

NIKON F4

Sold to
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Batteries: AA-size for 6V power system (4 batteries for MB-20 battery pack, 6 batteries for MB-21 battery pack), negative ground
Product number: FAA23051

QUICK REFERENCE

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ADJUSTMENT LOCATIONS

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CCD position	A*
Sprocket	B
Finder rail	C
FRE, stop position	D
FRE resistance	E
Angle, main mirror	F*
Angle, sub mirror	G*
AF coupler, height	H
Travel time, 2nd curtain	I
Travel time, 1st curtain	J**
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*normally do not disturb unless you have access to the Nikon computer interface

**reach from the front, mirror box removed, Fig. 13—the 1st-curtain adjustment is near the bottom of the shutter block.

ADJUSTMENT VALUES

Curtain-travel time: 2.2ms (20mm distance), 2.5ms (22mm distance), 2.9ms (24mm distance)

Curtain-travel direction on release: top to bottom

Flange-focal distance: 46.67 ±0.02mm (flange to outer rails)

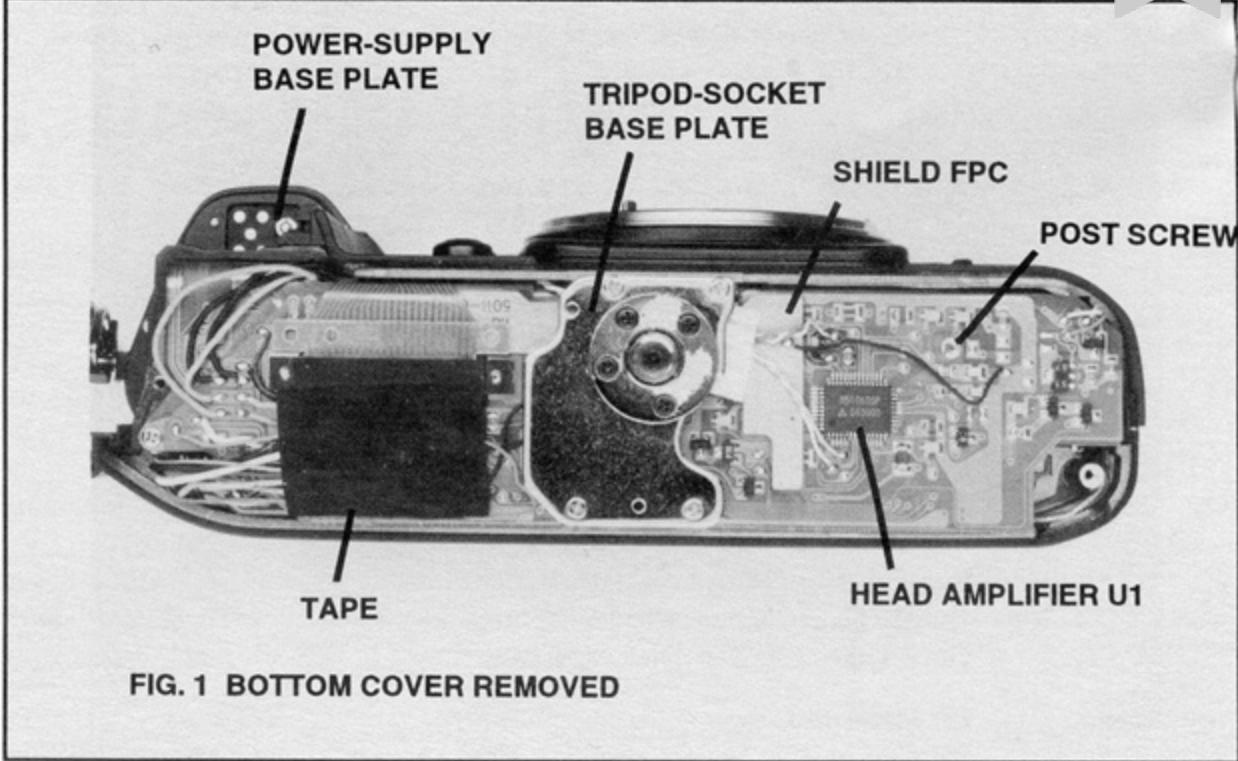


FIG. 1 BOTTOM COVER REMOVED

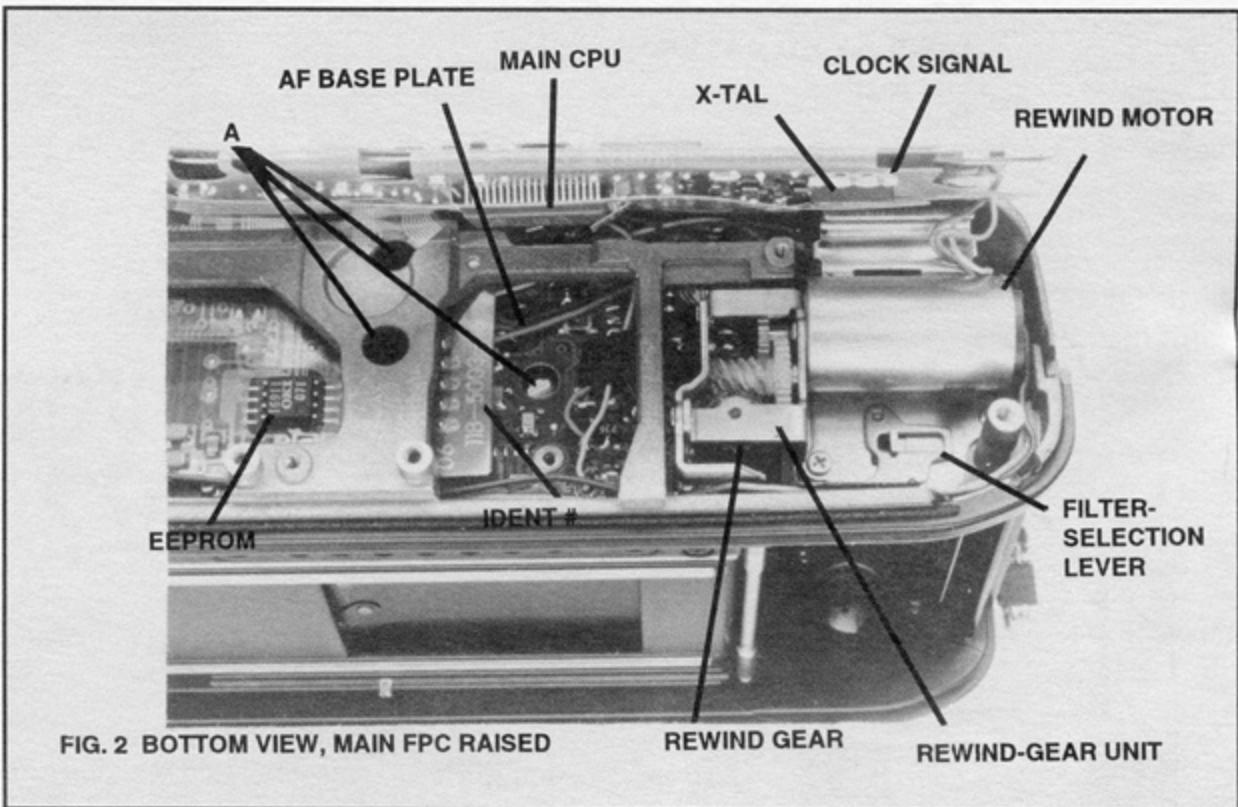


FIG. 2 BOTTOM VIEW, MAIN FPC RAISED

CCD-adjustment screws, initial settings: 2 1/2 turns (turn in each screw fully, then back out 2 1/2 turns)

Note: If you're adjusting the CCD position with the computer, remove the tripod-socket base plate, the tape holding the wires, and the 3 screws holding the bottom of the main FPC, Fig. 1. Then raise the main FPC, Fig. 2, to reach the CCD adjustment screws. The extra length of the wires allows you to raise the main FPC.

Sprocket timing: With the sprocket in the latched position, a sprocket tooth should be positioned as shown

in Fig. 5—32.4mm from the lead edge of the focal-plane aperture.

Flash-sync speed: 1/242 (marked 1/250)

AF shaft, height: 1.6 ±0.1mm above lens-mounting ring in AF mode. Adjust with screw H, Fig. 15.

Test voltages:

V-BAT. 6V supplied to camera by battery pack. Check at the orange wires, bottom of main FPC at release end.

VCC. 6V supplied to circuit when power switch is closed. Check at the gray wire, bottom of main FPC.

D5.5V. 5.5V operating voltage supplied by the DC/DC converter

when the prerelease switch is closed and during the 16-second timer. Check at the finder contact, Fig. 70, or at the AF-flex connector, Fig. 63. **CCD operating voltage.** Around 12V supplied by the DC/DC converter to the AF base plate when the prerelease switch is closed and during the 16-second timer. Check at the AF-flex connector, Fig. 63.

V-REF. 3.3V supplied by the main FPC to the fo and f-fo resistors, the SC dial, the shutter-speed dial, and the exposure-completion dial with the prerelease switch closed and during the 16-second timer. Check at the purple FRE wire through the front-plate cutout, rewind side of lens opening, Fig. 10.

Q1 out. Around 3.3V supplied by Q1 with the prerelease switch on and during the 16-second timer. Operates the aperture encoder, the AF encoder, the magnets, the LED's, and the flash-trigger circuit. Check at the white wire, bottom release end of main FPC.

AFPC VBAT. Around 5.5V supplied by Q57, Fig. 14, to operate the AF motor in the AF mode with the lens installed. Check at the end of the resistor on the AF base plate shown in Fig. 65.

ADJUSTMENT PROCEDURES

Note: All AF and AE adjustments require the Nikon computer interface.

1. Sprocket timing. Turn the sprocket in the film-advance direction until it latches. Loosen the 2 setscrews at the top of the sprocket (B in Fig. 3) and turn the sprocket to the timed position, Fig. 5.

Note: In the sprocket-latched position, you may not be able to reach the 2 setscrews. It's then necessary to disengage and reposition the sprocket. If you've removed the release-side top cover, move the R-coupling slide lever, Fig. 4, slightly toward the center of the camera until the sprocket disengages. If the release-side top cover is installed, disengage the sprocket by pushing the release button (the charge motor runs briefly).

BACK-SWITCH PIN

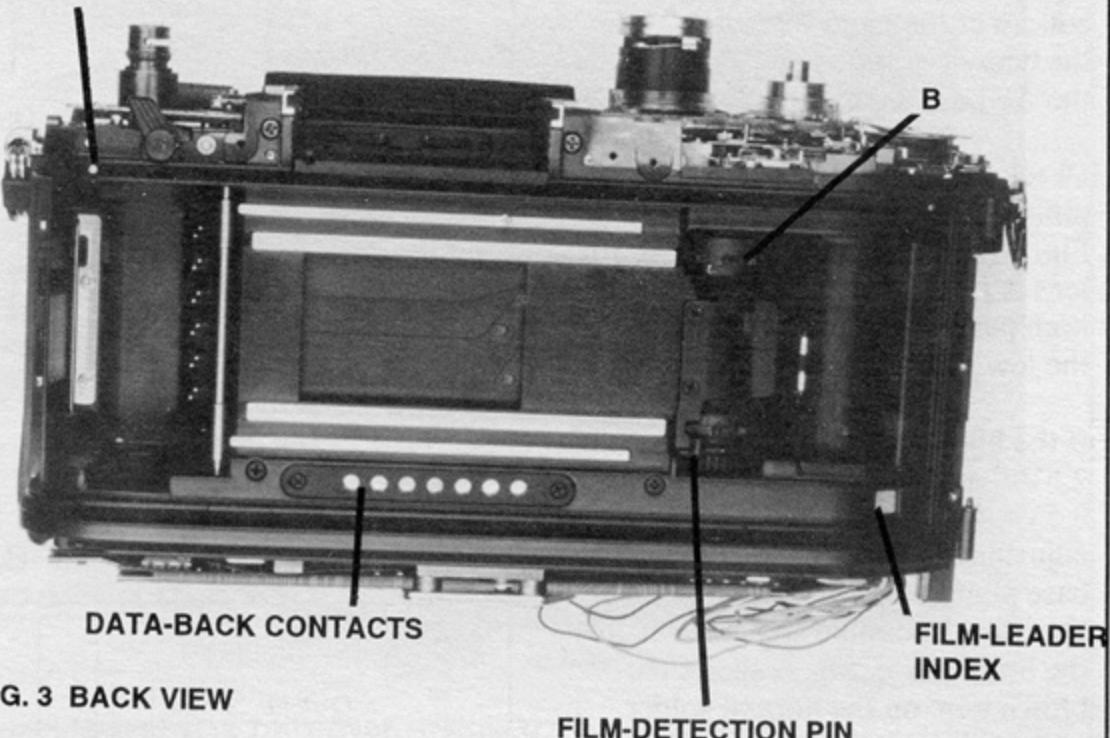


FIG. 3 BACK VIEW

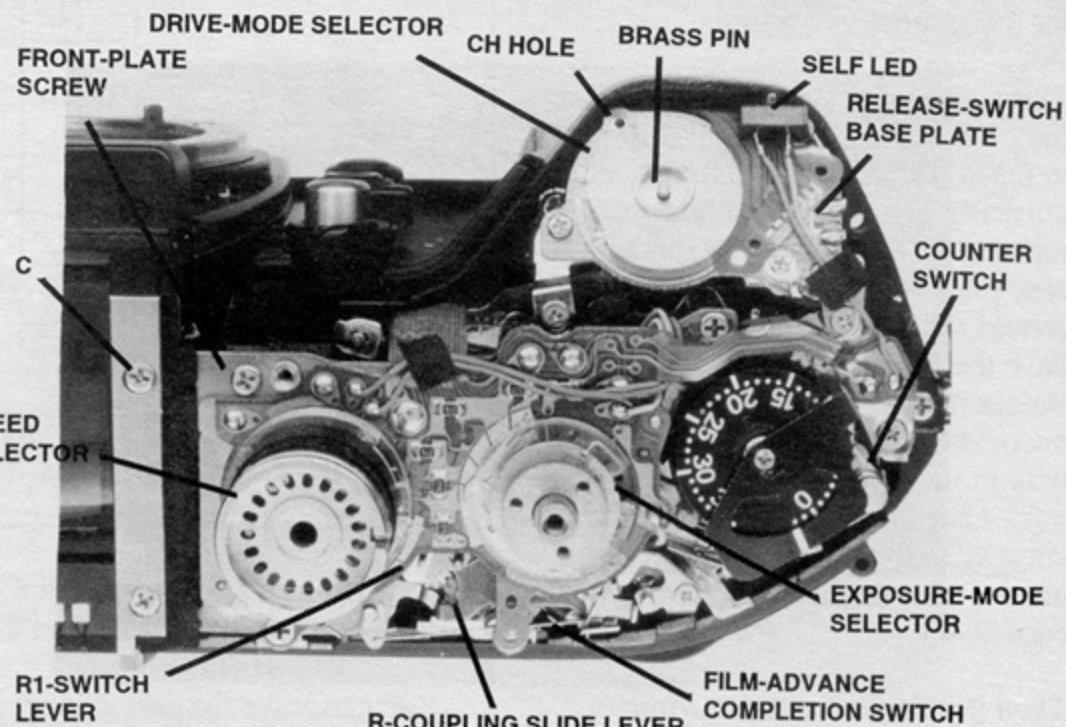


FIG. 4 RELEASE-SIDE TOP COVER REMOVED

Turn the sprocket until you can reach the 2 setscrews. Loosen the 2 setscrews and reposition the sprocket. Tighten 1 of the setscrews and again turn the sprocket to the latched position. Repeat the procedure until you can reach both setscrews with the sprocket latched.

2. Finder rail. Adjust the position of the release-side rail (C in Fig. 4) until the finder slides in freely with minimum sideplay (the rewind side finder rail keys to the front-plate casting).

3. AF encoder. Remove the bottom cover, the tripod-socket base plate,

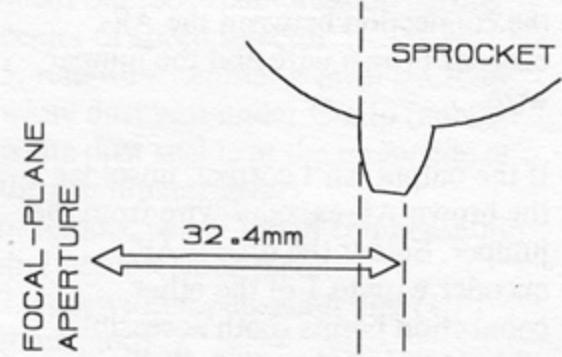


FIG. 5 SPROCKET TIMING

and the tape over the wires, Fig. 1. Remove the 3 screws holding the bottom of the main FPC. Lift aside the bottom of the main FPC to reach the AF base plate, Fig. 2.

Check the sine-wave signal at the pink wire on the AF base plate, Fig. 6 (output of AF encoder) as the lens is moving to focus. Note that the high peak of the trace is over 2.5V; the low peak is under 0.5V, Fig. 7.

If the high peak of the trace is under 2.5V—or if the low peak is above 0.5V—the AF encoder requires adjustment. With the new-style AF base plate (see, *Revised Parts #6*), there are 3 possible solder lands for the brown wire. Fig. 6 shows the brown wire on the normal solder connection. You can move the brown wire to solder land 1 or solder land 3 for adjustment.

The brown-wire solder land is under the body casting, making it difficult to reach. However, the adjustment is normally not required unless you replace the AF encoder or the AF base plate (repairs that probably should not be attempted unless you have the Nikon computer interface). Before replacing the front-plate/mirror-box assembly, solder a jumper wire to the brown-wire land, Fig. 6. Solder the brown wire from the AF encoder to the other end of the jumper wire (rather than to the AF base plate).

Then install the front-plate/mirror-box assembly. Connect the flex connectors and the wires to the main FPC, Fig. 6. You can now check the output of the AF encoder at the pink wire. If the output is correct, insulate the connection between the AF-encoder brown wire and the jumper wire.

If the output isn't correct, unsolder the brown AF-encoder wire from the jumper. Solder the brown AF-encoder wire to 1 of the other connection points (both accessible with the mirror box installed) and repeat the test.

High peak of trace is less than 2.5V—solder the brown wire to land 3.

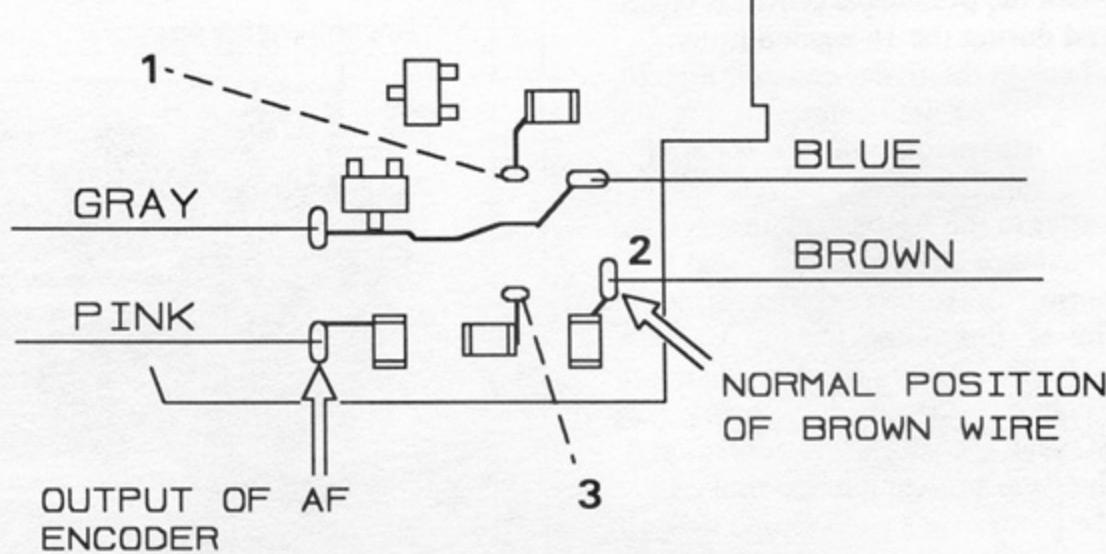


FIG. 6 BOTTOM OF AF BASE PLATE, REWIND END

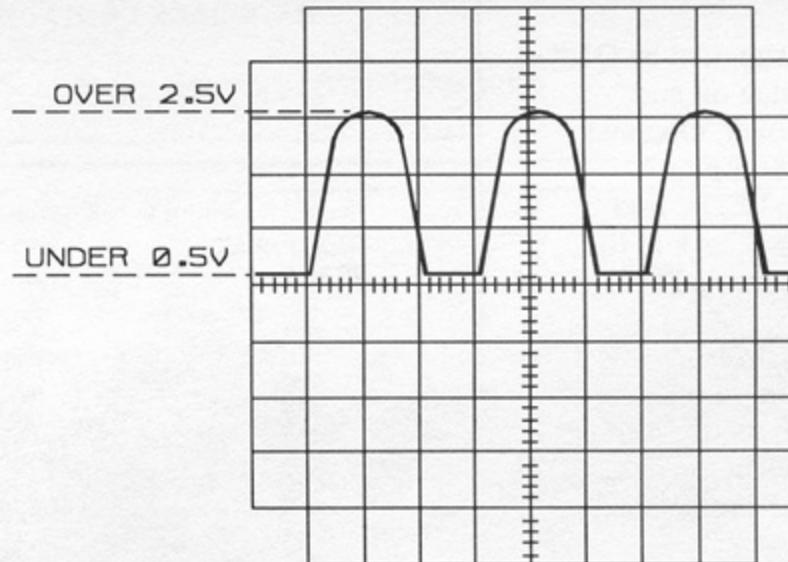


FIG. 7 SCOPE TRACE AT PINK WIRE AS LENS IS SEEKING, SETTING OF 1 V/CM, 0.1ms SWEEP TIME

Low peak of trace is over 0.5V—solder the brown wire to land 1.

You can leave the jumper wire in the camera. Insulate the end of the wire. Then tape the wire to the AF base plate. If the camera does not have the revised AF base plate, the only adjustment is by shifting the AF encoder, Fig. 38.

4. FRE stop position. Adjust by turning the cord-hooking shaft—D in Fig. 15—until the f-fo pulley and the aperture-coupling ring, Fig. 10, come against their respective stops simultaneously.

5. FRE resistance. Adjust by loosening the 2 screws and shifting the f-fo base plate—E in Fig. 15. Nikon uses a special tool lens to set the resistance measured between the

purple and yellow wires. Typical values using a 50mm 1.8 AF lens:

f/1.8—0Ω	f/2.8—2.73K
f/4—4.41K	f/5.6—5.95K
f/8—7.13K	f/11—8.14K
f/16—8.85K	f/22—9.2K

6. Release stroke. Prerelease switch closes when the release button moves down $0.5 \pm 0.1\text{mm}$. Release switch closes when the release button moves down $1.0 \pm 0.2\text{mm}$. Adjust by changing the pin in the release-shaft bushing, Fig. 4. Nikon provides the pin in 5 lengths, identified by the grooves in the pin. Part #—1K360...

4.95mm (no grooves)	—032
5.10mm (1 groove)	—033
5.25mm (2 grooves)	—034
5.40mm (3 grooves)	—035
5.50mm (4 grooves)	—047

DISASSEMBLY

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Preliminary: remove finder, focusing screen, battery pack

Settings for disassembly: drive-mode selector in CH position (for reassembly alignment)

Note: As with other EEPROM-based cameras, adjustments and some repairs require the factory computer system. In the F4, the repairs that affect the adjustments are:

- replacing the main FPC**—the main FPC includes the EEPROM, Fig. 2; Nikon supplies the main FPC only as a complete unit.
- replacing the AF base plate**—the CCD, Fig. 38, is part of the AF base plate; removing the complete assembly requires disturbing the CCD adjustments.
- replacing the front-plate/mirror-box assembly**—if the front plate is damaged, Nikon replaces the complete assembly; the AF base plate is not supplied with the replacement assembly (the repair requires resetting the CCD adjustments).

Disassembly for common repairs:

1. Replacing S2 gear. Remove the release-side top cover, the speed-dial base plate, and the upper film-advance base plate. See, *Sequence to remove upper film-advance base plate, replace S2 gear*.

2. Replacing shutter. Remove all covers and the mirror box. See, *Sequence to remove front-plate/mirror-box assembly* and *Sequence to remove shutter block*.

3. Replacing rewind gear. Check the rewind gear by removing the bottom cover, the tripod-socket base plate, and the tape over the wires, Fig. 1. Remove the 3 screws holding the bottom of the main FPC (1 screw is a post screw, Fig. 1, the long screw goes at the release end). Raise the main FPC, Fig. 2, to check the rewind gear and rewind-gear unit.

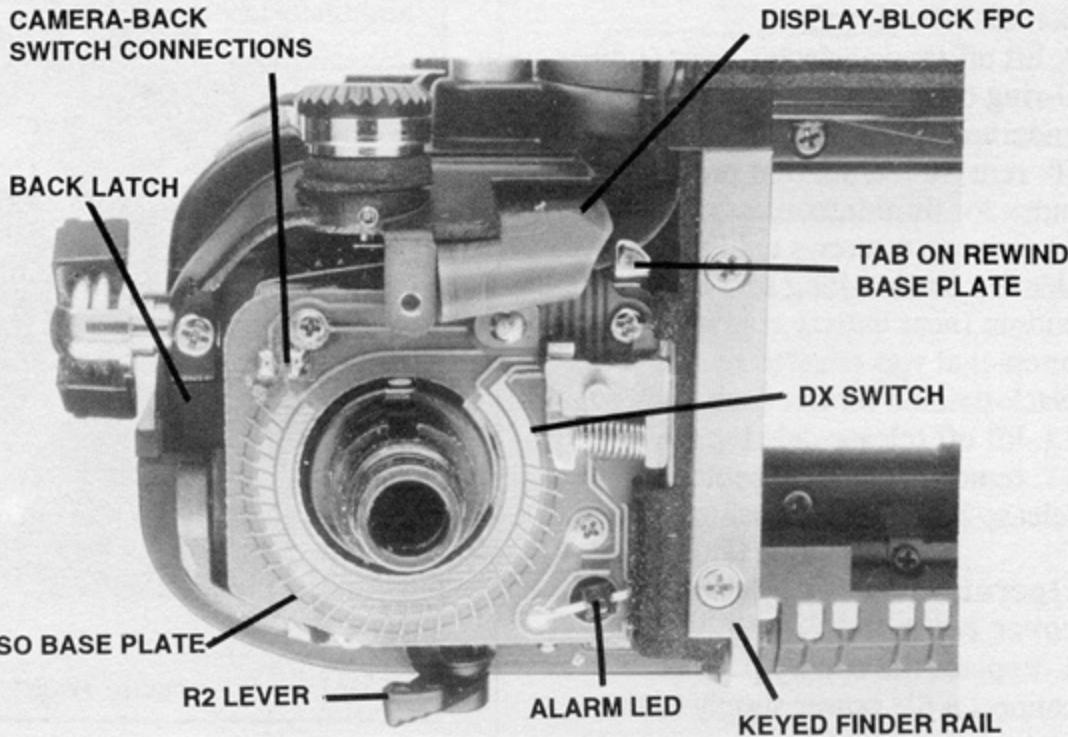


FIG. 8 REWIND-SIDE TOP COVER REMOVED

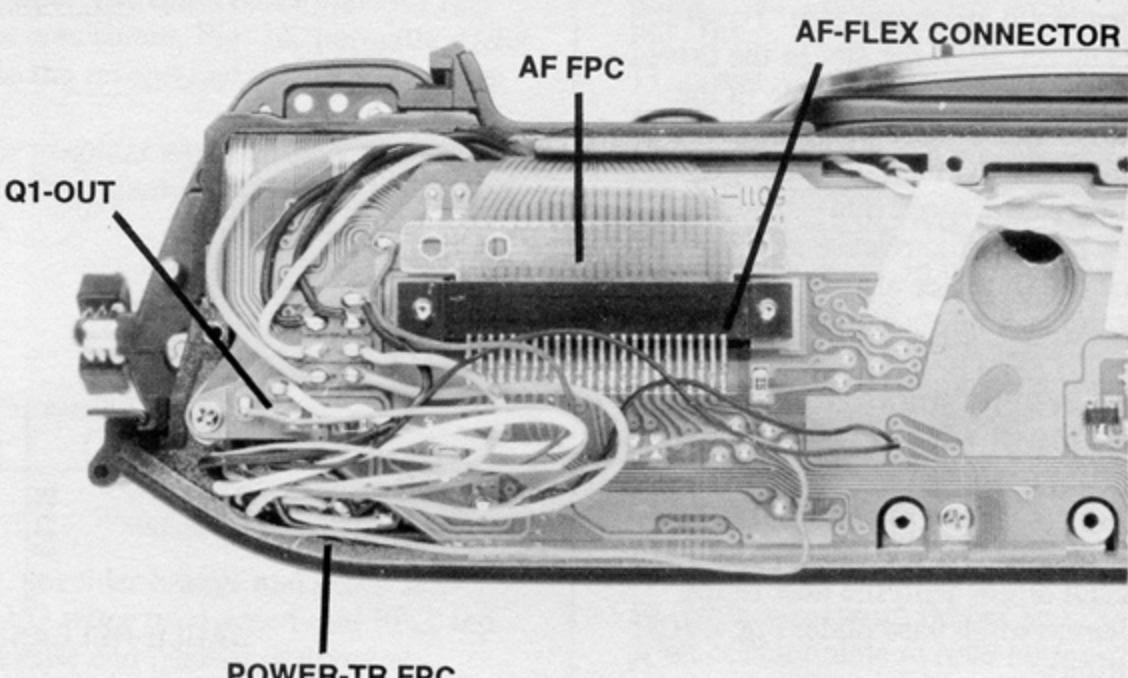


FIG. 9 BOTTOM VIEW, RELEASE END

If the rewind gear is damaged—and the camera has the old-style rewind motor (see, *Revised Parts #2*)—order both the rewind-shaft assembly and the rewind-gear unit. Remove the mirror box to replace the parts. See, *Sequence to remove mirror box*.

4. Replacing the charge motor. Remove the covers, the mirror box, and the film-advance unit. Disassemble the film-advance unit (*Sequence to disassemble film-advance unit*).

Sequence to remove release-side top cover:

- remove speed-dial rubber grip
- loosen 3 setscrews, outer circum-

ference of speed dial

- lift off speed dial (center lock pin loose)
- lift out loose compression spring, center of speed selector
- remove illuminator lever—C-clip, white dust seal under C-clip (another white dust seal is at the underside of the illuminator lever)
- remove cap at top of compensation dial (double-stick tape)
- remove compensation dial (1 screw, top)

Note: Avoid lifting the locking knob in the compensation dial—the spring for the locking knob can come loose.

8. remove detent plate for compensation dial (3 screws)
9. lift off mode-selector lever (rubber O-ring on top, white dust seal underneath)
10. remove red dot that provides index for illuminator lever (cement)
11. remove 4 screws holding release-side top cover—long screw from bottom (near battery contacts), white screw that was covered by red dot, 2 black-painted screws from back edge
12. lift off release-side top cover
13. remove brass pin, center of release-switch brass bushing, Fig. 4

Operation with release-side cover removed:

1. Replace the battery pack or connect a 6V power supply to the battery-contact posts, Fig. 13 (+ to front of camera).
2. Set the power switch (drive-mode selector) to an on position. To set the CH mode, align the slot in the drive-mode selector with the hole in the release-switch base plate, Fig. 4.
3. Remove the lock pin from the center of the speed dial—insert the lock pin into the release-switch bushing (in place of the pin, Fig. 4) for use as a release button.

Reassembly highlights, release-side top cover:

1. Turn the speed selector to the locked position (X setting), Fig. 4.
2. Turn the drive-mode selector until its slot aligns with the hole in the release-switch base plate, Fig. 4 (CH setting).
3. Set the drive-mode selector on the top cover to CH and replace the release-side top cover.
4. When you replace the speed knob, align the "X" calibration with the center of the camera.

Sequence to remove rewind-side top cover:

1. remove rewind knob (screw at top center of knob)
2. remove ISO-dial cover plate (snap ring)
3. disengage crank-release lever and drop out rewind fork
4. disconnect and remove spring for crank-release lever
5. remove crank-release lever
6. lift out pivot pin for crank-release lever (silver-colored)

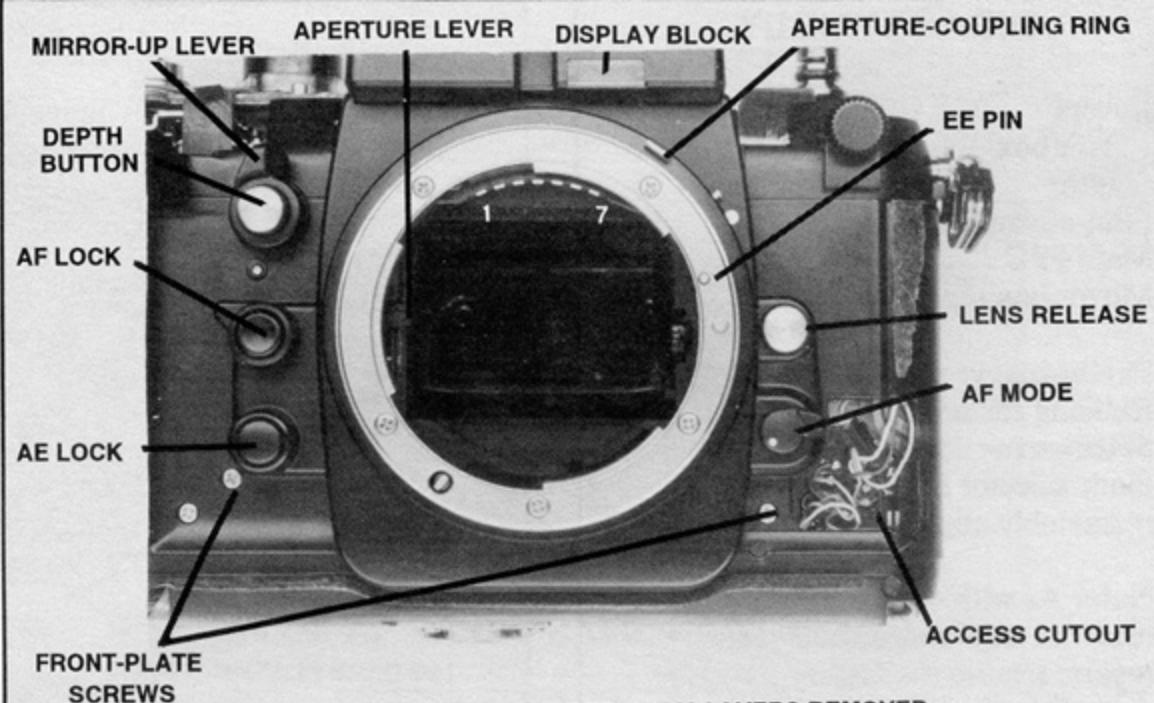


FIG. 10 FRONT VIEW, RUBBER BODY COVERS REMOVED

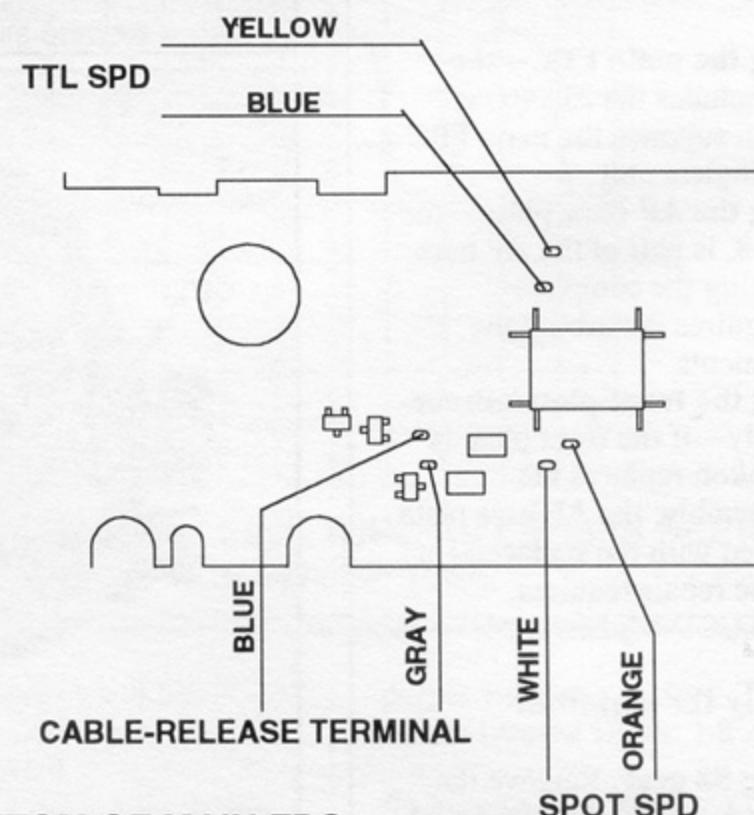


FIG. 11 BOTTOM OF MAIN FPC

7. unscrew retaining ring holding ISO dial
8. remove ISO index ring and ISO dial (white dust seal under ISO dial)
9. remove 3 top-cover screws (small screw at top, 2 screws at side)
10. move R2 lever to down (on) position
11. lift off rewind-side top cover

Reassembly highlights, rewind-side top cover:

1. Open the camera back by pulling up the back latch, Fig. 8.
2. Move the R2 lever to the down (rewind) position. Seat the rewind-

- side top cover and replace the 3 screws (small screw on top).
3. Replace the ISO dial with its calibrations to the back of the camera. Seat the ISO index ring with the tab on its underside keyed to the slot in the rewind-fork bushing (the index line is then at the back of the camera). Replace the retaining ring.
4. Replace the pivot pin and crank-release lever. Connect the spring for the crank-release lever and replace the ISO-dial cover plate with the snap ring.
5. Install the rewind fork from the inside of the film chamber. Turn the

rewind fork until its slot clears the tooth of the fork gear, Fig. 42. Hold aside the crank-release lever and push up the rewind fork.

Note: The new-style rewind fork has a nylon bushing at its top end. The bushing makes it a little more difficult to seat the rewind fork.

Sequence to remove bottom cover:

1. remove rubber cover, bottom (be careful to avoid bending the brass plate under the rubber cover—the double-stick tape normally stays with the bottom cover rather than with the rubber)
2. remove 5 bottom-cover screws—long screw at each end, white screw toward front rewind end, 2 black screws toward center)
3. lift off bottom cover (wires attached—double-stick tape around the tripod-socket holds the bottom cover)
4. unsolder blue and gray cable—release wires from bottom of main FPC, Fig. 11

Sequence to remove front-plate/mirror-box assembly:

1. remove tripod-socket base plate, Fig. 1 (4 screws—the screw threads are locked)
2. remove black tape over wires, bottom, Fig. 1
3. unsolder 2 black and 1 orange AF-base-plate wires from connections at end of main FPC, Fig. 12

Note: The wires coming from the AF base plate route from the end of the camera body to the main-FPC lands, Fig. 12—the other wires route from the center of the body to the lands.

4. unsolder wires at bottom near head amplifier IC, Fig. 11:
 - yellow and blue TTL SPD wires (twisted pair)
 - orange and white SPOT SPD wires (twisted pair)
 - black shield wire (unsolder from shield FPC, Fig. 1)

5. free shield FPC, Fig. 1, from bottom of camera (yellow tape)
6. remove 2 rubber body covers (double-stick tape) from front plate

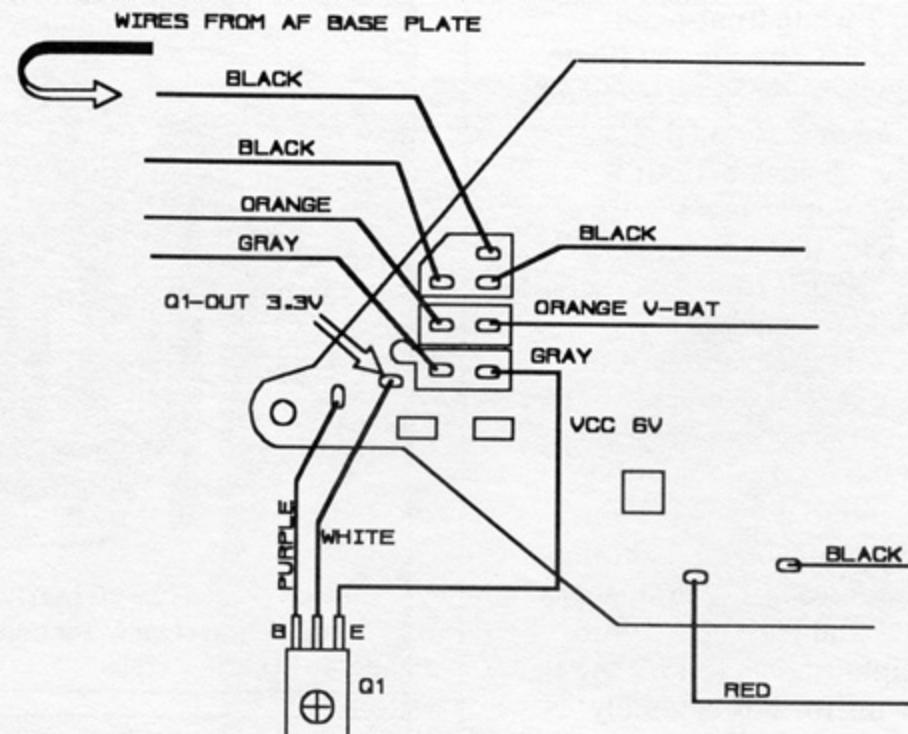
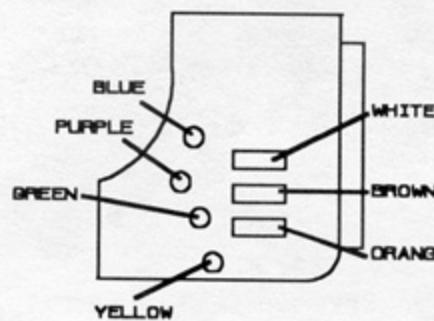


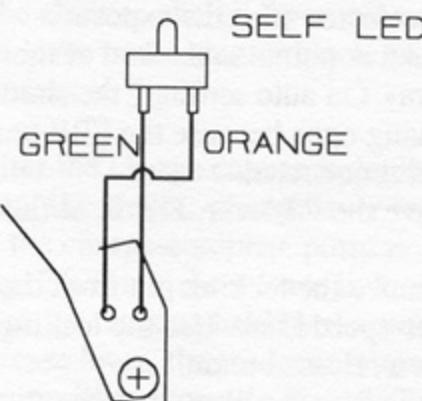
FIG. 12 BOTTOM OF MAIN FPC, RELEASE END

Note: The brass cover plate for the access cutout, Fig. 10, normally sticks to the rewind-end rubber body cover.

7. unsolder wires through access cutout (shown in drawing below)



8. unsolder orange and green self-LED wires from speed-dial FPC, top release end (shown in drawing below)—note the routing of the orange wire (it may route under or above the speed-dial FPC)



9. remove 2 screws holding release-switch base plate, Fig. 4
10. lift release-switch base plate and remove 2 screws holding power-supply base plate (circuit board under release-switch base plate with the 2

orange and 2 black power wires, Fig. 16)

11. reseat release-switch base plate and replace at least 1 of the screws
12. remove finder rail, rewind end, Fig. 8 (2 screws)
13. remove cover plate at release end of body (4 screws) to uncover end flex connector, Fig. 13
14. remove press-contact plate (2 screws) and pressure rubber through cutout at release end of body
15. separate top section of 3-layer end flex connector (connector for lock-encoder FPC at back of front plate)
16. replace pressure rubber and press-contact plate to hold bottom 2 sections of end flex connector (to prevent the flex sections from catching on the front plate and to allow testing with the mirror box removed)
17. disconnect edge connector for AF FPC, bottom of camera, Fig. 9 (slide the connector of the AF FPC toward the front of the camera)
18. remove 3 screws holding display block, top front of mirror box, Fig. 10
19. separate display block from top of mirror box
20. free display-block FPC from under silver-colored tab on rewind base plate, Fig. 8
21. remove screw at top front of speed-dial base plate (screw toward front of camera that passes into top of front plate, Fig. 4)

22. remove 2 white front-plate screws, front bottom, Fig. 10 (there are 2 white screws at the release side—remove only the screw that's closer to the AE-lock button)
23. remove 2 mirror-box screws at back of camera (near finder rails)
24. remove 2 black front-plate screws at rewind end of camera
25. remove 2 black-painted front-plate screws at release end of camera
26. remove front-plate/mirror-box assembly

Note: The porous-plastic light trap on the release-side finder rail sticks to the speed-dial base plate. Work loose the light trap as you lift out the front-plate/mirror-box assembly.

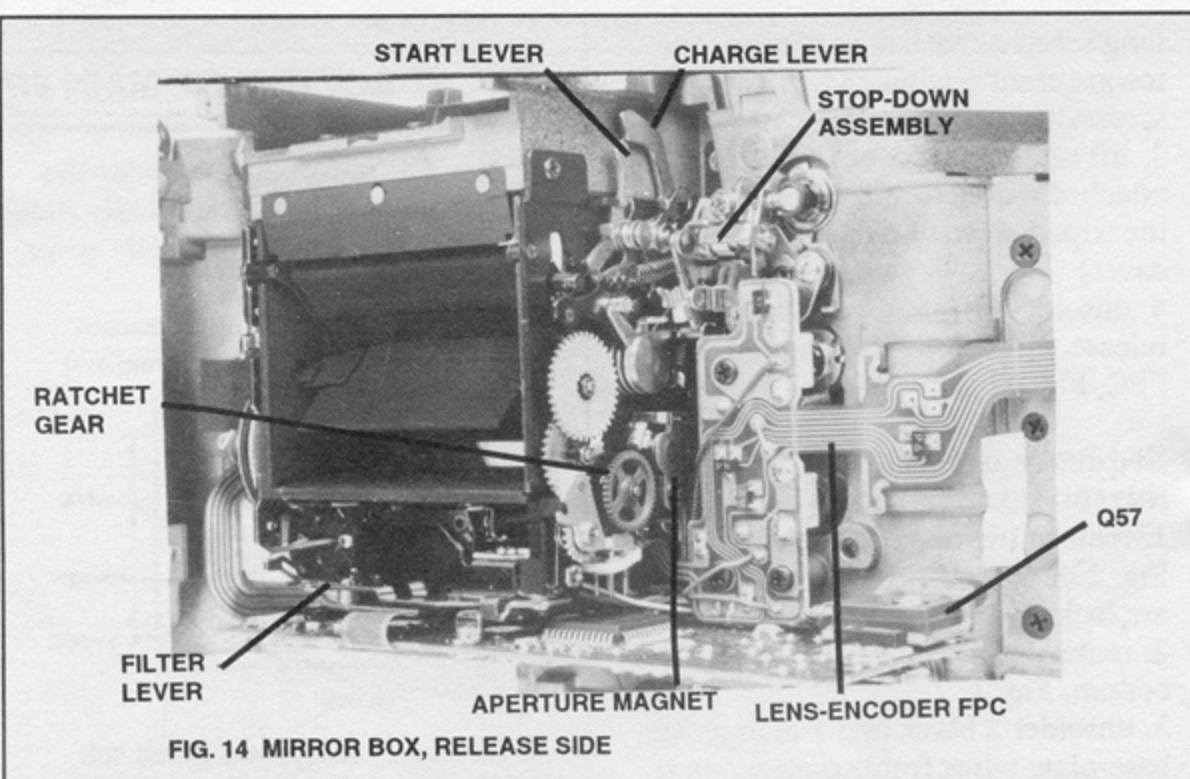
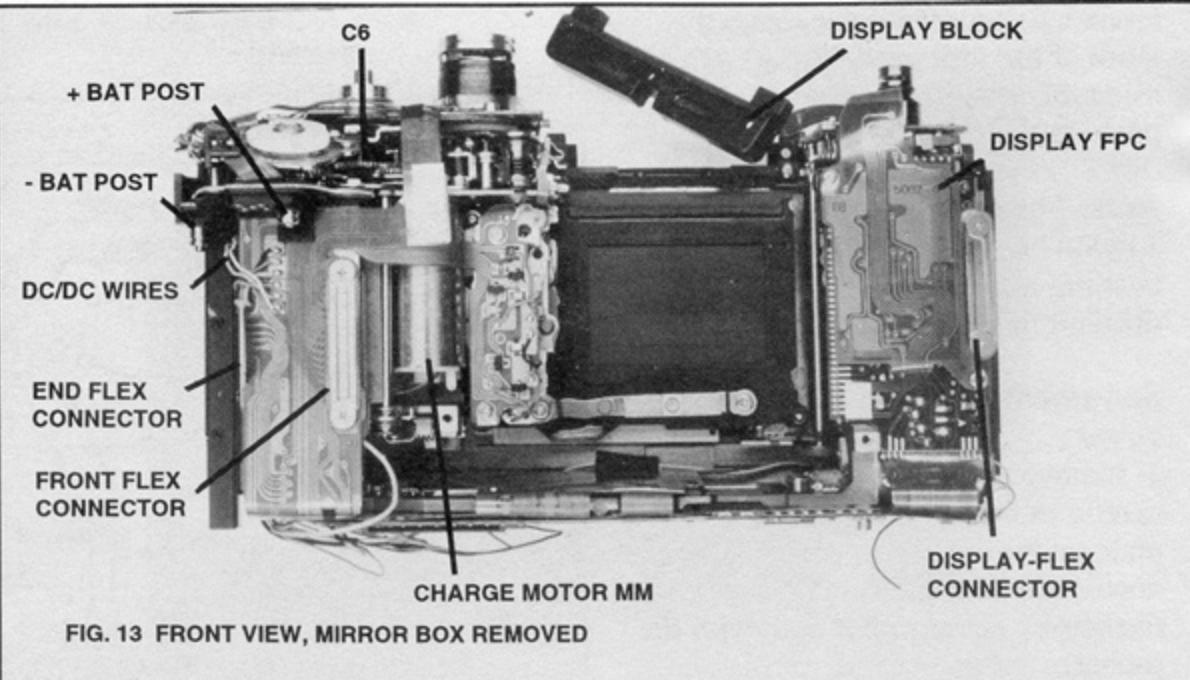
Operation with mirror box removed:

Mechanical:

1. To charge the shutter, turn brass charge gear C6, Fig. 13, counter-clockwise as seen from the top (left to right as seen from the front). After each partial turn, hold the gear to prevent it from backing up.
2. As you turn the charge gear C6, the shutter-charge lever, Fig. 16, drives the set lever in the shutter block, Fig. 19, toward the release end of the camera. Continue turning gear C6 until the shutter-charge lever returns to its start position—the end that couples to the set lever in the shutter block moves fully toward the center of the camera.
3. Release the shutter by pushing the upper release lever, Fig. 16, toward the back of the camera. Both curtains release together unless the speed selector is set to time—at time, the time latch, Fig. 16, mechanically holds the 2nd curtain.

Electronic:

1. Connect the 2 flex sections of the end flex connector (main FPC and power-tr FPC) using the pressure bar, Fig. 13. Make sure the release-switch base plate has at least 1 mounting screw replaced for a ground connection.
2. Connect 6V between the battery-contact posts, Fig. 13 (+ to the post at the front of the camera).
3. Turn the drive-mode selector, Fig. 4, until its slot points to the hole in the release-switch base plate (CH position).



4. Turn the exposure-mode selector, Fig. 4, to the manual-speeds position (you can temporarily seat the exposure-mode lever—turn the exposure-mode selector until the exposure-mode lever points to the end of the camera). On auto settings, the shutter will hang open because the FRE has been disconnected.
5. Move the R2 lever, Fig. 8, to the up position.
6. Remove the locking pin from the shutter-speed knob. Use the locking pin as a release button.
7. Make sure the film-advance unit is in the charge-complete position (the end of the shutter-charge lever, Fig. 16, fully toward the center of the camera)—if not, mechanically charge the unit. The shutter should then release when you close the release

switch. The release magnet separates, disengaging the mirror-release lever in the film-advance unit. The film-advance unit both mechanically releases the mirror and the shutter. After the shutter releases, the charge motor should run until the charge lever again moves to the charge-complete position (charging-completion switch opens).

Note: It may be necessary to reset the circuit by first turning the drive-mode selector counterclockwise to the lock position. With the mirror box removed, the film-advance unit must start from the charge-complete position. If you mechanically release the shutter—even with power supplied—the charge motor won't run to recharge the mechanism.

Sequence to remove shutter block:

1. remove flex-connector pressure bar and pressure rubber for front flex connector, Fig. 13 (2 screws)
2. separate shutter FPC (bottom flex, front-flex connector) from posts at front of camera
3. remove 3 screws holding main FPC at bottom of camera (long screw at release end, short screw at center back, post screw at rewind end), Fig. 1
4. lift bottom of main FPC to reach rewind motor, Fig. 2
5. remove 2 screws holding rewind-gear unit, Fig. 2
6. lift out rewind motor and rewind-gear unit together with rewind-coupling shaft (leave wires attached), Fig. 18

Note: The cartridge-chamber cover and spring under the rewind-gear unit are loose. The spring is cemented to the cartridge-chamber cover.

7. mechanically release the shutter (push upper release lever, Fig. 16, toward back of camera)
8. remove 3 screws holding shutter block—white shoulder screw at top left-hand corner, 2 black screws at back of aperture (black shoulder screw goes on rewind side)
9. slide out shutter block toward bottom of camera

Operation notes, shutter block removed: You can charge the curtains by pushing the set lever, Fig. 19, from left to right. But with the shutter block removed, the release link, Fig. 19, remains in the released position—the set lever won't return to the position shown in Fig. 19. To release the shutter, push the set lever from left to right. The 1st curtain releases, but the 2nd curtain remains mechanically latched at *time*. Push the time latch, Fig. 19, from left to right to release the 2nd curtain.

In normal operation, the shutter-release lever in the film-advance unit, Fig. 34, engages the release link in the shutter block. As the charge motor runs, the charge cam, Fig. 24, drives the shutter-charge

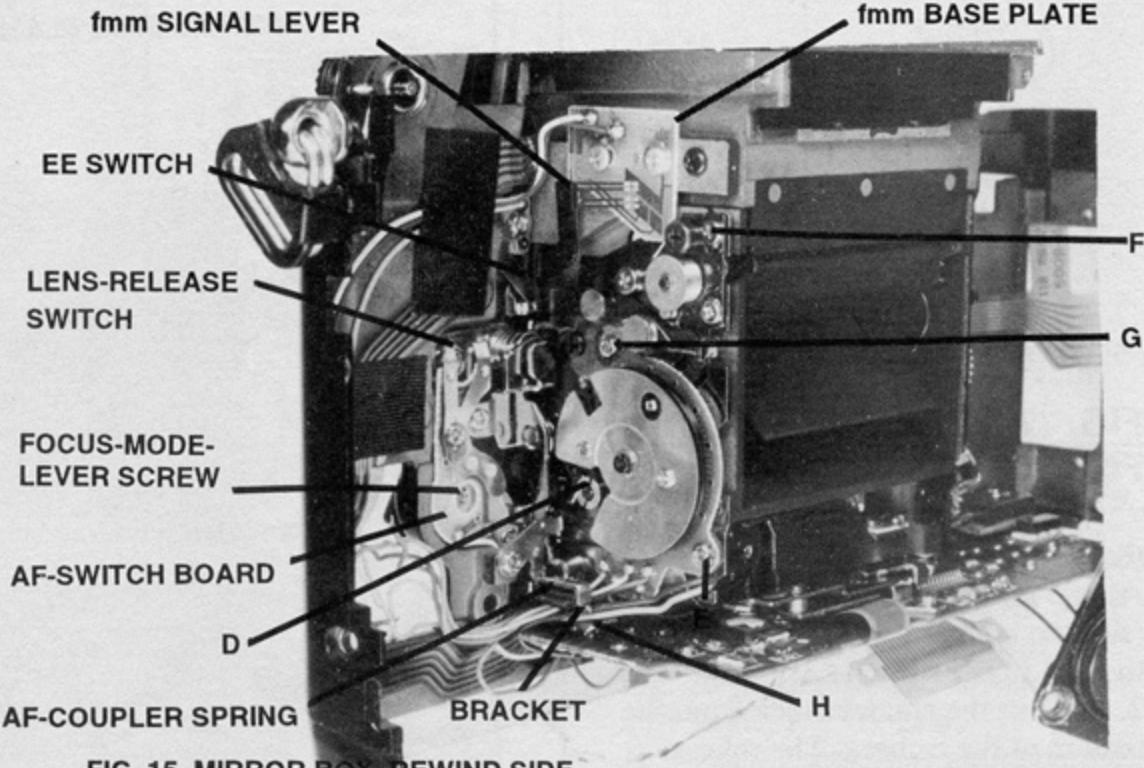


FIG. 16 FRONT VIEW, RELEASE-SWITCH BASE PLATE REMOVED

lever (counterclockwise in Fig. 24). The shutter-charge lever moves the set lever in the shutter block from left to right in Fig. 19.

After the charge cam completes 1 turn, the shutter-charge lever returns to the charge-complete position, Fig. 24. Since the release link, Fig. 19, remains held by the shutter-release lever, the set lever returns to the position shown in Fig. 19. The charging-completion switch, Fig. 24, opens to stop the charge motor. The curtains remain mechanically held until the release magnet separates. The mirror-up lever, Fig. 36, then moves forward and disengages the

start lever on the mirror box, Fig. 14. Disengaging the start lever raises the mirror. As the mirror-up lever continues moving forward, it disengages the shutter-release lever.

Reassembly highlights, shutter block and mirror box:

1. Check the position of the shutter-release lever at the bottom of the lower film-advance base plate, Fig. 30—the tab on the shutter-release lever should be in the released position as shown in Fig. 17. If the tab is in the charged position (other end of slot), push in the upper release lever, Fig. 16—the tab should move to the released position. If the tab remains in

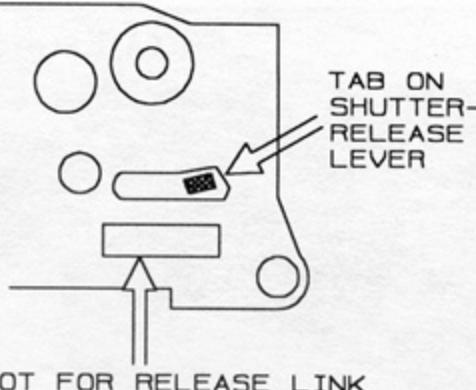


FIG. 17 UNDERSIDE OF FILM-ADVANCE UNIT

the charged position, hold in the release lever and turn C6, Fig. 13, (right to left) until the tab moves to the end of the slot, Fig. 17.

2. Slide in the shutter block from the bottom of the camera. The release link, Fig. 19, passes through the slot indicated in Fig. 17. Make sure the time latch on the shutter block fits to the right of the time lever on the speed-dial base plate, Fig. 16.

3. Replace the shutter-block screws—the white shoulder screw in the upper left-hand corner and the 2 black screws at the back (shoulder screw closer to the rewind end).

4. Seat the cartridge-chamber cover in the bottom of the camera body—the cartridge-chamber cover keys to the body casting. To hold the cartridge-chamber cover in place, place a piece of masking tape over the cartridge-chamber cover from the back of the camera (holding the cartridge-chamber cover to the body).

5. Seat the rewind-motor assembly from the bottom of the camera, Fig. 2. Make sure the rewind-motor wires aren't pinched under the rewind-gear unit.

6. Before replacing the rewind-motor screws, seat the rewind-coupling shaft. Fit the bottom end in the pivot hole of the rewind-gear unit—tilt the rewind-coupling shaft as necessary until the clutch disk sits under the filter-selection lever, Fig. 18. Then seat the upper end of the rewind-coupling shaft in the brass bearing (on the rewind base plate), Fig. 18.

7. The film-advance unit should be in the charge-complete position—the end of shutter-charge lever toward the center of the camera, Fig. 24. If not, turn gear C6, Fig. 13, to charge the shutter.

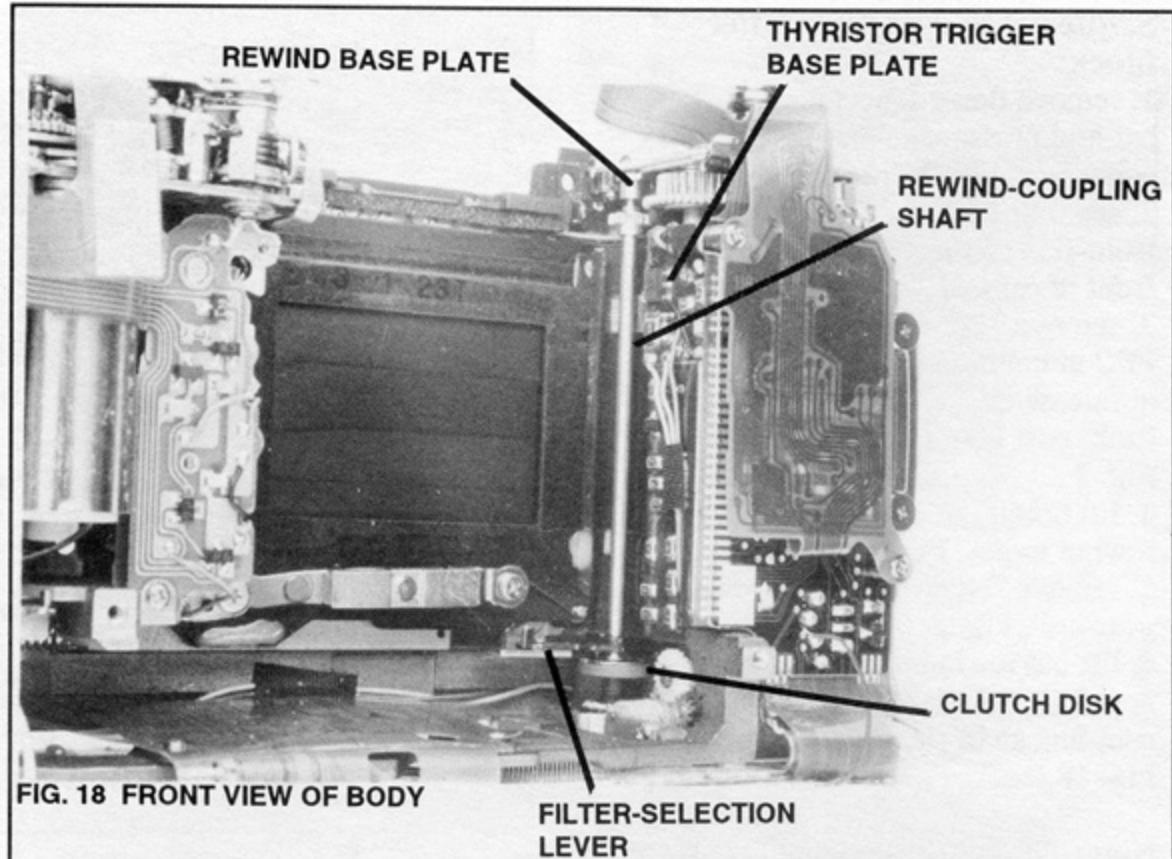


FIG. 18 FRONT VIEW OF BODY

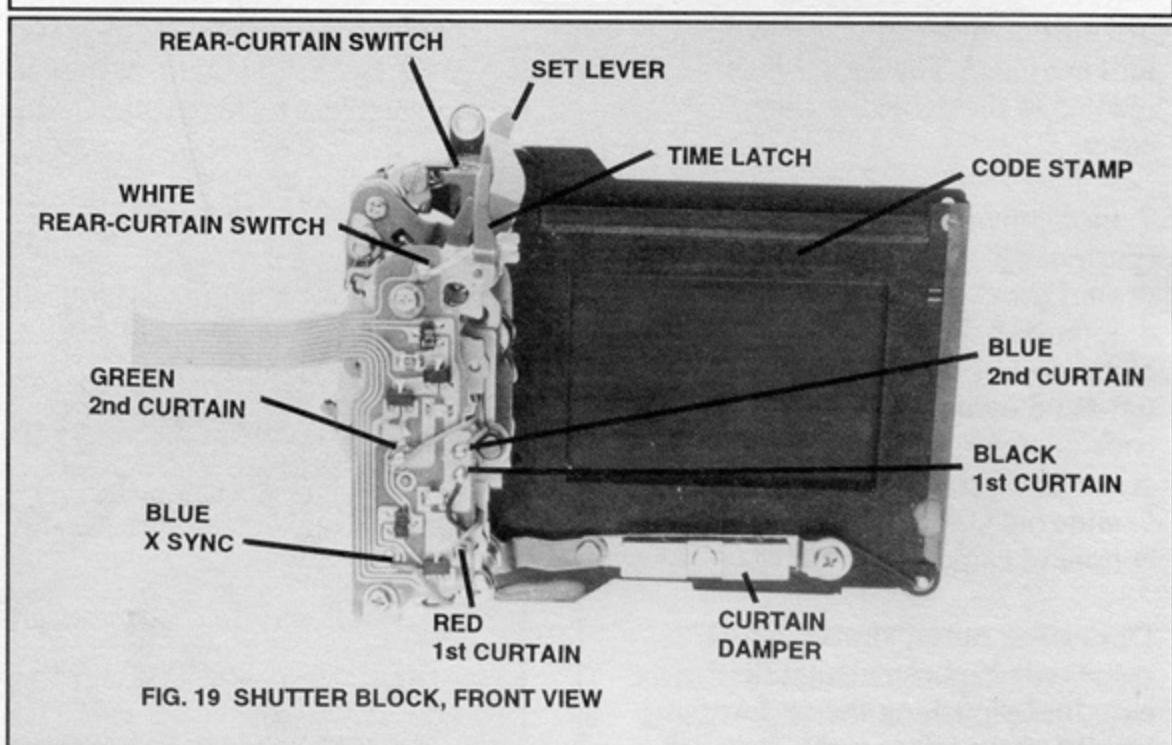


FIG. 19 SHUTTER BLOCK, FRONT VIEW

8. Move the mirror to the down position by pushing forward the charge lever on the mirror box, Fig. 14.

9. The filter lever on the mirror box, Fig. 14, connects to the filter-selection lever on the rewind-gear assembly, Fig. 2. Before seating the mirror box, **move the filter lever fully to your left** (as seen from the back of the mirror box). **Move the filter-selection lever on the rewind-gear assembly fully to the right** (as seen from the front of the camera)—turn the clutch disk until its pin moves the filter-selection lever toward the rewind side of the camera, Fig. 20. After seating the

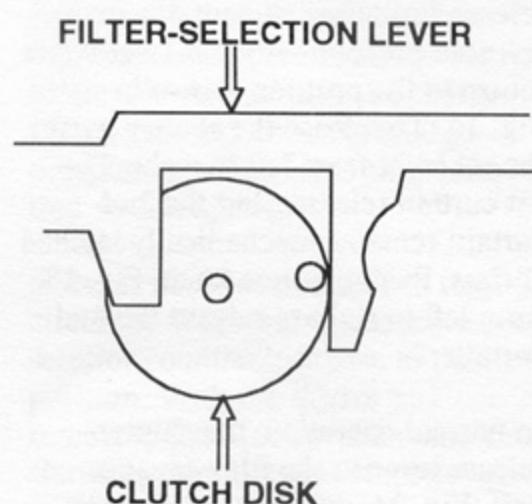


FIG. 20 TOP VIEW OF CLUTCH DISK

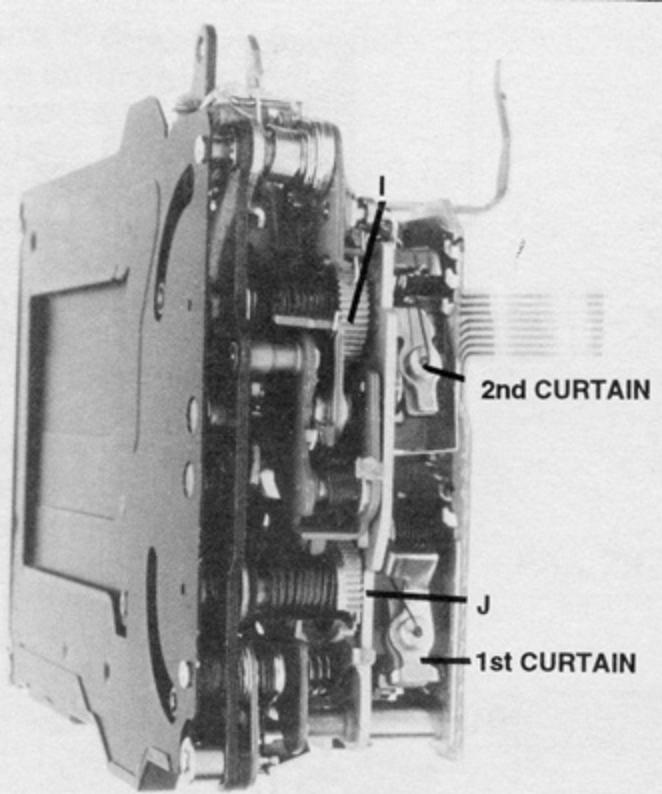


FIG. 21 SHUTTER BLOCK, END VIEW

mirror box, check the filter-lever coupling by moving the filter-selection lever, Fig. 2, back and forth—you should feel the 2 click positions of the filter lever.

9. When you solder the wires from the AF base plate, route the wires from the release-side ends of the main-FPC solder lands as shown in Fig. 9.

10. Nikon recommends covering the wire connections for the TTL SPD and the spot SPD (2 twisted pairs), Fig. 11, with moisture-proofing agent.

Sequence to remove film-advance unit:

Note: If you're replacing the S2 gear, it's not necessary to completely remove the film-advance unit or the mirror box—see, *Sequence to remove upper film-advance base plate*. Remove the film-advance unit to replace the spool motor FM or the charge motor MM.

1. remove mirror box
2. remove front flex-connector pressure plate and pressure rubber, Fig. 13
3. disconnect speed-dial FPC from front-flex connector
4. remove end flex-connector pressure plate and pressure rubber,

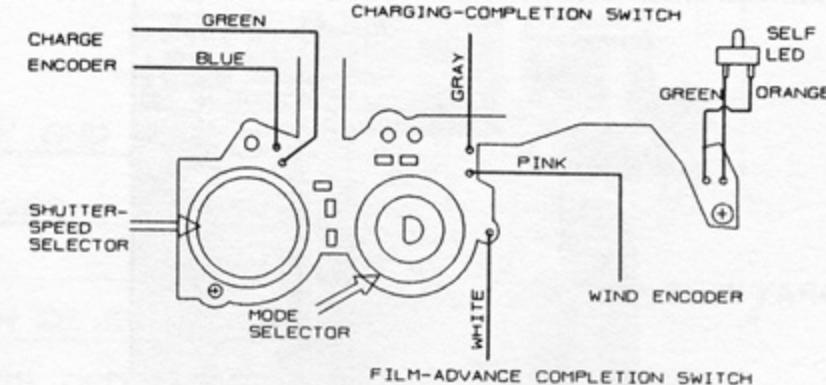


FIG. 22 TOP OF SPEED-DIAL FPC

Fig. 13 (if you reassembled the flex connector when removing the mirror box)

5. unsolder wires from speed-dial FPC, Fig. 22

6. remove screws holding release-switch base plate (if you replaced the screws after removing the mirror box)

7. tilt release-switch base plate to front of camera, Fig. 16

8. unsolder speed-dial FPC from counter switch, Fig. 16

9. remove screw holding speed-dial FPC (near self-LED connections)

10. remove 2 screws holding speed-dial base plate (countersunk screw to back of camera)

11. remove speed-dial base plate

12. remove screw holding bracket for charge encoder, Fig. 24

13. slide off charge encoder toward front of camera (slightly spring up the

top of the charge-encoder bracket to clear post, Fig. 24)

14. lift off pulse blade, Fig. 24 (tilt slightly to clear counter dial)

15. remove pulse-driving gear, Fig. 24 (E-clip—pulse-driving gear keys to shaft of C7 gear)

16. loosen 2 setscrews at top of sprocket, Fig. 3

17. unsolder wires from power-tr FPC, bottom of camera, Fig. 23

18. unsolder wires from front of main FPC, release end (DC/DC converter

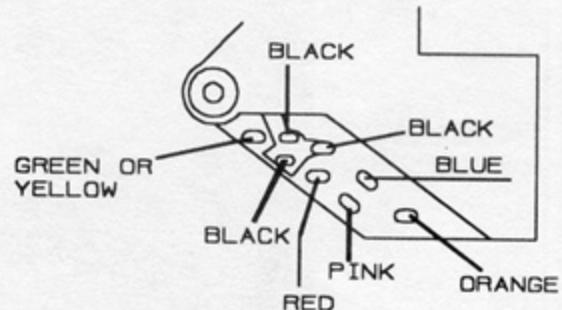


FIG. 23 POWER-TR FPC, BOTTOM RELEASE END

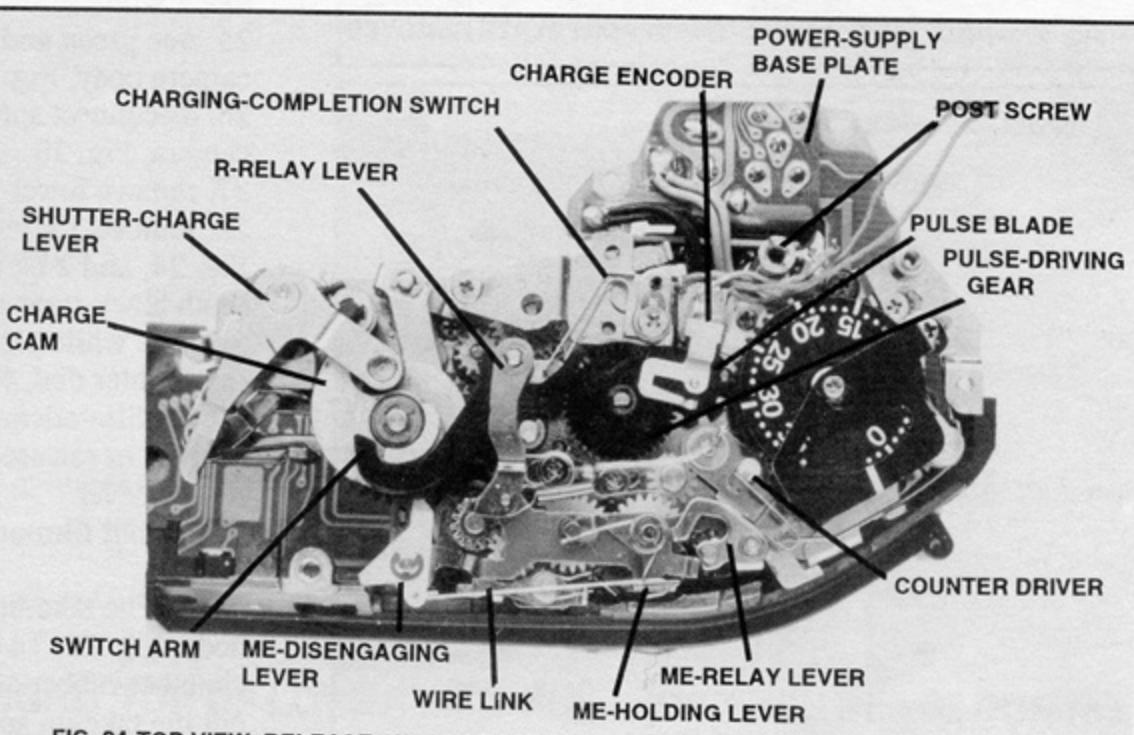


FIG. 24 TOP VIEW, RELEASE-SWITCH BASE PLATE REMOVED

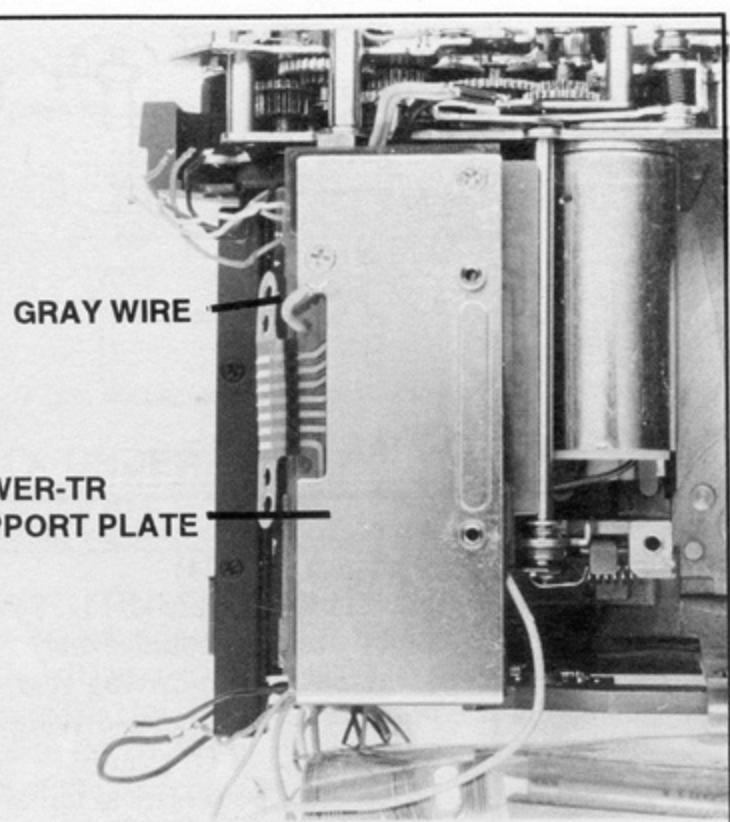


FIG. 25 FRONT VIEW, MAIN FPC REMOVED

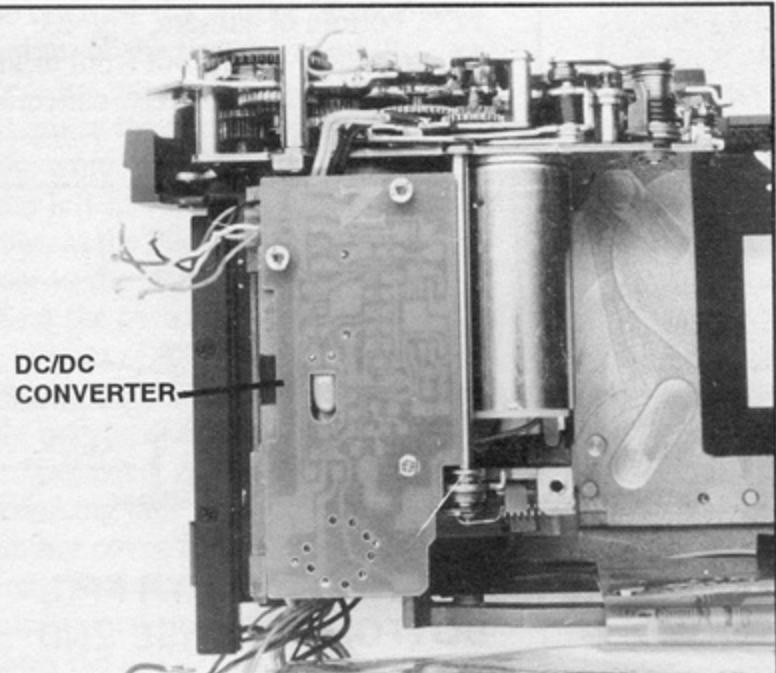


FIG. 27 FRONT VIEW, POWER-TR SUPPORT PLATE REMOVED

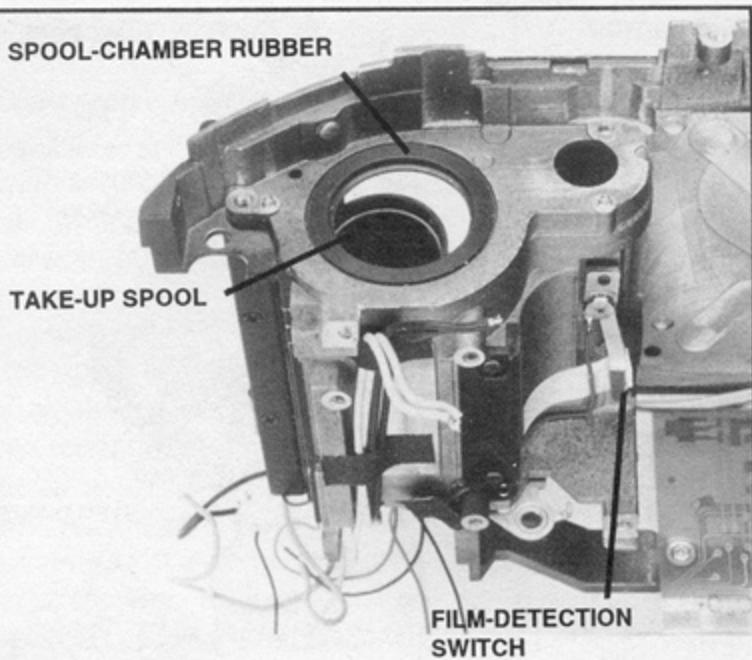


FIG. 28 CAMERA BODY, FILM-ADVANCE UNIT REMOVED

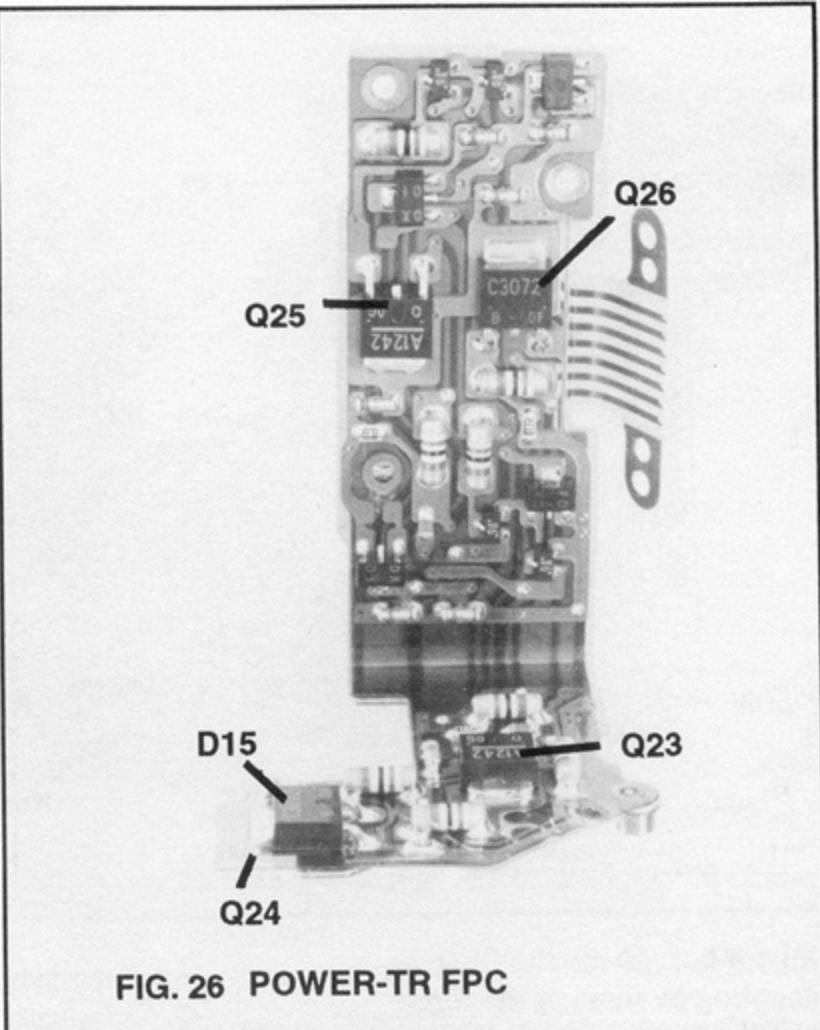


FIG. 26 POWER-TR FPC

wires and gray wire, Fig. 29)

19. unsolder 2 orange wires and 2 black wires from power-supply base plate, Fig. 12
20. separate shutter flex from posts at front of camera (bottom section of front-flex connector)
21. remove black screw holding power-supply base plate through hole next to – battery post, Fig. 13
22. lift front of main FPC away from power-tr support plate, Fig. 25
23. remove power-tr support plate with power-tr FPC, Fig. 26 (2 countersunk screws)
24. remove DC/DC converter, Fig. 27 (2 post screws toward top, 1 white screw)
25. free green and black charge-motor wires from tape, front of camera body, Fig. 30
26. disconnect spring from lower release lever, bottom of camera, Fig. 30
27. remove lower release lever, Fig. 30 (E-clip)
28. remove 3 screws holding film-advance unit—post screw, Fig. 24, and 2 black screws on lower film-advance base plate (both black screws are to the back of the film-advance unit—1 near the white plastic ME-disengaging lever, the other behind the counter dial, Fig. 24)
29. lift film-advance unit until lower end of release shaft clears bearing in release-magnet bracket and remove spring for lower release lever
30. lift out film-advance unit, Fig. 32, toward top of camera

Note: The take-up spool is loose, remaining in the camera body, Fig. 28. To remove the take-up spool, take off the spool-chamber rubber at the top of the body casting, Fig. 28. Then lift out the take-up spool toward the top of the camera.

Sequence to disassemble film-advance unit:

1. disconnect wire link from ME-holding lever, Fig. 24
2. remove ME-relay lever, Fig. 24 (shaft screw)
3. remove 3 screws holding upper film-advance base plate
4. lift off upper film-advance base plate

FM motor—if you're disassembling the film-advance unit to replace the spool motor FM, remove the 2 FM-motor screws, Fig. 33. Then remove the FM motor—note the loose spacer on top of the FM motor

5. remove the gears, Fig. 33 and Fig. 34 (3 gears are held by E-clips)

Note: To remove the S9 gear, Fig. 33, spring the spool clutch lever, Fig. 33, toward the back of the film-advance unit—until the pin on the spool clutch lever clears the slot in the S9 gear. Then swing up the spool clutch lever, against its spring tension, and lift off the S9 gear.

6. remove inner film-advance plate, Fig. 34—3 screws

Caution: The spring on the multiple-exposure lever, Fig. 36, is loose.

MM motor—if you're disassembling the film-advance unit to replace the charge motor MM, you can now remove the 2 motor screws from the top of the lower film-advance base plate, Fig. 36.

Operational check, film-advance stopper:

With the inner film-advance plate removed, check the latching operation of the sprocket as follows:

1. Turn the sprocket shaft, Fig. 32, to rotate the sprocket cam, Fig. 31, in a counterclockwise direction.
2. The sprocket cam pushes the film-advance stopper in a counterclockwise direction. When the sprocket cam moves the film-advance stopper the maximum amount, Fig. 31, check the overtravel (space gap between the latching end of the film-advance stopper and the stopper-latch lever). The space gap should be

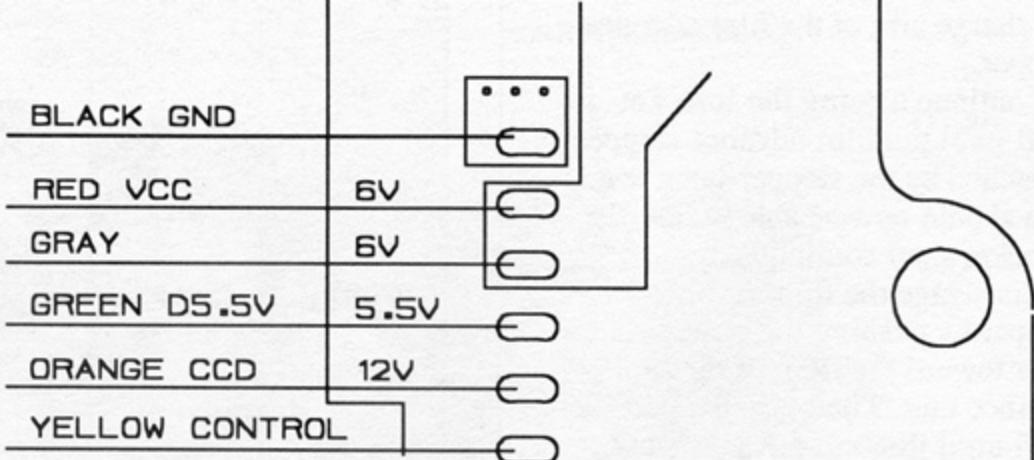


FIG. 29 FRONT OF MAIN FPC, RELEASE SIDE

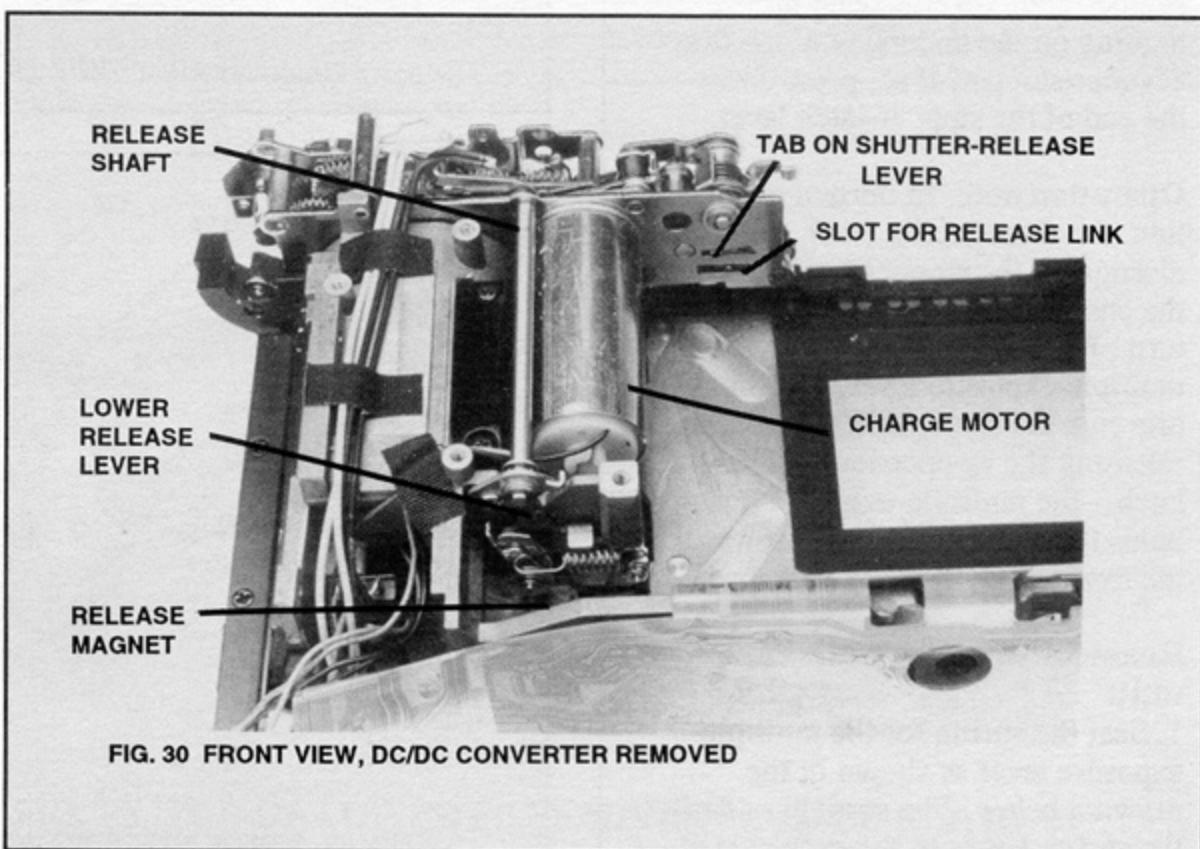


FIG. 30 FRONT VIEW, DC/DC CONVERTER REMOVED

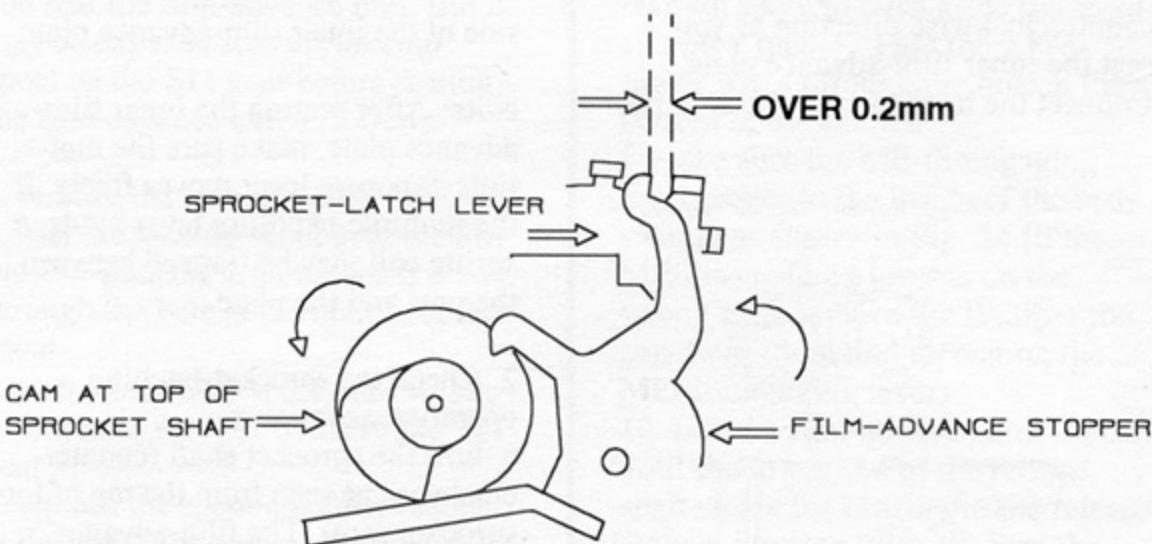


FIG. 31 TOP OF LOWER FILM-ADVANCE BASE PLATE DURING FILM ADVANCE

over 0.2mm. If not, you can reform the charge arm of the film-advance stopper.

3. Continue turning the sprocket shaft until the film-advance stopper is latched by the stopper-latch lever. You should now be able to turn the sprocket shaft continuously.

4. Disengage the film-advance stopper by pushing the stopper-latch lever toward the front of the film-advance unit. Then turn the sprocket shaft until the film-advance stopper engages and stops the sprocket cam.

5. If the film-advance stopper doesn't freely move toward the sprocket cam, it may be binding on the stopper-latch lever. Check to see if the stopper-latch lever is bent up, binding on the underside of the film-advance stopper. If so, press down the end of the stopper-latch lever.

Operation note: In normal operation, the disengaging lever, Fig. 35, disengages the stopper-latch lever as the charge cam, Fig. 24, starts to turn. For multiple exposures, the multiple-exposure lever, Fig. 35, prevents the disengaging lever from releasing the stopper-lever latch—the multiple-exposure lever holds the disengaging lever toward the front of the film-advance unit.

Reassembly of film-advance unit:

1. Seat the spring for the multiple-exposure lever as shown in the drawing below. The straight end of the spring hooks to the back side of the multiple-exposure-lever tab. Pull the hooked end of the spring in a counterclockwise direction as you seat the inner film-advance plate. Connect the hooked spring end to the

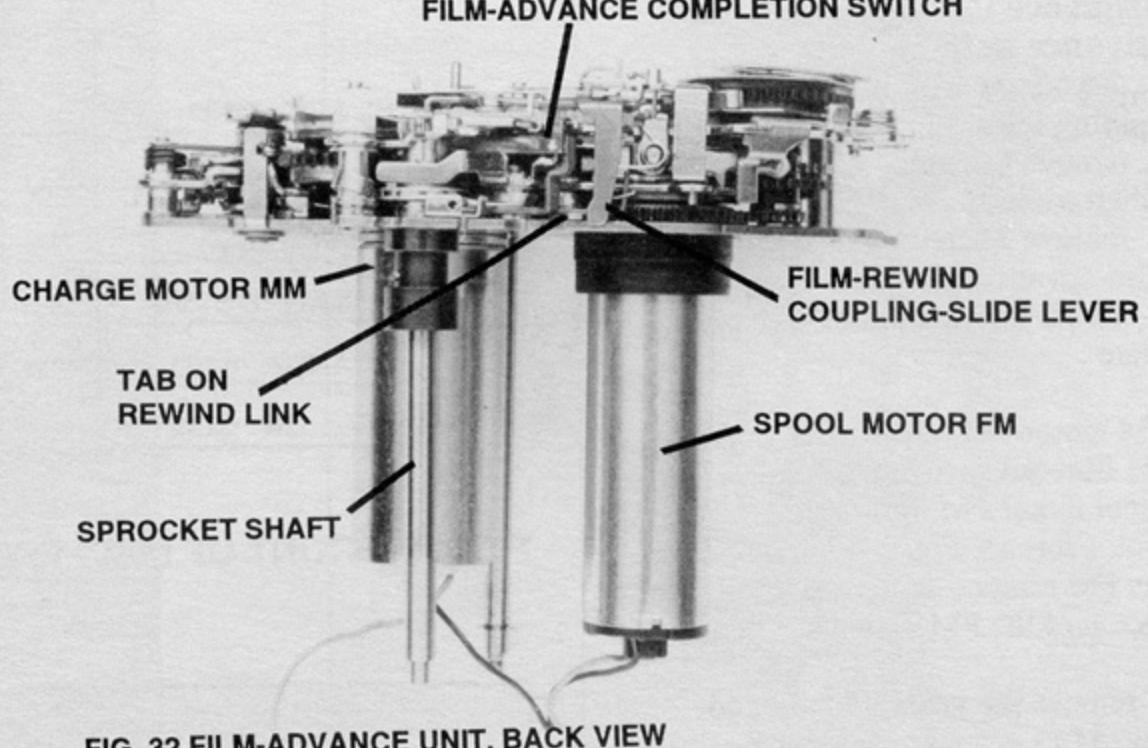
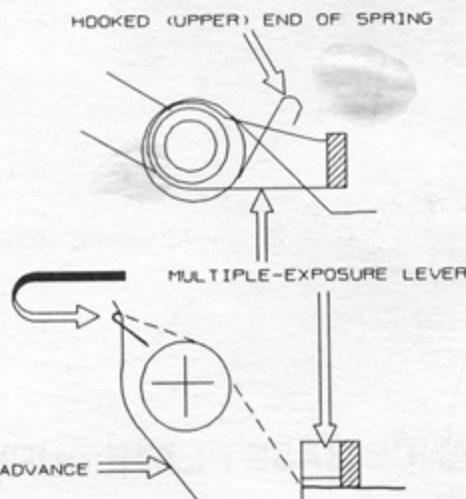


FIG. 32 FILM-ADVANCE UNIT, BACK VIEW

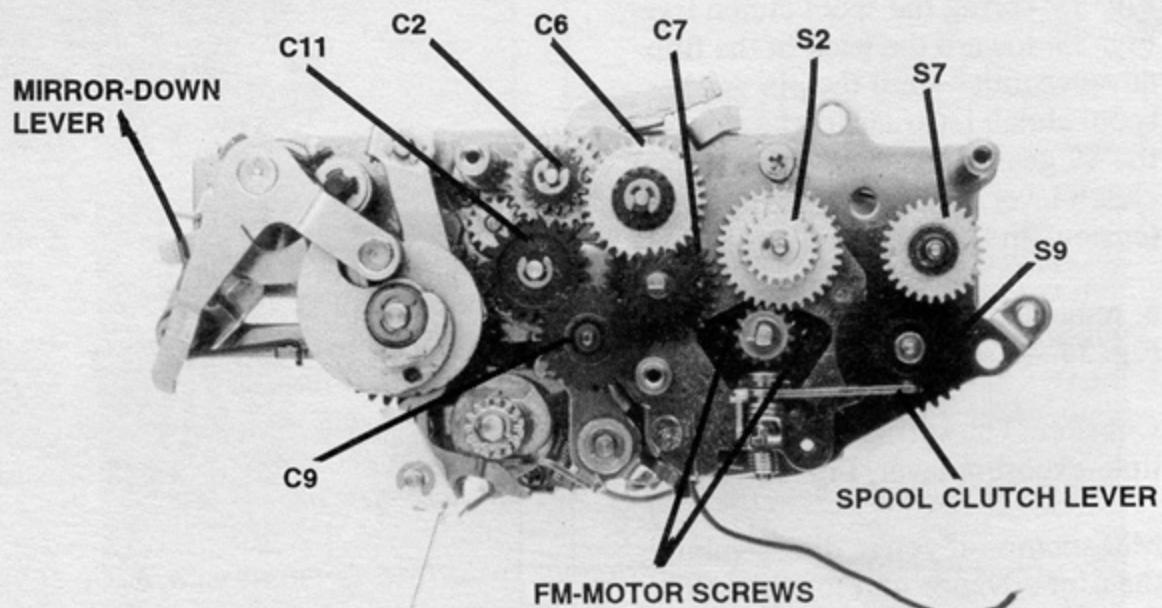


FIG. 33 TOP OF FILM-ADVANCE UNIT, SPEED-DIAL BASE PLATE REMOVED

side of the inner film-advance plate.

Note: After seating the inner film-advance plate, make sure the multiple-exposure lever moves freely. If the multiple-exposure lever binds, a spring coil may be trapped between the post and the plate.

2. Check the sprocket-latching operation as follows:

- a. turn the sprocket shaft (counterclockwise as seen from the top of the sprocket cam). The film-advance stopper should engage the latching surface of the sprocket cam, stopping the sprocket shaft.
- b. Turn the C6 gear, Fig. 13, counter-

clockwise to simulate the charge cycle. The film-advance stopper should disengage from the sprocket cam. Continue turning the brass gear until the shutter-charge lever drops onto the low spot on the charge cam—the charged position, Fig. 24.

- c. Push the mirror-release lever, Fig. 34, toward the back of the film-advance unit. The mirror-up lever, Fig. 36, should disengage and move toward the front of the film-advance unit.
- d. Turn the sprocket shaft counterclockwise—the film-advance stopper should again drop into engagement with the sprocket cam to stop the sprocket.

Note: You can also disengage the sprocket by pushing the tab on the rewind link, Fig. 32, a slight distance from right to left. If you push the rewind link too far, its lower end will move to the wrong side of the stopper-lever latch, Fig. 35. The film-advance stopper then fails to engage the sprocket cam. To reposition the rewind link, hold the film-advance stopper, Fig. 35, in a clockwise direction (against its spring tension). Then move the rewind link from left to right, Fig. 32.

3. Replace the film-advance and charge gears, Fig. 33. Lubricate the gear shafts with shutter oil.
4. Turn the sprocket to the latched position. Time the counter driver on the upper film-advance base plate as shown in Fig. 24—the slot in the counter driver faces the counter-driver spring.
5. As you seat the upper film-advance base plate, Fig. 24, be careful of the film-advance completion switch (underside of the upper film-advance base plate, Fig. 32)—the inner contact of the film-advance completion switch must sit to the outside of the upturned tab of the advance-completion lever, Fig. 34.
6. Seat the upper film-advance base plate. Check the position of the film-advance completion switch by pulling the inner contact toward the back of the film-advance unit. Replace the 3 screws.
7. Replace the ME-relay lever, Fig. 24—pass the lower end of the ME-relay lever under the spring for the spool clutch lever, Fig. 33, and to the front of the tab on the multiple-exposure lever, Fig. 36. Replace the shaft screw. Check by moving the ME-relay lever in a counterclockwise direction—you should feel the spring tension of the multiple-exposure lever.
8. If the shutter block is in the camera, make sure the shutter-release lever in the film-advance unit is in the released position, Fig. 17 (if not, charge and release the film-advance unit).
9. The slip spring in the top end of the take-up spool keys to the notch in the S11 gear, Fig. 36. You can leave the take-up spool in the camera as

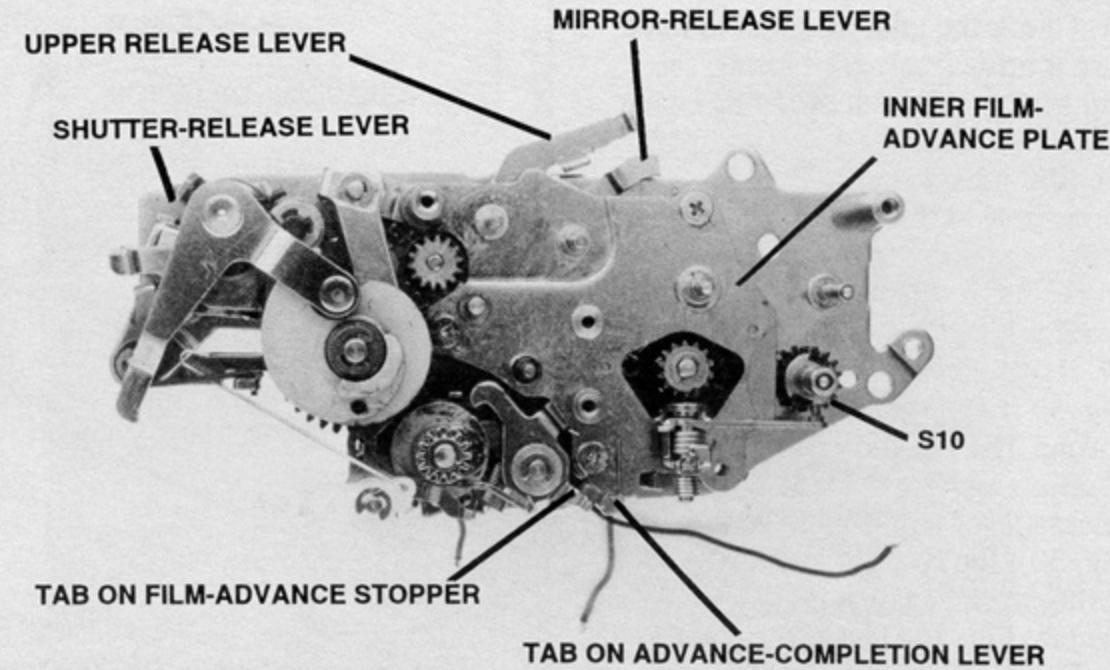


FIG. 34 TOP OF FILM-ADVANCE UNIT, GEARS REMOVED

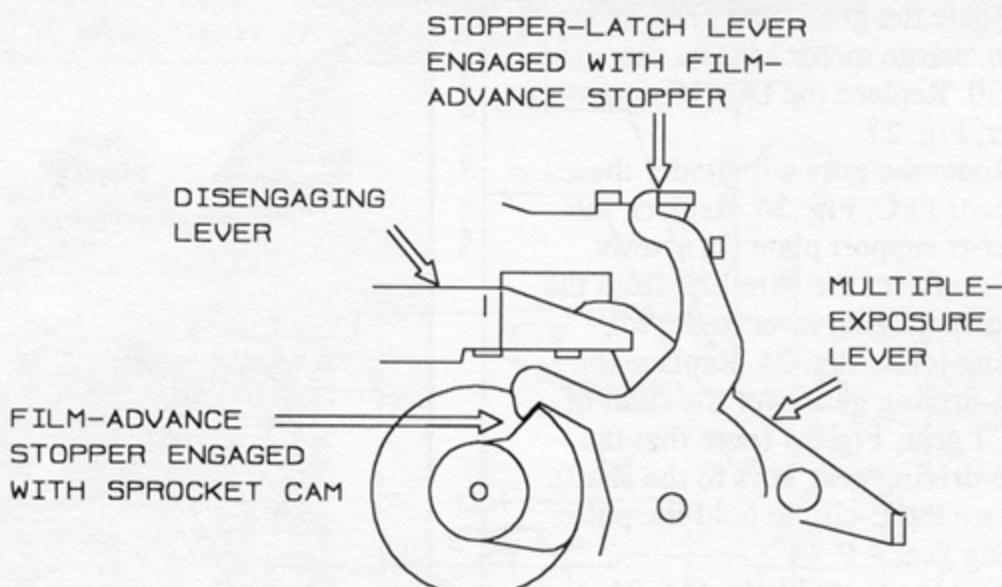


FIG. 35 TOP OF LOWER FILM-ADVANCE BASE PLATE

you seat the film-advance unit. But it may be easier to seat the take-up spool on the S11 gear before seating the film-advance unit as follows:

- a. remove the take-up spool
- b. seat the take-up spool over the FM motor—pass the 2 motor wires through the hole at the bottom of the spool
- c. turn the take-up spool until its slip spring seats into the notch in the S11 gear
- d. replace the spool-chamber rubber at the top of the body casting, Fig. 28
- e. hold aside the film roller (back of body casting) and seat the film-advance unit and take-up spool from the top of the body casting—allow the

take-up spool to push aside the spool-chamber rubber. Pass the 2 FM-motor wires through the hole at the bottom of the camera

f. make sure the ME-disengaging lever passes to the inside of the body casting as shown in Fig. 24 (if the ME-disengaging lever is on the wrong side, remove the E-clip—you can then lift up and reposition the ME-disengaging lever)

10. Lift the film-advance unit slightly until the lower end of the release shaft clears the bearing in the release-magnet housing, Fig. 30. Seat the lower-release-lever spring over the lower end of the release shaft (hooked end of spring facing the bottom of the camera), Fig. 30. Then fully seat the

film-advance unit.

11. Check the take-up spool to make sure it turns freely (if it binds, the slip spring came out of the S11-gear notch). Replace the 3 screws holding the film-advance unit, Fig. 24. If the screw hole at the back of the camera is blocked, move the R-coupling slide lever, Fig. 4, to the rewind (latched) position.

12. Replace the lower release lever, Fig. 30 (E-clip) and connect the spring. The hooked end of the spring connects against the side of the lower release lever (right-hand edge in Fig. 30); the straight end of the spring hooks against the back edge of the tab, Fig. 30. The spring then pushes the lower release lever against the armature lever of the release magnet.

13. Route the green and black wires of the charge motor MM as shown in Fig. 30. Replace the DC/DC converter, Fig. 27.

14. Route the gray wire under the power-tr FPC, Fig. 25. Replace the power-tr support plate (2) screws.

15. Reconnect the wire link from the ME-disengaging lever to the ME-holding lever, Fig. 24. Replace the pulse-driving gear over the shaft of the C7 gear, Fig. 24 (note that the pulse-driving gear keys to the shaft). Replace the E-clip to hold the pulse-driving gear.

16. Seat the pulse blade, Fig. 24, and the charge encoder. Slide the charge encoder over the pulse blade from the front of the camera (the charge encoder straddles the pulse blade).

17. Replace the speed-dial base plate. Make sure the R1-switch lever, Fig. 4, fits over the tab on the R1-relay lever. If the shutter block is in place, fit the time lever on the speed-dial base plate to the left of the time latch in the shutter (as seen from the front of the camera, Fig. 16).

18. Reassemble the front flex connector, Fig. 13.

19. Tighten 1 of the sprocket screws, Fig. 3. Turn the sprocket in the film-advance direction until it latches. Adjust the sprocket timing (*Adjustment Procedures*).

Sequence to remove upper film-advance base plate, replace S2 gear (mirror box installed):

1. remove release-side top cover

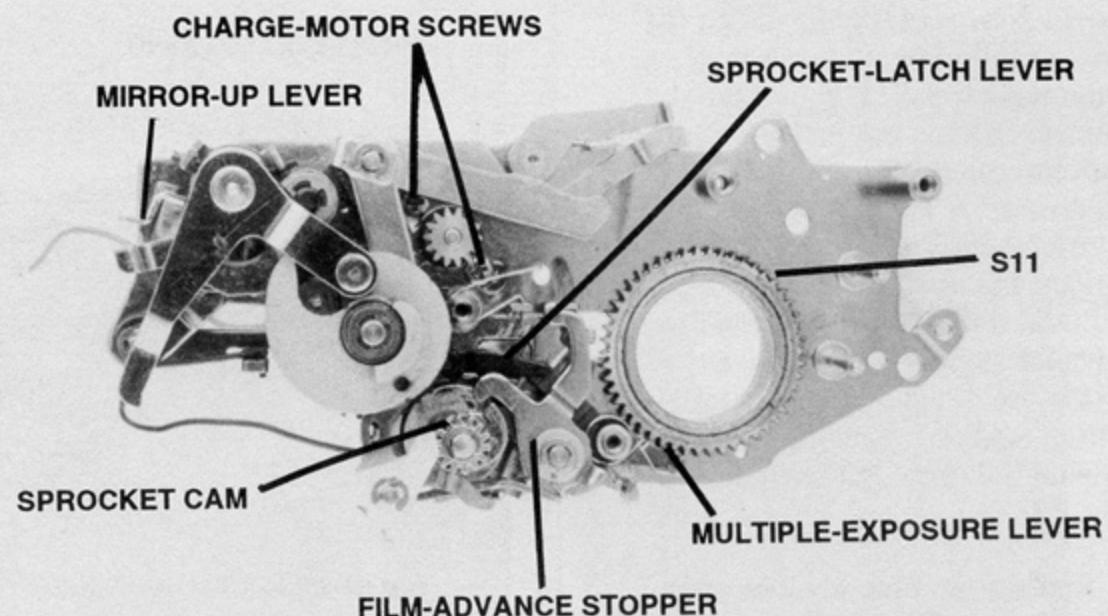


FIG. 36 TOP OF FILM-ADVANCE UNIT, INNER FILM-ADVANCE PLATE REMOVED

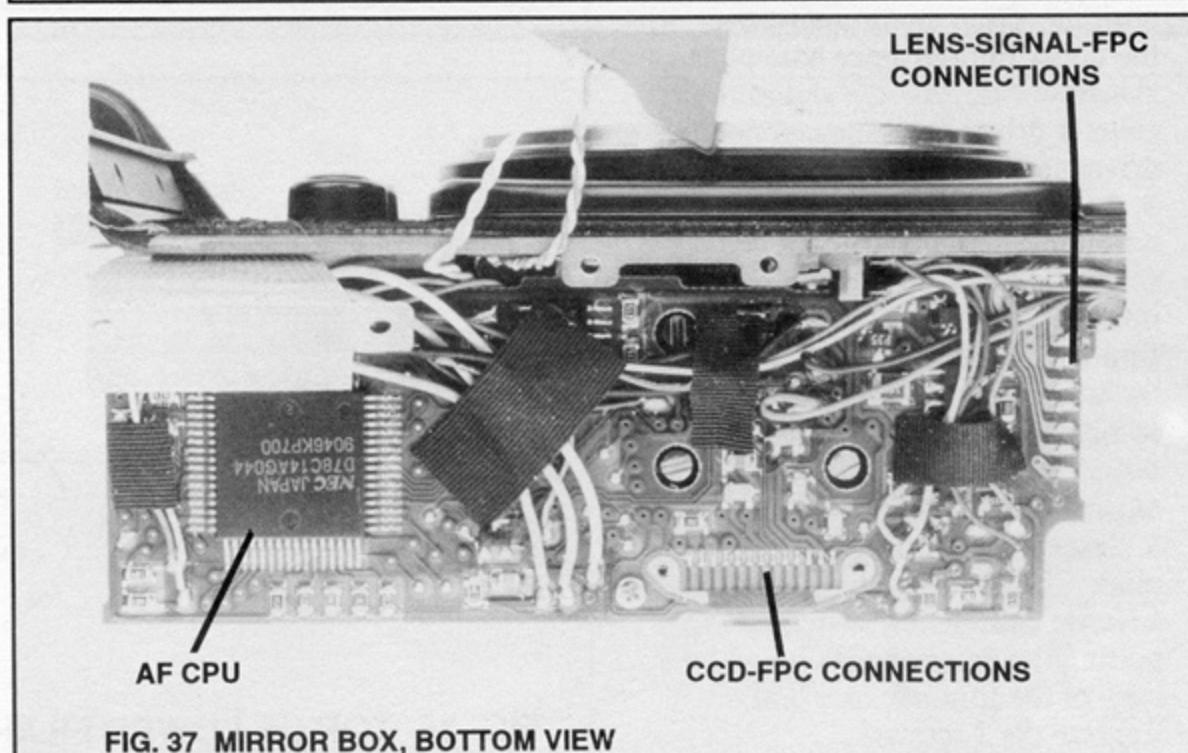


FIG. 37 MIRROR BOX, BOTTOM VIEW

2. unsolder wires from speed-dial FPC, Fig. 22
3. unsolder counter-switch contact from speed-dial FPC, Fig. 16
4. remove screw holding speed-dial FPC to speed-dial base plate (end, by counter dial)
5. remove 3 screws holding speed-dial base plate
6. lift aside speed-dial base plate (flex still connected)
7. remove screw holding charge encoder, Fig. 24
8. slide off charge encoder toward front of camera (spring up top of charge-encoder bracket slightly to clear brass post)
9. lift off pulse blade, Fig. 24
10. remove pulse-driving gear, Fig. 24 (E-clip)

11. disconnect wire link from tab on ME-holding lever, Fig. 24 (move the ME-holding lever against its spring tension until you can disconnect its tab from the wire link)
12. remove shaft screw holding ME-relay lever, Fig. 24
13. remove 3 screws holding upper film-advance base plate, Fig. 24
14. lift off upper film-advance base plate

Reassembly highlights:

1. The lower end of the ME-relay lever, Fig. 24, fits under the spring on the spool-clutch lever, Fig. 33, and to the front of the tab on the multiple-exposure lever, Fig. 36. With the film-advance unit removed from the camera, Fig. 32, you can replace the

ME-relay lever after replacing the upper film-advance base plate. But with the film-advance unit in the camera, it's necessary to position the ME-relay lever before you completely seat the upper film-advance base plate.

2. As you seat the upper film-advance plate, make sure the contacts of the film-advance completion switch, Fig. 32, fit to the outside of the tab on the advance-completion lever, Fig. 34. Check the position of the ME-relay lever and the film-advance completion switch before you replace the screws.

3. Reconnect the wire link to the ME-holding lever, Fig. 24.

Operation note: For multiple-exposure operation, the ME-relay lever moves counterclockwise, Fig. 24. The lower end of the ME-relay lever moves the multiple-exposure lever, Fig. 35, clockwise to prevent the sprocket from disengaging. The ME-holding lever holds the ME-relay lever in the multiple-exposure position. During the charge cycle, the charge cam, Fig. 24, strikes the white plastic ME-disengaging lever. The wire link then pulls the ME-holding lever out of engagement with the ME-relay lever.

4. Seat the pulse-driving gear, Fig. 24, over the keyed shaft of the C7 gear. Replace the E-clip.

5. Seat the pulse blade, Fig. 24. Replace the charge encoder—the charge encoder, Fig. 24, straddles the pulse blade. Lift the top of the charge-encoder bracket slightly to fit its hole over the post for the pulse blade.

6. The time lever on the speed-dial base plate must fit to the left of the time latch on the shutter (as seen from the front, Fig. 16). As you seat the speed-dial base plate, push the time latch in the shutter toward the mirror box (alternately, set the speed selector to time—the time lever then drops into the speed-cam notch). Also, the slot in the R1-switch lever, Fig. 4, must fit over the tab on the R1-relay lever. Seat the speed-dial base plate and check the positions of the time lever and the R1-switch lever. Replace the screws (counter-sunk screw to back of camera).

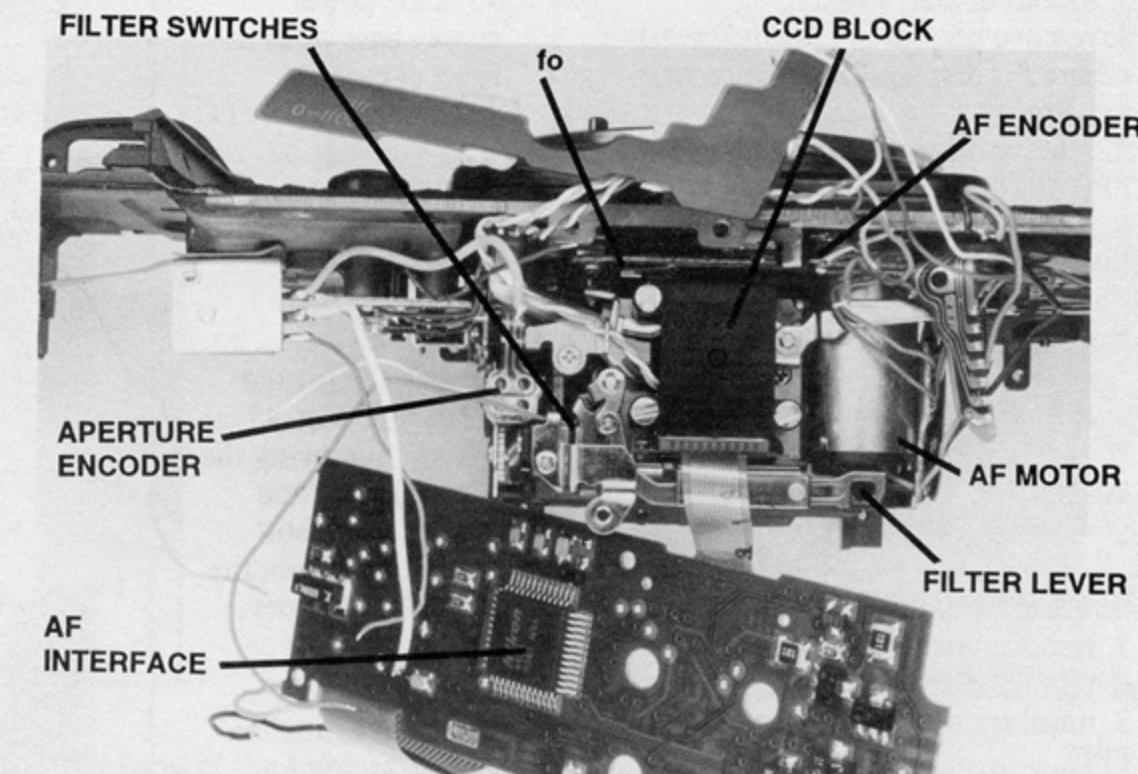


FIG. 38 MIRROR BOX, AF BASE PLATE REMOVED

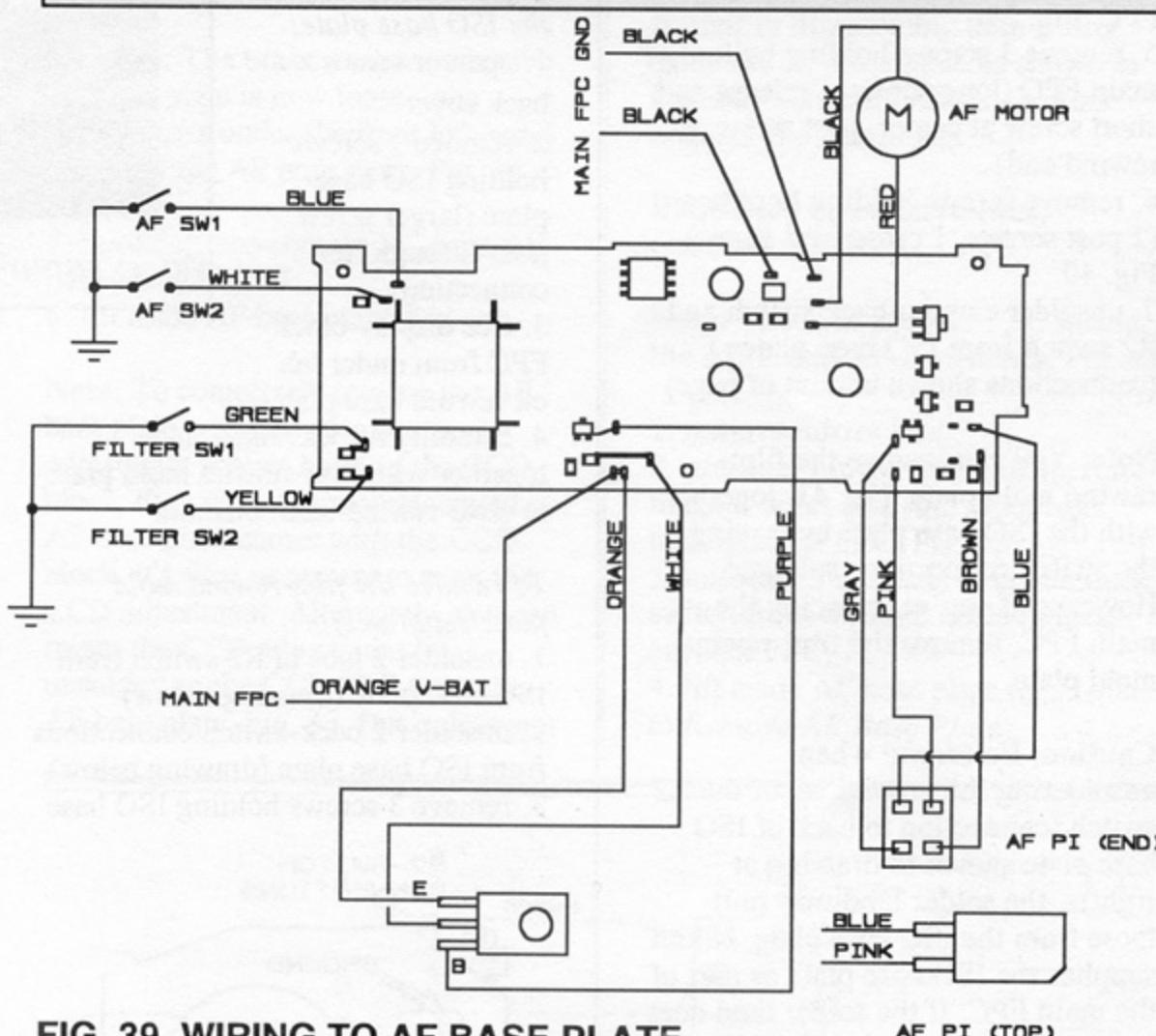


FIG. 39 WIRING TO AF BASE PLATE

7. Solder the wires to the speed-dial FPC, Fig. 22. Note that the green, blue, gray, and pink wires pass under the speed-dial FPC. The orange wire from the self-LED may route under the speed-dial FPC in early cameras.

Note: If the shutter will now release

once—and the alarm LED then flashes—check the position of the time lever, Fig. 16.

Sequence to remove display block:

1. remove mirror box
2. remove 2 screws at front of display

FPC, Fig. 13

3. unfold display FPC
4. remove pressure plate and pressure rubber for display-FPC flex connector, Fig. 13
5. remove display block with display FPC
6. remove contact plate for display FPC, Fig. 40

Note: Fig. 40 shows the revised contact plate (*Revised Parts #12*). On reassembly, seat the contact plate as shown in Fig. 40—the straight-line lands up and facing the rewind end of the camera body.

Sequence to remove main FPC:

1. remove mirror box
2. remove display block
3. unsolder wires at bottom of main FPC
4. unsolder wires at front of main FPC, Fig. 29
5. remove 3 screws holding bottom of main FPC (long screw at release end, short screw at center, post screw at rewind end)
6. remove screws holding hard board (2 post screws, 1 crosspoint screw), Fig. 40
7. unsolder camera-back switch and R2 switch from ISO base plate (connections shown bottom of page)

Note: You can remove the film-rewind mold plate, Fig. 41, together with the ISO base plate by leaving the switch connections soldered. However, if you're replacing the main FPC, remove the film-rewind mold plate.

Caution: Be careful when unsoldering the ground tab of the R2 switch (connection to back of ISO base plate shown in drawing at right)—the solder land may pull loose from the ISO base plate. Nikon supplies the ISO base plate as part of the main FPC. If the solder land does come loose, jumper the tab of the R2 switch to ground.

8. unsolder 9 connections at top of main FPC, Fig. 40
9. remove 2 screws holding bottom of main FPC to inside of body casting
10. remove screw holding power-supply base plate (through access hole behind negative battery post,

Fig. 13)

11. slide power-supply base plate to front of camera
12. remove main FPC

Sequence to remove rewind-base plate:

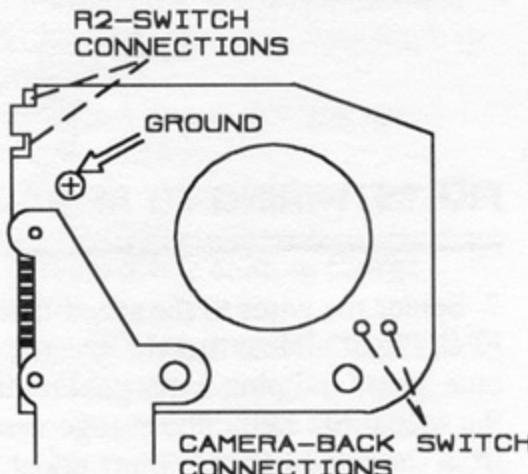
Note: You can remove the rewind base plate, Fig. 41, without removing the mirror box. If the mirror box is still installed, remove the rewind-end finder rail.

To remove the film-rewind mold plate, Fig. 41, together with the ISO base plate:

1. open or remove back cover
2. remove 3 screws holding ISO base plate (larger screw goes through flex connection)
3. free display-block FPC from under tab on rewind base plate
4. carefully lift ISO base plate together with film-rewind mold plate to clear rewind-shaft bushing

To remove the film-rewind mold plate separately:

1. unsolder 2 tabs of R2 switch from ISO base plate (drawing below)
2. unsolder 2 back-switch connections from ISO base plate (drawing below)
3. remove 3 screws holding ISO base



ISO BASE PLATE

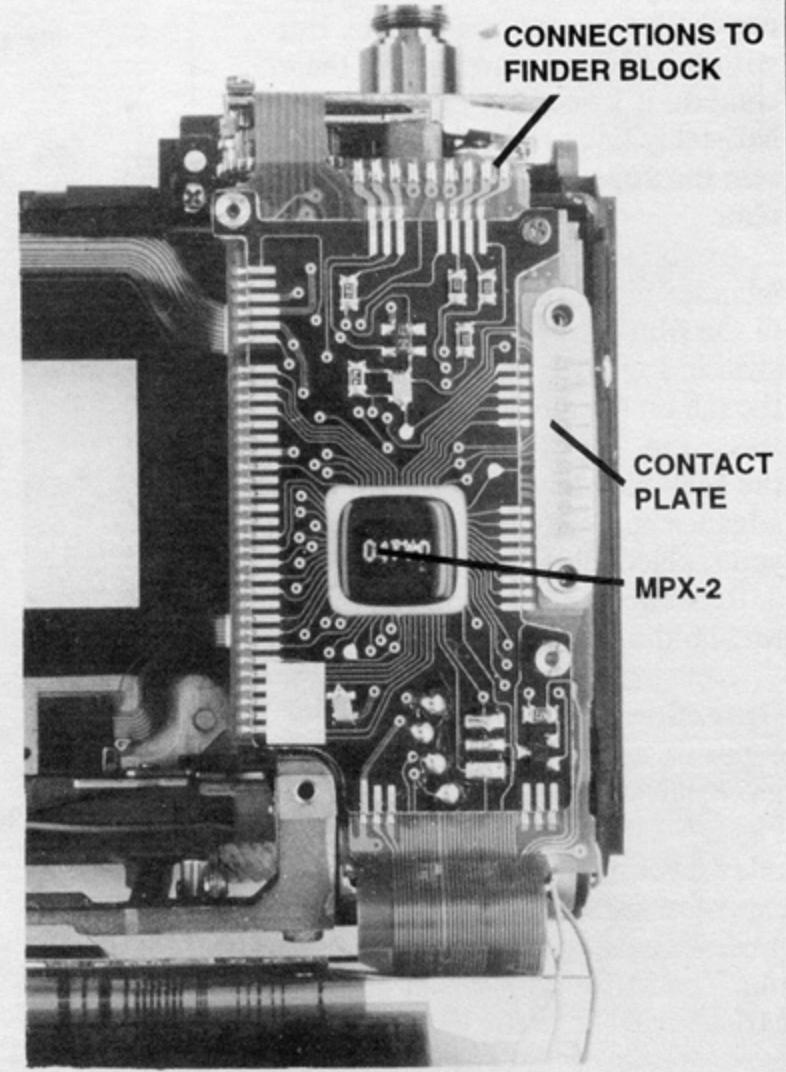


FIG. 40 FRONT OF BODY, DISPLAY FPC REMOVED

plate

4. free display-block FPC from under tab on rewind base plate
5. lift ISO base plate until it clears rewind-shaft bushing
6. lift out film-rewind mold plate, Fig. 41
7. remove rewind base plate, Fig. 41 (3 screws)
8. lift out fork gear, Fig. 42

Reassembly highlights:

1. Seat the fork gear, Fig. 42 (no timing).
2. As you seat the rewind base plate, make sure the upper pivot of the rewind-coupling shaft passes into the brass bushing (underside of rewind base plate).
3. To seat the film-rewind mold plate, first push the back-switch pin to the back of the camera. Then seat the film-rewind mold plate—make sure the camera-back-switch contact (underside of film-rewind mold plate) passes to the front of the back-switch pin. When you push in the back-switch pin, you should feel the spring pressure of the camera-back switch.

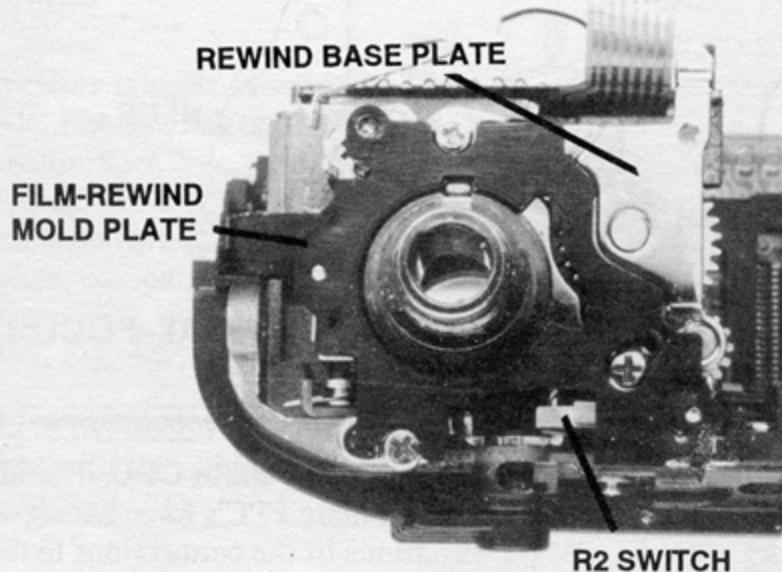


FIG. 41 TOP VIEW, ISO BASE PLATE REMOVED

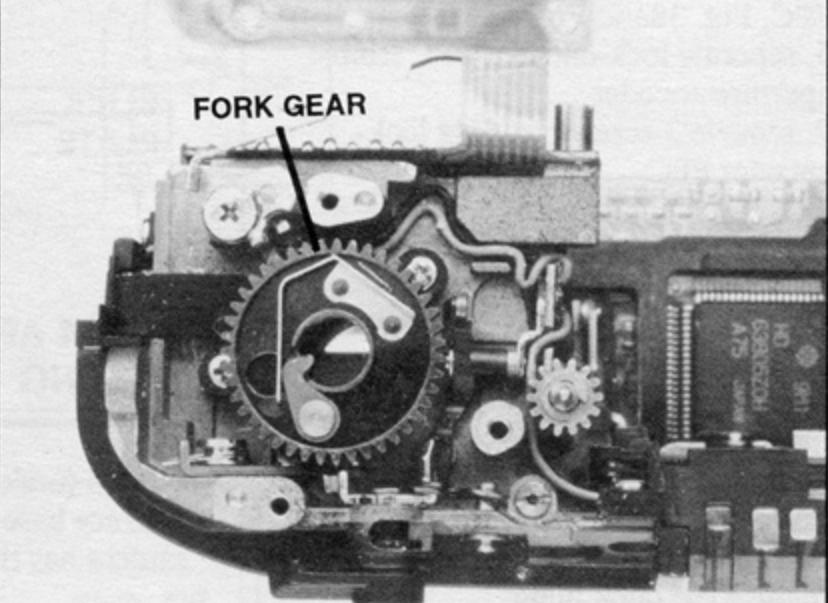


FIG. 42 TOP VIEW, REWIND BASE PLATE REMOVED

Mirror Box Repairs:

Nikon supplies individual mirror-box parts. However, the factory policy is to replace the complete front-plate/mirror-box assembly for a defective part. The replacement assembly is supplied without the AF base plate—replacing the front-plate/mirror-box assembly disturbs the CCD adjustment (unless you unsolder the CCD FPC from the AF base plate, Fig. 37).

Normal reason for replacing the front-plate/mirror-box assembly—broken casting resulting from twisting a loose strap lug (usually on the rewind side). If the casting is broken, it's probably best to send the repair to Nikon. Not only does repair disturb the CCD adjustment, the replacement part is expensive (over \$100). Always check to make sure the strap lugs are tight.

Sequence to remove AF base plate:

1. remove mirror box
2. remove tape sections from AF base plate, Fig. 37
3. unsolder wires from AF base plate, Fig. 39

Note: Unless you're replacing the AF base plate, it's not necessary to unsolder the orange and 2 black power wires, Fig. 39—you unsoldered the other ends of the wires to remove the mirror box.

4. remove 3 screws holding AF base plate—note the insulating washer

under the head of the screw above the lens-signal FPC, Fig. 37

Caution: The brass washer under the AF base plate is now loose—the washer goes under the front left-hand corner of the AF base plate, Fig. 37.

5. unsolder lens-signal FPC from AF base plate, Fig. 37
6. lift aside AF base plate, Fig. 38

Note: To completely remove the AF base plate, you can take out the 3 adjustment screws holding the CCD block, Fig. 38. Since a replacement AF base plate comes with the CCD block, it's then necessary to reset the CCD adjustment. Alternately, you can retain the CCD adjustment by unsoldering the CCD FPC from the AF base plate, Fig. 37. But unless you

have access to the Nikon computer interface, you should probably go no further in disassembly than lifting aside the AF base plate as shown in Fig. 38. You can then reach other areas of the mirror box.

Sequence to remove lock-encoder FPC:

Note: The lock-encoder FPC includes the AE-L and AF-L switches, Fig. 43.

1. remove mirror box
2. unsolder brown wire and aperture-magnet wires (red and blue) from lock-encoder FPC, Fig. 43
3. unsolder 2 contacts of double-lock switch from through holes in lock-encoder FPC, Fig. 43
4. lift aside AF base plate (*Sequence to Remove AF Base Plate*)

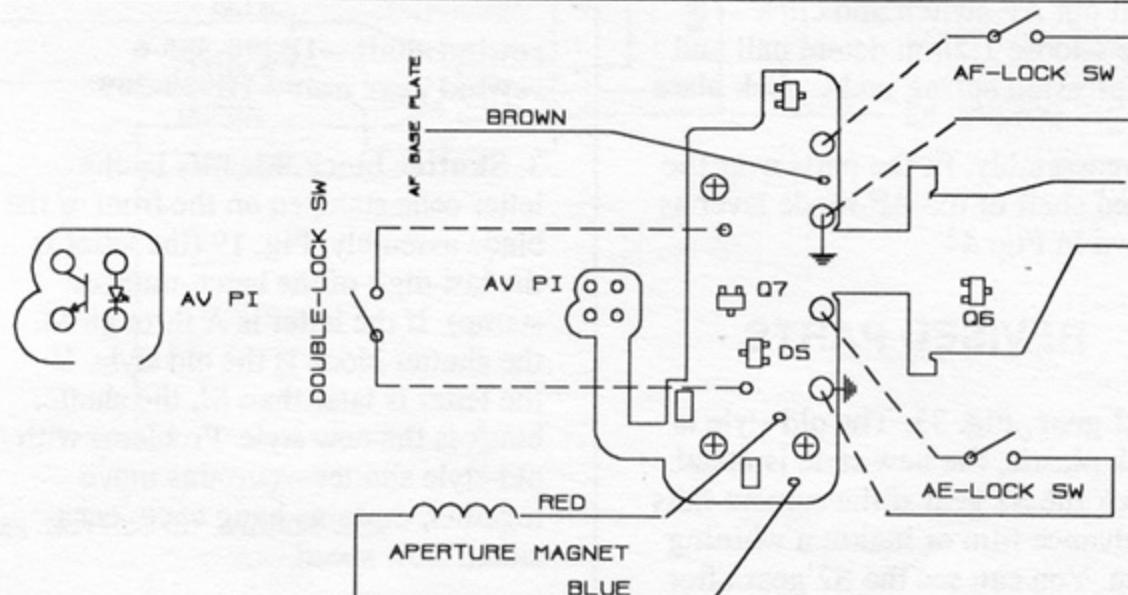


FIG. 43 WIRING TO LOCK-ENCODER FPC

- unsolder 4 aperture-encoder AV PI connections from lock-encoder FPC, Fig. 38 and Fig. 43
- separate lock-encoder FPC from aperture encoder
- remove 3 screws holding lock-encoder FPC

Sequence to replace focus-mode selector click plate:

Note: The focus-mode selector click plate is the detent plate that provides the 3 click-stop positions for the AF-mode lever. If the AF-mode lever is difficult to turn, install the revised click plate (*Revised Sections #9*). To remove the click plate:

- remove mirror box
- disconnect and remove AF-coupler spring, Fig. 15 (1 end connects to the bracket, Fig. 15—the other end connects to the AF-coupler lever)
- remove lens-release switch, Fig. 15 (1 screw)
- remove 2 screws holding bracket, Fig. 15

Note: The bracket includes the pulley for the FRE cord. It's not necessary to completely remove the bracket or disturb the cord—just lift the bracket far enough to reach the lower screw holding the AF-switch board.

- remove screw holding AF-switch board
- lift aside AF-switch board (leave wires attached)
- remove screw holding AF switch (you can work through the hole in the AF-switch board)
- lift out AF switch and click plate—loose 1.2mm detent ball and compression spring under click plate

On reassembly, fit the parts over the flatted shaft of the AF-mode lever as shown in Fig. 44.

REVISED PARTS

- S2 gear**, Fig. 33. The old style is black plastic, the new style is metal. Check the S2 gear if the camera fails to advance film or makes a whining noise. You can see the S2 gear after removing the release-side top cover—look from the front of the

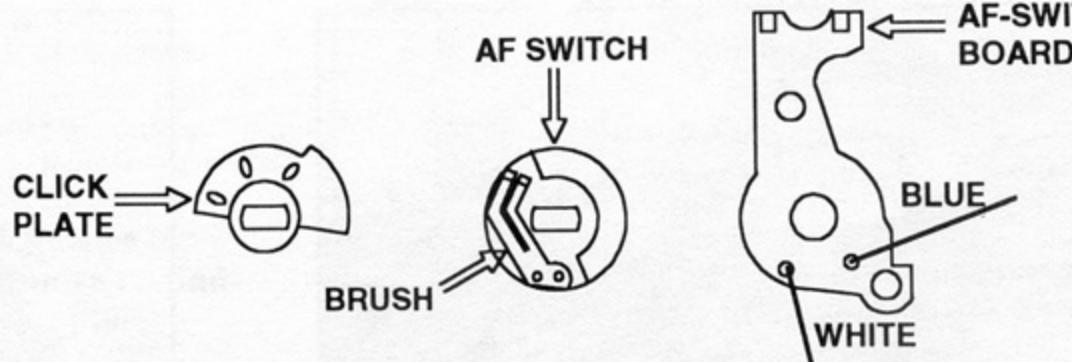


FIG. 44 AF-SWITCH PARTS, POSITIONS AT MANUAL-FOCUS SETTING

camera (under the upper film-advance base plate) to note if the camera has the old-style S2 gear.

S2 gear (revised)—1K277-093-2

2. Rewind gear, rewind gear unit, Fig. 2. The old-style rewind gear and rewind worm gear could break, causing rewind failure. Check from the bottom of the camera. Remove the bottom cover, the tripod-socket base plate, and the 3 screws holding the bottom of the main FPC. Raise the rear edge of the main FPC, Fig. 2, to check the rewind gear and the rewind gear unit.

The new-style rewind gear is black in color. To replace the rewind gear, remove the mirror box and replace the rewind shaft with the new style.

Identify the rewind gear unit by the color of the support plate, Fig. 2. The old style is brass (the brass plate could distort, causing rewind failure); the new-style is a silver-colored metal. If the camera has the old style, replace the rewind gear unit.

rewind shaft—1B990-385-6
rewind gear unit—1B999-209

3. Shutter block. Identify by the letter code stamped on the front of the blade assembly, Fig. 19 (the letter is the last digit of the batch-number stamp). If the letter is A through M, the shutter block is the old style. If the letter is later than M, the shutter block is the new style. Problems with old-style shutter—curtains move together, curtains hang open, occasional slow speed.

shutter block—1B060-403

4. Main FPC, main CPU. The new and old main FPC's have wiring variations in the connections to the thyristor trigger base plate, Fig. 45 (*Revised Sections #5*). If the identification # printed on the main FPC, Fig. 2, is 5003-10 or higher, the main FPC takes the new-style thyristor trigger base plate.

main FPC (old)—1B990-397
main FPC (new)—1B990-397-1

If the identification # is 5003-17 or higher, the main FPC has the new-style main CPU. The main CPU was revised to correct blurring of the imprint data with the 250-exposure MF24 back in the CH, S, or CS drive mode (the proper mode with the MF-24 back is CL). You can identify the main CPU by the number stamped on the IC case—63B05Z0H identifies the old style, H8/330 identifies the new style.

Nikon also uses the serial number on the release-side top cover to identify the new-style main CPU—a serial number of 2399999 or earlier identifies the old style, a serial number of 2400001 or later identifies the new style.

The film-leader index, Fig. 3, identifies an F4 with the revised main CPU sold as a set with the MF-24 back. The film-leader index, normally all red in color, is red and silver for identification. If the film-leader index is red and silver, you know that the camera has the new-style main CPU (and that the camera was sold as a set with the revised MF-24 back).

The Nikon computer interface first determines whether the main CPU is

the old style or the new style. However, solder lands and test points are the same.

5. Thyristor trigger base plate. The old style, Fig. 45, has transistor Q38 and resistor R99. The new-style main FPC has Q38 and R99 mounted on the flex. The revised thyristor trigger base plate, compatible with the new-style main FPC, does not have Q38 and R99, Fig. 48.

Wiring to the main FPC is slightly different with the old style, Fig. 45 (*Revised Parts #4*).

In most cases, it's not necessary to replace the thyristor trigger base plate—the triac, the normal part to fail, is supplied separately (part #QT0008AS08). However, you can use the old-style thyristor trigger base plate with the new-style main FPC—just remove Q38 and R99, Fig. 45.

If you have the old-style main FPC, use the old style thyristor trigger base plate.

thyristor trigger base plate (old)—1B990-379

thyristor trigger base plate (new)—1B990-379-1

6. AF base plate. Revised to provide an adjustment for the output of the AF encoder. The new style AF base plate, Fig. 39, adds 3 fixed resistors and 2 more solder connections. You can solder the brown wire to any of the 3 connections, changing the fixed resistor in use, to adjust the AF-encoder output (see, *Adjustment Procedures*).

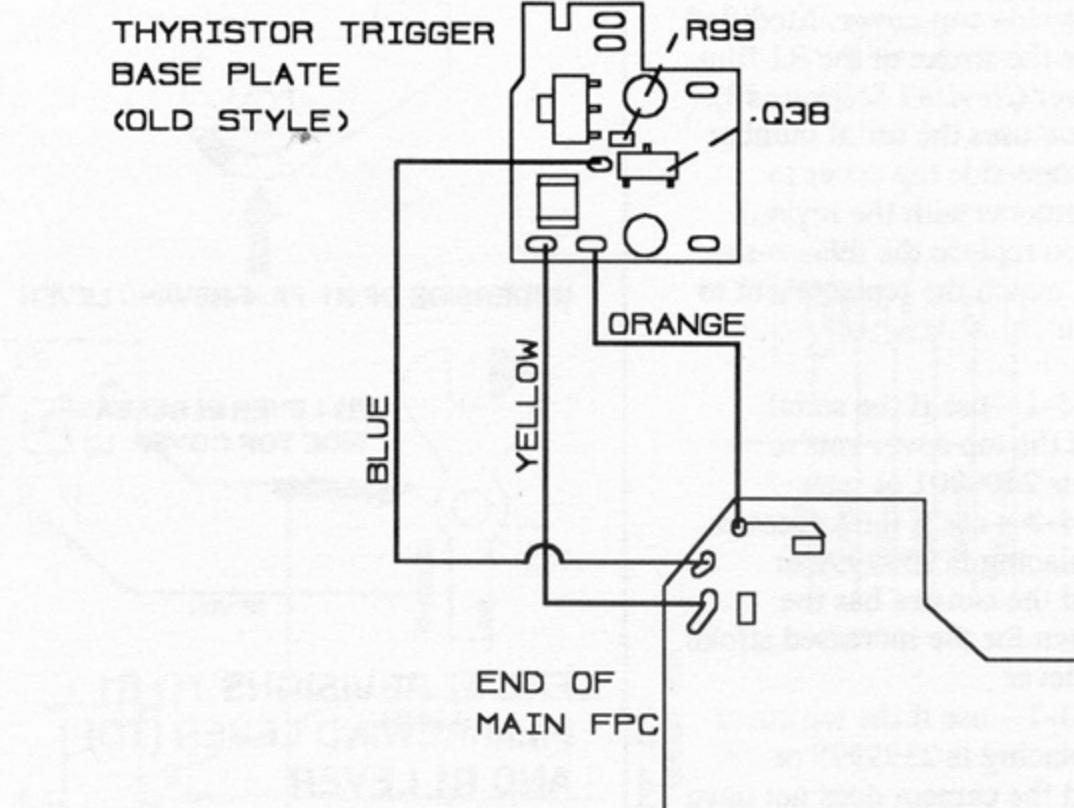
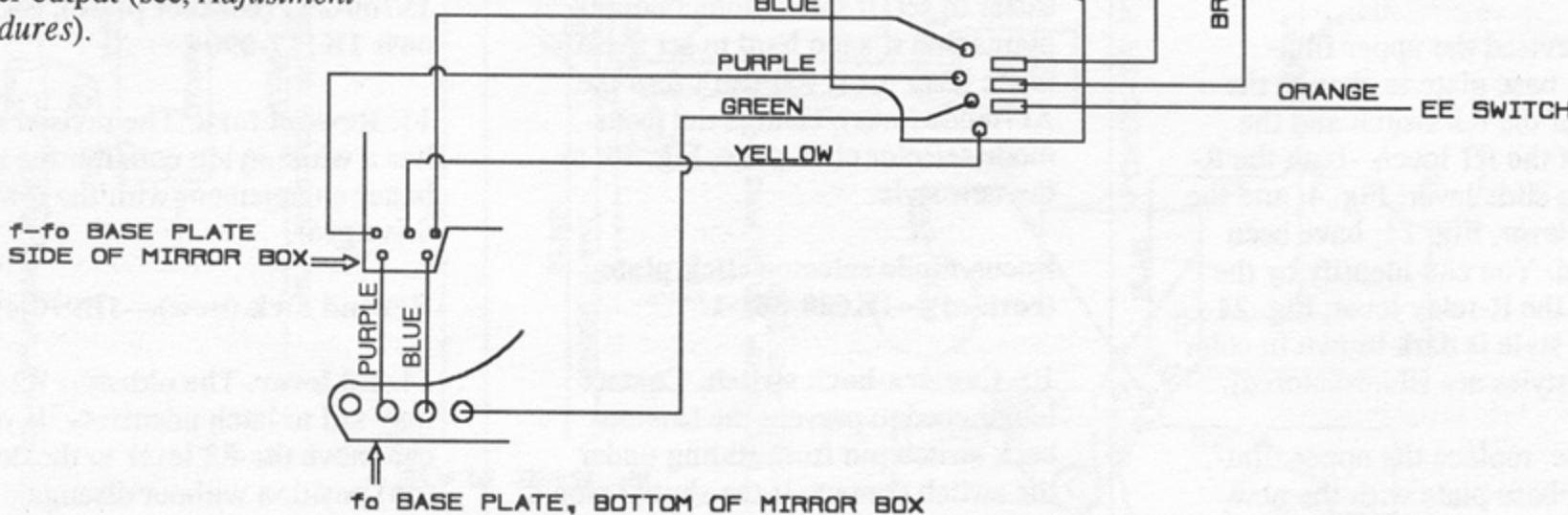


FIG. 45 WIRING TO EARLY STYLE THYRISTOR TRIGGER BASE PLATE

Replacing the AF base plate disturbs the CCD position (unless you unsolder the CCD flex from the AF base plate, Fig. 37). If you have the old-style AF base plate, and you need to adjust the AF sine wave, your only

adjustment is by shifting the AF encoder, Fig. 38. Since the adjustment is time-consuming, you may prefer to send the repair to Nikon.

AF base plate—1B990-356-1

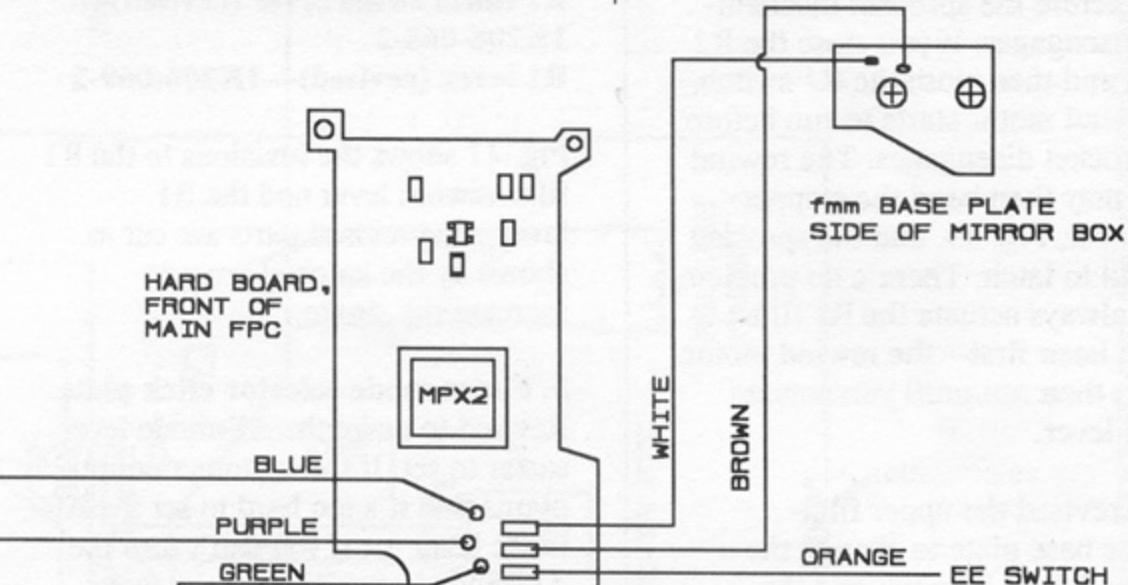


FIG. 46 WIRING TO MAIN FPC, FRONT REWIND SIDE OF LENS

7. Release-side top cover. Modified to increase the stroke of the R1 film-rewind lever (*Revised Sections #8*). Also, Nikon uses the serial number on the release-side top cover to identify cameras with the revised CPU. If you replace the release-side top cover, match the replacement to the camera:

1B999-445-1—use if the serial number of the top cover you're replacing is 2400001 or later

1B999-261-3—use if the top cover you're replacing is 2399999 or earlier and the camera has the modification for the increased stroke of the R1 lever

1B999-261-1—use if the top cover you're replacing is 2399999 or earlier and the camera does not have the revision for the increased stroke of the R1 lever

8. R1-lever stroke, timing of R1 switch. The R1-lever stroke was increased to provide a more positive feel. The timing of the R1 switch was changed to make the R1 switch close *after* the sprocket disengages.

With the old style, the R1 switch closes before the sprocket mechanically disengages. If you close the R2 switch and then close the R1 switch, the rewind motor starts to run before the sprocket disengages. The rewind motor may then bend the stopper-latch lever, Fig. 35, and the sprocket may fail to latch. There's no problem if you always actuate the R1 film-rewind lever first—the rewind motor doesn't then run until you actuate the R2 lever.

Nikon revised the upper film-advance base plate to change the timing of the R1 switch and the stroke of the R1 lever—both the R-coupling slide lever, Fig. 4, and the R-relay lever, Fig. 24, have been modified. You can identify by the color of the R-relay lever, Fig. 24—the new style is dark brown in color (earlier styles are silver-colored).

To revise, replace the upper film-advance base plate with the new style. Also replace the R1 lever (underside of top cover) and the R1 film-rewind lever (alternately, you



FIG. 47 REVISIONS TO R1 FILM-REWIND LEVER (TOP) AND R1 LEVER

can replace the complete release-side top cover—see, *Revised Parts #7*).

Note: If the sprocket won't latch, it may be necessary to bend down the end of the stopper-latch lever, Fig. 35.

upper film-advance base plate (revised)—**1B990-444-1**

R1 film-rewind lever (revised)—**1K206-068-2**

R1 lever (revised)—**1K206-069-2**

Fig. 47 shows the revisions to the R1 film-rewind lever and the R1 lever—the revised parts are cut as shown by the hatched areas to increase the stroke.

9. Focus-mode selector click plate. Revised to make the AF-mode lever easier to set. If the customer complains that it's too hard to set the AF-mode lever (or if you can't turn the AF-mode lever), change the focus-mode selector click plate, Fig. 44, to the new style.

Focus-mode selector click plate (revised)—**1K600-861-1**

10. Camera-back switch. Contact lengthened to prevent the camera-back switch pin from sliding under the switch contact. If the shutter won't release with the back cover closed—but the charge motor and the wind motor run briefly when you push the

release button—the camera-back switch isn't opening. If the shutter will release with the back cover open, the camera-back switch isn't closing.

Check by pushing in the back-switch pin, Fig. 3—you should feel the spring tension of the camera-back switch contact. If the back-switch pin is sliding under the camera-back switch contact, replace the film-rewind mold plate, Fig. 41, and the camera-back switch pin.

back-switch pin—**1K371-353-2**
film-rewind mold plate—
1B990-389-1

11. Film-advance completion switch. Revised early in the production of the camera to prevent overlapping frames, double exposures. If the camera has an early serial number (2100000 to 2106500), it may have the old-style film-advance completion switch, Fig. 32. The thickness of the switch contacts was increased (0.15mm to 0.2mm) for firmer contact pressure.

Note: To check the film-advance completion switch, see, *Troubleshooting steps—Film Advance*.

film-advance completion switch—
1B999-380

12. Contact plate for LCD-FPC connector. Revised to improve contact between the LCD FPC and the main FPC. Fig. 40 shows the new style—a hard board with gold contacts (the old type has elastic connectors). Update with the following parts:

1S700-292 (contact plate), **1K117-089**, **1K117-090**

13. Rewind fork. The revised style has a white nylon collar at the top for better engagement with the rewind-drive gear.

Rewind fork (new)—**1B990-406-2**

14. R2 lever. The old-style R2 lever may fail to latch positively. If you can move the R2 lever to the down (on) position without disengaging the latch, replace with the new style.

R2 lever (new)—**1K201-084-1**

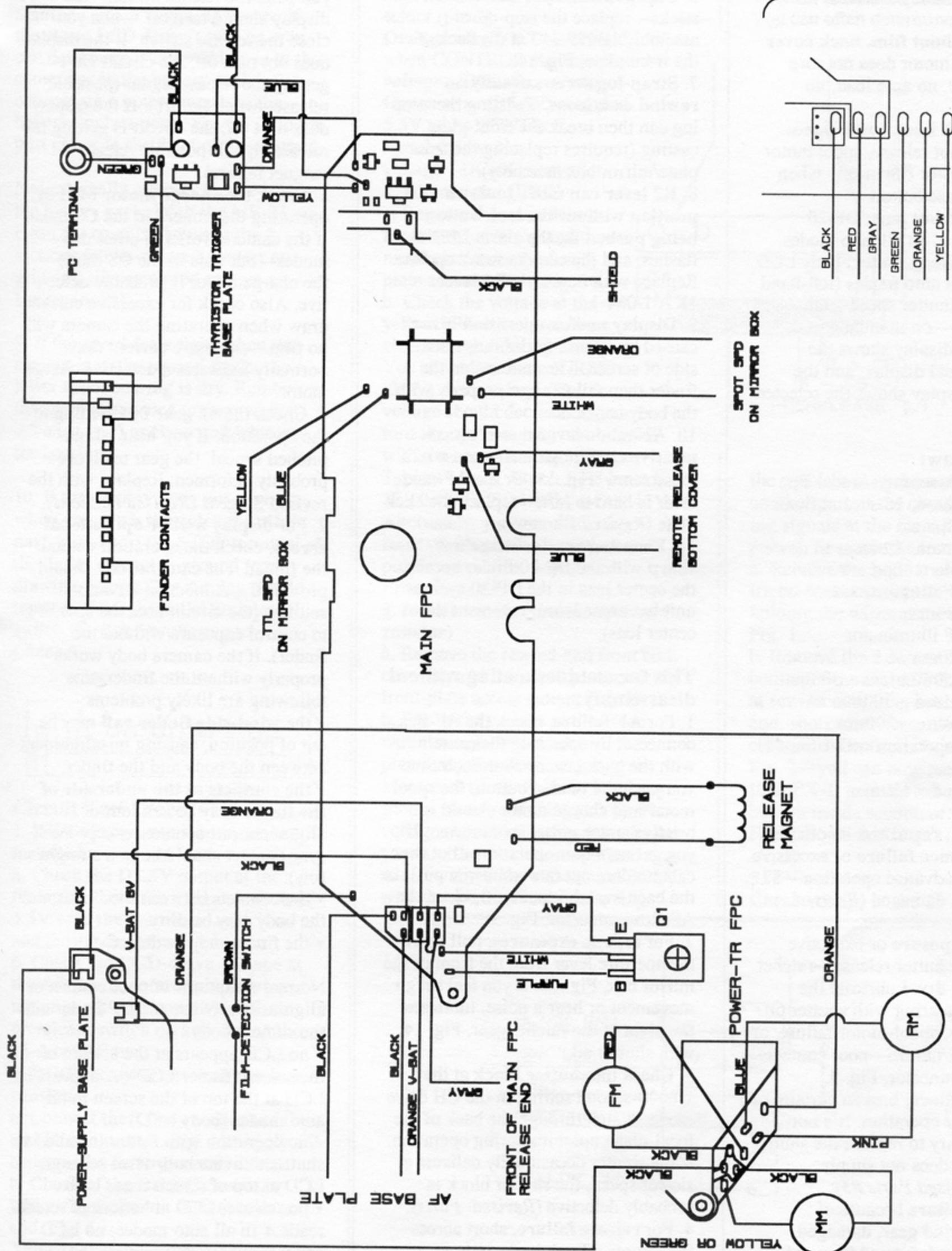


FIG. 48 WIRING, BOTTOM AND FRONT RELEASE SIDE (INSET) OF MAIN FPC

TROUBLESHOOTING

Behavior without batteries: no operation

Behavior without film, back cover closed: spool motor does not turn after exposure, no auto load, no rewind

Behavior with back cover open: shutter does not release, spool motor and charge motor run briefly when you push release button

Behavior without lens: DP-20

finder shows A on all auto modes

Behavior without finder: body LCD shows A in all auto modes (left-hand display) and shutter speed (right-hand display)—on manual speeds, the left-hand display shows the metered-manual display, and the right-hand display shows the selected shutter speed

Current draw:

- leakage, lock setting—under 5µa
- power switch on, 16-second timer off—under 10µa
- power switch on, R2 lever in down position—under 100µa
- timer on, AF illuminator off—under 180ma
- timer on, AF illuminator on—under 220ma
- during AF, 50mm lens—500ma
- during auto load—700ma
- during exposure—200ma
- continuous operation with film, CH mode—1A
- during rewind—450ma

Frequently repaired sections:

1. Film-advance failure or excessive noise during advance operation—S2 gear, Fig. 33, damaged (*Revised Parts #1*).

2. Erratic exposure or excessive noise during shutter release—ratchet gear, Fig. 14, dry. Lubricate the ratchet-gear bearing with shutter oil.

3. AF failure, spool-motor failure, or rewind-motor failure—poor contact in AF-flex connector, Fig. 9.

4. Shutter failure, broken curtain, or erratic shutter operation. It's normally necessary to replace the shutter block. Nikon does not supply curtains (*Revised Parts #3*).

5. Rewind failure because of damaged rewind gear, damaged worm gear, or deformed frame of rewind-gear unit (*Revised Parts #2*).

6. Depth-of-field preview button sticks—replace the stop-down assembly 1B999-243 at the back of the front plate, Fig. 14.

7. Strap-lug screw, usually on rewind end, loose. Twisting the strap lug can then break the front-plate casting (requires replacing the front-plate/mirror box assembly).

8. R2 lever can move to down (on) position without the lock button being pushed in; the alarm LED then flashes, and the camera won't operate. Replace with new-style R2 lever 1K201-084-1.

9. Display and/or operation errors caused by a loose finder rail, release side of screen. The contacts on the finder then fail to align properly with the body contacts.

10. AF-mode lever doesn't have positive click positions because of a loose screw, Fig. 15. Or the AF-mode lever is hard to turn—replace the click plate (*Revised Parts #9*).

11. Focusing-screen image not sharp with the DP-20 finder because the center lens in the DP-20 eyelens unit has come loose (recement the center lens).

Tips for troubleshooting without disassembly:

1. For AF failure, check the AF-flex connector by operating the camera with the back cover open. Each time you push the release button, the spool motor and charge motor should run briefly (motor noise, spool turns). If you get no motor operation—but the camera does operate when you push in the back-switch pin, Fig. 3, clean the AF-flex connector, Fig. 9.

2. For erratic exposures, pull down the aperture lever from the front of the mirror box, Fig. 10. If you feel rough movement or hear a noise, lubricate the pivot of the ratchet gear, Fig. 14, with shutter oil.

3. Check the shutter block at the 1/8000-second setting in the CH drive mode. Watch through the back of the focal-plane aperture during operation. If the shutter occasionally delivers a slower speed, the shutter block is probably defective (*Revised Parts*).

4. For release failure, short across the remote release in the bottom cover. If the shutter then releases,

suspect the release switch. Or check the LED/LCD display in the finder as you push the release button—the display should turn off when you close the release switch. If the display does not turn off, the circuit isn't getting the release signal (possible release-switch failure). If the display does turn off, the circuit is getting the release signal (possible release-magnet failure).

5. Check the charge motor MM by operating the camera in the CS mode. If the camera works in other drive modes—but fails in the CS mode—the charge motor is probably defective. Also check for excessive current draw when operating the camera with no film—excessive current draw normally indicates a defective charge motor.

6. Check the S2 gear by listening to the operation. If you hear a high-pitched squeal, the gear teeth are probably deformed. Replace with the revised S2 gear (*Revised Sections*).

7. For display and/or operational errors, check the operation without the finder. The camera body should provide the A mode at all auto settings (the circuit uses the spot SPD to control exposure without the finder). If the camera body works properly without the finder, the following are likely problems:

- ✓ the **wind-side finder rail** may be out of position, causing misalignment between the body and the finder.
- ✓ the **contacts at the underside of the finder** may be bent out of alignment (all contacts except the X-syne contact should be in a straight row).
- ✓ the contacts between the finder and the body may be dirty.
- ✓ the finder may be defective.

Normal symptoms of poor contact or alignment between the DP finder and the camera body:

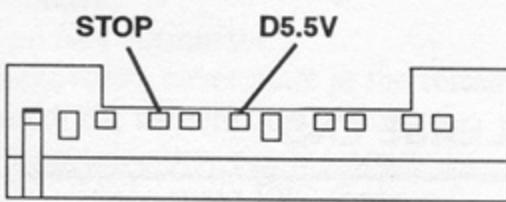
- ✓ no LCD appears at the bottom of the screen (finder LCD), A appears in LCD at the top of the screen in all auto modes (body LCD)
- ✓ no operation with finder installed or shutter delivers bulb at all settings, LCD at top of screen reads bulb
- ✓ no release, LCD at bottom of screen reads A in all auto modes, no LCD appears at bottom of screen in the manual mode

8. For no operation, move the R2 lever to the down (on) position. The alarm LED should flicker, indicating that the camera is getting power. If the alarm LED doesn't turn on, you can determine if the problem is in the camera or in the battery pack by connecting a power supply to the battery-contact posts, Fig. 13 (+ to the post closer to the front of the camera).

Note: Usually a power failure is in the battery pack. With the MB-21, clean the contacts between the 2 sections (silver-colored contact on grip and silver-colored contact on battery insert).

9. If the spool feels tight when the camera is in the rewind mode, the lower spool bearing is dry. Remove the spool (*Sequence to remove film-advance unit*) to clean and lubricate the bearing.

10. If the display does not turn on when you push the release button part way, short the STOP terminal of the finder contact to ground (see drawing below). The display should turn on. If so, check the prerelease switch (*Switch Locations and Checks*).



Circuit Test Procedures

1. DC/DC converter—mirror box installed

- Check the D5.5V output at the finder contact shown above—around 5.5V with the prerelease switch on and during the 16-second timer.
- Check the CCD-drive voltage at the AF-flex connector pin (shown at top of page)—around 12V with the prerelease switch on and during the 16-second timer.

2. DC/DC converter—mirror box removed

- Connect the 2 body sections of the end flex connector, Fig. 13. Apply 6V between the battery-contact posts.
- Check at the DC/DC-converter wires, front of main FPC at release end, Fig. 49.

Yellow wire (control)—should switch low when you close the prerelease

switch (and stay low for the 16-second timer). **Voltage stays high**—MPX-1 IC defective or poor solder (pin 3).

Orange wire (CCD)—around 12V when CONTROL switches low. **No voltage**—DC/DC converter.

Green wire (D5.5V)—around 5.5V when CONTROL switches low. **No voltage**—DC/DC converter.

2. f-fo resistor (FRE)

- Remove the rewind-end front body covering and the metal plate over the front-plate access cutout, Fig. 10.
- Check the voltage at the yellow FRE wire (prerelease switch on and during timer). You should measure V-REF (3.3V) with no lens. The voltage should decrease as you turn the aperture ring ccw—to 0V with the aperture ring fully ccw.

Typical values, 50mm f/1.8 lens: f/22 - 0.49V, f/8 - 1.67V, f/4 - 2.45V
Alternately, you can check the resistance between the yellow and purple wires. See, *Adjustment Procedures #5*.

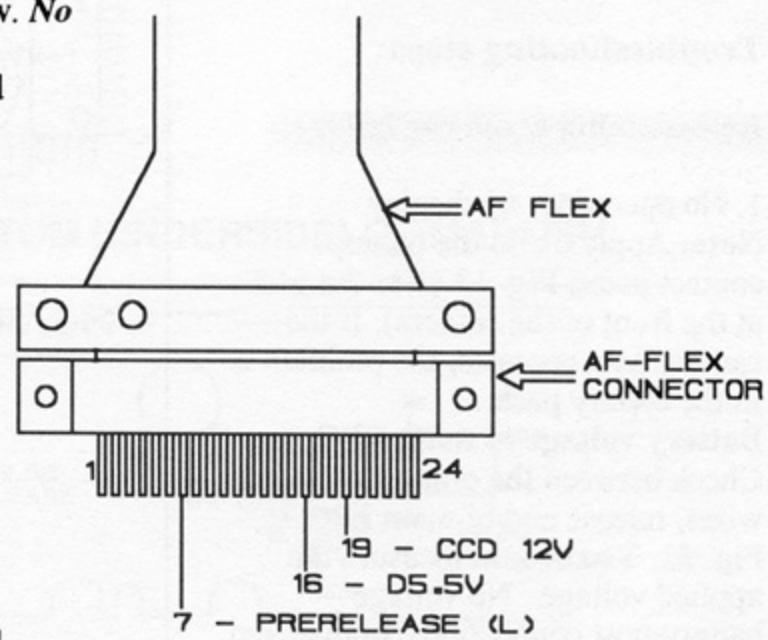
3. fo resistor (maximum-aperture resistor)

- Remove the rewind-end front body covering and the metal plate over the front-plate access cutout, Fig. 10.
- Check the voltage at the green wire through the cutout with the prerelease switch on or during the 16-second timer. With no lens, you should measure V-REF (3.3V). The voltage should smoothly decrease as you turn the maximum-aperture ring in a ccw direction—to around 0.42V with the maximum-aperture ring

fully ccw. Typical value with a 50mm f/1.8 lens—2.5V.

4. Main FPC test points

You can often determine if



the problem is in the main FPC or in another part of the circuit by checking signals at the main FPC test points. To reach the test points:

- Remove the bottom cover, the tripod-socket base plate, and the tape holding the wires at the release end, Fig. 1.
- Remove the 3 screws holding the bottom of the main FPC (post screw at rewind end, long screw at release end, short screw at center).
- Raise the bottom of the main FPC, Fig. 2—you can now reach the CPU, IC MPX-1, and the test points at the bottom inside section of the main FPC (shown in *Troubleshooting steps*).

5. TV resistor

Check voltage at the TV TP on the

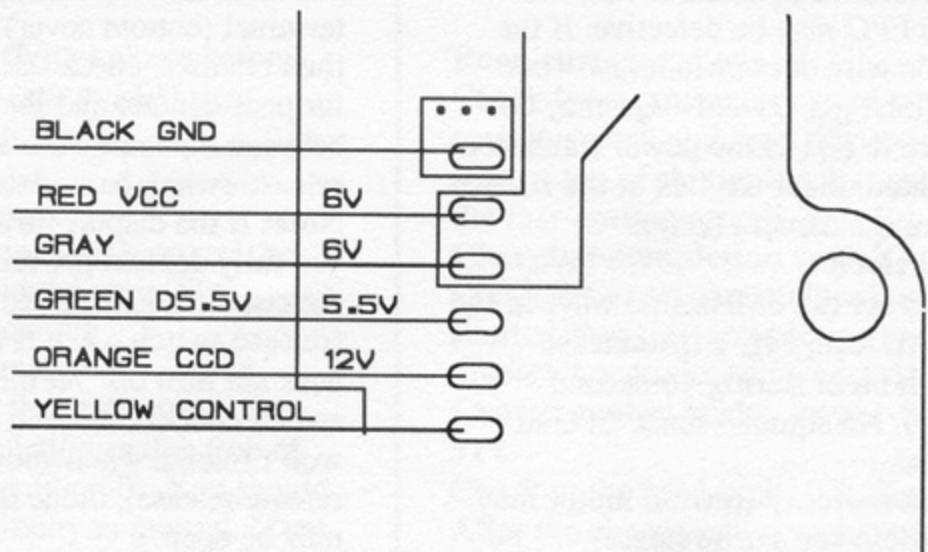


FIG. 49 FRONT OF MAIN FPC, MIRROR BOX REMOVED

speed-dial FPC, Fig. 50, with the prerelease switch on or during the 16-second timer. The voltage should decrease as you set slower shutter speeds as shown in the chart, Fig. 50.

Troubleshooting steps:

Release failure, mirror failure:

- No operation, no display

Note: Apply 6V to the battery-contact posts, Fig. 13 (+ to the post at the front of the camera). If the camera now operates, the problem is in the battery pack.

Battery voltage to main FPC

Check between the orange and black wires, release end of main FPC, Fig. 51. You should measure the applied voltage. No voltage—battery-post connections, orange and black wires to power-supply base plate.

Power switch

Check at the gray wire, bottom release end of main FPC, Fig. 51. With the drive-mode selector in any position other than L, you should measure 6V. No voltage—power switch, poor contact, or solder between main FPC and release-switch base plate.

DC/DC converter

Check for D5.5V—see, *Circuit Test Procedures #1*, page 25.

Q1-out

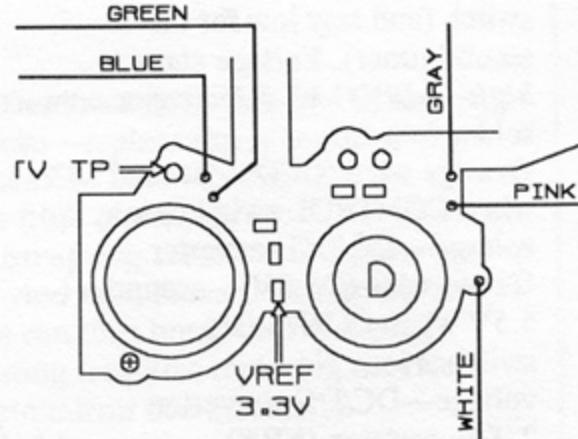
Check at the white wire, bottom release end of main FPC, Fig. 51—around 3.5V with the prerelease switch on and during the 16-second timer. No voltage—check at the purple wire, Fig. 51 (Q1 base). The purple wire should switch from around 5.5V to 5.3V when you close the prerelease switch. If not, the main FPC may be defective. If the purple wire does switch low—but you don't get Q1-out—Q1 may be defective (Q1 is the power transistor mounted under the flex at the release end of the camera body).

CPU clock

Check for the 8MHz sine wave at the X-TAL lead, Fig. 2 (prerelease switch on or during 16-second timer). No signal—main CPU or X-TAL.

Filter switches (rewind motor may run when you push release)

Check the filter switches (*Switch*



SPEED	VOLTAGE	SPEED	VOLTAGE
1/8000	3.35v	1/30	1.89v
1/4000	3.17v	1/15	1.71v
1.2000	2.98v	1/8	1.52v
1/1000	2.80v	1/4	1.33v
1/500	2.61v	1/2	1.14v
1/250	2.43v	1	0.95v
1/125	2.24v	2	0.77v
1/60	2.07v	4	0.58v

FIG. 50 VOLTAGES AT TV TP

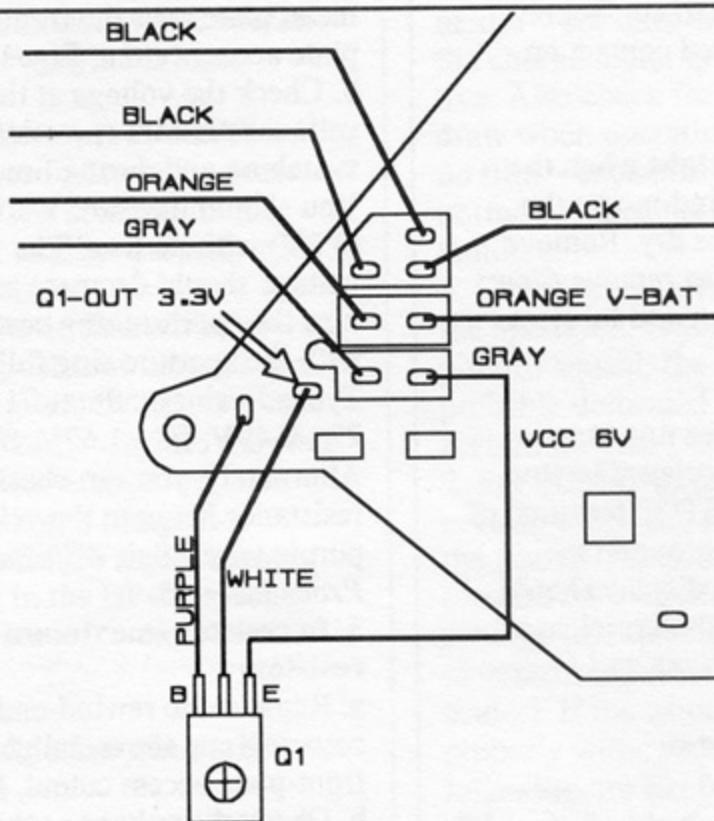


FIG. 51 BOTTOM OF MAIN FPC, RELEASE END

Locations and Checks) and the coupling between the filter lever, Fig. 14, and the filter-selection lever.

- No release, display o.k.

Release switch

Short across the cable-release terminal (bottom cover). If the shutter then releases, check the release switch for poor contact and for poor solder between the main FPC and the release-switch base plate, Fig. 52.

Note: If the display turns off when you fully depress the release button, the circuit is getting the release signal (release switch o.k.). If the display does not turn off, yet the release switch checks o.k. (and the shutter won't release when you short the remote release), diode D1, Fig. 54, may be open.

Camera-back switch (brief motor

sound each time you push release button)

Check for a constantly closed camera-back switch (*Revised Sections #10*).

Release magnet (alarm LED flickers for 16 seconds after you fully depress release button)

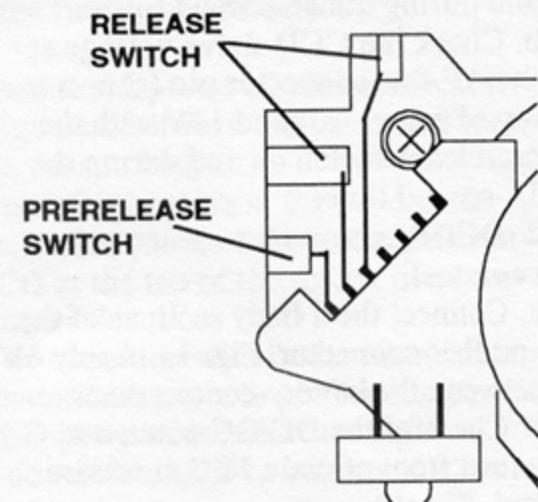


FIG. 52 SPEED-DIAL BASE PLATE

Disconnect the red and black release-magnet wires, Fig. 55. Apply around 3V between the wires—the release magnet should separate, and the mirror should move up. If not, the release magnet is defective or sticking. Coil resistance— 30Ω .

Q29

Short the base of Q29, Fig. 55, to ground—the mirror should release. If not, Q29 may be open or have poor solder.

Main CPU

Check at the base of Q29, Fig. 55, and push the release button—you should get a low pulse. No pulse—main CPU defective or poor solder (pin 60, Fig. 76).

3. No operation, mirror in raised position

Charge motor MM

Disconnect the green (or yellow) MM wire from the power-tr FPC (bottom of camera, release end, Fig. 59). Apply 3V between the green wire (+) and ground—the charge motor should run, returning the mirror.

Note: The charge motor should draw around 100-200ma. If you get excessive current draw (around 800ma), the charge motor may be defective.

End flex connector

Remove the cover plate at the release end of the camera body. Clean the connections between the power-tr FPC and the main FPC (bottom 2 sections).

Power-tr FPC, main FPC

Raise the bottom of the main FPC, Fig. 2. Apply power and short the charge TP, Fig. 53, to ground—the charge motor should run. If not, the

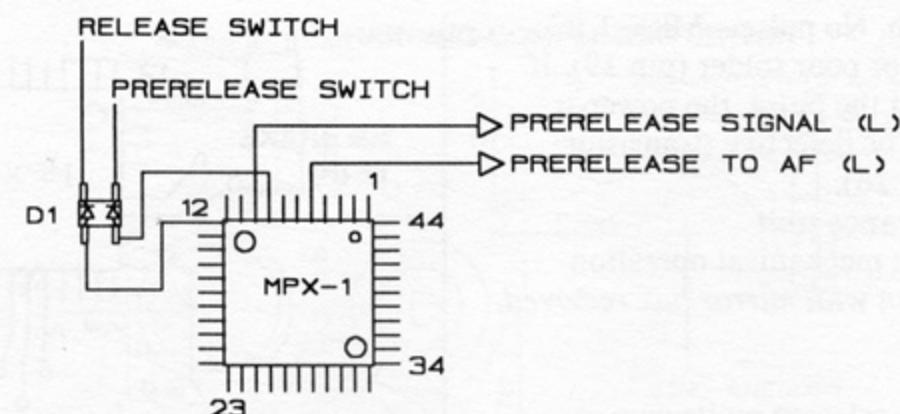


FIG. 54 MPX-1 AT BOTTOM (UNDERSIDE) OF MAIN FPC

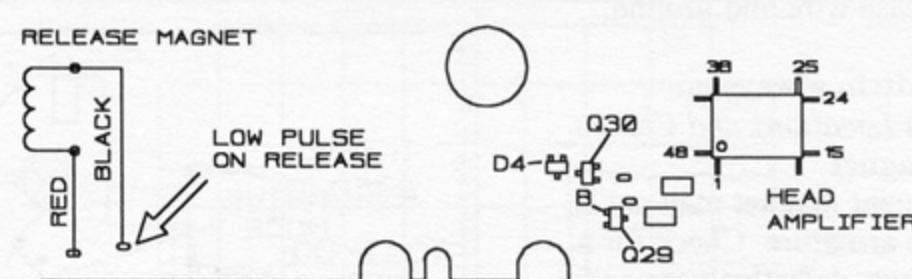


FIG. 55 BOTTOM OF MAIN FPC

power-tr FPC may be defective (transistor Q25, Fig. 26). If the charge motor does run, the main FPC may be defective (MPX-1 IC or solder at pin 21, Fig. 54).

4. No operation, alarm LED always on—runs for auto load with no film, back closed

Film-detection pin

Check by pushing in the film-detection pin next to the sprocket, Fig. 3—the film-detection pin should move in smoothly and return on its own. If the film-detection pin binds or sticks, it may be burred (replace the film-detection pin by removing the plate at the back of the sprocket).

Film-detection switch

See, *Switch Locations and Checks*.

5. Delay after shutter closes before mirror returns, alarm LED then flashes for 16 seconds

Front-flex connector

Clean the connections between the shutter FPC and the main FPC.

Rear-curtain switch

Mechanically release the shutter. Then check at the gray wire to the charging-completion switch (top of speed-dial FPC, Fig. 60). You should get direct continuity to ground. If not, the rear-curtain switch isn't making

contact.

Note: You can reach the rear-curtain switch at the top of the shutter block after lifting aside the speed-dial base plate.

6. Mirror rises part way when you release shutter, alarm LED then flashes for 16 seconds

Charging-completion switch

See, *Switch Locations and Checks*.

Front-flex connector

Clean the front-flex connector (connections between main FPC and speed-dial FPC), Fig. 13.

Main CPU

Also check solder (pin 44).

7. Charge motor continues running after exposure

Rear-curtain switch

Check for a constantly closed rear-curtain switch and for a disconnected spring, top of shutter block (next to the rear-curtain switch, Fig. 19).

Charging-completion switch

Check for a constantly closed or shorted charging-completion switch (*Switch Locations and Checks*).

Charge-motor brake, power-tr FPC

Check at the MM-brake TP, Fig. 57. After the charge motor recharges the mirror and shutter, the TP should

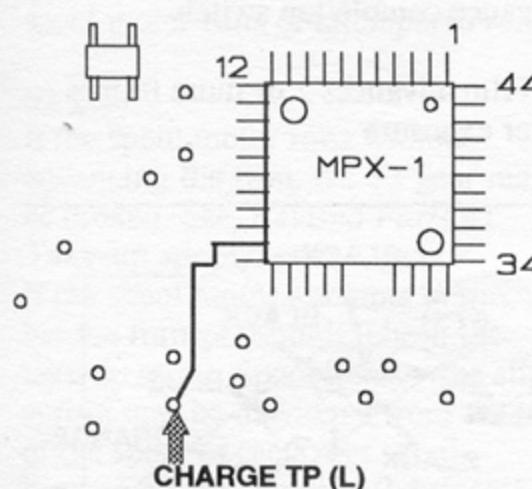


FIG. 53 UNDERSIDE OF MAIN FPC

pulse high. No pulse—MPX-1 IC defective or poor solder (pin 19). If you do get the pulse, the power-tr FPC may be defective (transistor Q26, Fig. 26).

Film-advance unit

Check the mechanical operation (*Operation with mirror box removed, page 8*).

8. Shutter releases on its own

Remote release

Check for a short between the gray remote-release wire and ground, Fig. 48.

Release switch, always on

See, *Switch Locations and Checks*.

Release magnet

The permanent magnet may not be holding the armature. Check for a dirty interface, defective permanent magnet.

Film-advance unit

Check the mechanical operation (*Operation with mirror box removed, page 8*).

Drive modes:

1. CH operation in CS mode

Front-flex connector

Clean the connections between the speed-dial FPC (top section) and the main FPC.

Charge encoder

Check at the blue wire of the charge encoder, Fig. 56, as you operate the camera—you should get a pulse-train signal (scope settings—2 v/cm,

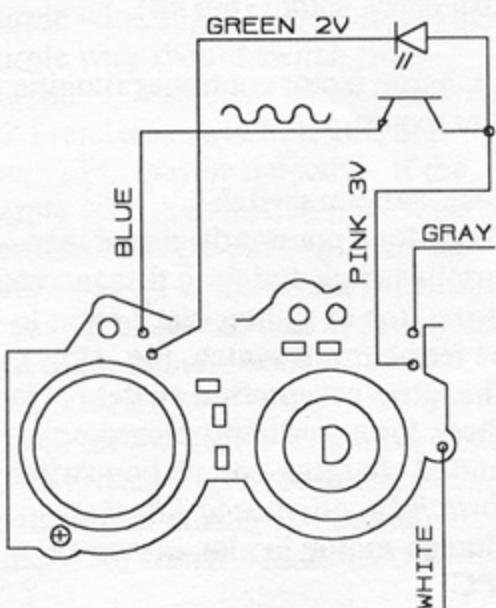


FIG. 56 SPEED-DIAL FPC

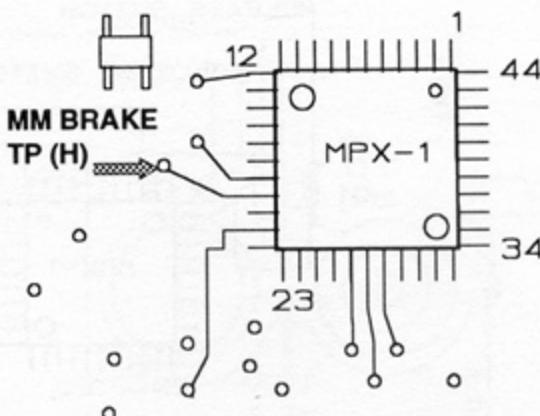


FIG. 57 UNDERSIDE OF MAIN FPC

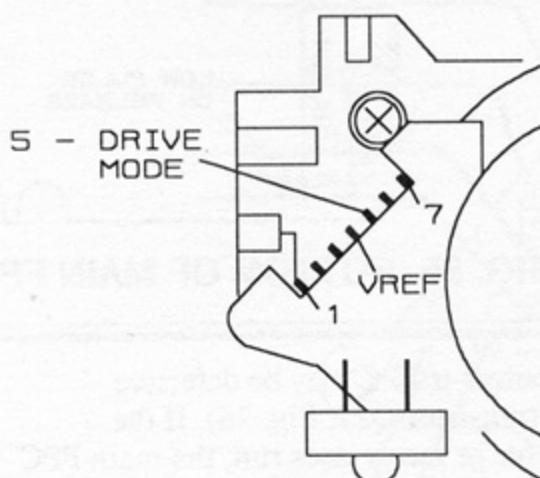


FIG. 58 RELEASE-SWITCH BASE PLATE

0.5ms sweep).

Note: The voltages at the pink and green wires, Fig. 56, are supplied by the main FPC as the charge motor is running. If you don't get the voltages, the main FPC may be defective or the front-flex connector may be dirty. If you do get the output from the charge encoder, but the camera still delivers CH in the CS mode, the MPX-1 IC may be defective or have poor solder (pin 30, Fig. 57).

2. Single operation in all drive modes

VREF to drive-mode selector

Check for VREF (3.3V) at connection #4, main FPC to release-switch base plate, Fig. 58 (prerelease switch on or during timer). No voltage—poor solder between main FPC and release-switch base plate.

Drive-mode VR

Check the voltage at connection #5, main FPC to release-switch base plate, Fig. 58. You should get close to 0V at single, around 0.88V at CH, around 1.8V at CL, and around 2.22V

at CS. If you get 0V at all settings, check for poor contact in the drive-mode VR (under drive-mode selector).

3. Charge motor won't run or complete cycle in CS mode—or, with film loaded, 2 release strokes required (1 to charge mirror, 1 to advance film)

Battery voltage, low

Charge motor MM

Check current draw in the CS mode (should be under 800ma). If you get excessive draw, check the charge motor MM. See, *Motor Locations and Checks*.

Battery pack MB-21

Check the adjustments.

Film advance, rewind:

1. Uneven film spacing, double exposures

Film-detection pin

Check the film-detection pin, Fig. 3, for free movement. Binding may be caused by an abrasion on the film-detection pin (replace the film-detection pin by removing the plate below the sprocket).

Film-advance completion switch

Check for contact bounce at the white wire to the speed-dial base plate, Fig. 60. Fig. 61 shows the trace at a 20ms sweep time. Contact bounce over 1.5V may shut off the spool motor. Clean the film-advance completion switch (you can reach the contacts without removing the speed-dial base plate, Fig. 4). Or reform the film-advance completion switch for better contact. If you still get excessive contact bounce, replace the film-advance completion switch.

2. Film advances 2 or more frames after exposure

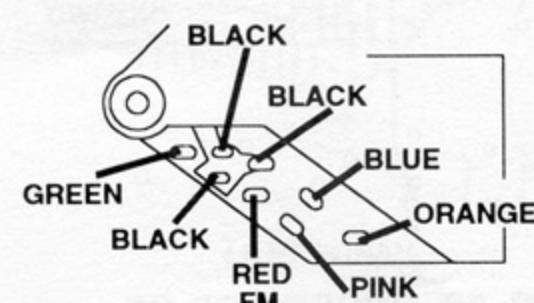


FIG. 59 POWER-TR FPC

Stopper-latch lever
Check the sprocket latching by turning the sprocket from the back of the camera. After the sprocket has turned 8 teeth, it should latch (disengage the sprocket by pushing the release button—the charge motor runs long enough to disengage the sprocket). If the sprocket fails to latch, the stopper-latch lever, Fig. 35, may be binding the film-advance stopper. Bend down the end of the stopper-latch lever.

3. No auto load, spool motor doesn't run

AF-flex connector

Clean the edge connector, Fig. 63.

Film-advance completion switch, film-detection switch

See, *Switch Locations and Checks*.

Spool motor FM

Disconnect the red wire from the power-tr FPC (bottom release end of camera, Fig. 59). Apply 3V between the red wire (+) and ground. The spool motor FM should run in the film-advance direction.

Note: With 3V applied and no film, the spool motor should draw around 25ma. If you get excessive current draw, check for a bind in the take-up spool.

Main FPC, power-tr FPC

Raise the bottom of the main FPC, Fig. 2. Push the release button part way and short the FM TP, Fig. 64, to ground—the spool motor FM should run. If not, the power-tr FPC may be defective (transistor Q23, Fig. 26). If the spool motor does run, the main FPC may be defective (MPX-1 IC or solder at pin 20).

4. No auto load or film advance, spool motor runs or attempts to run

S2 gear

If the spool motor runs without advancing the film, the S2 gear may be broken. See, *Revised Parts #1*.

Take-up spool, rewind gear

If the spool motor attempts to run, but the transport binds, check the take-up spool. Spool binds—the slip spring may be dislodged from the top of the spool or the lower spool bearing may be binding (lubricate with grease).

Also make sure the upper rewind

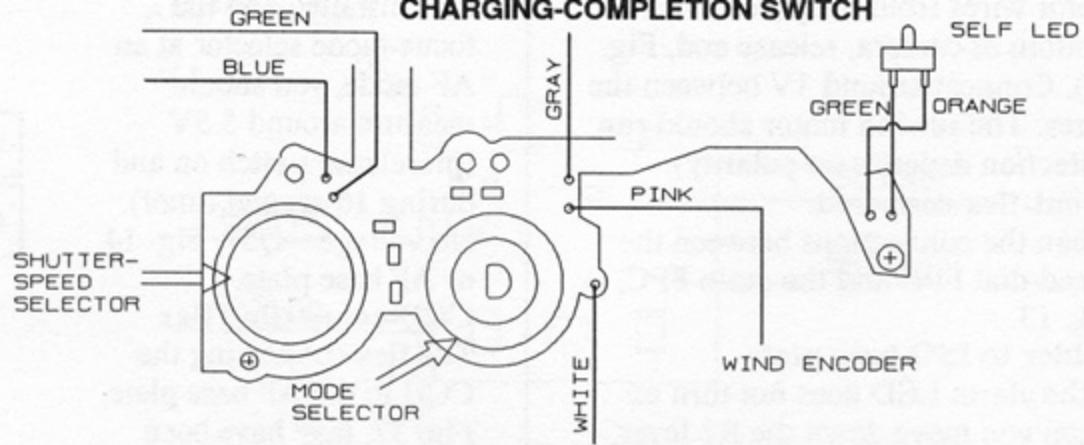


FIG. 60 SPEED-DIAL FPC

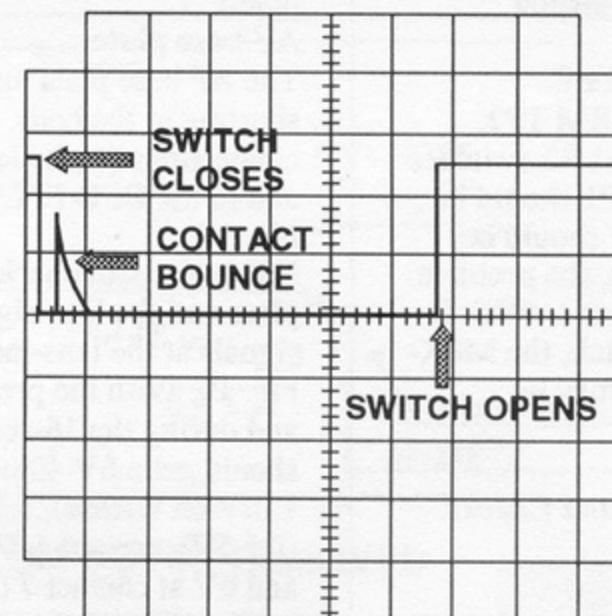


FIG. 61 TRACE AT FILM-ADVANCE COMPLETION SWITCH SHOWING CONTACT BOUNCE — 2V/cm, 20ms SWEEP TIME

gear (spring-loaded gear on underside of rewind base plate, Fig. 41) disengages from the pinion on the rewind-coupling shaft. With the R2 lever in the up (advance) position, the rewind-coupling lever, Fig. 42, should lift the upper rewind gear above the pinion. If not, it may be necessary to bend the end of the rewind-coupling lever.

5. No auto load (necessary to continue releasing shutter to advance counter to "1")

Counter switch

See, *Switch Locations and Checks*.

Front-flex connector

Clean the front-flex connector, Fig. 13.

6. No rewind, rewind motor runs

Rewind gear

Check for a broken rewind gear, Fig. 2 (see, *Revised Sections*).

Rewind-gear unit

Check for a damaged worm gear and

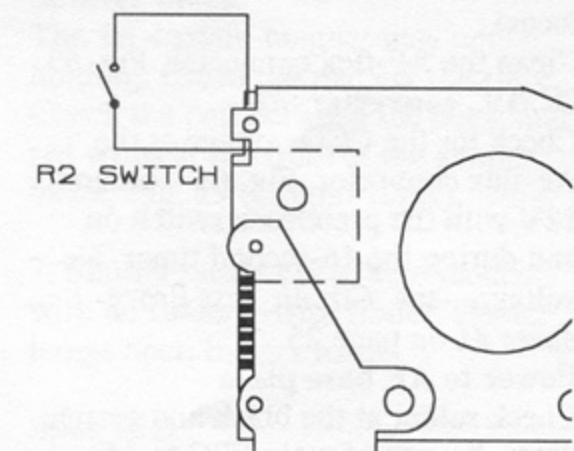


FIG. 62 ISO BASE PLATE

a bent gear-unit frame, Fig. 2 (see, *Revised Sections*).

7. No rewind, rewind motor does not run

AF-flex connector

Clean the AF-flex edge connector, Fig. 63.

R1 switch, R2 switch

See, *Switch Locations and Checks*.

Rewind motor RM

Disconnect the pink and blue rewind-

motor wires from the power-tr FPC (bottom of camera, release end, Fig. 59). Connect around 3V between the wires. The rewind motor should run (direction depends on polarity).

Front-flex connector

Clean the connections between the speed-dial FPC and the main FPC, Fig. 13.

Solder to ISO base plate

If the alarm LED does not turn on when you move down the R2 lever, and the R2 switch checks o.k., check solder between the ISO base plate and the main FPC (R2-switch connection), Fig. 62.

Power-tr FPC, main FPC

Check at RM TP1 and RM TP2, Fig. 64, with the R1 and R2 switches on, film loaded. RM TP1 should be low (0V), and RM TP2 should be high (around 4V). If so, the problem may be a defective power-tr FPC. If the RM TP's don't switch, the MPX-1 IC or the main CPU may be defective (main FPC).

Filter switch

See, *Switch Locations and Checks*.

Autofocus:

1. No lens movement on AF

AF-flex connector (shutter will release even though lens isn't in focus)

Clean the AF-flex connector, Fig. 63.

DC/DC converter

Check for the CCD voltage at the AF-flex connector, Fig. 63—around 12V with the prerelease switch on and during the 16-second timer. No voltage—see, *Circuit Test Procedures #1* on page 25.

Power to AF base plate

Check solder at the black and orange wires, bottom of main FPC to AF base plate, Fig. 51.

Prerelease switch

See, *Switch Locations and Checks*.

Prerelease signal to AF base plate

Check the prerelease signal at the AF-flex connector pin, Fig. 63—the signal should switch low when you push the release button part way. Signal stays high—MPX-1 IC defective or poor solder (pin 5).

AFPC VBAT

Raise the bottom of the main FPC, Fig. 2, and check at the end of the resistor shown in Fig. 65. With the

lens installed and the focus-mode selector at an AF mode, you should measure around 5.5V (prerelease switch on and during 16-second timer). No voltage—Q57, Fig. 14, or AF base plate.

CCD-connecting flex

The flex connecting the CCD to the AF base plate, Fig. 37, may have been broken from impact (requires replacing AF base plate).

AF base plate

The AF base plate may be shorting to the body. Insulate the flex connections (to the lens-signal FPC and to the CCD FPC) with tape, Fig. 37.

Note: You can check the AF base plate and the lens-signal FPC by the signals at the lens-mount contacts, Fig. 10. With the prerelease switch on and during the 16-second timer, you should get a 6V 40ms pulse at contact 1 (0V on release), 5.5V at contact 4 (D5.5V), around 4.7V at contact 6, and 0V at contact 7 (gnd). At contacts 2, 3, and 5 you should get digital activity. Contact 2 switches to 0V on release; contacts 3 and 5 switch to

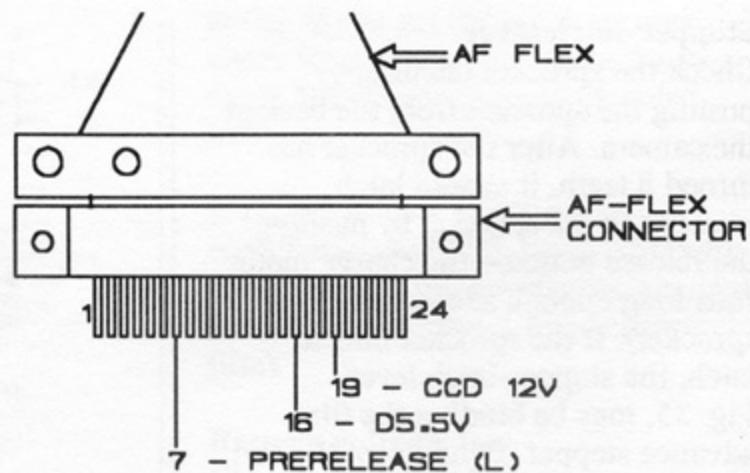


FIG. 63 AF-FLEX CONNECTOR, BOTTOM OF CAMERA

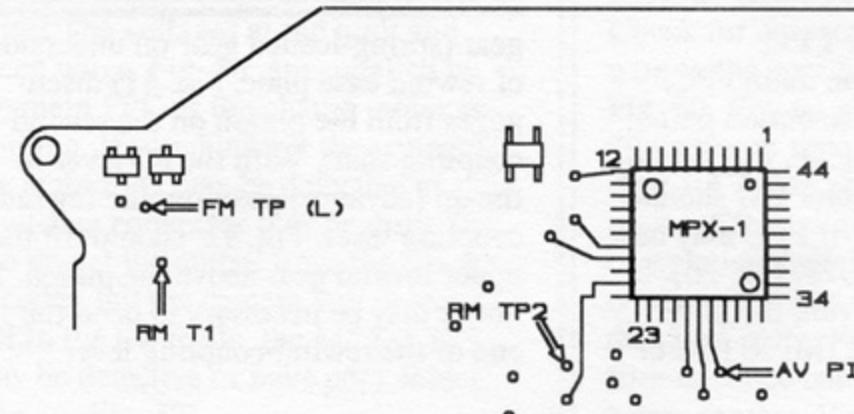
2. Lens seeks

Dust on CCD

Blow off the CCD through the opening, bottom of the mirror box.

AF encoder

Remove the bottom cover, tripod-socket base plate, and the tape holding the wires, Fig. 1. Remove the 3 screws and raise the bottom of the main FPC as shown in Fig. 2. Check the output of the AF encoder at the pink wire, Fig. 65, as the lens is seeking. You should get the trace shown in Fig. 7. The peaks of the



5.5V on release. If you don't get the signals, the lens-contact FPC may be broken or shorted. Or the AF base plate may be defective. Repair may require the Nikon computer interface.

Lens-release switch

Check the lens-release switch, Fig. 15, for poor contact (the lens-release switch provides the ground contact for the AF switches).

AF SW1, AF SW2

See, *Switch Locations and Checks*.

AF motor

See, *Motor Locations and Checks*.

FIG. 64 MAIN FPC, BOTTOM

sine waves should be equal—if not, the AF encoder may be out of position. Or the adjustment may be incorrect (see, *Adjustment Procedures*). If you get no trace, the AF encoder may be defective.

Exposure:

1. Diaphragm always stops down fully

End flex connector

Clean the connections between the lock-encoder FPC (top section) and the main FPC.

Aperture encoder AV PI

Check at the AV PI test point, Fig. 64. You should get a sine-wave signal as the diaphragm is closing. Scope settings —0.5ms sweep time, 2 v/cm. No signal—aperture encoder AV PI, Fig. 38.

Aperture magnet, main FPC

Check for the aperture-magnet stop signal at the collector of Q5, Fig. 64. The voltage, around 5.5V, should pulse low (around 2V) when you release the shutter. No pulse—main CPU (or pin solder, pin 62). Pulse o.k.—aperture magnet or lock-encoder FPC (Q6, Q7, Fig. 43).

2. Diaphragm operation erratic or always fully open

Ratchet gear

Pull down the aperture lever, Fig. 10, to check for rough movement. If the aperture lever feels rough, lubricate the ratchet gear, Fig. 14, with oil.

Aperture magnet

Check for a dirty interface, Fig. 14, (erratic operation) or a defective permanent magnet (diaphragm always fully open).

3. Shutter curtains run together, all settings

Front-flex connector

Clean the connections between the shutter FPC and the main FPC.

2nd-curtain magnet

Check the coil between the green and blue wires, front of shutter FPC, Fig. 19 (around 100K).

4. Shutter curtains run together, fast-speed settings

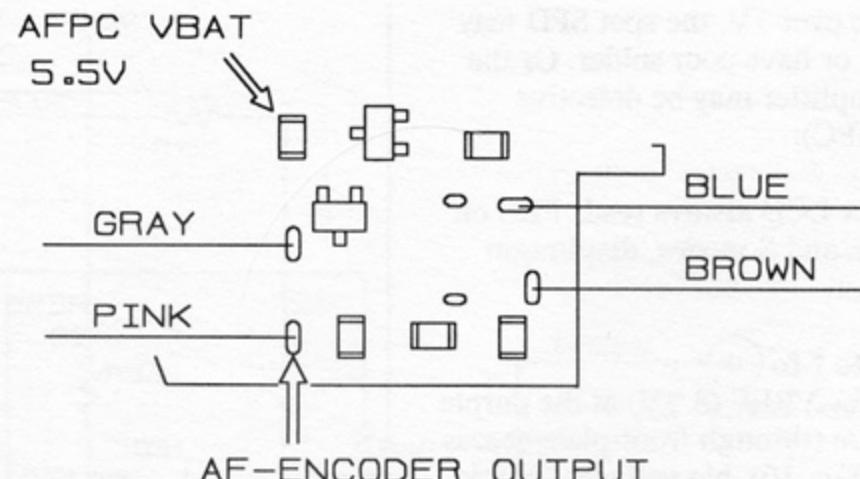


FIG. 65 AF BASE PLATE

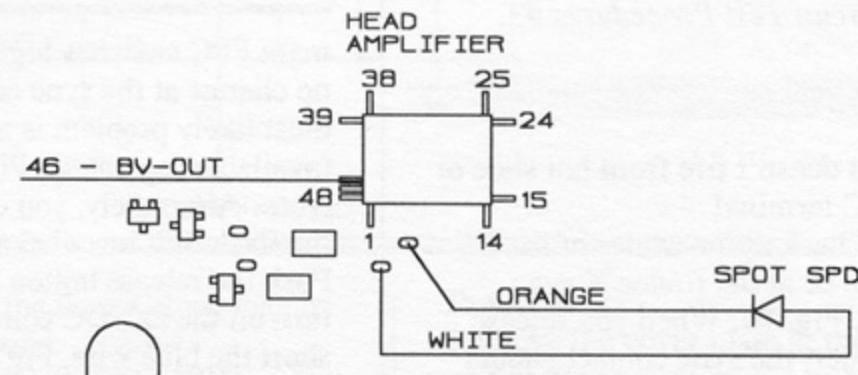


FIG. 66 BOTTOM COVER REMOVED

Shutter block

If the camera has the old-style shutter, replace with the revised shutter block (*Revised Sections #3*). If the camera has the new-style shutter block, check the 1st-curtain magnet armature for a disconnected spring, Fig. 21.

Curtain-travel times

Check for a slow 1st-curtain travel time. With the mirror box removed, you can reach the 1st-curtain travel-time adjustment from the front bottom of the shutter block.

5. Shutter curtains run together at manual speeds, or manual shutter speeds don't correspond to setting

VREF to TV resistor

Check VREF at the speed-dial FPC, Fig. 50 (3.3V, prerelease switch on and during 16-second timer). No voltage—clean front flex connector.

TV resistor

See, *Circuit Test Procedures #4*.

6. No change in the fast speeds — speeds above 1/125 all around 1/60

Front-flex connector

Clean the connections between the shutter FPC and the main FPC.

Shutter block

The 1st-curtain magnet may not be holding. Clean the magnet interface. Check the coil between the black and red wires at the front of the shutter block, Fig. 19 (around 100K).

7. Shutter hangs open, auto modes with no finder—with finder, shutter hangs open in spot mode

Spot SPD

Disconnect the orange and white spot-SPD wires, Fig. 66. Measure the voltage between the wires as you vary the BV (+ on white). The voltage should change from 0V (no light) to around 0.5V with high light striking the spot SPD (the spot SPD mounts to the CCD block).

Head amplifier

Check the output at pin 46, Fig. 66, as you vary the BV. The output should change as you change the light level from around 1.4V to around 2.3V (more + with lower BV). If you

measure over 3V, the spot SPD may be open or have poor solder. Or the head amplifier may be defective (main FPC).

7. Finder LCD always reads FEE on program and S modes, diaphragm fully open

VREF to f-fo

Check for VREF (3.3V) at the purple FREF wire (through front-plate access cutout, Fig. 10). No voltage—check for poor solder between the main-FPC hard board and the flex at VREF, Fig. 71.

f-fo resistor

See, *Circuit Test Procedures #3*.

Flash:

1. Flash doesn't fire from hot shoe or from PC terminal

Note: Check at the center of the PC terminal or at the finder X-sync contact, Fig. 70. When you release the shutter, the sync contact should switch high—around 0.85V, the voltage drop across the triac, Fig. 69, when the triac switches on. If you are getting the output, the problem may be in the flash unit. Check the following for no output:

X-sync contacts, front-flex connector

Check at the yellow wire, rewind end of main FPC, Fig. 67. With the shutter open, the yellow wire should switch high (around 3.5V). No signal—clean the front-flex connector (connectors between shutter FPC and main FPC), check the X-sync contacts (*Switch Locations and Checks*).

Q38, emitter-to-collector short

Check at the blue wire, rewind end of main FPC, Fig. 67. With the shutter open, the blue wire should switch to around 2V (Q38 off). If the blue wire stays low, Q38 may be shorted or the main CPU may not be turning off Q38. Check the base signal to Q38—you should measure around 0.7V (prerelease switch on). The base should pulse low when you release the shutter. If not, the main CPU may be defective.

Thyristor trigger base plate

Check solder to the wires at the thyristor trigger base plate, Fig. 48. If the blue wire at the bottom of the

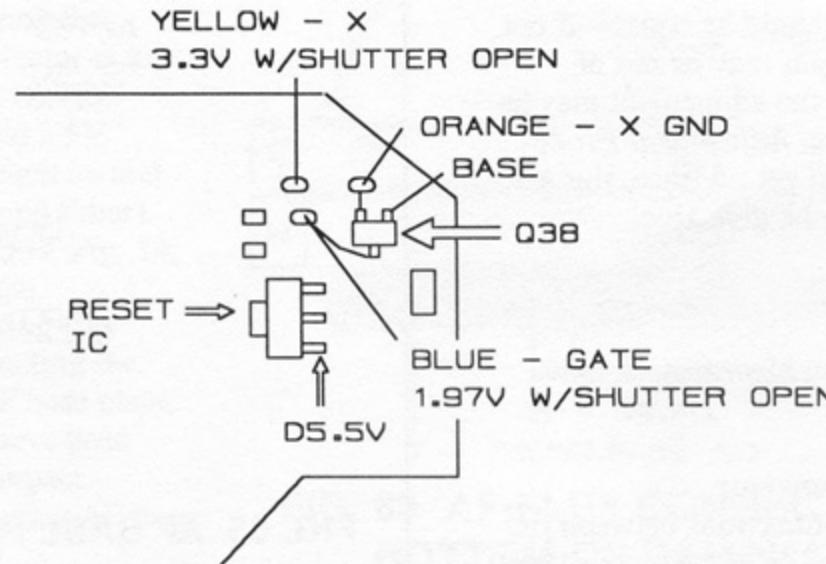


FIG. 67 BOTTOM OF MAIN FPC, REWIND END

main FPC switches high—but you get no change at the sync contact—the most likely problem is an open triac (available separately, Fig. 68).

Note: Alternately, you can check with the flash unit installed and charged. Push the release button part way to turn on the DC/DC converter. Then short the blue wire, Fig. 67, to D5.5V—the flash should fire. If the flash does fire, the thyristor trigger base plate isn't getting the signal from the main FPC (X-sync contacts, Q38). If the flash still does not fire, the problem is in the thyristor trigger base plate.

Display:

1. No camera LCD (LCD at top of focusing screen)

Display-block flex connector

Clean the contact plate and the flex contacts, Fig. 40. If the camera has the old-style contact plate, replace it with the revised contact plate (*Revised Parts*).

Solder to MPX-2 hard board

Check the solder connections at

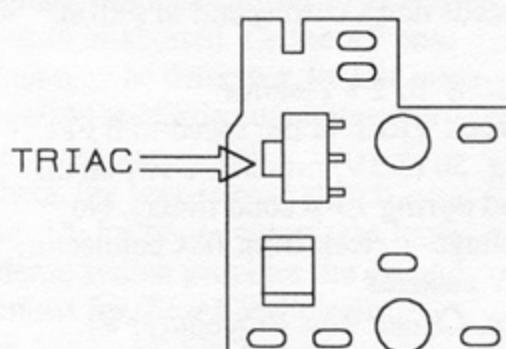


FIG. 68 THYRISTOR TRIGGER BASE PLATE

connections 6, 7, and 8 between the main FPC and the hard board, front rewind side of lens, Fig. 71 (right-hand edge).

Main FPC, display block

Check signals at the hard board, Fig. 71, with the LCD block removed. With the prerelease switch on, you should get the clock signal at the LCD clock connection (right-hand edge of hard board, connection #6), Fig. 71. Scope settings—2v/cm, 1ms sweep time. You should get activity at the LCD control I/O (connection #7) and around 5.25V at connection #8. If you do get the signals, the problem may be the display FPC; if you don't get the signals, MPX-2 may be defective.

2. No finder LCD, bottom of focusing screen (DP-20 finder)

Finder rail

Check for a loose finder rail, release side. If the finder rail is loose, the finder contacts may not align.

Finder contacts, bent

Check the contacts on the underside of the finder. All the contacts except the X-sync contact (1st contact) should be in a straight row.

D5.5V to finder contact

Check for D5.5V at the finder-block contact, Fig. 70 (5.5V with prerelease switch on and during 16-second timer). No voltage—check for poor solder between the finder-block FPC and the main FPC at the D.5.5V and ground connections, Fig. 71.

Finder clock, I/O signals

Check for the finder clock at the finder-block contact, Fig. 71 (scope settings—2 v/cm, 5ms sweep). You

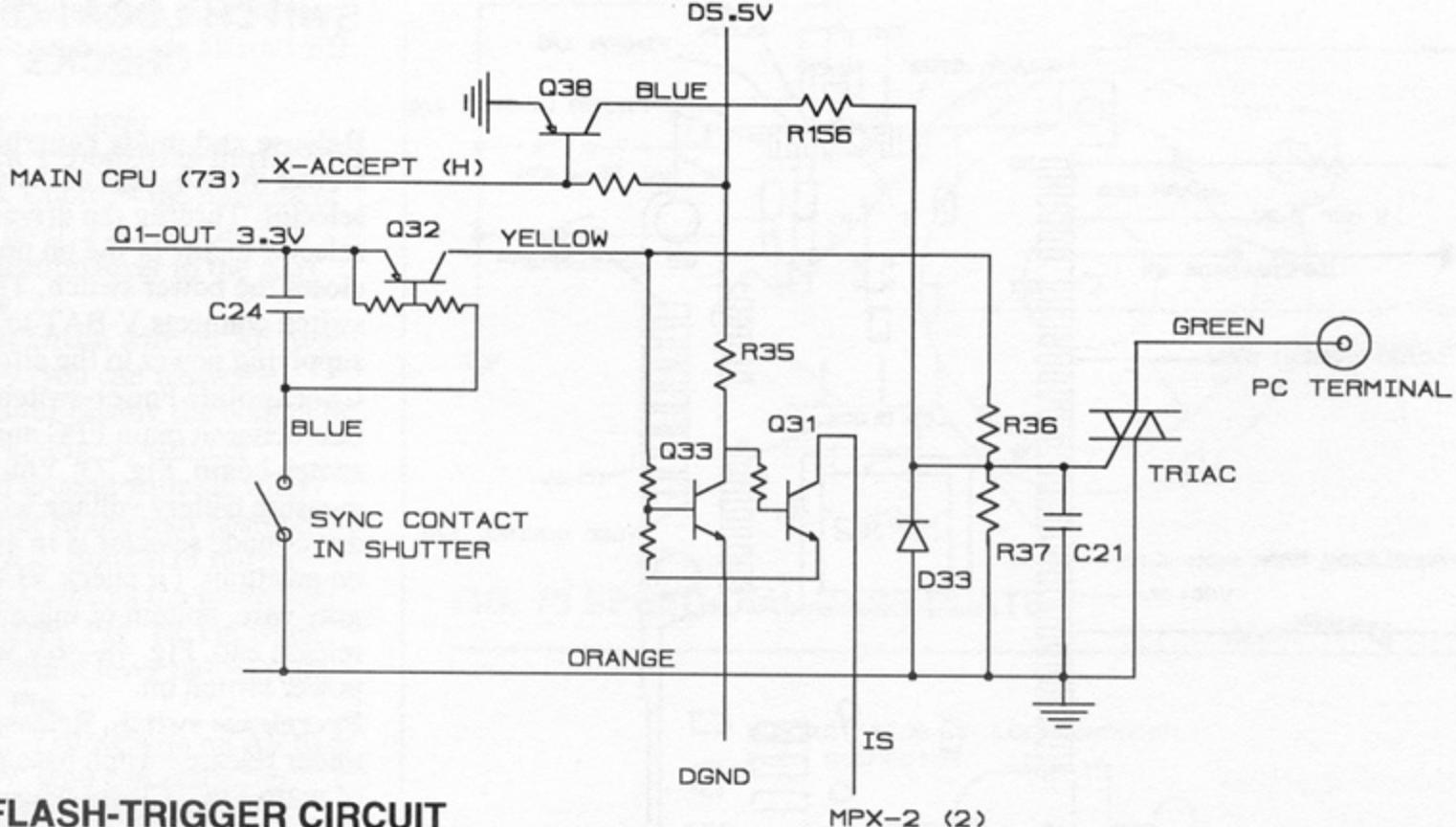


FIG. 69 FLASH-TRIGGER CIRCUIT

should get the clock signal with the prerelease switch on and during the 16-second timer. No signal—check solder between the finder-block FPC and the main FPC, Fig. 71.

3. LCD/LED display does not turn off after 16 seconds

AE-L, AF-L switch

Remove the cover plate at the release end of the camera body and disconnect the top section of the end flex connector. Replace the pressure plate to hold the bottom 2 sections. If the display now turns off after 16 seconds, the AE-L switch or the AF-L switch is staying on, Fig. 43.

Prerelease switch, always on

Check the prerelease switch if the lens moves to focus even though the release button hasn't been pushed part way. See, *Switch Locations and Checks*.

Ready connection

Unsolder the READY connection at the top of the main FPC, rewind side, Fig. 71. If the finder display now turns off after 16 seconds, the ready

connection at the finder block may be shorted to ground.

DC/DC converter, main FPC

Check the DC/DC converter with the mirror box removed, Fig. 49. If CONTROL always stays low, the main FPC is defective (CONTROL should switch high after the 16-second delay). If CONTROL switches high—but you still get the D5.5V and CCD voltages—the DC/DC converter is defective. Also check for a pinched yellow wire (CONTROL).

4. LCD/LED display does not hold on for 16 seconds

Batteries low

Power-supply base plate, loose
Check the screw holding the power-supply base plate (from underside, next to - battery post through access hole).

AF base plate

Disconnect the AF-flex connector, Fig. 9. If the display now stays on for 16 seconds, the AF base plate is defective.

Battery drain:

1. Excessive leakage current, power switch off

Battery connections

Check for corrosion around the power-supply base plate, Fig. 24.

Power-tr FPC

Remove the cover plate at the release end of the camera body and disconnect the 3 sections of the end flex connector. If the current drain stops, the leakage is in the power-tr FPC, Fig. 26.

AF base plate

Disconnect the orange AF V-BAT wire from the bottom of the main FPC, Fig. 48. If the current drain stops, the leakage is in the AF base plate, Fig. 39.

Main FPC

If the current drain continues with the AF base plate and power-tr FPC disconnected, MPX-1, Fig. 64, may be defective (check for corrosion around the pins).

2. Excessive leakage current, power switch on

DC/DC converter

Disconnect the gray VCC wire from the bottom of the main FPC (gray wire that solders to release-side end of land). If the current draw stops, the leakage is in the DC/DC converter.

C28, C29

You can check current draw after disconnecting the $0.1\mu\text{F}$ chip capacitors, Fig. 64. But the capacitors are difficult to reach—they're on the section of main FPC that mounts to the bottom of the body casting. If the

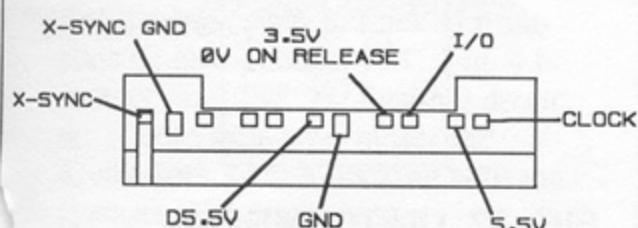


FIG. 70 FINDER CONTACTS

SWITCH LOCATIONS AND CHECKS

Release and mode controls:

Power switch. Part of drive-mode selector. Turning the drive-mode selector to any of the on positions closes the power switch. The power switch connects V-BAT to VCC, supplying power to the circuit.

Checkpoint: Power-switch connection between main FPC and release-switch board, Fig. 73. You should measure battery voltage when the drive-mode selector is in any of the on positions. Or check VCC at the gray wire, bottom of main FPC at release end, Fig. 48—6V with the power switch on.

Prerelease switch. Release side top, under release-switch base plate. Part of main FPC. Closes when you push the release button part way to start the 16-second timer, AF, and AE.

Checkpoint: Prerelease-switch connection on release-switch base plate, Fig. 73, or on underside of power-supply base plate, Fig. 72—direct continuity to ground with the release button partially depressed.

Release switch. Release side top, under release-switch base plate, Fig. 4. Part of main FPC. Closes when you fully depress the release button to release the mirror (release magnet separates).

Checkpoint: Release-switch connection on release-switch base plate, Fig. 73, or on underside of power-supply base plate, Fig. 72—direct continuity to ground with the release button fully depressed.

DX switch. Long contact on ISO base plate, Fig. 8. Closed by the ISO dial at the DX setting. The main CPU then accepts DX information from the cartridge.

Checkpoint: Short across the DX

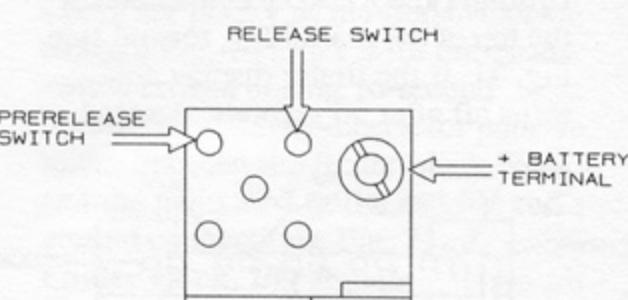


FIG. 72 UNDERSIDE OF POWER-SUPPLY BASE PLATE

capacitors aren't the problem, the leakage may be in an IC (main FPC replacement).

3. Excessive current draw with prerelease switch on and during 16-second timer

AF base plate

Disconnect the AF-flex connector, Fig. 9. If the current draw returns to normal, the leakage is in the AF base plate.

4. Excessive current draw during release cycle, no film

Charge motor MM

See, *Motor Locations and Checks*.

5. Excessive current draw during rewind or film advance

Take-up spool binding

Check by turning the spool in the rewind direction. If the movement feels rough, lubricate the lower spool bearing with grease. If the spool binds, the slip spring may have dislodged from the top end of the spool.

Spool motor FM

See, *Motor Locations and Checks*.

Light leaks:

1. EE pin missing. The EE pin,

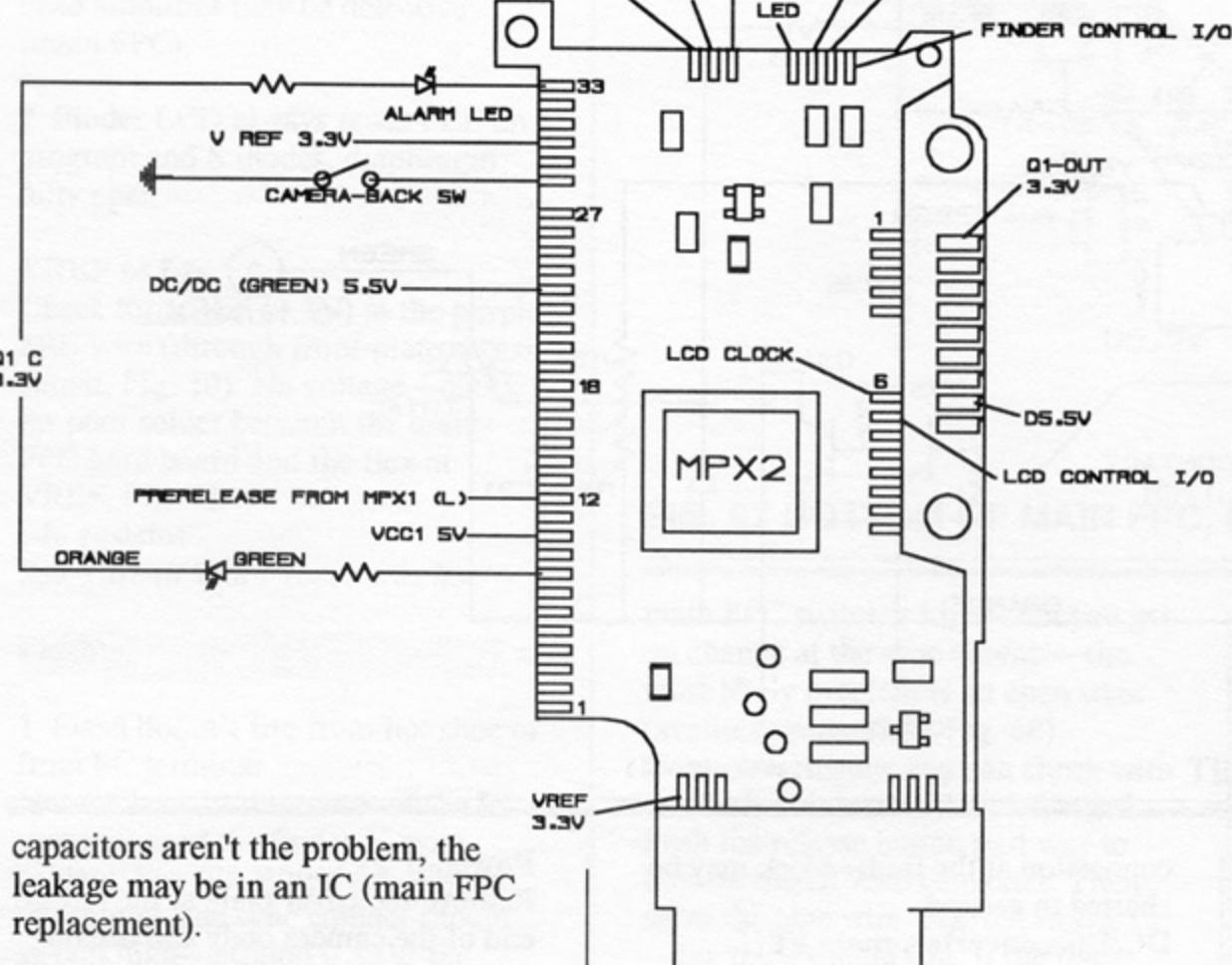


FIG. 71 MAIN FPC, FRONT, REWIND SIDE OF LENS

Fig. 10, is held by an E-clip (behind the lens-mounting ring). If the E-clip comes off, the EE pin can come out—the spring for the EE pin normally stays in place.

2. Flair diagonally across the negative, especially with subjects at close distances—check the pins inside the mirror box that couple to the mirrors (sub mirror and main mirror). Paint the ends of the pins with dull black lacquer.

3. Light leak at cartridge side of negative—the light may come from the alarm LED, Fig. 8. Nikon now supplies a doughnut-shaped porous-plastic light trap 1K117-427-1. Cement the light trap around the alarm LED on the ISO base plate.

4. Light leak from cartridge window on back cover—Nikon has revised the porous-plastic light trap around the window. The drawing here shows the shape of the revised light trap—1K116-836-2.

switch, Fig. 8, and push the release button. With no film, the alarm LED should flash.

Mirror-box switches:

Filter switch 1. Bottom of mirror box, Fig. 38. Controls the movement of the filter lever, Fig. 14. On with the filter-selection lever in the start position, Fig. 2.

Checkpoint: Green wire on AF base plate, Fig. 39 (you can reach the connection after raising the bottom of the main FPC, Fig. 2)—direct continuity to ground with the filter-selection lever in the start position.

Filter switch 2. Bottom of mirror box, Fig. 38. Controls the movement of the filter lever, Fig. 14. On when the filter-selection lever moves from right to left, Fig. 2.

Checkpoint: Yellow wire on AF base plate, Fig. 39 (you can reach the connection after raising the bottom of the main FPC, Fig. 2)—direct continuity to ground when you push the filter-selection lever from right to left, Fig. 2.

Focus-mode (AF) switches. Back of front plate, rewind side, Fig. 15. Select manual, AF single, and AF continuous modes.

Checkpoint: Blue and white wires, bottom of AF base plate, Fig. 39. In manual focus, neither wire connects to ground. On AF single, the blue wire connects to ground. On AF continuous, the white wire connects to ground.

AF-lock switch. Front side of the lens-encoder FPC, back of front plate, release side, Fig. 43. Locks the focus. **Checkpoint:** Brown wire to AF base plate, Fig. 39, or at lens-encoder FPC unit, Fig. 43—direct continuity to ground with AF-lock button depressed.

Lens-release switch

Back of front plate, rewind side, Fig. 15. Normally on, connecting the AF switches to ground. When you push the lens-release button, the lens-release switch opens and disconnects the AF switches from ground to disable AF operation.

Double-lock switch. Back of front plate on lens-encoder FPC, Fig. 43 (schematic—Fig. 74). Pushing down the double-lock lever closes the double-lock switch, locking both the focus and the exposure.

AE-lock switch. On the front side of

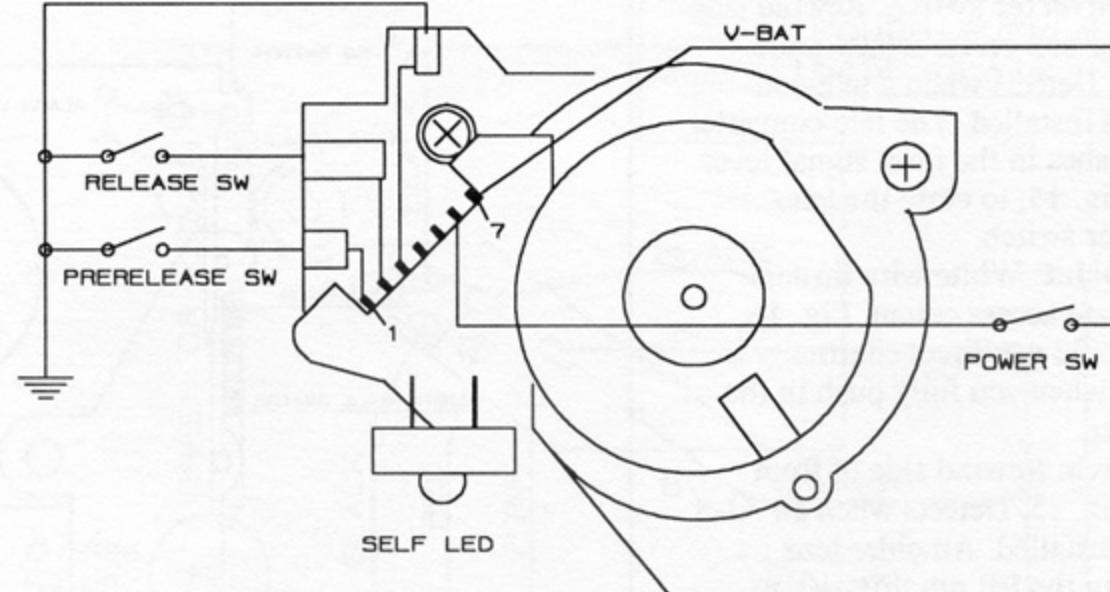


FIG. 73 SPEED-DIAL BASE PLATE

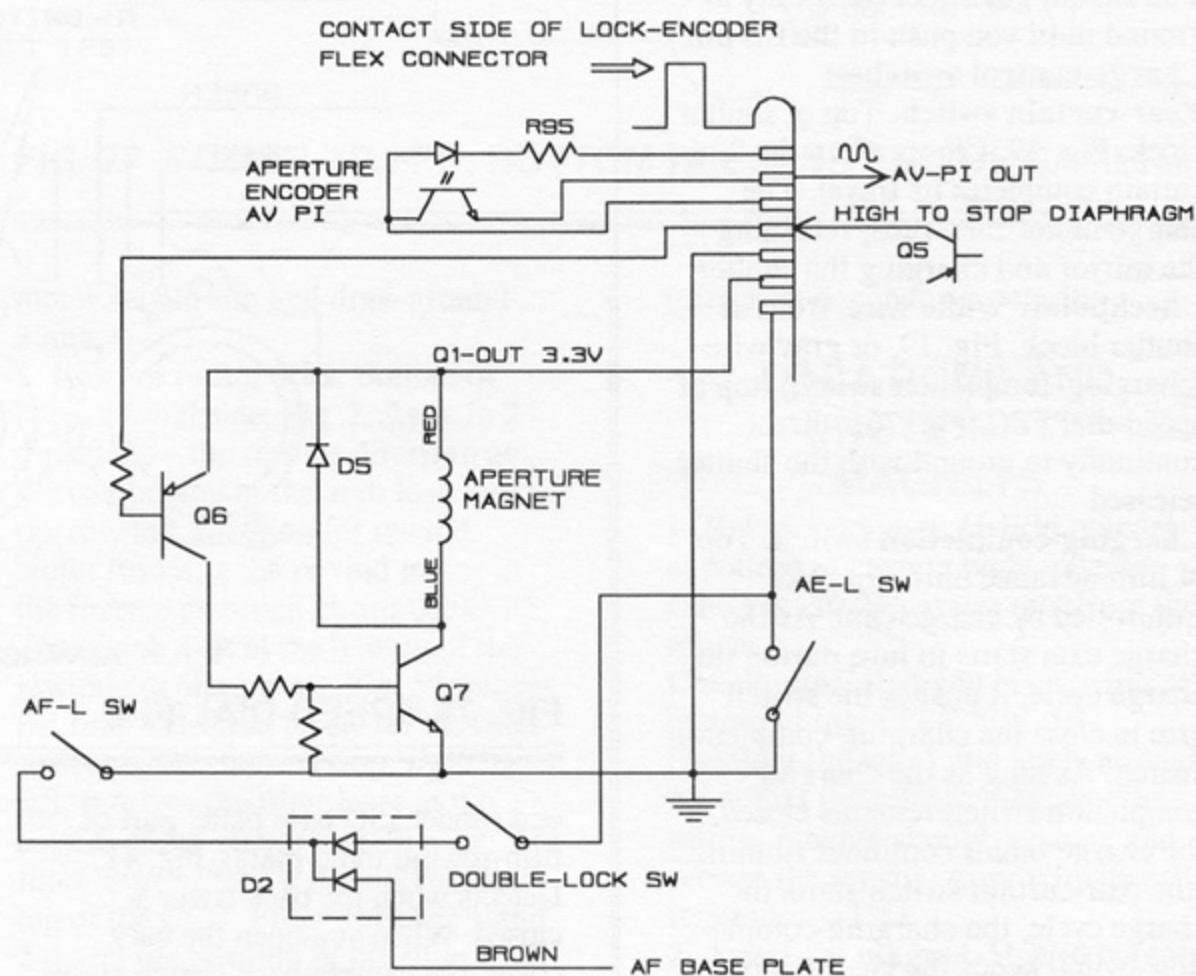


FIG. 74 SCHEMATIC OF LOCK-ENCODER FPC, BACK OF FRONT PLATE

the lens-encoder FPC, back of front plate, release side, Fig. 43 (schematic—Fig. 74). Pushing in the AE-lock button turns on the EL LCD in the finder and locks the exposure. **Checkpoint:** Bottom connection of lens-encoder FPC, Fig. 74 (disconnect top flex from end flex connector)—direct continuity to the ground connection with the AE-lock button pushed in.

fm switch. Rewind side of mirror box on fmm base plate, Fig. 15. Detects the focal length of the lens installed. A lens with a focal length of 135mm or longer pushes in the fmm-signal lever, Fig. 15, to close the fm switch. **Checkpoint:** Brown wire through front-plate access cutout, Fig. 46. You should get direct continuity to ground when you push in the FM lever a slight distance.

of mirror box on fmm base plate, Fig. 15. Detects when a tele-converter is installed. The tele-converter fully pushes in the fmm signal lever lever, Fig. 15, to close the tele-converter switch.

Checkpoint: White wire through front-plate access cutout, Fig. 46. You should get direct continuity to ground when you fully push in the FM lever.

EE switch. Rewind side of front plate, Fig. 15. Detects when an AI-S lens is installed. An older lens pushes in the EE pin, Fig. 10, to open the EE switch.

Checkpoint: Orange wire through front-plate access cutout, Fig. 46. You should get direct continuity to ground until you push in the EE pin.

Charge-control switches:

Rear-curtain switch. Top of shutter block, Fig. 19. Closes when the 2nd curtain completes its travel. The charge motor then runs, returning the mirror and charging the shutter.

Checkpoint: White wire, front of shutter block, Fig. 19, or gray wire (charging-completion switch), top of speed-dial FPC, Fig. 76—direct continuity to ground with the shutter released.

Charging-completion switch. Top of film-advance unit, Fig. 24. Controlled by charge cam. As the charge cam starts to turn during the charge cycle, it pushes the switch arm to close the charging-completion switch. As long as the charging-completion switch remains closed, the charge motor continues running (the rear-curtain switch starts the charge cycle, the charging-completion switch keeps the charge motor running to complete the charge cycle). When the charge cycle is complete, the charging-completion switch opens to shut off the charge motor.

Checkpoint: Gray wire on speed-dial FPC, Fig. 76. After the release cycle, you should get direct continuity between the gray wire and ground (signal from rear-curtain switch). As the charge motor runs, you should continue getting direct continuity—no continuity at the end of the charge cycle.

Film-advance, rewind switches:

Camera-back switch. Top, rewind

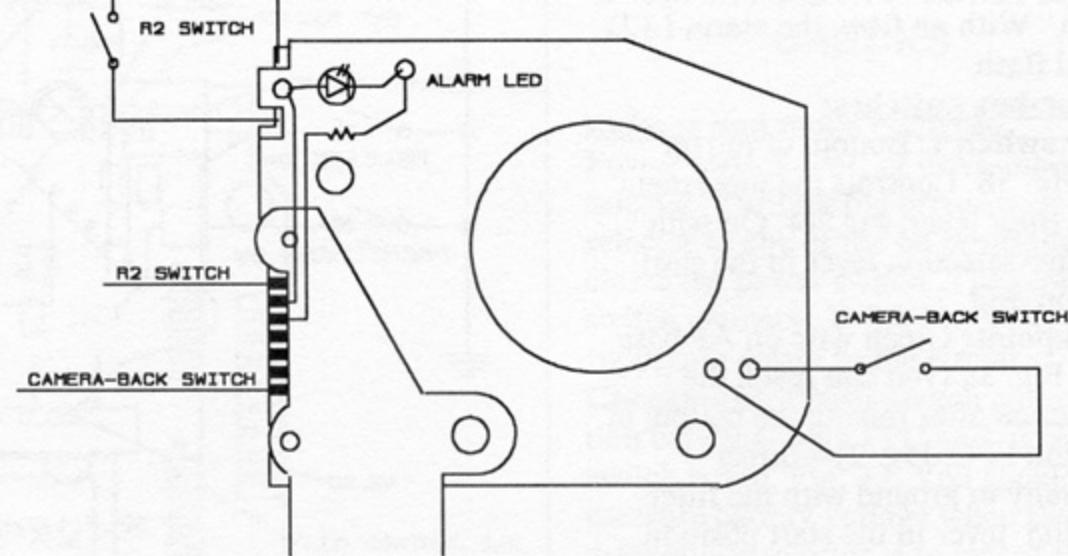


FIG. 75 ISO BASE PLATE

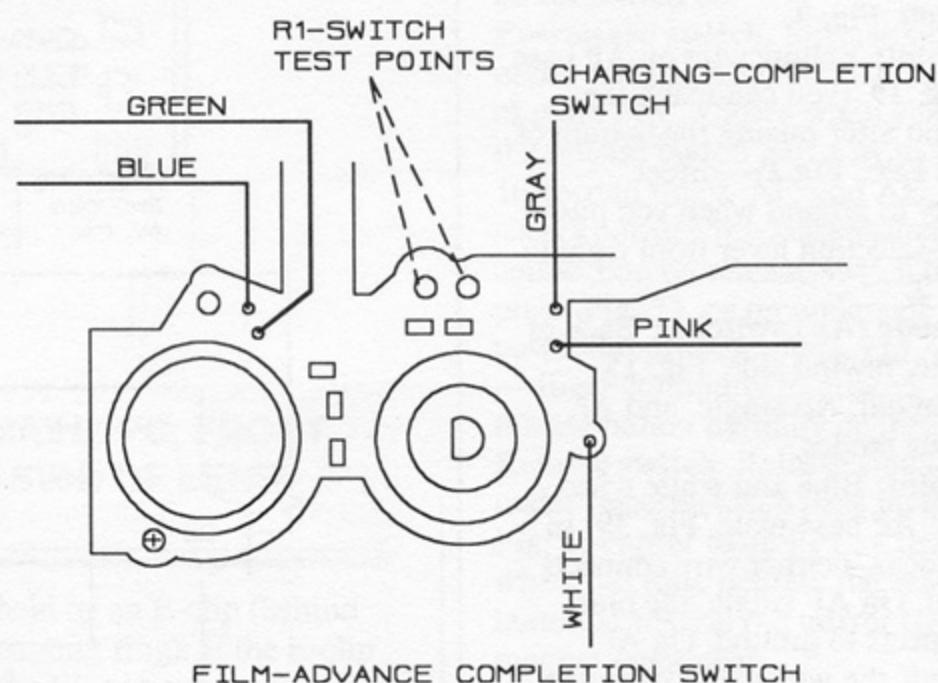


FIG. 76 SPEED-DIAL FPC

end (under ISO base plate, part of film-rewind mold plate), Fig. 41. Detects when the back cover is closed. When you open the back cover, the camera-back switch closes to clear the rewind mode. In the closed position, the back cover pushes in the back-switch pin, Fig. 3, to open the camera-back switch.

Checkpoint: Camera-back-switch solder connections on ISO base plate, Fig. 75. You should get direct continuity with the back cover open, no continuity with the back cover closed.

R1 (rewind 1) switch. Underside of speed-dial base plate. Closes when you move the R1 lever to the rewind position for rewind mode.

Checkpoint: Test points at front of speed dial, Fig. 76—direct continuity

between the test points with the R-coupling slide lever, Fig. 4, latched in the rewind position.

R2 (rewind 2) switch. Top, rewind end (part of film-rewind mold plate), Fig. 41. Closes when you move down the R2 lever for film rewind (if the R1 switch is also closed).

Checkpoint: R2-switch solder connections on ISO base plate, Fig. 75—direct continuity with the R2 lever in the down position.

Film-detection switch. Front of body casting, release side, Fig. 28. Closed until the film pushes in the film-detection pin at the bottom of the sprocket, Fig. 3. The film-detection switch then opens, detecting that film is loaded.

Checkpoint: Brown wire at bottom of main FPC, Fig. 48—direct

continuity to ground until you push in the film-detection pin.

Film-advance completion switch. In film-advance unit, Fig. 32. On when the sprocket is in the latched position, turns off when the sprocket latch disengages. Detects when the film has advanced 1 frame.

Checkpoint: White wire on speed-dial FPC, Fig. 76—direct continuity to ground until the sprocket reaches the latched position.

Shutter switches:

Rear-curtain switch (see, *Charge-control switches*).

X-sync contact. Bottom of shutter block. Closes when the 1st curtain crosses the aperture, switching high the yellow wire to the thyristor trigger base plate, Fig. 67. The voltage (Q1-out) turns on the triac to fire the flash when the main CPU switches off Q38, Fig. 67 (X-accept).

Checkpoint: Blue wire, front of shutter FPC, Fig. 19—direct continuity to ground with the shutter released. Or check at the yellow wire, bottom rewind end of main FPC, Fig. 67. The yellow wire should switch high (around 3.5V) when the 1st curtain releases.

MOTOR LOCATIONS AND CHECKS

1. **Charge motor MM.** Front of camera on film-advance unit, Fig. 13. Drives the charge cam, Fig. 24, to charge the mirror and shutter.

Checkpoint: Unsolder the green wire (or yellow wire in older cameras), power-tr FPC at bottom of camera, Fig. 77. Connect 3V between the disconnected wire (+) and ground—the charge motor should run and draw around 100-200ma. If the current draw is excessive (around 800ma), the charge motor may be defective.

Note: If the charge motor runs in CH and S modes, check the operation on the CS mode. A failure or erratic operation in the CS mode indicates a defective charge motor.

2. **Spool motor FM.** On film-advance unit, Fig. 32—fits into take-up spool. Drives the spool to advance the film.

Checkpoint: Disconnect the red wire, power-tr board at bottom of camera, Fig. 77. Connect 3V between the red wire (+) and ground—the spool

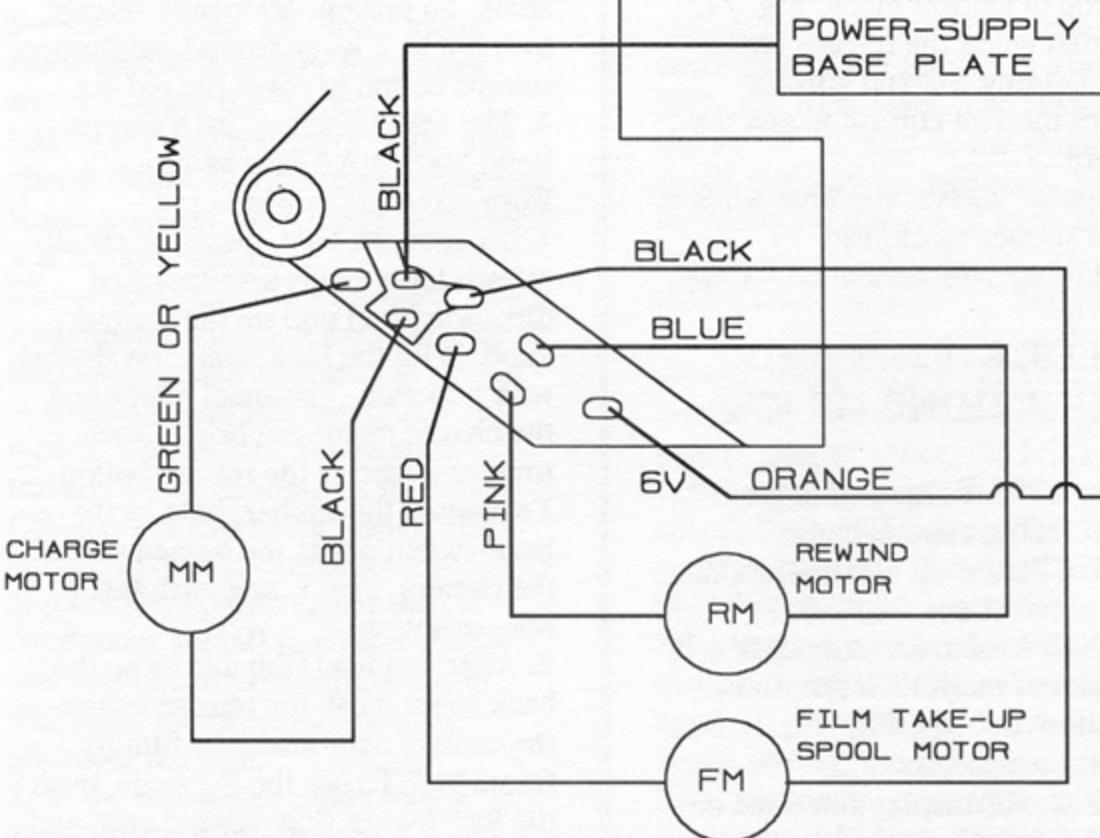


FIG. 77 POWER-TR FPC, BOTTOM RELEASE END OF CAMERA

motor should run and draw around 25ma.

3. **Rewind motor RM.** Bottom of body, rewind side, Fig. 2. Runs in 2 directions—the reverse direction at the completion of the auto load and the forward direction for rewind.

Note: Running the rewind motor in the reverse direction cleans the CCD. The clutch disk at the bottom of the rewind-coupling shaft, Fig. 18, moves the filter-selection lever. As the filter-selection lever moves from right to left, it drives the filter lever at the bottom of the mirror box, Fig. 14. The filter lever sweeps a filter across the top of the CCD. Filter switches 1 and 2 detect the position of the filter lever—filter switch 2 closes when the filter lever moves from left to right, and filter switch 1 closes when the filter lever returns to the start position, Fig. 2.

Checkpoint: Disconnect the pink and blue wires from the power-tr FPC, Fig. 77. Connect around 3V between the wires. The rewind motor should run (direction depends on polarity).

4. **AF motor.** Bottom of mirror box, Fig. 38. Drives the AF coupler to focus the lens.

Checkpoint: Disconnect the red and black wires, bottom of AF base plate, Fig. 39. Apply around 3V between the wires. The AF motor should run

(direction depends on polarity).

LOCATIONS AND FUNCTIONS OF MAGNETS

1. **Release magnet.** Hybrid magnet at bottom of camera body, release side, Fig. 30. Separates to release the mirror.

Checkpoint: Red and black wires at bottom of main FPC, Fig. 55. Unsolder the wires and apply around 3V across the release magnet—the release magnet should separate and release the mirror. Approximate coil resistance— 33Ω .

2. **Aperture magnet.** Hybrid magnet at side of mirror box, Fig. 14. Separates to stop the diaphragm-closing mechanism at the proper aperture.

Checkpoint: Red and blue wires at lens-encoder FPC, Fig. 43. Approximate coil resistance— 70Ω .

3. **1st-curtain magnet.** Electromagnet at bottom of shutter block, Fig. 21. Energized when the release switch closes, holding the 1st curtain. Releases the 1st curtain when the mirror rises.

Checkpoint: Red and black wires at front of shutter block, Fig. 19. Approximate coil resistance— $100K$.

4. **2nd-curtain magnet.** Electromag-

net at top of shutter block, Fig. 21. Energized when the release switch closes, holding the 2nd curtain. Releases the 2nd curtain to end the exposure.

Checkpoint: Green and blue wires at front of shutter block, Fig. 19. Approximate coil resistance—100K.

LOCATIONS AND FUNCTIONS OF IC'S

1. **Main CPU.** Bottom of main FPC (section facing camera body), Fig. 78. CPU for all camera functions except autofocus.
2. **MPX-1.** Motor-driver/interface IC on bottom of main FPC (section facing camera body, Fig. 78). Drives the motor transistors.
3. **MPX-2.** AE/display interface on main-FPC hard board, Fig. 40. Receives exposure information inputs from f-fo (aperture), fo (maximum aperture), ISO, and DX.
4. **Head amplifier U1.** Bottom of main FPC, Fig. 1. Amplifier for the TTL and spot SPD's.
5. **AF CPU U6.** CPU for autofocus on the AF base plate, Fig. 37.
6. **AF interface U7.** Interface between the AF CCD and the AF CPU on the AF base plate, Fig. 38.
7. **AF CCD U8.** CCD IC on CCD block, Fig. 38.
8. **LCD driver U5.** On display FPC, Fig. 13 (back). Driver for the display-block LCD and LED's.

OPERATING INSTRUCTIONS

Battery pack:

1. The MB-21 battery pack (standard battery pack) takes 6 AA-size batteries; 3 fit in the grip and 3 fit in the battery insert. Remove the grip by turning the wing nut at the bottom; remove the base with the thumb wheel at the back.
2. The battery check is on the back of the base unit. If the batteries are good, both BC LED's turn on when you push the battery-check button. Only 1 LED turns on to indicate low batteries. If neither LED turns on, the batteries are too low for operation.
3. The base unit has a shutter-release button at the end for use with vertical

shots. To prevent accidental release, turn the lock lever around the shutter-release button to cover the red dot.

4. The MB-20 battery pack (dealer item) takes 4 AA-size batteries.

Film advance, rewind:

1. To open the back, push the crank-release lever in the arrowmarked direction; then pull up the rewind knob. With the back open, the shutter won't operate. The spool motor and the charge motor run briefly each time you depress the release button. To operate the shutter, hold in the back-switch pin at the rewind end of the camera, Fig. 3, and push the release button.

2. After you load film and close the back cover, push the release button—the camera auto-loads the film to frame "1." To use the DX code, push the lock button (top, rewind end) and turn the ISO dial to "DX." Or set a manual ISO to override the DX. If you've set the ISO dial to "DX"—and the cartridge isn't DX coded—the camera won't operate. The alarm LED flashes for the duration of the 16-second timer when you push the release button.

3. The frame count shows both on the frame counter and on the LCD above the focusing screen. With no film, the LCD frame counter shows "0."

4. For **multiple exposures**, pull out the multiple-exposure lever (top release side, next to counter window). After the exposure, the film doesn't advance; you can then shoot a 2nd exposure on the same frame. The multiple-exposure lever returns to the normal position following the exposure. You can shoot any number of exposures on the same frame by pulling out the multiple-exposure lever before you release the shutter.

5. At the end of the film, the alarm

LED glows steadily. The alarm LED continues to glow for the duration of the 16-second timer and turns on again if you push the release button. To use the manual rewind, push the lock button above the R1 film-rewind lever (release end) and pull the R1 film-rewind lever toward the back of the camera; then rewind with the rewind crank. To use the power rewind, pull out the R1 film-rewind lever. Then push the lock button by the R2 lever (back, rewind end) and move down the R2 lever. At the completion of the rewind, the camera won't operate until you open the back cover.

Finder:

1. When you push the release button part way, the finder display turns on. The display remains on 16 seconds after you let up the release button (with good batteries—the display turns off immediately with low batteries). The LCD and LED's to the top of the focusing screen are in the camera body; the LCD to the bottom of the focusing screen is in the finder.

2. To remove the finder, push the finder-latch lever (top, rewind end) toward the finder. Then slide off the finder toward the back of the camera. The new-style finder has a double latch to prevent the finder from falling off accidentally—if you accidentally disengage the finder-latch lever, the finder can only move a slight distance before it's again latched (hold in the finder-latch lever to slide off the finder).

3. The DP-21 finder (standard finder) provides 3 metering modes—matrix metering, spot metering, and center-weighted metering. Set the metering mode with the metering-mode selector (large knob on side with

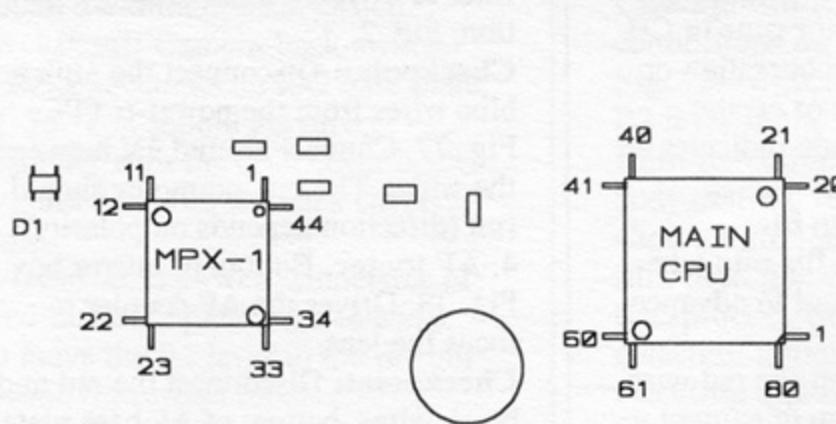


FIG. 78 BOTTOM OF MAIN FPC (SIDE FACING CAMERA BODY)

metering symbols).

Matrix metering. In the center position of the metering-mode selector, the finder provides 5-segment matrix metering. When you push the release button part way, the matrix symbol shows on the left-hand end of the LCD. If the lens is not installed, the LCD shows the center-weighted icon rather than the matrix icon.

Spot metering. Set the metering-mode selector to the single-dot position. The LCD shows the single dot at the left-hand end of the display. The camera now uses the spot SPD in the camera body and reads only the light within the 5mm circle at the center of the screen.

Center-weighted metering. Set the metering-mode selector to the center-weighted position (fully clockwise). The 12mm circle at the center of the screen now has 60% of the sensitivity. The finder LCD shows the center-weighted symbol.

4. The smaller knob on the DP-20 finder (marked “- +”) provides diopter correction. Set the diopter by pulling out and then turning the diopter-adjustment knob until the focused image appears sharp. If the diopter-adjustment knob doesn’t have the “- +” calibrations, the finder has been modified with a fixed-diopter eyepiece. The finder then has no diopter correction.

5. The eyepiece-shutter lever at the back of the finder closes the blinds over the eyepiece. Close the eyepiece blinds when checking or adjusting auto exposure.

6. The exposure-compensation dial on the finder provides metering compensation for certain focusing screens. With the standard screen, set the exposure-compensation dial to “0.” Certain accessory screens require changing the setting. To change the setting, remove the finder and turn the slotted adjustment screw at the underside. Nikon provides a special tool with the finder.

Drive modes:

1. Set the drive mode with the drive-mode selector around the release button. Push down the lock button by the drive-mode selector to set the drive mode:

L — power switch off. No release, no LCD.

S—single frame. The spool motor advances the film after the charge motor charges the shutter.

CH—continuous high (5.7fps). The charge motor and the spool motor run simultaneously to recharge the shutter and advance the film.

CL — continuous low (3.4fps). The spool motor advances the film after the charge motor charges the shutter in manual-focus and single AF modes. The motors run simultaneously in the continuous AF mode. **CS**—continuous silent (1fps). The circuit drives the charge motor sequentially (pulses rather than a continuous signal) to silence operation and to conserve battery power. The spool motor simultaneously advances the film.

3. In the self-timer mode (clock symbol), the self-timer starts when you push the release button. The LED at the front of the camera (above the grip) flickers during the delay. The frequency increases 2 seconds before the shutter releases. Cancel the self-timer by turning the drive-mode selector to CS.

Exposure modes:

1. Set the exposure modes with the lever under the exposure-compensation knob.

M (manual) — the setting of the shutter-speed knob determines the shutter speed. When you push the release button part way, the LCD below the focusing screen shows the selected shutter speed and the metered-manual scale. To set proper exposure, turn the shutter-speed knob or the aperture ring until only 1 LCD dot shows on the metered-manual scale (below the index).

The shutter-speed knob latches at the “X” setting (1/250, the fastest full-aperture speed). Disengage the latch by pushing the lock button on top of the shutter-speed knob. At the “X” setting, the finder LCD shows “1/250.”

T (time)—the shutter stays open until you turn the shutter-speed knob to another setting. The finder LCD shows “--.” The shutter mechanically latches the 2nd curtain at “T.”

B (bulb)—the shutter stays open as long as you keep the release button depressed (2nd curtain held electronically). The finder LCD shows “-.”

A (aperture-preferred)—the camera

automatically selects the shutter speed according to the aperture setting, ISO, and light level. The finder LCD shows “A” as well as the shutter speed that will be delivered. You can leave the shutter-speed knob at any setting except “T.” At “T,” the finder LCD shows “- -,” and the shutter stays open until you turn the shutter-speed knob to another setting.

If the camera can’t program a proper shutter speed, the LCD shows “HI” or “LO” rather than the shutter speed. If the LCD shows “HI,” set a smaller aperture; If the LCD shows “LO,” set a larger aperture.

S (shutter-speed preferred)—the camera automatically selects the aperture according to the shutter-speed setting, the light level, and the ISO. Set the aperture to the smallest f/stop; set the shutter speed you want on the speed knob.

The finder LCD shows “S,” the selected shutter speed, and the aperture that will be automatically selected. If the camera can’t set proper exposure, the LCD shows “HI” or “LO” rather than the f/stop.

If you don’t set the smallest f/stop, the LCD shows “FEE” rather than the f/stop. The camera will still operate. However, you don’t have the full range of f/stops.

At the bulb setting, the LCD shows “- -.” The shutter stays open as long as you keep the release button depressed. At the time setting, the LCD shows “--.” The shutter stays open until you turn the shutter-speed knob to another setting.

P (program) and PH (program high)—the camera programs both the aperture and the shutter speed. At PH, the camera selects a faster shutter speed and larger aperture for the same lighting conditions. Set the aperture to the smallest f/stop; set the shutter-speed knob to any setting other than “T.”

The finder LCD shows “P” at both program settings as well as the shutter speed and f/stop. If you don’t set the smallest aperture, the LCD shows “FEE” rather than the f/stop. The camera will still operate, but it can’t use the full range of apertures. If the camera can’t set the proper exposure, the LCD shows “HI” or “lo” rather than the shutter speed.

At the time setting, the LCD shows

only “—.” The shutter stays open until you turn the shutter-speed knob to another setting.

Focus modes:

Set the focus mode with the AF-mode selector (front, rewind end).

M. Manual focus. The LED's at the top of the finder display provide focus assist. LED arrows indicate the direction to turn the focusing ring. When the green LED turns on, the lens is properly focused. If the X LED turns on, the light is insufficient for the focus assist.

S. Single. The lens moves to the focus position when you push the release button part way. When the lens is properly focused, the green focus LED turns on. The focus then remains locked as long as you keep the release button partially depressed. The shutter won't release until the green focus LED turns on.

If there's insufficient light or insufficient contrast for autofocus, the X LED turns on. The shutter won't then release.

C. Continuous. The lens continues to focus as long as you keep the release button partially depressed. The green focus LED turns on when the lens reaches the focus position. The shutter won't release until the green LED turns on.

AE-lock and AF-lock:

1. To lock the exposure, take a reading by pushing the release button part way. Then push the AE-lock button (front, release end—lower button, Fig. 10). “E L” shows on the LCD display to show that the exposure is locked.

2. To lock the focus on continuous AF, push the AF-lock button (front, release end—upper button, Fig. 10). The lever around the AF-lock button allows you to lock both the focus and the exposure simultaneously. With the lever in the upper position (1 dot), pushing the AF-lock button locks only the focus. With the lever in the down position (2 dots), pushing the AF-lock button locks both the focus and the exposure.

Exposure compensation:

1. Push the latch on the exposure-compensation knob toward the center of the knob. Then turn the exposure-compensation knob to set the compensation.

2. When you push the release button part way, a +/- LED turns on at the

upper right-hand corner of the finder display. The LCD next to the LCD frame counter shows the actual compensation in stops.

Finder illuminator:

The finder-illuminator lever at the base of the speed knob turns on the illuminator LED's for the finder LCD's. With the finder-illuminator lever uncovering the red dot, the illuminator LED's turn on when you push the release button part way. The illuminator LED's remain on for the duration of the 16-second timer.

PART NUMBERS

1. Frequently replaced parts:

S2 gear—1K277-093-2
rewind shaft—1B990-385-6
rewind-gear unit—1B999-209-1
shutter—1B060-403
film-detection pin—1K681-015
R2 lever—1K201-084-1

2. Motors:

charge motor—1B060-394
rewind motor—1B060-407
spool motor—1B990-436
AF motor—1B060-406

3. Switches:

film-advance completion switch—1B999-222
charging-completion switch—1B999-221
counter switch—1B999-223
film-detection switch—1B990-380

4. Encoder parts:

charge encoder—1B990446
pulse blade—1K260-437
pulse-driving gear—1K260-436
rewind fork gear—1B990-387
AF encoder—1S726-050
Aperture encoder—1S258-009

5. Gears:

C2—1B990-437
C9—1B990-438
C6—1B990-439
C7—1B990-440
C10—1B990-441
S7—1B990-442
C11—1K260-420
S9—1K260-427

6. Circuit boards, components:

DC/DC converter—1B990-391
display FPC—1B990-354
power-tr FPC—1B990-394-1
main FPC—1B990-397-1
AF base plate—1B990-356-1
thyristor trigger base plate—
new—1B990-379
old—1B990-379-1

Q1—1B990-392

FRE—1B999-245

7. Covers:

bottom cover—1B999-215
bottom-cover rubber—1B990-416
back cover—1B999-216
rewind-side top cover—1B990-404
release-side top cover—Revised Parts

8. Other:

release-switch pin—see, *Adjustment Values*
tripod-socket base plate—1K625-076
tripod-socket—1K400-293
speed-knob lock-pin spring—
1K220-279
speed-knob lock pin—
1B999-205-1
rewind shaft—1B990-406
back-latch spring—1K220-284
rewind-knob assembly—
1B990-405-1
crank-release-lever spring—
1K225-184
lower-release-lever spring—
1K230-296
crank-release-lever pin—1K360-184
release-side body cover—1K116-815
rewind-side body cover—1K116-816
release magnet—1B060-395
finder rail sponge A (release side)—1K116-779
finder rail sponge B (rewind side)—1K116-780
finder rail sponge C (small sections at backs of finder rails)—1K116-781
EE pin—1K371-392
focus-mode selector click plate—1K600-861-1
cable-release-connector cap—1K467-128
sync-terminal cap—1K467-016
counter-index plate—1K470-076



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