene is automatically adjusted for better exposure by the triple sensor.

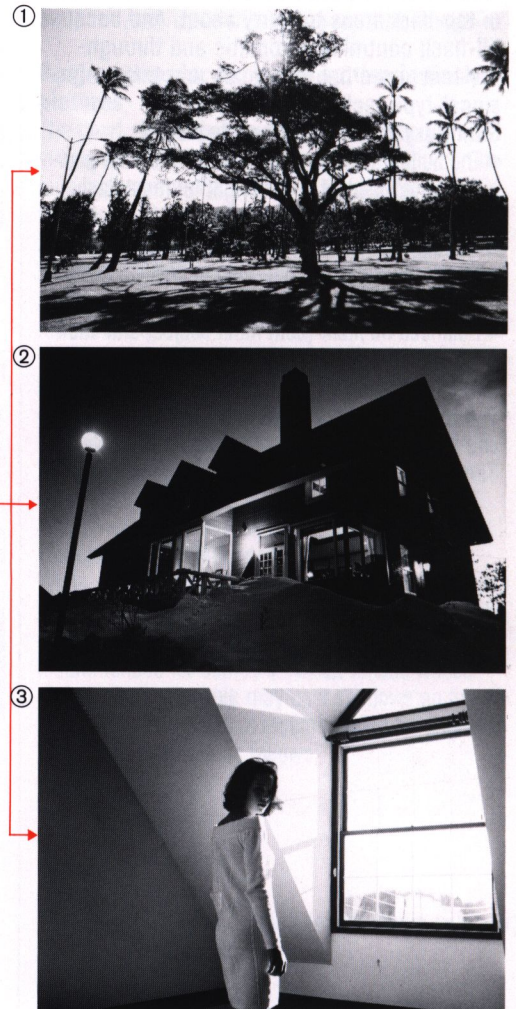


Scene classification pattern

	Dark scene			Bright scene	
Maximum brightness	Dark, night scenes	Indoors, or twilight	General outdoor scenes	Outdoors, fine weather	Outdoors, bright sun
Contrast					
Low contrast	Light	Light	Light	Light	Light
Normal contrast	Light	Light	Light	Light	Light
High contrast	Light	Light	Light	Light	Light



Light	Low brightness-weighted metering
Medium	Centreweighted metering
Dark	Average metering





BALANCED FILL-FLASH

The N4004 has a built-in auto TTL flash, assuring great flash photography anytime. The flash can be used for regular as well as fill-flash photography, a normally difficult technique. In this important area too, Nikon engineers have given the N4004 a unique advantage by way of Decision Master System's triple-sensor light meter (see previous section). This Nikon-pioneered exposure measurement system assures perfect exposures everytime with both background and subject coming out balanced — no wash-outs or too-dark areas to worry about. And because fill-flash control is automatic and through-the-lens, even beginners can use this professional-type technique right away.

Summary of N4004 flash features

- The built-in flash is always there when the photographer needs it — just right for most flash picture occasions.
- Through-the-lens automatic flash output control.
- Decision Master System automatically recommends use of flash when the subject is backlit.
- Balanced fill-flash (both main subject and background are accurately exposed).

The N4004 built-in flash

The guide number is 12 (at ISO 100 and in meters) and flash sync speed is 1/100 sec. Flash coverage 35mm. Recycling time approx. 4.5 seconds.

Why N4004 balanced fill-flash is better
Consider a typical backlit subject.

Centerweighted metering without flash

In a photo taken with centerweighted metering, the main subject tends to turn out underexposed because the exposure is poorly influenced by the bright background, while the background is correctly exposed.

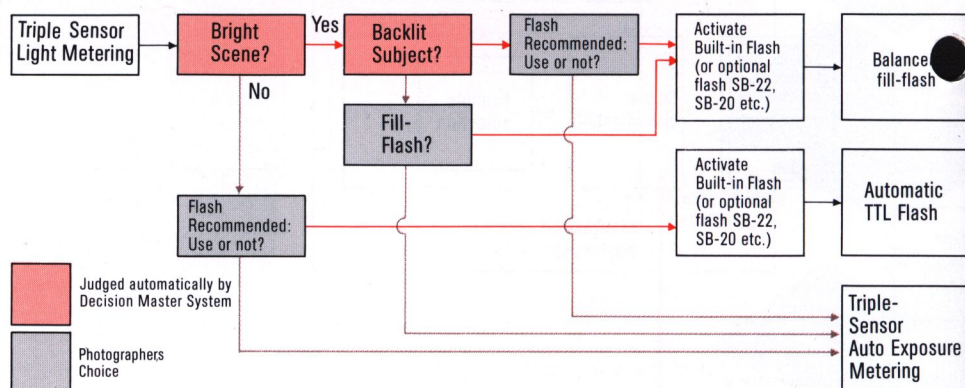


Manual exposure compensation

If exposure compensation is done manually to match the exposure to the main subject, the main subject may come out better exposed, but the background becomes overexposed. In a photo with exposure compensation such as this, the background details are lost and the main subject tends to be flat and unexciting.



Total light control



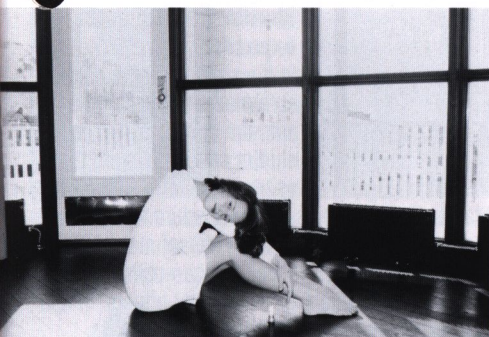
Total light control

The N4004 controls all lighting conditions automatically thanks to fill-flash, auto TTL flash, and triple-sensor metering.

If the scene is dark, or lower than EV10, Image Master Control's triple-sensor light meter recommends the use of flash; if the photographer then activates the flash, an auto TTL flash photograph is taken. If the scene is not dark but the subject is backlit, or the central sensor output is EV1 lower than another sensor output, the use of flash is recommended. If the photographer then activates the flash, a balanced fill-flash picture is taken. If the flash is activated without Decision Master System recommendation, the flash picture is taken and either fill-flash or normal TTL is determined by the brightness of the scene. In all lighting conditions, unless the flash is activated, the triple sensor assures correct exposure with available light.

Balanced fill-flash control

The Nikon N4004 controls both background and flash output accurately. In designing the software required to achieve this, Nikon analyzed a tremendous amount of sample photos assuring that optimum results are obtained all the time.



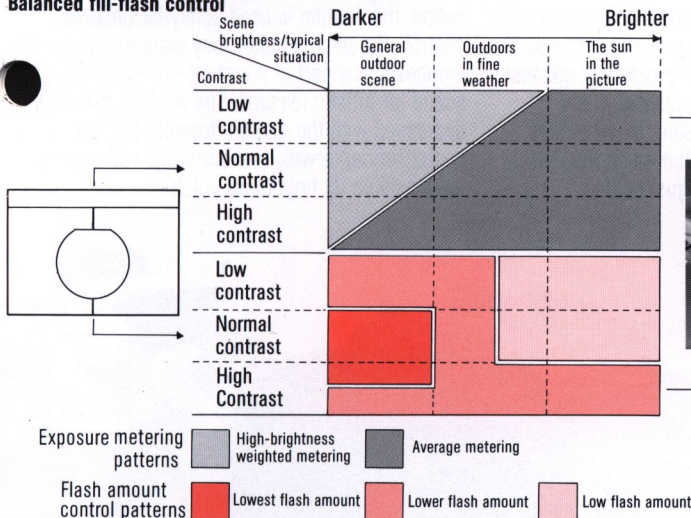
Conventional fill-flash

In lighting conditions such as shown here, fill-flash becomes a powerful technique to solve the problem. But to give a correct exposure for both subject and background, using flash in addition to daylight involves extremely complicated calculations.

N4004 balanced fill-flash

Thanks to Decision Master System, the N4004 has made this procedure totally automatic. Both background and the main subject are correctly exposed, due to the use of balanced fill-flash. And it's all automatic!

Balanced fill-flash control



Controlling the flash output

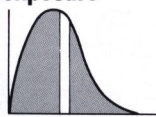
Using the average brightness and contrast obtained from the triple sensor, the scene is classified into two groups: bright-light weighted and averaged. Then proper exposure value is calculated using the three exposure values measured by the triple sensor. This adjusts the exposure, taking background brightness information into consideration as much as possible.

Controlling the background exposure

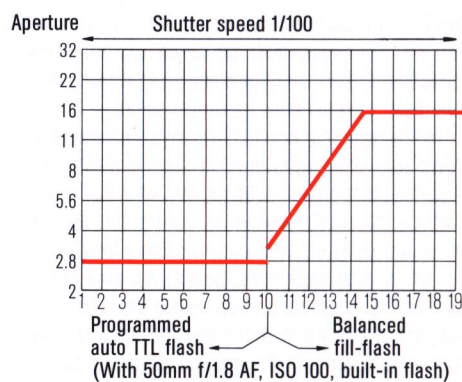
Fill-flash exposure is the sum total of available light and the light from the flash, unlike flash pictures in the dark where existing light is negligible. Thus good fill-flash pictures depend on accurately determining how much flash is required. The N4004 does this automatically.

Using contrast and average brightness as detected by Decision Master System's triple sensor, the amount of flash is determined as one of three different levels — low, lower, and lowest.

The TTL sensor monitors the amount of light as it is exposed on the film surface, by monitoring the reflected light from the film; flash output is then automatically cut the moment the predetermined level is achieved.



DECISION MASTER SYSTEM



Program line for exposure setting in flash pictures

The chart shows the program lines for exposure setting in N4004 flash photography in the program auto exposure mode. Note that the shutter speed is fixed at 1/100. From EV10* (with ISO 100) to the right or brighter, the balanced fill-flash program line is selected. This means that the best aperture is automatically chosen to provide optimum exposure for the background.

When the scene is darker than EV10*, normal programmed TTL auto flash control is chosen. That is, the aperture is automatically set to match the ISO film speed. In this example with a 50mm f/1.8 lens and using ISO 100 film and built-in flash, the aperture is fixed at f/2.8.

* An average of the three outputs from the triple sensor.

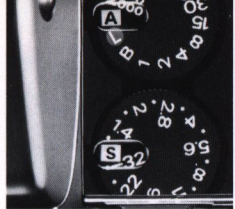
Compatible AF Nikkors with built-in flash

While all AF Nikkor lenses are compatible with the N4004 for great flash pictures, with either the built-in flash or an optional flash, the built-in flash is not recommended for some AF Nikkor lenses whose size or coverage angle may cast shadows on the scene. AF Nikkor lenses recommended for use with the built-in flash are as follows:

AF Nikkor

- 50mm f/1.4;
- 50mm f/1.8;
- 180mm f/2.8 ED-IF;
- 300mm f/4 ED-IF;
- 28~85mm f/3.5~4.5; (focal length 35mm or longer)
- 35~70mm f/3.3~4.5;
- 35~105mm f/3.5~4.5;
- 35~135mm f/3.5~4.5;
- 70~210mm f/4
- Micro 55mm f/2.8

- Do not use a lens hood; it could cause slight vignetting.
- AF 35~105mm f/3.5~4.5 and AF 35~135mm f/3.5~4.5 lenses cannot be used for macro focusing. Other lenses cannot be used if the focusing distance is shorter than the flash shooting range.
- Vignetting may occur when shooting a subject located near the minimum focusing distance (1.5m) with an AF 35~135mm f/3.5~4.5 lens at 35mm focal length.

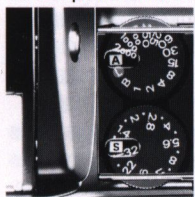


EXPOSURE CONTROL

Simple dial operations

The N4004 has two dials which are located ergonomically at the top of the body so that the user can easily confirm the exposure setting.

These two dials control four exposure modes. With S set on the aperture dial, Decision Master System automatically sets the aperture that matches the shutter speed the user picks. With A set on the shutter speed dial, Decision Master System automatically sets the shutter speed that matches the aperture picked by the user. When the dials are set to A and S, the program auto exposure mode is activated. In the manual exposure mode, the user selects any combination of aperture and shutter speed and follows or ignores the viewfinder LED exposure indications.



Dual program auto exposure

In the program auto exposure mode, the N4004's Decision Master System determines the appropriate combination of shutter speed and aperture for a correct exposure. There are two program lines to accommodate the varied exposure requirements of lenses of different focal length.

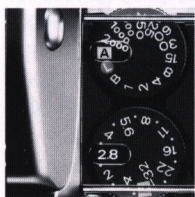
Decision Master System automatically selects the normal program for lenses with focal lengths shorter than 135mm. The high-speed program is selected for lenses with a focal length of 135mm or longer, favoring higher shutter speeds to reduce

picture blur due to camera shake, a critical factor with telephoto lenses.

This is true with zoom lenses, too. For example, with a 70-210mm zoom lens, the program line automatically shifts at the 135mm focal length setting.

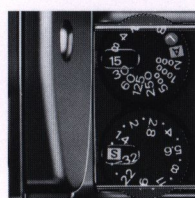
Note that both the high-speed program and normal program stop at EV15-2/3*. Decision Master System's triple sensor measures EV values brighter than 15-2/3. But the exposure is controlled at EV15-2/3, even for those scenes exceeding it. Because virtually all subjects have exposure values lower than 15-2/3, photographing them at higher than EV15-2/3 results in under-exposed subjects.

*This value changes according to ISO film speed. EV15-2/3 is for ISO 100.



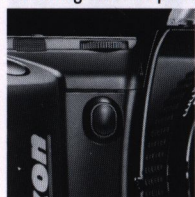
Aperture-priority auto exposure

In the aperture priority auto exposure mode, the photographer sets lens aperture on the aperture dial with the shutter speed dial at A. Decision Master System then sets the shutter speed for a correct exposure as read by the triple-sensor light meter. The merit of this method is that one can set depth of field for any calculated effect. In this auto exposure mode, shutter speed selection is stepless, which means that the shutter speed actually picked by Decision Master System could be any value between the settings indicated on the dial, thus enabling finer exposure adjustment.



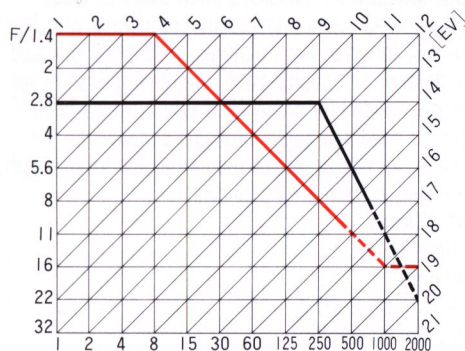
Shutter-priority auto exposure

In the shutter-priority exposure mode, the photographer sets the shutter speed on the shutter speed dial with the aperture dial at S. Decision Master System then sets the aperture for a correct exposure as read by the triple-sensor meter. The merit of this method is that one can utilize the motion of the subject for calculated effects. In this auto exposure mode, the aperture is stepless, which means that the actual aperture picked by Decision Master System could be anything between the settings indicated on the dial, thus enabling finer exposure adjustment.



AE lock

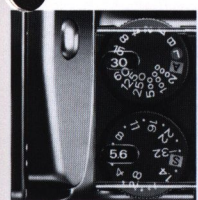
In any of the three auto exposure modes, by depressing the AEL (auto exposure lock) button, the photographer can override triple-sensor metering and activate center-weighted metering. With Decision Master System eliminating the need for manual exposure compensation, this feature is used solely for creative control. The photographer may want to give special emphasis to a part of a picture in a high-contrast scene for artistic reasons. The AE lock button is depressed with the camera framing that part at its center for centerweighted metering, with special emphasis on its brightness value.



— Normal program (50mm f/1.4, ISO 100)

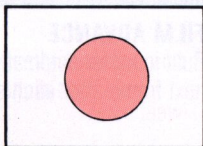
— High-speed program (180mm f/2.8, ISO 100)





Manual exposure control

Manual exposure control is easier than ever with the N4004 because both aperture and shutter speed setting controls are on the body. The viewfinder LED gives information on correct exposure in easy-to-understand graphic symbols. The metering activated in this case is centerweighted.



Centerweighted metering

The N4004 activates centerweighted metering in AE lock and meter-assisted manual exposure only. In this mode, only the reading from the central segment of the triple sensor is measured. For the reading to be meaningful as an override of auto exposure for advanced photographers, the meter reading is not adjusted by Decision Master System's computer.

N4004 TTL auto flash control

With the built-in flash or an optional Nikon TTL speedlight activated, the N4004 employs its TTL auto flash exposure modes. If the available light is EV10 or brighter, the N4004 selects balanced fill-flash, and in brightness lower than EV10 it operates with the normal TTL auto flash. The optional Nikon speedlights for TTL auto operation include the SB-20, SB-22, SB-15, or SB-16B.

As the flash is fired, the TTL sensor monitors the reflection of light from the film surface as it is exposed and signals to the flash when to stop as the exposure of the film reaches a predetermined level.

The settings of aperture and shutter speed in N4004 flash shootings depend on the exposure modes.

Programmed TTL auto flash: in program auto exposure mode

The N4004 flash operates in the programmed TTL auto flash mode when the camera is set at the Program auto exposure mode. The shutter speed is automatically set at 1/100 by the N4004. The aperture is set based on the ISO number of the film in use. When the maximum aperture of the lens is smaller than the normally selected aperture for the film, the full aperture is set. For instance, an f/3.5 lens is set at f/3.5 with an ISO 100 film which normally is matched by f/2.8.

Programmed TTL auto flash: in shutter priority auto exposure mode

The N4004 flash also operates in the programmed TTL auto flash mode when the camera is set at shutter-priority auto exposure mode. The shutter speed is automatically set at 1/100 sec. if the dial is set at 1/125 to 1/2000. However, any slower shutter speed setting is unchanged by the N4004. The aperture is controlled as explained above.

TTL auto flash: in manual exposure mode

The N4004 flash operates in the TTL auto flash mode when the camera is set at the manual exposure mode. The N4004 selects 1/100 sec. shutter speed automatically if the dial is set at 1/125 to 1/2000. Any slower shutter speed setting is unchanged by the N4004. It is then up to the photographer to select the aperture, taking depth of field and flash reach into consideration.

TTL auto flash: in aperture-priority auto exposure mode

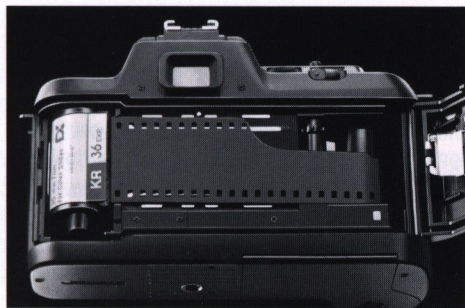
The N4004 flash also operates in the TTL auto flash mode when the camera is set at the aperture-priority auto exposure mode. The N4004 automatically sets the shutter speed at 1/100 sec. The viewfinder exposure indications give useful information for aperture setting decisions.





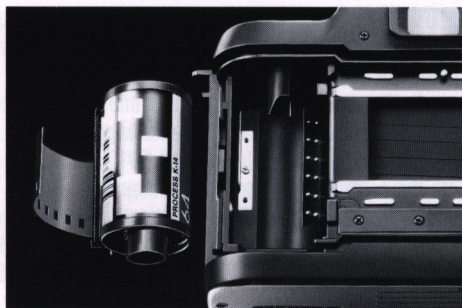
BUILT-IN MOTOR DRIVE

Decision Master System makes film handling easy and automatic.



LOADING

User just inserts film with film leader on orange mark, closes the camera back and presses the shutter release button to advance film automatically to the first frame; shutter remains closed until the first shot.



DX INDEXING

On loading, the film speed of DX-coded film in the ISO 25-5000 range is automatically read and set accordingly; non-DX coded film is automatically set to ISO 100.



FILM ADVANCE

Built-in motor automatically advances film to the next frame after each shot.

Battery life

Number of 36-exposure film rolls per set of fresh batteries (approx.):

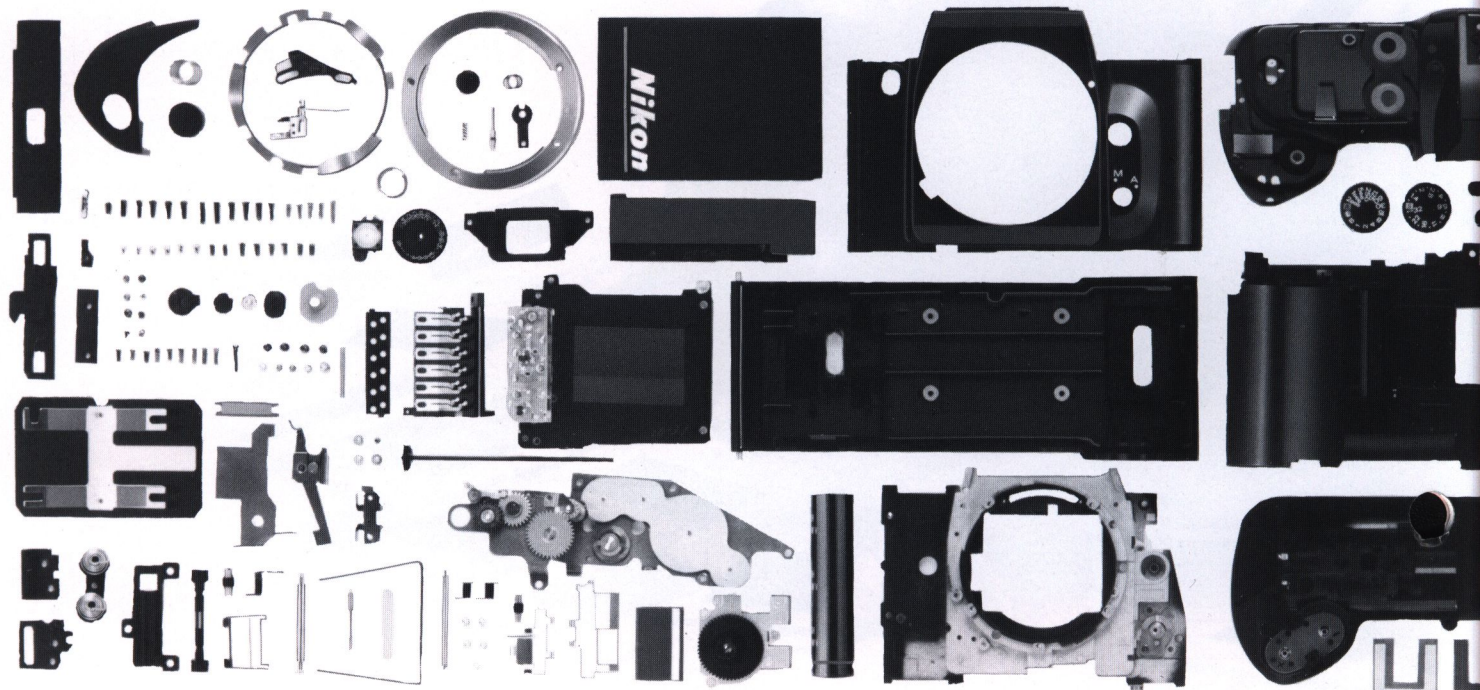
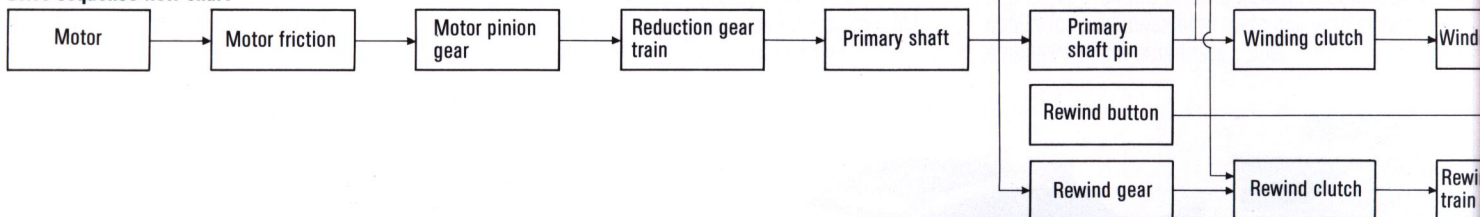
For Autofocus operation with AF Nikkor lens covering the full range from infinity (∞) to the closest distance and back to infinity (∞) before each shot.

Batteries

With AF Nikkor 35~70mm f/3.3~4.5 or 50mm f/1.8

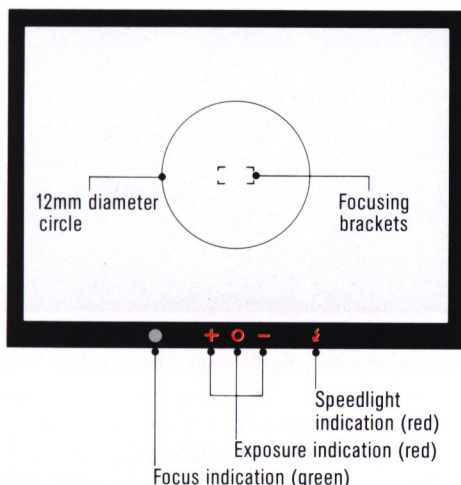
	Without flash		With 50% flash	
	at 20°C	at -10°C	at 20°C	at -10°C
AA-type alkaline-manganese (LR06)	50	8	20	5
NiCd (KR-AA)	16	15	7	4
Zinc-carbon (SUM-3)	20	1	8	—

Drive sequence flow chart





VIEWFINDER INFORMATION



The N4004 viewfinder

With its newly improved, brighter BriteView screen, the N4004 with Decision Master System makes it easier for the user to see what is being shot — great for manual focusing. Also, the 12mm eyepoint makes viewing more comfortable for eyeglass wearers. Decision Master System gives the user the necessary shooting information in uncluttered, easy-to-understand graphic symbols in the viewfinder.

Shutter locks

Whenever Decision Master System determines that the picture will not come out correctly focused and exposed — i.e., until correct autofocus and automatic exposure are secured — it locks the shutter release button. It also prevents mistakes due to improper lens aperture setting (i.e., it is not set to the minimum aperture in the program mode) or insufficient flash recharge.

	● (green)	+ ○ -	⚡	Remarks/Shutter lock
Autofocus	① In-focus	● ON		
	② Front/rear focus	● OFF		Shutter locks in AF mode
	③ Autofocus impossible	● Blink		Shutter locks
Auto Exposure	① Auto exposure possible: (High-speed shutter)	○: ON		In S (Shutter-priority) mode, LED never blinks
	② Auto exposure possible: (Slow-shutter warning)	○: Blink		When the automatically selected shutter speed is slower than 1/32
	③ Too bright for auto exposure	+ : ON		Shutter locks
	④ Too dark for auto exposure	- : ON		Shutter locks
	⑤ Manual: correct exposure (±1/3EV)	○: ON		
	⑥ Manual: +1EV to +1/3EV	+ ○: ON		
	⑦ Manual: -1/3EV to -1EV	○ -: ON		
	⑧ Manual: too bright to measure; more than 1EV over	+ : ON		Shutter does not lock
	⑨ Manual: too dark to measure; more than 1EV under	- : ON		Shutter does not lock
	⑩ AE lock	①~④		Camera automatically selects centerweighted measurement
	⑪ Shutter set at B (Bulb)	All OFF		
Speedlight	① Speedlight prompt		⚡ Blink	Low brightness; Fill-flash: External speedlight used but not switched on
	② Speedlight ready		⚡ ON	All exposure LEDs turn off.
	③ Full-power flash warning		⚡ Blink	Immediately after shot
	④ External Speedlight wrong setting		⚡ Blink	Before shooting, when speedlight is turned ON
	⑤ Recharging the built-in speedlight		⚡ OFF	Shutter locks
	⑥ Recharging external speedlight		⚡ OFF	
	⑦ Beyond acceptable film speed range for TTL photography (over ISO 400)		⚡ Blink	
	⑧ When using both built-in & external speedlight			Built-in speedlight is given priority.
Others	① Small-aperture setting mistake warning	+ - Blink alternately		Shutter locks
	② End of film			Self-timer LED turns ON; Shutter locks

OPTIONAL SPEEDLIGHTS

DECISION MASTER SYSTEM

The optional Nikon TTL speedlights, when used with the N4004, work with the same advanced flash exposure controls as the N4004 built-in auto TTL flash, including balanced fill-flash and programmed auto TTL flash. Such Nikon speedlights as the SB-20, SB-22, SB-15, and SB-16B provide more powerful flash output and range than the N4004's built-in flash. The SB-20 and SB-22, both equipped with built-in autofocus illuminators, also enable autofocus in total darkness.

Nikon SB-22 Autofocus Speedlight

The new Nikon Speedlight SB-22, is a compact version of the SB-20 Autofocus Speedlight. Guide number is 25 (at ISO 100 and in meters) or 82 (at ISO 100 and in feet). Built-in diffuser is for use with 28mm wideangle lenses. Autofocus illuminator LED enables autofocus in the dark. Flash head can be tilted for bounce flash shooting. Programmed TTL auto flash, non-TTL auto and manual modes are selectable.

Nikon SB-20 Autofocus Speedlight

The Nikon Speedlight SB-20 has a higher power compared with the SB-22. The guide number is 30 (at ISO 100 and meters) or 98 (at ISO 100 and in feet). The head zooms for three different flash coverage settings matching 28mm, 35mm, 85mm and longer focal length lenses. Autofocus illuminator LED enables autofocus in the dark. Flash can be adjusted for bounce flash. Programmed TTL auto flash, non-TTL auto and manual modes are selectable.

SB-20 Specifications

Guide Number
30 (ISO 100, meters, normal setting)
98 (ISO 100, feet, normal setting)
Flash coverage
28mm/35mm/85mm or longer
No. of flashes
Approx. 160*
Recycling time
Approx. 6 sec.*
AF assist LED
Provided
Power source
Four 1.5V AA-type batteries
Dimensions (W×H×D)
2.8×4.3×2.7 in. (including mounting foot)
Weight
9.1 oz. (without batteries)

*With alkaline-manganese batteries at full output in manual operation.

SB-22 Specifications

Guide Number
25 (ISO 100, meters, normal setting)
82 (ISO 100, feet, normal setting)
Flash coverage
28mm/35mm or longer
No. of flashes
Approx. 200*
Recycling time
Approx. 4 sec.*
AF assist LED
Provided
Power source
Four 1.5V AA-type batteries
Dimensions (W×H×D)
2.7×4.1×3.1 in. (including mounting foot)
Weight
8.8 oz. (without batteries)



SB-20

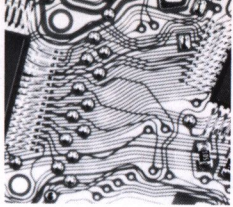


SB-22

N4004 and speedlight operation

With TTL speedlight			
Exposure Mode	Shutter speed	Aperture	Speedlight Prompt
Program auto	1/100	auto	yes
Shutter-priority auto	1/100 or slower*	auto	yes
Aperture-priority auto	1/100	as set by dial	yes
Manual	1/100 or slower*	as set by dial	yes
With manual or non-TTL auto speedlight			
Exposure Mode	Shutter speed	Aperture	Speedlight Prompt
Program auto	shutter locks	—	—
Shutter-priority auto	shutter locks	—	—
Aperture-priority auto	1/100	as set by dial	yes
Manual	1/100 or slower*	as set by dial	yes

*Shutter speed setting of 1/125 or above is automatically disregarded and 1/100 is set. Slower shutter speed setting is respected.

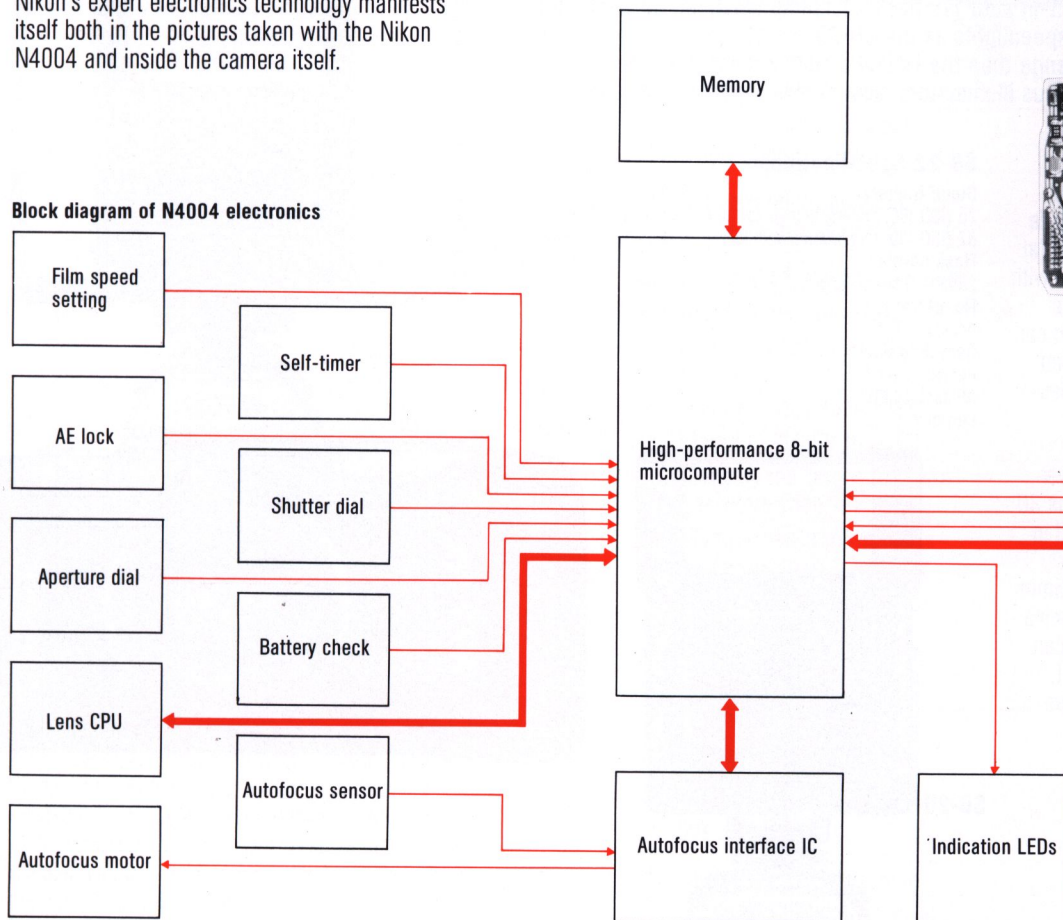


ELECTRONICS

Nikon N4004 electronics

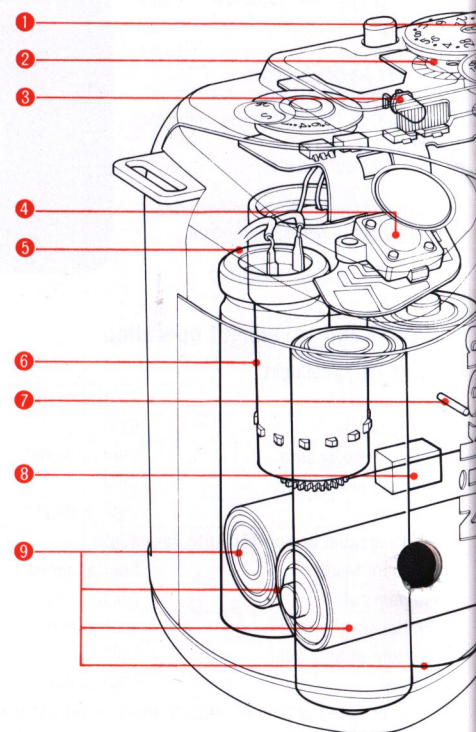
Nikon's expert electronics technology manifests itself both in the pictures taken with the Nikon N4004 and inside the camera itself.

Block diagram of N4004 electronics



Electronic parts configuration

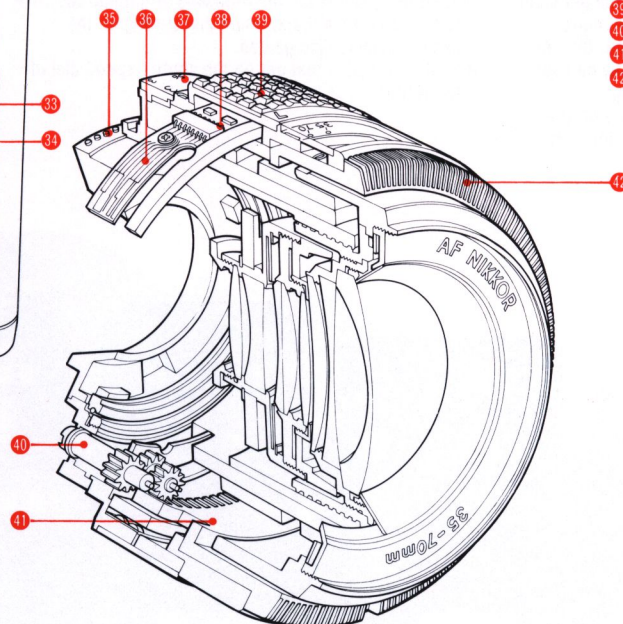
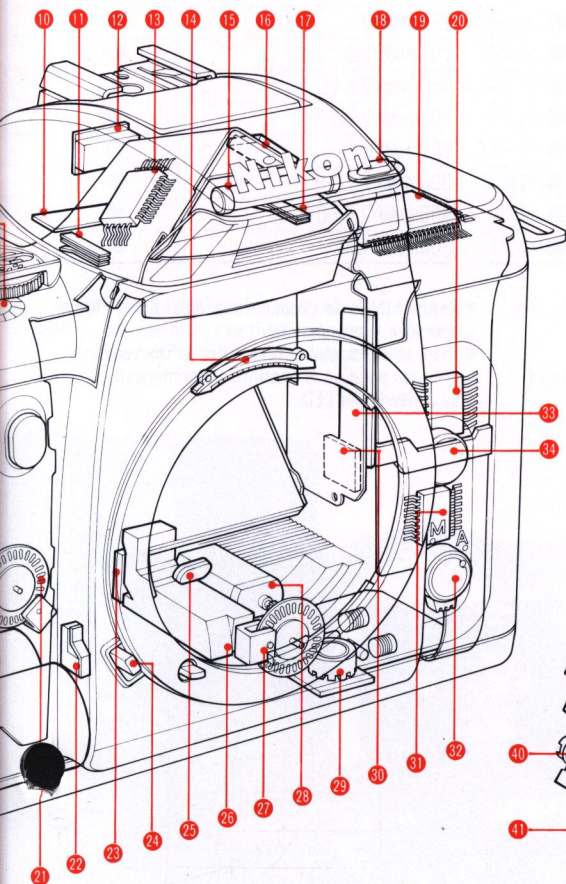
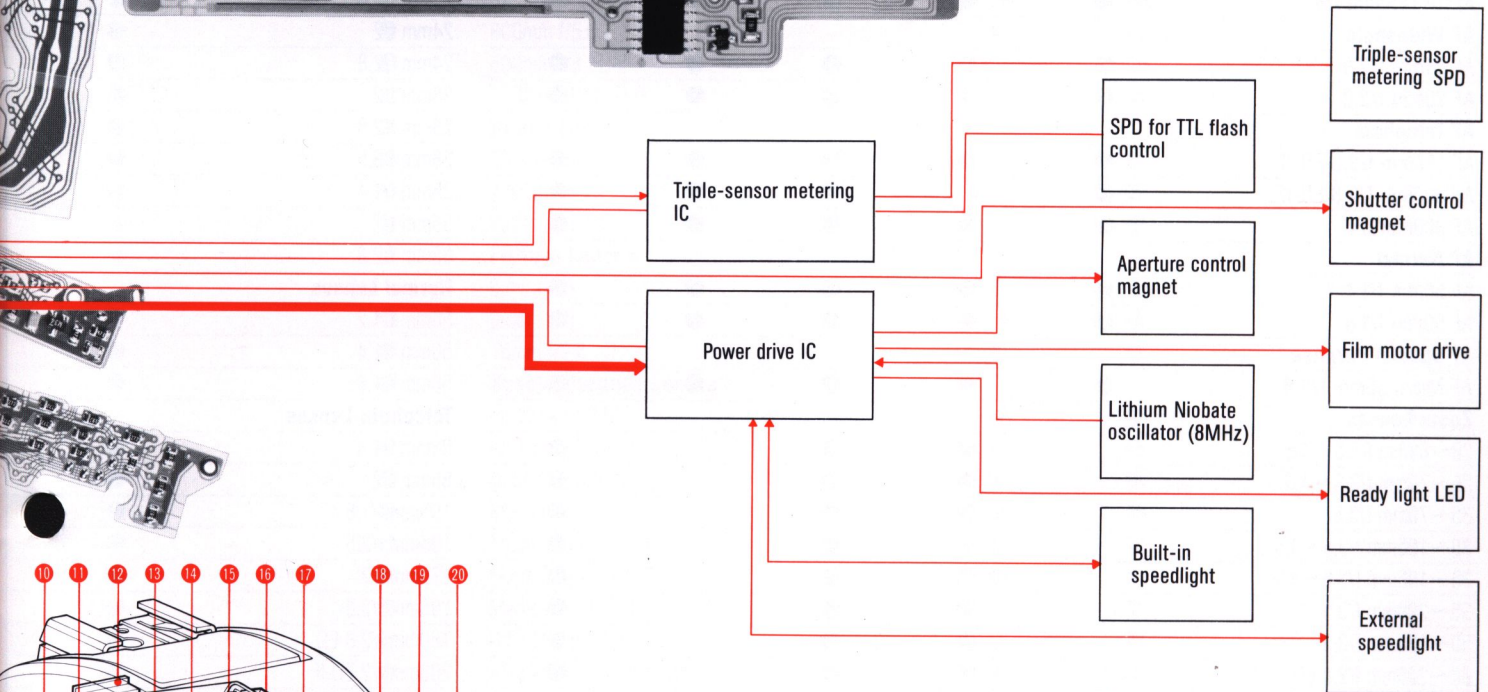
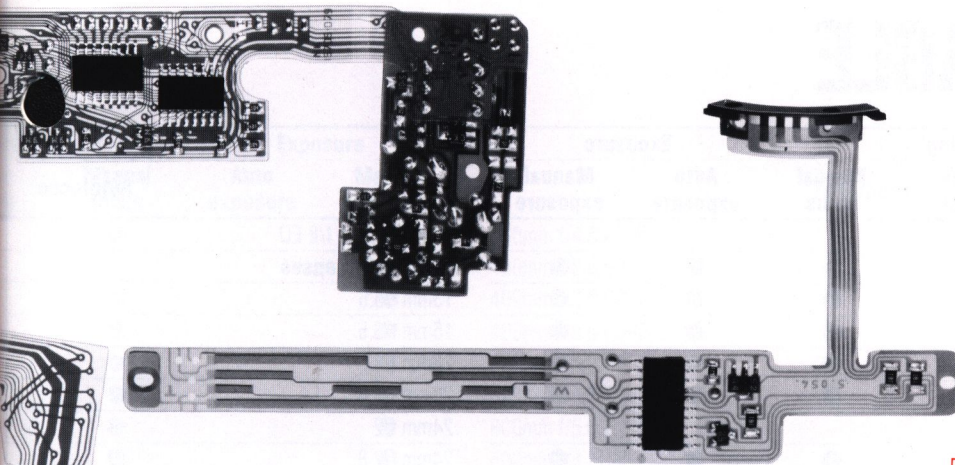
- | | | |
|----------------------------|---|--|
| 1 Shutter dial pattern | 13 IC head amp | 24 Minimum f switch |
| 2 Aperture dial pattern | 14 Camera/lens electronic contacts | 25 TTL flash metering SPD |
| 3 Self-timer LED | 15 Flash tube | 26 AM200 optical block |
| 4 Shutter release switch | 16 Interface IC | 27 Photo interrupter for autofocus control |
| 5 Main condensor for flash | 17 Built-in flash switch | 28 Autofocus motor |
| 6 Winding motor | 18 Self-timer switch | 29 DC/DC converter |
| 7 Film detect switch | 19 CPU | 30 Autofocus interface IC |
| 8 Aperture magnet | 20 Resistor array | 31 E ² PROM |
| 9 Batteries | 21 Photo interrupter for aperture control | 32 Focus mode switch |
| 10 Viewfinder LEDs | 22 Mirror switch | 33 DX contacts |
| 11 Flash selector switch | 23 AM200 CCD sensor unit | 34 Data-back FPC |



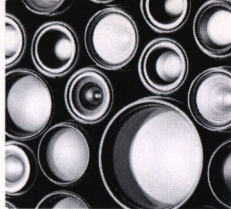
DECISION MASTER SYSTEM

AF Nikkor with CPU

All AF Nikkor autofocus lenses have a Central Processing Unit (CPU) built-in. The computer in the camera body communicates with the lens CPU through seven electronic contacts. Information relayed between them includes data on lens such as minimum f/stop, focal length, etc. With a zoom lens, the focal length setting in actual use is constantly monitored for optimum results.



- 35 AF signal contacts
- 36 Zoom encoder
- 37 Aperture control ring
- 38 CPU
- 39 Zoom ring
- 40 Coupling drive axis
- 41 Gear Train
- 42 Manual focusing ring



LENS TABLE

	Focusing			Exposure	
	Autofocus	Focus assist	Manual focus	Auto exposure	Manual exposure
AF Zoom					
AF 28~85mm f/3.5~4.5	●	●	●	●	●
AF 35~75mm f/3.3~4.5	●	●	●	●	●
AF 35~105mm f/3.5~4.5	●	●	●	●	●
AF 35~135mm f/3.5~4.5	●	●	●	●	●
AF70~210mm f/4	●	●	●	●	●
AF Wideangle					
AF 24mm f/2.8	●	●	●	●	●
AF 28mm f/2.8	●	●	●	●	●
AF Telephoto					
AF 180mm f/2.8 ED-IF	●	●	●	●	●
AF 300mm f/2.8 ED-IF	●	●	●	●	●
AF 300mm f/4	●	●	●	●	●
AF Normal					
AF 50mm f/1.4	●	●	●	●	●
AF 50mm f/1.8	●	●	●	●	●
AF Special Purpose					
AF Micro 55mm f/2.8	●	●	●	●	●
Zoom Lenses					
28~85mm f/3.5~4.5		●	●		●
35~70mm f/3.3~4.5		●	●		●
35~70mm f/3.5		●	●		●
35~105mm f/3.5~4.5		●	●		●
35~135mm f/3.5~4.5		●	●		●
35~200mm f/3.5		●	●		●
50~135mm f/3.5		●	●		●
80~200mm f/2.8 ED		●	●		●
80~200mm f/4		●	●		●
50~300mm f/4.5 ED		●	●		●
100~300mm f/5.6		●	●		●
200~400mm f/4 ED		●	●		●

180~600mm f/8 ED

Wideangle Lenses

13mm f/5.6

15mm f/3.5

18mm f/3.5

20mm f/2.8

24mm f/2

24mm f/2.8

28mm f/2

28mm f/2.8

28mm f/3.5

35mm f/1.4

35mm f/2

35mm f/2.8

Normal Lenses

50mm f/1.2

50mm f/1.4

50mm f/1.8

Telephoto Lenses

85mm f/1.4

85mm f/2

105mm f/1.8

105mm f/2.5

135mm f/2

135mm f/2.8

180mm f/2.8 ED

200mm f/2 ED-IF

200mm f/4

300mm f/2 ED-IF

300mm f/2.8 ED-IF

300mm f/4.5

The Nikon N4004 is designed to work to its full potential when an AF Nikkor lens is mounted. However, current Nikon F-mount lenses (AI-type/Series E) other than AF Nikkors use the same bayonet mount and may be used on the N4004 without TTL exposure metering.

When a non-AF Nikkor lens or an AF Nikkor for the Nikon F3AF is mounted on the N4004, operation is as follows:

- Aperture is set by the aperture ring of the non-AF Nikkor lens; thus the aperture dial setting on the camera body is disregarded.
- Shutter speed is that set on the shutter speed dial of the N4004.

- None of the auto exposure modes of the N4004 is operative — only manual.
- There is no exposure information in the viewfinder.
- In-focus position is confirmed electronically by a viewfinder LED.



DECISION MASTER SYSTEM

[illegible]

	Focusing		Exposure	
	Autofocus	Focus assist	Manual focus	Manual exposure
300mm f/4.5 ED-IF		●	●	●
400mm f/2.8 ED-IF		●	●	●
400mm f/3.5 ED-IF		●	●	●
400mm f/5.6 ED-IF		●	●	●
600mm f/4 ED-IF		●	●	●
600mm f/5.6 ED-IF		●	●	●
800mm f/5.6 ED-IF		●	●	●
800mm f/8 ED-IF			●	●
1200mm f/11 ED-IF			●	●
Reflex Lenses				
500mm f/8			●	●
1000mm f/11			●	●
2000mm f/11			●	●
Fisheye Lenses				
6mm f/2.8		●	●	●
8mm f/2.8		●	●	●
16mm f/2.8		●	●	●
Special Purpose Lenses				
PC 28mm f/3.5		●	●	●
PC 35mm f/2.8		●	●	●
Noct 58mm f/1.2		●	●	●
Micro 55mm f/2.8		●	●	●
Micro 105mm f/2.8		●	●	●
Micro 200mm f/4 IF		●	●	●
Medical 120mm f/4 IF		●	●	●
UV 105mm f/4.5		●	●	●
AF 80mm f/2.8 (For F3AF)		●	●	●
AF 200mm f/3.5 ED-IF (For F3AF)		●	●	●
Series E Lenses				
28mm f/2.8		●	●	●
135mm f/2.8		●	●	●

- TTL automatic flash control is available with non-AF lenses. The user must use the flash sync speed on the shutter speed dial and the appropriate aperture on the lens.

- TC-16A cannot be used with the N4004.

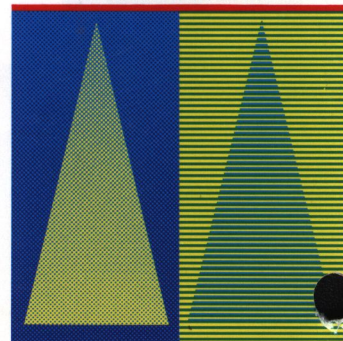




Nikon cameras have been flying in space on NASA's manned spacecraft programme ever since the APOLLO programme. It also includes SKYLAB and the joint venture APOLLO-SOYUZ.

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We take the world's
greatest pictures.®

IMAGING TECHNOLOGIES
FROM NIKON



PHOTOGRAPHIC ELECTRONIC

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