

LAB REPORT

By Norman Goldberg and Michele A. Frank

NIKON FM2

No. 7009649



Camera Type: 35-mm manual-exposure single-lens reflex

Normal lenses: 50-mm f/1.2, f/1.4, f/1.8; 55-mm f/2.8 Micro; 58-mm f/1.2 Noct; and 35-70-mm f/3.5 Nikkor

Shutter: Mechanically governed, vertically traveling titanium with speeds from 1 to 1/4,000 sec plus B and X (1/200 sec)

Viewfinder: Fixed, eye-level type; three interchangeable focusing screens; standard screen has central rangefinder spot surrounded by microprism ring on ground-glass/Fresnel field; 12-mm-diameter reference circle for metering; shutter speeds and apertures visible; three-LED exposure readouts outside of picture area; LED at top outside finder for readylight indication/wrong synch speed set

Exposure Meter: Through-lens, full-aperture, heavily center-weighted readings; uses two silicon photodiodes; EV range (ASA 100, 50-mm f/1.4 lens) EV 1 to 18; ASA range, 12 to 6,400; light touch on shutter-release button turns on meter for approximately 30 sec; choice of one three-volt lithium cell or two 1.55-volt silver-oxide (S-76) or two 1.5-volt alkaline-manganese (A-76) batteries

Flash Synchronization: Hot shoe and single PC outlet; X at 1/200 sec; M, FP, and MF bulbs at 1/30 sec or slower; contacts on shoe for dedicated flash units

Loading: Conventional, swing-open back

Film Transport: Single-stroke, 135° winding angle with 30° standoff

Other Features: Self-timer; memo holder on back, multiple-exposure lever, camera-back lock, depth-of-field preview lever; motor-drive electrical contacts

Weight: 1,052.2 g (37.11 oz.) with 35-70-mm zoom and batteries

Dimensions: L., 142.6 mm (5.61 in.); H., 90.4 mm (3.56 in.); D., 152.2 mm (5.99 in.) with 35-70-mm zoom

Accessories: Line of lenses from 6- to 2,000-mm, including zooms; macro and micro equipment; data back, dedicated electronic-flash units; motor drive, more

Price: Body only, \$364 (chrome), \$380 (black); 35-70-mm Nikkor zoom, \$675

Distributor: Nikon, Inc., 623 Stewart Ave., Garden City, N.Y. 11530.

Field Check

By Larry Sribnick

In these days of electronic bells and whistles, the Nikon FM2 is a refreshingly mechanical, no-nonsense, professional-grade camera that can take the abuse of everyday use. Only the exposure-metering system is powered by the batteries, so if they fail, the rest of the camera continues to work normally.

Although there are many changes and refinements that make the Nikon FM2 more versatile than the FM, the two that stand out are the FM2's top shutter speed of 1/4,000 sec, and its ability to synchronize with electronic flash at shutter speeds up to 1/200 sec.

If you like high-speed films and often find yourself shooting in bright-light situations, you'll love the 1/4,000-sec speed. A typical camera with a 1/500- or 1/1,000-sec top shutter speed, loaded with ASA 400 film, is limited in its performance under normal sunny-day conditions. The lens must be stopped way down, losing sharpness and giving so much depth of field that it is virtually impossible to isolate a particular subject. By contrast, the FM2's 1/4,000-sec setting allows the lens to be opened up to f/8 or f/5.6, giving optimum optical performance and moderate control of depth of field.

Obviously, 1/4,000 sec allows you to freeze the action of a fast-moving subject. It also makes the FM2 an ideal "grab-shot" camera. Travelers by train or bus know how fast a photograph can come and go while one is looking out through the

window. At such times, a high shutter speed is needed to stop the motion of the subject and vehicle, as well as the shaking of the excited photographer. The top speed of the FM2 has an



Lift tab (A) to unlatch viewscreen retaining frame, but avoid dusty conditions when doing this or changing lenses, because of wide diaphragm-actuator-arm port (B), through which mirror-mechanism geartrain is visible. Dust protection is provided under motor-drive coupling on baseplate through gasket (not visible). Other details on base include motor-drive contacts, battery compartment, tripod socket, rewind shift button. Self-timer lever and depth-of-field preview lever are easily reached. Button on opposite side of body flange is lens-mount bayonet-latch release.

LAB REPORT

amazing ability to calm down your photographs even when you aren't.

Most SLRs synchronize electronic flash at 1/60 sec, while some others (including the Nikon FM) work at 1/125. The FM2's higher 1/200-sec synch capability offers real advantages for indoor or outdoor flash work. Professional flash units often have very bright modeling lights that can cause double or ghost images of moving subjects. (One image is from the electronic flash, the other from ambient light during the 1/60- or 1/125-sec exposure duration.) This problem is not limited to studio situations—any well-lighted room can cause the same effect. A 1/200 synch speed goes a long way toward eliminating this headache by reducing the ambient-light exposure.

High-speed flash synch also comes in handy for outdoor fill-flash shooting. The higher the synch speed, the larger the lens opening that can be used. This, in turn, permits a longer flash-to-subject distance for the same amount of flash output and fill illumination. With the FM2, I was able to shoot at a useful 12 ft., instead of a confining six or seven ft. from my subject. (Naturally, I could also work closer by choosing a slower shutter speed and smaller aperture.) The only problem I ran into is that the meter turns off when the shutter-speed dial is moved to 1/200 sec. My solution was to meter at 1/250 sec, then stop down the lens slightly and switch the shutter to 1/200 sec for the actual photograph.

The display for the FM2's metering system has been redesigned and simplified. Replacing the FM's trio of LED dots next to the correct-, under-, and overexposure symbols, the FM2 has

symbols that actually light up. This change makes the display easier to read. (Eyeglass wearers can see the image on the focusing screen, but they may have trouble seeing the metering and shutter-speed displays on either side without moving their head.)

The symbols used for the metering system are "+," "-", and "0." When only the circle is lighted, the exposure is correct to within $\pm 1/5$ stop. When the circle and either the plus or minus are lighted, the exposure is between 1/5 and one full

stop of being right. When only the plus or minus is lighted, the exposure is one stop or more off. I would have liked an indication of $\pm 1/2$ -stop from the correct setting, but in all of my tests, keeping only the center circle lighted gave me correct exposures.

The focusing screen itself is now removable, and interchangeable with those available for the Nikon FE. The standard "K" screen has a central horizontal split-image rangefinder surrounded by a microprism collar. The remainder of the standard screen consists of an extremely fine groundglass surface, which produces bright, crisp images, making focusing easy.

Through-the-lens metering is of typical Nikon center-weighted design, with a central circle scribed on the viewing screen to indicate the area of most sensitivity. Turning the meter on is simply a matter of pulling out the advance lever and pressing lightly on the shutter release. The FM2's meter then stays on for 30 seconds unless the shutter button is again pressed. (By contrast, the FM's meter remains on until the advance lever is pushed back in.)

The soft-release shutter button is one of the best I have ever used. Predicting exactly when the shutter will fire is no problem at all. Pushing the advance lever in against the body locks the release, so you never have to fumble with an on/off switch.

The film-advance lever is of the nonratcheted, short-stroke type. Multiple exposures are much easier with the FM2 than with the FM, because the multiple-exposure-release catch has been relocated. You can now press the catch and



Clockwise motion of lever (A) disengages wind from advance-lever action, permitting multiple exposures. Safety latch (B) must be nudged counterclockwise to permit rewind knob to be pulled up, unlatching back. To permit closest focusing, set zoom-control collar to "70", slide latch button toward "M". Focus action now operates from infinity to close limit of 192 mm. To shift focal length, move focus collar back to 0.7-m setting, then latch button pushed forward.

LENS TEST GLOSSARY

Aberrations: A flawlessly manufactured lens may still exhibit residual aberrations (image faults). Often, certain aberrations are permitted by the designer to minimize others felt to be more harmful to image quality.

Astigmatism: Causes lines radial to the optical axis, and lines perpendicular to these, to focus in two different planes. Improved by stopping down.

Centering: The center of curvature of each lens surface should lie on a common line.

Coma: Comet- or tear-drop-shaped images of off-axis points of light. Improved by stopping down.

Contrast test: Contrast levels are compared electronically between the image of a coarse and fine slit, and the result is expressed as a percentage.

Critical f-stop: The largest opening at which the aberration being examined is considered to be un-

der satisfactory control.

Distortion: Causes image of window frame (for example) to bow out (barrel type) or in (pincushion type), but does not influence sharpness. Not improved by stopping down.

Flare: Causes an overall loss in contrast. Sometimes called "veiling glare."

Flare test: The lens is presented to a target consisting of a totally black spot surrounded by a uniformly bright field of infinite dimension. The amount of light energy present in the center of the image of the black spot is measured and expressed as a percentage of the light energy in the image of the bright surround.


Lateral chromatic aberration: A variation of magnification with color. Not improved by stopping down.

Longitudinal chromatic aberrations: A shift of focus with color. Not improved by stopping down.

Spherical aberration: Causes a focus shift as the lens is stopped down.

T-number: The actual maximum f-number divided by the square-root of the percentage of transmitted light.

Vignetting: Causes underexposure at the corners of the film. Improved by stopping down.

Misc. terms and practices: *Close working limits* are measured from the target to the foremost portion of the lens when it is set to its closest focusing position. The *close-limit field size* is measured at this point. The portions of the image field examined during both the contrast and star tests are the center, $1/2$ out, $2/3$ out, and far edge for rectangular formats and correspond to the following positions within the 24×35 -mm format of a 35-mm camera's image; the center, 6 mm off-center, 12 mm off-center, and 18 mm off-center. Square formats are examined at the center, halfway to the edge, at the edge, and at the corner. 

Stripdown Report

Five years ago, in November 1977, our Lab Report on the Nikon FM was published. Comparing the new with the old is unavoidable, but this can be done quickly, because the FM2 is not simply a

warmed-over FM with a faster shutter. Its FM heritage is clear: die-cast aluminum main body, chromed-brass top and bottom cover panels, plastic front cowl, mechanical shutter, LED readout, and

simple, neat design and construction.

One of the best components to be retained from the FM is the variable resistor used to program the f-stop, film speed, and shutter speed into the metering system. Praised five years ago for its elegant appearance and function, this resistor is formed by depositing a fine metal pattern on a glass disk in much the same way as a mirror is "silvered," and is the equivalent of a long wire, whose resistance is proportional to its length. The designers of the FM2 have wisely incorporated what appears to be the same component.

The rest of the electronic circuitry is surprisingly abundant, considering the fact that this camera is only slightly inconvenienced, not crippled, if its battery is removed. The reason for the flexible circuit board draped over the pentaprism's roof is the extra features of the FM2, such as the 30-sec LED display for the metering system, and the camera's compatibility with dedicated flash units.

The circuit appears well made, but its design calls for several wires to be soldered to terminals located near the middle of the circuit, rather than at the edge, where the heat from desoldering (for repair purposes) would be less likely to damage the delicate circuit or its components. This is a complaint I've registered in the stripdown reports of several cameras. Three potentiometers are provided for adjusting the electrical values of the Nikon FM2.

Two silicon photocells straddle the finder eyepiece, each mounted behind a molded plastic prism/lens until that's noticeably towed in to produce strongly center-weighted readings of the viewfinder.

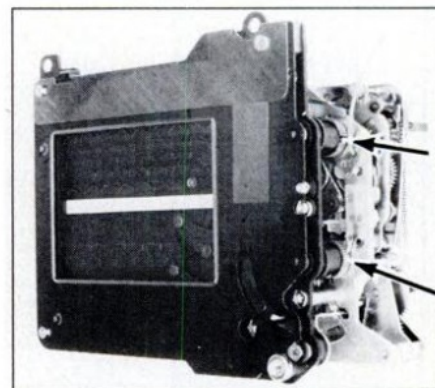
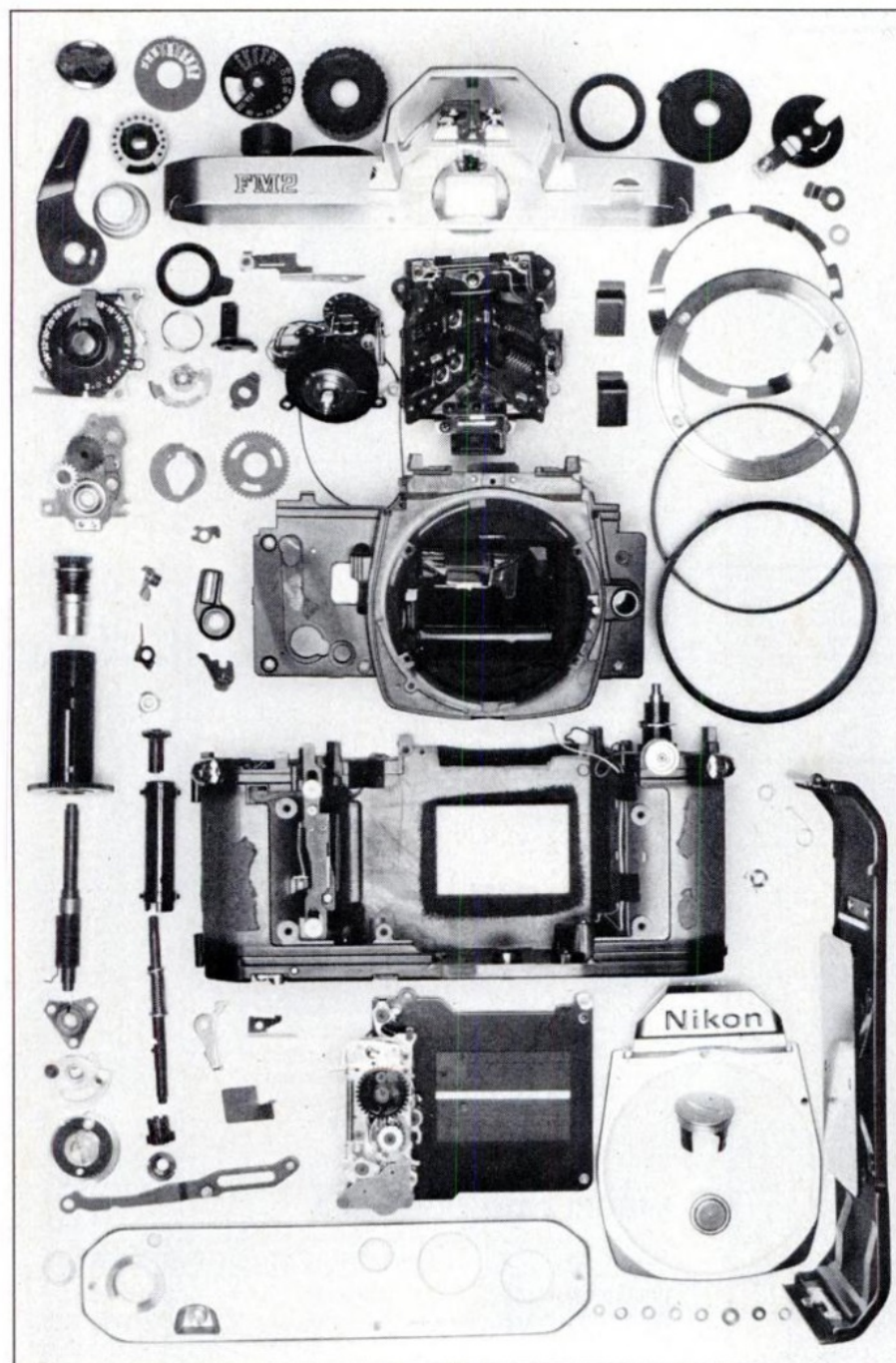
The new shutter is built on Copal's well-proven

/continued on page 176

	Interior	Exterior	
Material choice:	Good	Good	Repair access: Good
Assembly, finish:	Good	Good	Seal against dirt: Fair

Do frequently made adjustments require major stripdown? No

Modular construction? Mostly **Replace key parts easily? Yes**



Fundamentally strong, FM2 bears some relationship to predecessor, but uses new shutter and new circuitry for electronic functions. This is one of few current SLRs not totally dependent on battery.

Powerful mainsprings (arrows) and special blades allow shutter's top 1/4,000 speed. Otherwise, it is same as Copal CMS-M.

Field Check: Nikon FM2

continued from page 113

touch zooms, I find that I am constantly fiddling back and forth between pushing and twisting the lens. With a two-touch design, I can focus the lens and then concentrate on composition without fear of disturbing the focus.

The focus, zoom, and aperture rings of the 35→70-mm Zoom Nikkor have distinctly different feels, so I was never in doubt as to which was which.

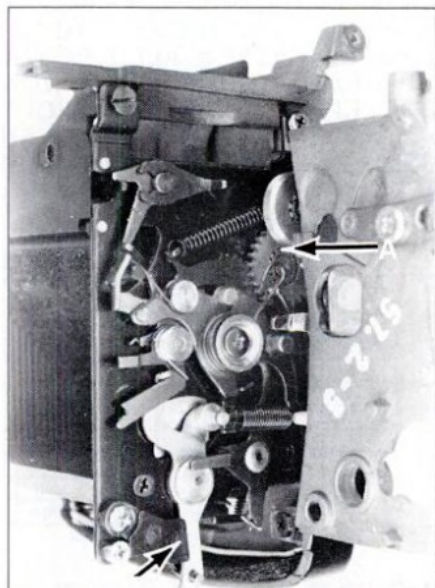
This Zoom Nikkor also has a close-focusing feature. In its normal position, at all focal lengths from 35→70-mm, the lens focuses to about 2.5 ft. When locked into the "close-focus" 70-mm position, it focuses continuously from infinity to 7½ in. from the front of the lens. ●

Stripdown: Nikon FM2

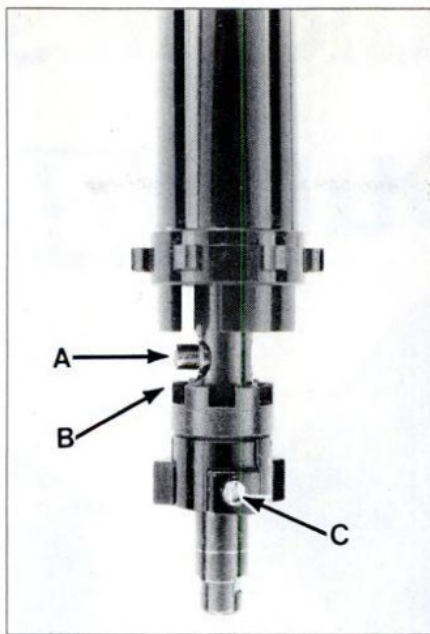
continued from page 114

model CMS-M. The big differences are heavier blade mainsprings and new blades. The blades are made of titanium, which is inherently light and strong. But to reduce their weight more, Nikon removed an appreciable amount of metal through selective chemical etching, in a way that retained the stiffness by leaving a pattern that looks like a tiny network of bridge girders. Additional surface treatment produced a tough, slippery hide, a necessity for rapid, low-friction motion of the blades.

Accelerating the blades fast enough for the top speed of 1/4,000 sec is the job of the blade mainsprings, but when the blades reach the end of their travel they



Mirror mechanism uses inertial geartrain (A) to govern its motion. Resilient plastic bumper (B) absorbs impact at end of mirror's cycle.



Winding motion is transferred to sprocket through coupling system made up of pin (A) in drive shaft, which engages notches in top half of coupling union (B). Lower half of coupling union is secured to top half with tiny set screws (C) threaded into two of the three lugs that engage mating notches in film-drive sprocket. System would be stronger if all three lugs had larger, longer screws, spot-drilled into top half of union.

have to be stopped without damage and with minimal impact. This is done by the snubbing or brake system, which also prevents the blades from rebounding at the end of their travel. The brake/snubbing system in this shutter appears identical to the one used in the slower versions, and seems to be very effective, despite its simplicity.

The mirror box is a strong casting, integral with the front plate, and the mirror box walls are well blackened and baffled. The mirror mechanism is impressively simple, yet employs an inertial geartrain to govern the mirror's action. All parts appear to be capable of heavy use, with sensible spring forces and good heat treatment.

The same applies to the wind mechanism with one small exception. The otherwise strong film-drive-sprocket coupling has a weak link—the final union between the driving shaft within the sprocket and the sprocket itself. This link depends on the security of two tiny set screws. I'd like to see larger, longer screws used here, with a slight spot-drilling of their contact point for extra security.

The rest of the wind system is motor-drive-tough. Four rows of ball bearings smooth the main drive shaft's motion with barely any trace of wet lubrication. In fact, this is one of the outstanding characteristics of the FM2—there's very

little evidence of wet lubrication anywhere in the camera. This should stretch the intervals between routine service.

Particular care should be taken when changing lenses and/or viewfinders to avoid getting any dust in the camera. This is true with any camera, of course, but especially so with the FM2 whose mirror mechanism geartrain can be seen through the unnecessarily wide port used by the diaphragm-actuating arm. Some shroud or gasket here would remedy the problem nicely.

Speaking of gaskets, Nikon shows us they know how to use them on the FM2's motor-drive coupling. From the outside it looks like someone left a cover plug off, but it's gasketed underneath with a rubber-like washer. ●

Lens Performance: Nikon FM2

continued from page 115

the front group rotates on a multistart threaded helicoid.

To produce the necessary motions while retaining a relatively constant grip for the user's hand, Nikon has gone to the expense of using a second focusing helicoid, connected to the actual focusing collar directly and rigidly. Through a sliding tongue-and-groove coupling, this second helicoid transfers the focusing actions to the helicoid within the lens barrel. Both helicoids have the same pitch, so there's a one-to-one relationship between the turning of the focus collar and the actual focus motion of the front group.

The advantage of the system is that the focusing collar doesn't slide back and forth along the barrel as the zoom-control collar is turned. A secondary benefit of the system is the way the front group dips into the main barrel at the 70-mm setting and scoots forward at the 35-mm position. This comes close to providing a zooming lens hood, without requiring a separate hood.

All of the sleeves and helicoids are aluminum, with a brass intermediate thrust washer in just the right place. Lubrication is moderate.

The auto-diaphragm employs a ball-bearing suspension for its rear actuator. Both its maximum aperture rest and its setting arm have sloping edges to produce constant f-stops despite shifting focal lengths.

An excellent rear baffle telescopes as the zoom action operates, maintaining a low flare level throughout the zoom range. Sharing credit for this is the effective multilayer coating, near-perfect edge blackening, and effective internal baffling. ●