# CANON A-1

Similar models: AE-1, AV-1, AT-1 (mechanically similar)

Battery: 1 ea. 6V PX28, 544, or 537 (negative ground)

Fig. 1—top cover removed

Fig. 2—bottom cover removed

Fig. 3—rewind-side test points

Fig. 4—front view, mirror box removed

Fig. 5—mirror box, back view

Fig. 6—rewind side of mirror box

Fig. 7—flex connectors, reassembly positions

Fig. 8—rewind side of main flex, A/T flex removed

Fig. 9—wind side of main flex, A/T flex removed

Fig. 10—S.AVE board, old style

Fig. 11—wiring to A/T flex, new style

Fig. 12—wiring pictorial, main flex

Fig. 13—IC pin voltages

ADJUSTMENT LOCATIONS:

| | |
|---|---|
| Film-speed (SV) brush | A |
| Diaphragm opening | B |
| 1/1000 second | C |
| Exposure, level | D |
| Exposure, gain (ratio) | E |
| Brake, first curtain | F* |
| Wind overtravel | G |
| Travel time, second curtain | H |
| Travel time, first curtain | I |
| Count switch SW4 (fast speed) | J |
| LED alignment | K |
| Brightness, LED display | L |
| Oscillator frequency | M |
| Switch SW5 | N |

*Reach from back of camera

ADJUSTMENT VALUES:

Curtain-travel time: 11.3ms ±0.3ms (34mm distance)
Flange-focal distance: 42.14mm (flange to pressure-plate rails), 41.9mm (flange to film-guide rails)
Oscillator frequency: 32,768 Hz

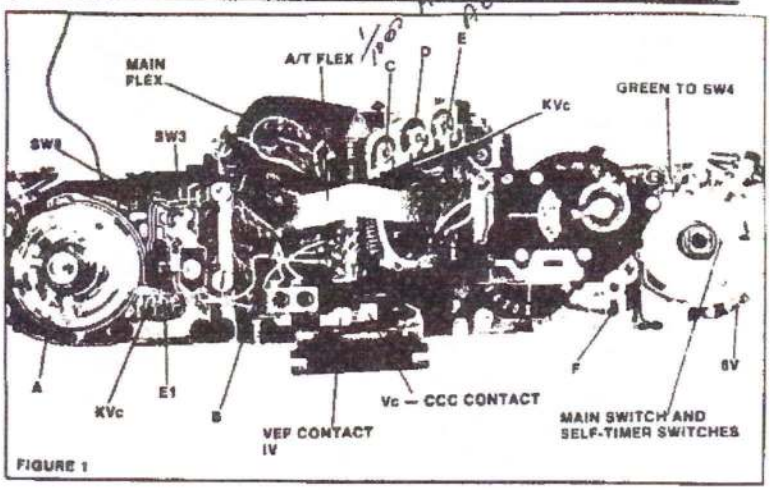


FIGURE 1

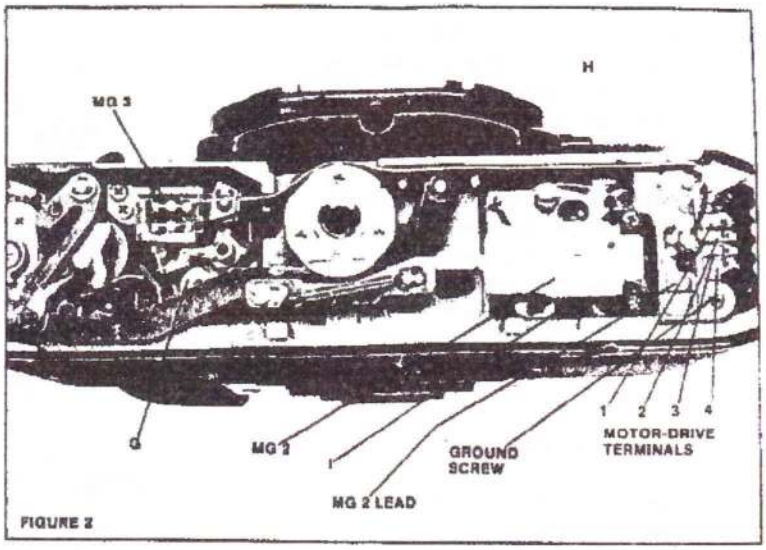


FIGURE 2

Vc voltage: 1,219V ±35 mv (measure to CCC contact, Fig. 1)
KVC voltage: 1.625V ±5% (measure to the capacitor lead, Fig. 1)
X-contact delay: 0.5ms or longer
Low-voltage interlock: 3.1 - 3.5V (the voltage at which the shutter will not release)
Self-timer delay: 2 seconds and 10 seconds

ADJUSTMENT SEQUENCE, EXPOSURE:

1. Set 1/1000, no lens. Adjust C for an accurate 1/1000. If necessary, you can bend the wire contact of SW4, Fig. 4, to bring in 1/1000. Make SW4 open sooner for a faster speed (by bending the tip of the wire contact closer to the insulator on the lever which opens SW4).
2. Set AV mode, selector dial at f/5.6, ASA 100, lens at auto. Check the auto shutter speeds at two light levels:

   EV 9—the shutter should deliver (and the LED display should read) 1/15

   EV 15—the shutter should deliver (and the LED display should read) 1/1000

   Adjust the gain (E) so that the shutter-speed error is the same at both light levels. Then adjust

the level (D) so that the shutter delivers 1/125 at EV 12. The LED display should always agree with the auto shutter speed (or auto diaphragm opening). There is no separate adjustment.

3. Set the AV mode, lens at the auto setting. Check the light transmission at the f/2, f/5.6, and f/11 settings of the selector dial. If the lens diaphragm is overexposing, you can adjust the S.AVE value (segmented aperture-value electrode, Fig. 6) in 1/8-stop increments. In the old style, Fig. 10, scrape away a conductor on the S AVE board. Opening the connection at path #1 provides 1/8 stop less transmission; also opening path #2 provides an additional 1/8 stop less exposure. In the newer style, you can make the adjustment without removing the mirror box. Wires connect the S.AVE paths to the A/T flex (the wires labeled, "S.AVE adjust," Fig. 11). Moving a wire to the adjacent open land opens the path connected to that wire. Move the orange wire to the adjacent land to decrease the exposure by 1/8 stop. Move both the orange wire and the white wire to adjacent lands to decrease the exposure by 1/4 stop. There is no adjustment for increasing the transmission.

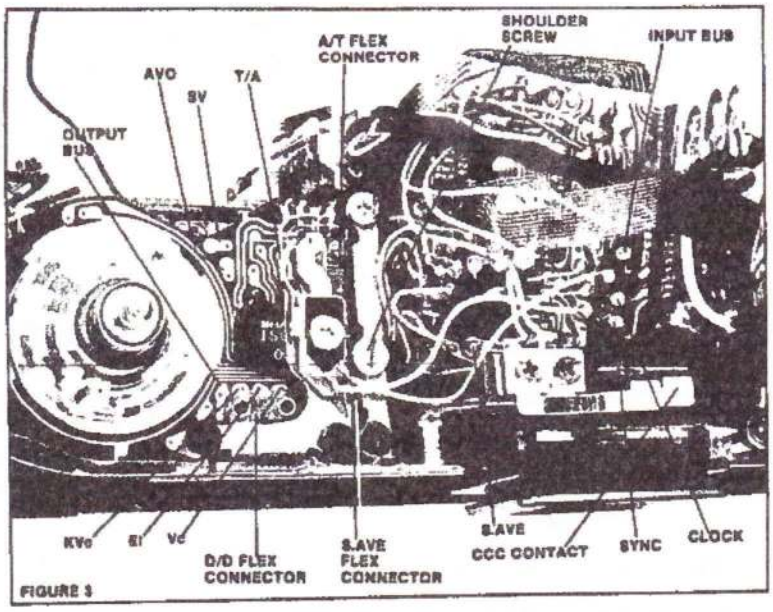


FIGURE 3

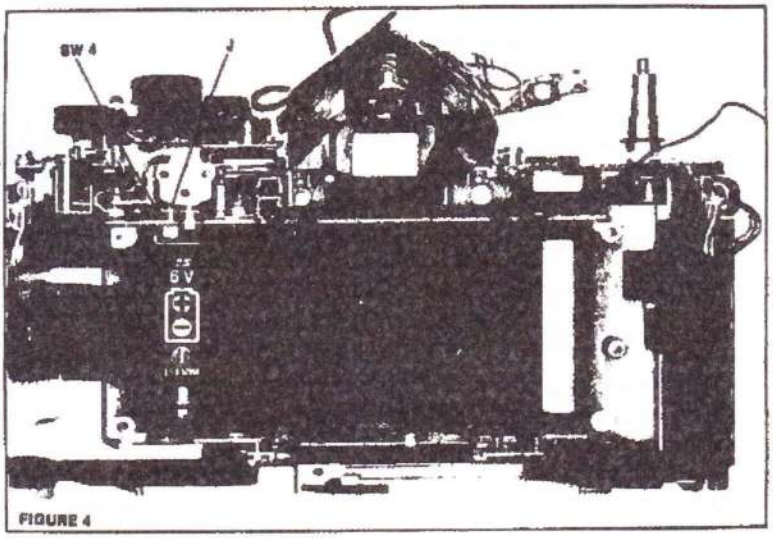


FIGURE 4

ADJUSTMENTS NOT NORMALLY REQUIRED:

1. Oscillator frequency. If you have replaced the OSC/INTERFACE IC, time the length of the self-timer delay at the 10-second self-timer setting. Adjust for an accurate 10-second delay by changing the oscillator resistor — M in Fig. 8. Alternately, use an oscilloscope or frequency counter to measure the frequency of the clock signal. Adjust for a frequency of 30,117 Hz to 34,134 Hz. Canon supplies Rosc (oscillator resistor M) in the following values for adjustment purposes: 115K, 118K, 121K, 124K, 127K, 130K, 133K, 137K, 140K, 143K, 147K, 150K, 154K, 158K, and 162K.
2. LED alignment. If you have removed and replaced the decoder-driver flex, Fig. 5, check the alignment of the LED display before tightening the two screws. You can reach the two screws, Fig. 5, with the mirror box installed; just remove the eyelens (2 screws) to align the LED display.
3. Brightness of LED display. Changing the value of resistor L, Fig. 7, changes the brightness of the finder display. Use a higher resistance value to reduce the brightness.

   Note: The brightness of the LED display changes automatically according to the light level. In higher light levels, the LED brightness increases for easier viewing.
4. Wind overtravel. With the shutter cocked, the MG3 armature should come against the second-curtain cam; there should be no space gap. This "minus latch" — 0.0 - (-0.15)mm — is critical for accurate automatically controlled exposures. The overtravel during the cocking stroke allows the MG3 armature to engage the second-curtain cam. Adjust by rotating the second-curtain cam after loosening its setscrews.
5. SV brush. Normally not necessary unless you have replaced the top cover or the SV brush. Incorrect adjustment causes exposure errors (wrong digital signals sent to the CPU). Canon supplies a special tool (SV check bit tool - 1S) for checking the ad-

justment; the tool holds the SV brush at the proper position. With the tool in place, insert ohmmeter leads into the two holes in the SV brush to make contact with the SV board. You should get no resistance with the tool in its center position; you should get infinite resistance with the tool rotated fully counterclockwise or clockwise. Without the tool, you can temporarily seat the film-speed dial; set ASA 400 and align the "400" calibration with the end of the camera body. Now, without turning the SV brush, remove the film-speed dial and check the continuity between the two holes — you should read infinite resistance. Rotate the SV brush a slight distance counterclockwise until you just get continuity and reset the film-speed dial; the first dot clockwise of "400" should now be pointing to the end of the camera body. The adjustment is by turning eccentric A, Fig. 1.

6. Switch SW5. Normally not necessary unless you have replaced related parts. Cock the shutter and adjust the SW5 eccentric (N in Fig. 9) so that the brush makes contact with the check pattern. When you release the shutter, at least four of the brush contacts should be on the SW5 path and at least four of the contacts should be on the SW5' path, Fig. 9.
7. AV brush. Normally not necessary unless you have replaced parts. Charge the mirror mechanism. Then check the continuity between the screw on the S.AVE board, Fig. 6, and the test point, Fig. 10. You should measure infinite resistance, but, if you move the AV brush slightly in either direction, you should measure nearly direct contact. To check with the camera assembled, cock the shutter and measure the resistance between the sky-blue S.AVE wire, Fig. 12, and ground — you should get direct contact. Then push in the stop-down slide. The AV brush should move down slightly, giving a resistance reading of around 40K. Adjust by repositioning the AV brush.
8. S.AVE board. If you replace the S.AVE board, check the continuity between the terminals on the S.AVE flex connector, Fig. 7, and the AVO brush (on the back of the AV unit, Fig. 6). Move the AVO brush until the wipers contact test points P1 and P1' on the AVO switch pattern, Fig. 10. You should then get direct continuity between the AVO brush and each terminal on the S.AVE flex connector. To adjust, shift the position of the S.AVE board.

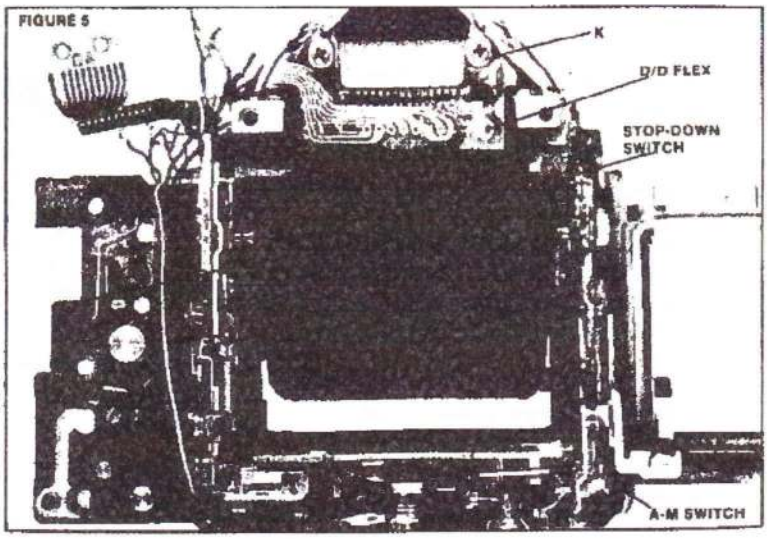


FIGURE 5

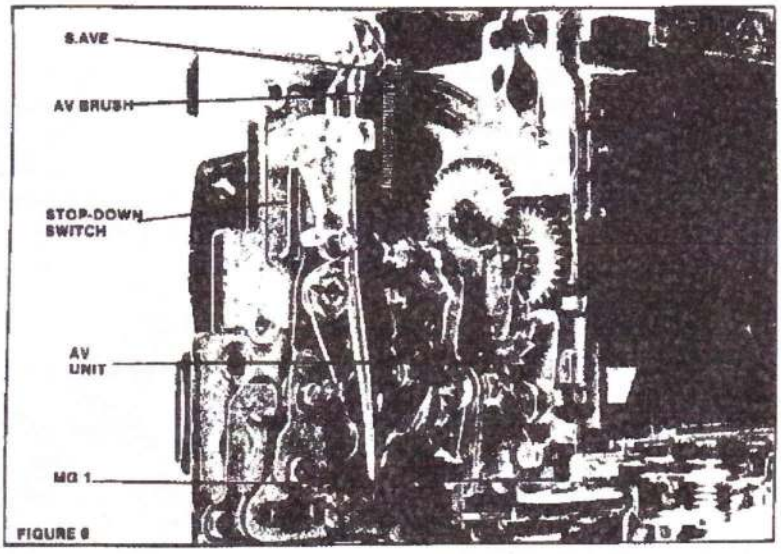


FIGURE 6

DISASSEMBLY SEQUENCE:

Control settings: display switch SW3 turned on to remove and replace top cover (the switch on the rewind side of the top cover that turns off the LED display — turn the switch so that the white dot on the top cover is visible)

Locations of left-hand threads: screws holding pinions on tops of winding rollers

Precautions:

1. Remove the battery before unsoldering wires from the flex.
2. Handle the flex circuits carefully to prevent damage; because of the double-sided board, it's difficult to jumper across breaks.
3. The screws holding the T/A selector are locked in place; use acetone on the screws to soften the locking agent.

Sequence:

1. bottom cover
2. front cover (4 screws)
3. top cover:
   a. 6 screws
   b. AT dial guard (the slide at the

front of the camera that prevents accidental turning of the selector dial) — move to raised position and remove screw (ball detent loose)
   c. detent base plate for AT dial guard (2 screws) and bracket under base plate
   d. wind lever, main-switch lever (snap ring), and multiple-exposure lever
   e. rewind knob and film-speed dial (snap ring)
   f. release button (unscrew retaining ring) and A/T change lever
   g. eyepiece-blind lever (remove rubber insert, 1 screw)
4. unsolder black sync wire from hot shoe
5. remove battery
6. unsolder wires from flex:
   a. blue, red, white, and green from front of SV board
   b. sky blue and red S.AVE wires (in early models, the red wire connects to the main flex — in later models, the red wire connects to the A/T flex)
   c. 3 S.AVE adjustment wires from A/T flex — orange, green, white (only in later models) (yellow)
   d. red and black MG1 wires
   e. blue and white wires that come from the front-plate switches (preview and memory hold)
7. loosen (but do not remove) shoulder screw for flex connectors, Fig. 3
8. screw holding S.AVE connector bar, Fig. 3
9. remove S.AVE connector bar and disconnect S.AVE flex connector
10. 2 screws holding decoder-driver connector bar, Fig. 3
11. remove decoder-driver connector bar and disconnect decoder-driver flex connector
12. disconnect both ends of rubber band above main flex
13. 2 sections of front leatherette
14. 2 screws, one on each side of eyepiece, back of camera
15. 5 front-plate screws
16. front-plate/mirror-box assembly — pass S.AVE and decoder-driver flex connectors under SV board

REASSEMBLY HIGHLIGHTS:

1. Replace the front-plate/mirror box assembly with the shutter and mirror released, mirror down. The MG 2 armature must also be in the released position (away from the core of MG2).
2. Orient the wires and S.AVE flex connector as shown in Fig. 7.
3. Pass the S.AVE flex connector, the decoder-driver flex connector, and the wires under the SV board as you install the front-plate/mirror-box assembly.

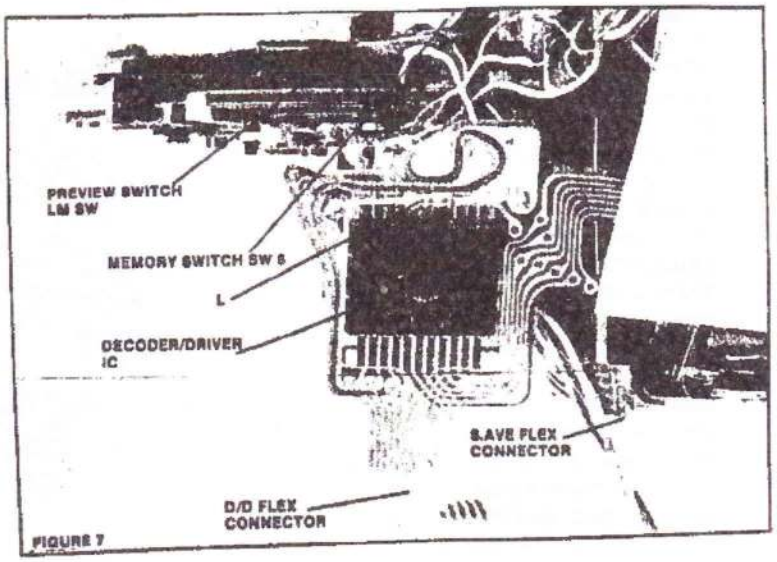
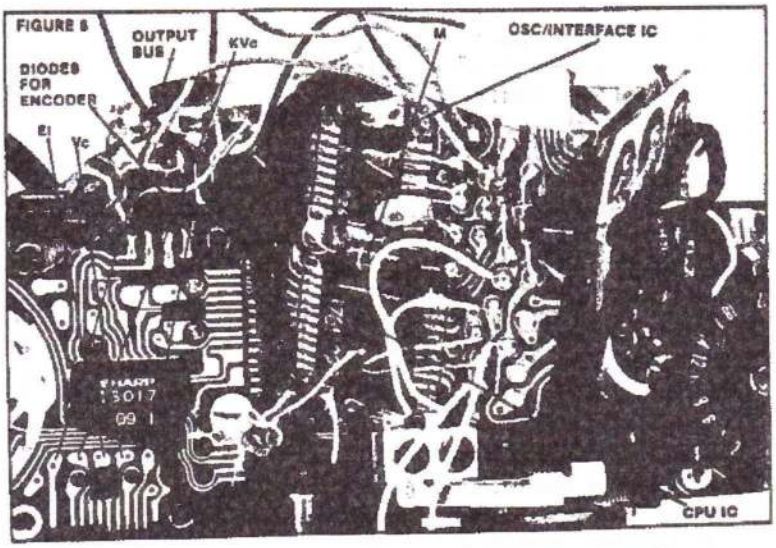


FIGURE 7




Sequence to remove A/T flex:

1. unsolder all wires shown in Fig. 11
2. unsolder the green SW4 wire, Fig. 1
3. T/A selector assembly (2 screws)
4. selector dial (center nut)
5. spring for selector-dial detent
6. loosen shoulder screw for flex-connector bars, Fig. 3
7. remove A/T flex-connector bar (1 screw) and disconnect A/T flex connector, Fig. 3
8. unsolder battery-test LED leads from A/T selector board
9. 3 screws, A/T selector board
10. E-clip holding multiple-exposure lever to rod (to front of wind lever)
11. disconnect forked end of multiple-exposure lever from pin on multiple-exposure switch plate
12. multiple-exposure switch plate and main-switch plate (the two brushes around the wind shaft)
13. 3 screws holding main-switch board

Note: You can lift aside the wind-lever side of the A/T flex to reach SW5, Fig. 9. Remove the selector dial and

the main-switch board as previously described. Remove the battery-test LED from its holder after unsoldering the two leads. Then lift aside the complete support plate for the A/T selector board by taking out two screws — one near the selector-dial detent and one inside the LED holder.

TROUBLESHOOTING:

Behavior without battery: shutter won't release, no LEDs
Behavior without lens: "M" LED always on
Typical current draw (6V supplied):
meter — 30ma (34ma when flashing)
shutter open — 39ma
self-timer — 32ma
battery test — 59ma

Malfunctions resulting from poor contact at flex connectors:

1. Decoder/driver flex connector. No sync signal, no output bus signal, no LEDs, shutter hangs open.
2. A/T flex connector. No T/A signal, bulb indication and flashing "32" in finder, shutter hangs open.
3. S.AVE flex connector. No AVO signal, larger aperture than maximum aperture of lens will display (will display, for example, "1.4" even though a "1.8" lens is installed), "P" and "oo" will show in display at certain settings.

Positions and functions of switches:

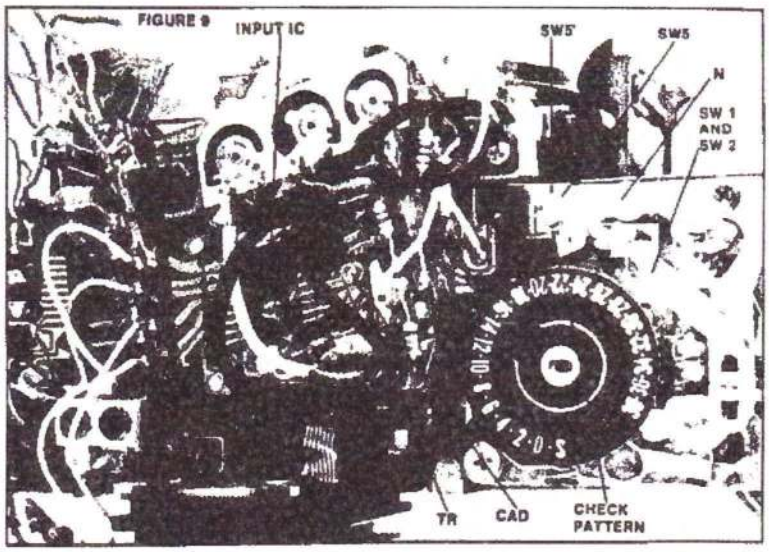
Note: The labeling of the switches according to functions corresponds to that in other A-series Canons.

SW1. Metering switch, under the A/T board, Fig. 9. Pushing the release button part way closes SW1 to turn on transistor TR. TR supplies the E1 voltage to MG1, MG2, and the ICs. When SW1 closes, the LED display turns on and the release capacitor C47 charges.

SW2. Release switch, under SW1, Fig. 9. Pushing the release button all the way closes SW2. The release capacitor C47 then discharges through MG2, Fig. 2, to release the mirror.

SW3. Display switch, Fig. 3. Closing SW3 turns off the LED display.

SW4. Count switch, Fig. 4. SW4 closes with the shutter cocked, providing direct contact between the green wire, Fig. 1, and ground. When the first curtain releases, SW4 opens and allows the timing capacitor Ct to start charging. As soon as Ct reaches the trigger voltage, the timing circuit starts counting clock pulses to determine the shutter speed.




SW5, SW5', and SW5". Shutter-released and motor-drive switch, Fig. 9. With the shutter released, SW5 connects pin 20 of the CPU IC to ground. SW5 disconnects pin 20 from ground when you cock the shutter. SW5' and SW5" control the ground signal to the motor-drive terminals, Fig. 2.

SW6. Memory switch on front standard, Fig. 7. Closing SW6 (blue wire to ground) turns on the LED display. The display holds the reading as long as SW6 remains closed.

SW7. Main switch, under wind lever, Fig. 1. Turning the main-switch lever on the top cover to the "A" position closes the main switch. The main switch then supplies battery power to MG3, the battery-test LED, and transistor TR. TR turns on when SW1 closes. The main switch also provides the two self-timer delays when rotated clockwise — 2 seconds and 10 seconds.

SW8. Battery-test switch, Fig. 3. Closing SW8 causes the INPUT IC to send the battery-test signal through the input bus. The battery-test LED then flickers to show a good battery. SW8 also serves as a cancel switch. When you push down and then let up SW8, power is removed from the rest of the circuit to cancel a long exposure, the self-timer delay, etc.

Preview switch LM (light meter) SW. On the front standard, Fig. 7. Closing the preview switch (white wire to ground) turns on transistor TR (same as closing SW1).

Stop-down switch. Back of front plate, Fig. 6. Closes when you push in the stop-down slide, providing direct contact between the red wire and the blue wire at the SV board, Fig. 12 (the lens must first be set to a manual f/stop). The f/stop information in the display then blanks out, and the shutter delivers an automatic shutter speed according to the amount of light coming through the stopped-down aperture.

Note: Setting the stopped-down function releases the diaphragm-control mechanism. If you cock the shutter and set the stopped-down function, you must release the shutter before resetting the lens to the "A" position. Otherwise, the finder displays an error signal — EEEE EE — and the shutter will not release. To correct, set the multiple-exposure lever to the multiple-exposure position and recock the shutter.

A-M (auto-manual) switch. Back of front plate, Fig. 5. Closes when you set a manual f/stop, providing direct continuity between the white wire and the green wire at the SV board, Fig. 12. The "M" then displays in the finder.

Functions of ICs and test procedures:

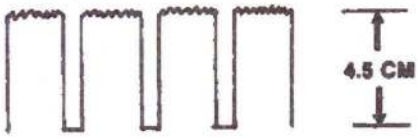
1. OPT. MOSFET amplifier for silicon photodiode. Same as PX-1 in the AE-1, but slightly different

specifications. Check by measuring the output at pin 8 with the release button partially depressed; you should measure around 1V with the top cover removed. The output voltage should go more positive as the light level increases. Also check for the Vc voltage at pin 5. If you get the Vc voltage at pin 5, but the output at pin 8 is 0.8V or below (or doesn't change with changing light levels), replace OPT IC. If you do not get the Vc voltage at pin 5, the problem could be the INPUT IC. Replace the OPT IC first and then check the pin 5 voltage. If the voltage is still incorrect, replace the INPUT IC.

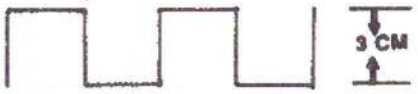
2. INPUT. Amplifies the MOS out and converts the brightness value to a digital signal. The digital signal appears at the — lead of capacitor CAD, Fig. 9. The INPUT IC also supplies the Kvc voltage at pin 6 and the Vc voltage at pin 9, and it multiplexes the brightness value signal with the mode signal (battery test, auto, or electronic flash) at the input bus (pin 13). Test by measuring the Kvc and Vc voltages and by checking the CAD signal. Check the flash changeover by connecting a 4.7K resistor between the CCC contact and ground. The display should then read: "60 F 8.0." If the indication does not change when you connect the 4.7K resistor, replace the INPUT IC.
3. CPU. Digital IC that feeds logic signals to the OSC/INTERFACE IC to control the magnets and feeds the multiplexed signal to the decoder/driver IC for the LED display. Check the signal at the output bus.
4. OSC/INTERFACE: Supplies the oscillator for the clock signal and provides the interface to the magnets. Also provides the bias signal at pin 4 and the clock signal at pin 15.
5. DECODER/DRIVER (D/D). Decodes the binary number from the output bus to drive the LED display. Check for the sync signal, the output bus signal (if no signal, suspect the CPU IC — not the D/D IC), and for the voltages at the D/D flex connector, Fig. 3.

Note: The A-1 uses digital signals to control both the diaphragm opening and the shutter speeds. To check the signals, you need an oscilloscope. Canon recommends a dual-trace scope with a bus checker to separate the multiplexed signals in the bus lines; the Canon service manual shows the proper signals on a dual-trace scope. However, you can perform several tests using a good single-trace scope. The following diagrams show the signals at the test points, Fig. 3 and Fig. 9, with the release button partially depressed to close SW1. The scope is set to auto sweep, AC.

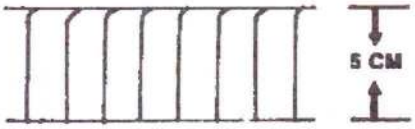
1. SYNC
   Scope settings — .5V/cm, .1ms; improper trace — D/D IC.



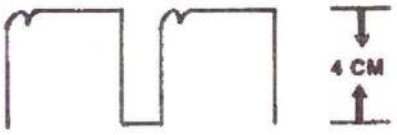

2. CLOCK
   Scope settings — .5V/cm, 5μs; improper trace — OSC/INTERFACE IC.




3. INPUT BUS
   Scope settings — .2V/cm, 20μs; improper trace — INPUT IC. You should also get the trace by closing the battery-test switch.




4. SV
   Scope settings — .5V/cm, 50μs; coupling pin on SV brush pointing directly to the back of the camera. The trace should change shape as you rotate the SV brush for different film-speed settings. No trace — poor contact between the Sv brush and board. Improper trace — SV brush out of adjustment.



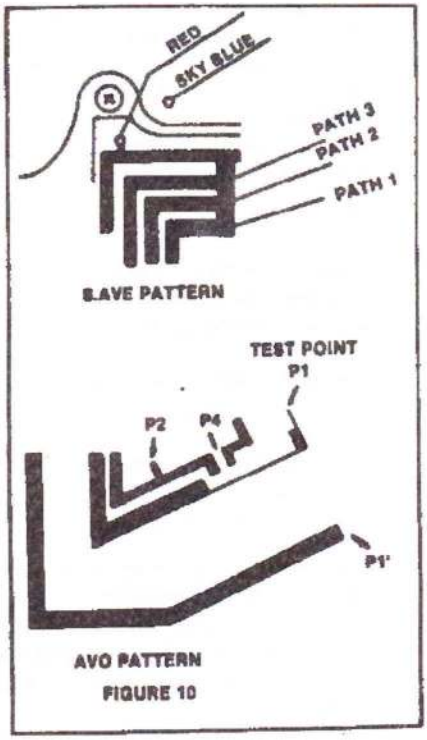
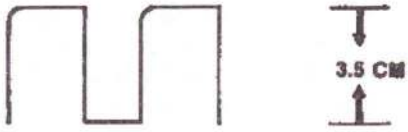
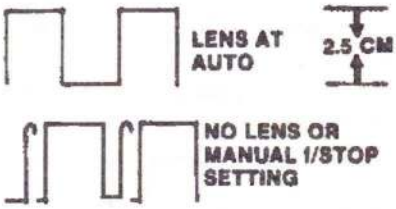



FIGURE 10

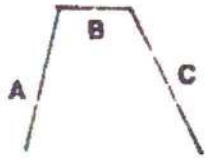
5. AVO
   Scope settings — .5V/cm, 50μs; f/1.8 lens installed. Without a lens, you should be able to make the trace shape change by pushing in the maximum-aperture correction pin. No trace — poor contact in the AVO brush (mirror box) or in the S.AVE flex connector.




6. OUTPUT BUS
   Scope settings — .5V/cm, .1ms; A/T dial set to "P" and SV-brush pin pointing directly to the back of the camera. The trace should change with light-level changes and will pulse if you change the A/T dial to 1/1000. No trace — CPU IC.

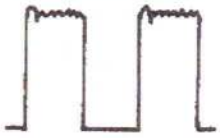


7. CAD
Scope settings — 50mv/cm, 2ms. Portion A of the trace changes according to the light level, thereby making portion B longer or shorter. B gets longer as the light increases (because A gets steeper). Portion C always remains the same. No trace — INPUT IC or capacitor CAD.

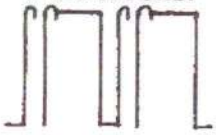



8. T/A
Scope settings — .5v/cm, .1ms. The trace should change shape as you rotate the selector dial. No trace or improper shapes — poor contact in selector-dial brush or A/T flex broken.

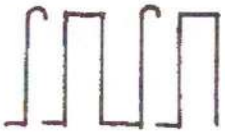
**PROGRAM SETTING:**




**1/1000 SECOND:**




**1/22:**




Standard tests for electronic problems:

1. 1.219V Vc at CCC contact — no voltage, replace INPUT IC
2. 1.625Kvc at level adjustment — no voltage, replace INPUT IC
3. MOS OUT at pin 8 of OPT IC — below 0.8V or no change with light changes, replace OPT IC
4. CLOCK signal at CLOCK test point — no signal, replace OSC/INTERFACE IC
5. SYNC signal at SYNC test point — no signal, replace D/D IC
6. CAD signal at CAD test point — no signal or no change in signal with light changes, replace INPUT IC

Troubleshooting steps for specific problems:

1. Shutter won't release, no LEDs

Battery voltage to flex

Check for +6V to the red wire at the back of the main-switch board, Fig. 1. No voltage — battery box or wiring.

Main switch

Check for 6V to the emitter of TR, Fig. 9. You should get 6V with the main switch on (A) and 0V with the main switch off (L). No voltage — poor contact in main switch or break in flex between main switch (black wire) and TR emitter.

Transistor TR or TR bias path

Check for the E1 voltage (battery voltage minus drop across transistor) with the release button partially depressed at the TR collector. No voltage — check TR and bias resistors, Fig. 9.

No clock signal (OSC/INTERFACE IC)

2. Shutter won't release, LEDs o.k.
Battery voltage too low

Combination magnet MG2 or release capacitor C47

Depress the release button part way and short between the negative MG2 lead and ground, Fig. 2; the mirror should release. If not, check the continuity of the MG2 coil. Approximate coil resistance: 90 ohms. Check for 6V across C47 at the point shown in

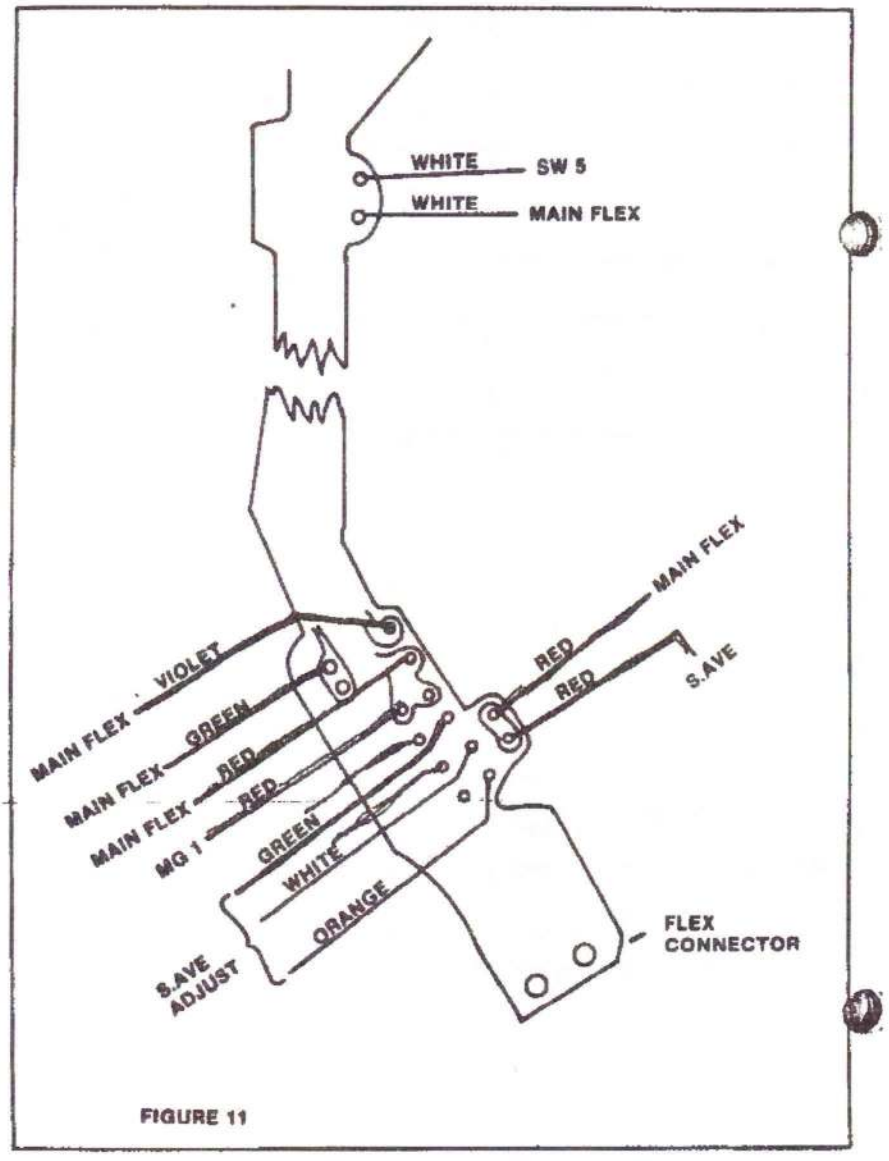



FIGURE 11

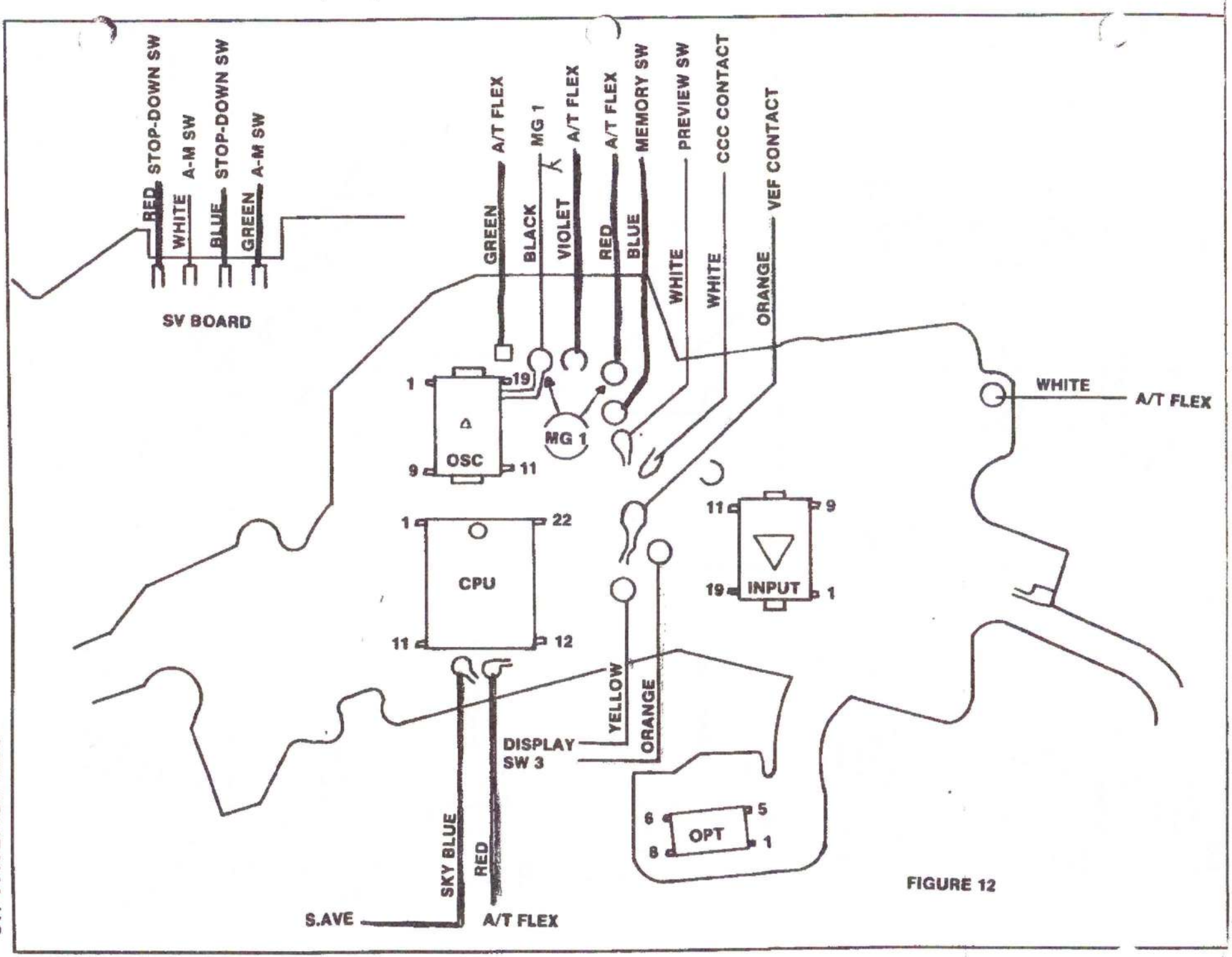

RED
STOP-DOWN SW
WHITE
A-M SW
BLUE
STOP-DOWN SW
GREEN
A-M SW
SV BOARD
GREEN
A/T FLEX
BLACK
MG 1
VIOLET
A/T FLEX
RED
A/T FLEX
BLUE
MEMORY SW
WHITE
PREVIEW SW
WHITE
CCC CONTACT
ORANGE
VEF CONTACT
1
19
OSC
9
11
MG 1
WHITE
A/T FLEX
1
22
CPU
11
12
11
9
INPUT
19
1
YELLOW
ORANGE
DISPLAY
SW 3
6
5
OPT
8
1
SKY BLUE
RED
S.AVE
A/T FLEX

FIGURE 12

FIGURE 13

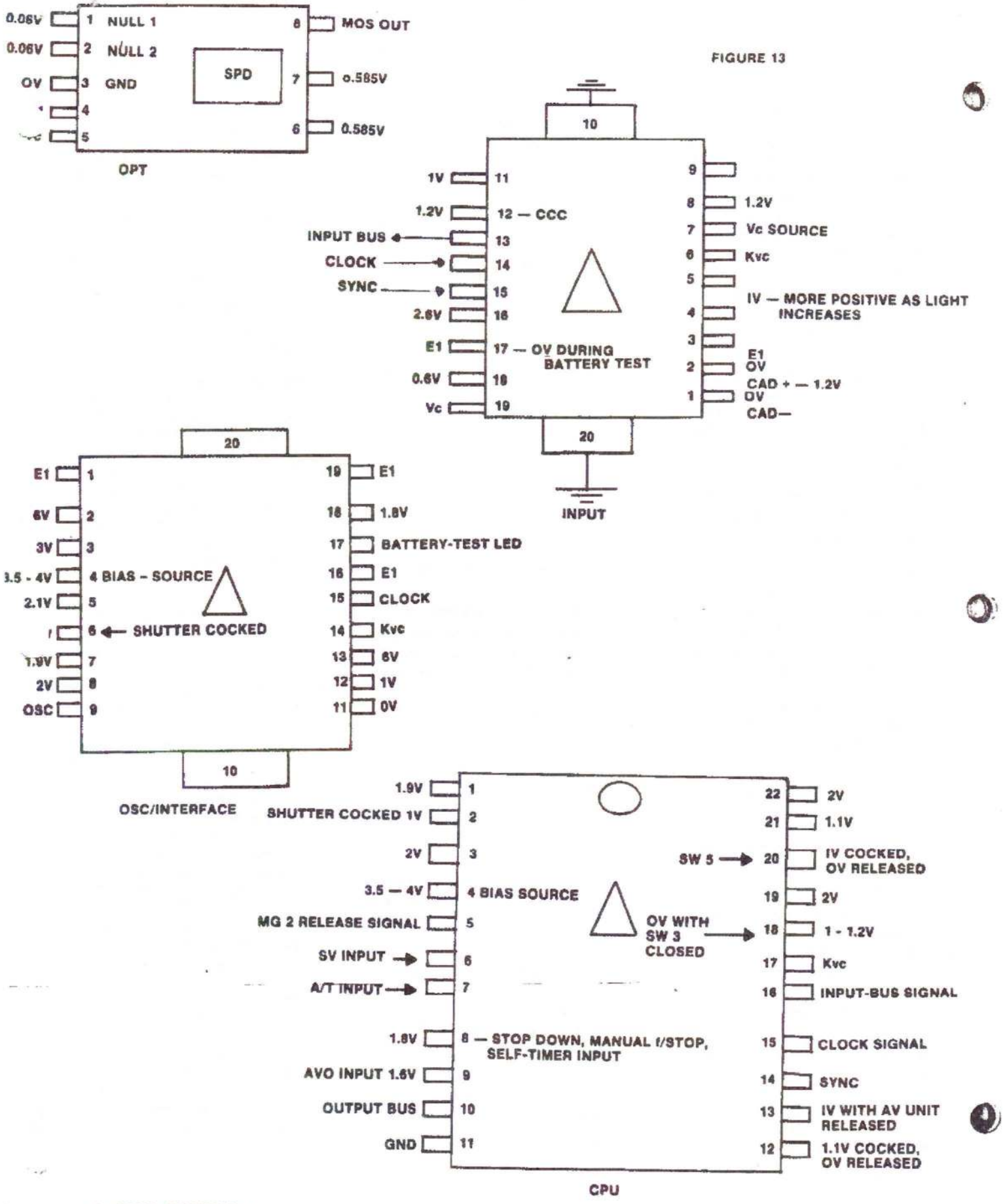

0.06V 1 NULL 1
0.06V 2 NULL 2
OV 3 GND
4
5
SPD
8 MOS OUT
7 o.585V
6 0.585V
OPT
10
1V 11
1.2V 12 — CCC
INPUT BUS 13
CLOCK 14
SYNC 15
2.6V 16
E1 17 — OV DURING BATTERY TEST
0.6V 18
Vc 19
9
8 1.2V
7 Vc SOURCE
6 Kvc
5
4 IV — MORE POSITIVE AS LIGHT INCREASES
3
2 E1 OV
1 CAD + — 1.2V OV CAD—
20
INPUT
20
E1 1
6V 2
3V 3
3.5 - 4V 4 BIAS – SOURCE
2.1V 5
6 ← SHUTTER COCKED
1.9V 7
2V 8
OSC 9
19 E1
18 1.8V
17 BATTERY-TEST LED
16 E1
15 CLOCK
14 Kvc
13 6V
12 1V
11 0V
10
OSC/INTERFACE
1.9V 1
SHUTTER COCKED 1V 2
2V 3
3.5 — 4V 4 BIAS SOURCE
MG 2 RELEASE SIGNAL 5
SV INPUT 6
A/T INPUT 7
1.8V 8 — STOP DOWN, MANUAL f/STOP, SELF-TIMER INPUT
AVO INPUT 1.6V 9
OUTPUT BUS 10
GND 11
22 2V
21 1.1V
SW 5 20 IV COCKED, OV RELEASED
19 2V
OV WITH SW 3 CLOSED 18 1 - 1.2V
17 Kvc
16 INPUT-BUS SIGNAL
15 CLOCK SIGNAL
14 SYNC
13 IV WITH AV UNIT RELEASED
12 1.1V COCKED, OV RELEASED
CPU

Fig. 2 with the release button partially depressed. No voltage — C47 or R2.2 (the resistor through which C47 charges).

Count switch SW4, poor contact (later models)

Check the continuity between the green wire and ground, Fig. 1. You should get direct contact with the shutter cocked. In the later models, poor contact in SW4 prevents the shutter from releasing. In the earlier models, poor contact in SW4 causes erratic fast speeds.

CPU IC or OSC/INTERFACE IC

Check the voltage at pin 3 of the OSC/INTERFACE IC — the voltage should go low when SW2 closes (release button fully depressed). If the voltage does go low, check the OSC/INTERFACE IC, Fig. 13. If the voltage does not go low, check the CPU IC, Fig. 13.

SW5, poor contact in released position or out of adjustment

With the shutter released, SW5 connects pin 20 of the CPU to ground. To check, release the shutter manually (push the MG2 armature toward the front of the camera). Short pin 20 of the CPU to ground. Then remove the short and cock the shutter. If the shutter now releases, clean SW5 and check the adjustment.

3. Shutter will not release, no LEDs (or no change in LED display)

   Input IC

   Check the Vc, Kvc, and input-bus signals (see "Functions of ICs and test procedures"). The input IC may have been damaged by an off-brand flash unit.

   CPU IC

   Check the output-bus signal and the sync signal.

4. Shutter won't release, error signal only in finder at auto, no AVO signal

   S.AVE plate — poor contact or out of adjustment

5. Error signal on auto and manual, shutter works o.k.

   CPU IC

6. No change in LED readout or exposure, shutter does release

   OPT IC

   Check for a changing MOS OUT at pin 8 of the OPT IC. The voltage should go more positive as the light level increases. Very low voltage or no change in voltage — replace the OPT IC (refer to "Functions and ICs and test procedures").

   INPUT IC

   Check the input at pin 7 — the voltage should go more positive as the light level increases. No change — check thermistor RTC for an open or poor solder. Check the analog-to-digital converter at pin 3 for the CAD signal. Improper signal — INPUT IC or capacitor CAD.

   CPU IC

   Check the output-bus signal.

7. Overexposure on fast shutter-speed settings

   MG3, dirty interface or weak armature spring

8. Underexposure on auto diaphragm and on auto shutter speeds

   MG1, dirty interface

9. Both curtains travel together, all modes

   MG3, not holding armature

   Check the continuity of MG3 between the black wire and the red wire, Fig. 2. Approximate coil resistance — 200 ohms. If you short the black wire to ground and release the shutter, the shutter should stay open for as long as you maintain the short.

   Wind overtravel, insufficient

10. Diaphragm always fully open, LEDs read o.k.

    MG1, open coil

    Check the coil between the red and black MG1 wires at the main flex, Fig. 12. Approximate coil resistance — 330 ohms. If you short the black wire to ground, the diaphragm should always stop down fully. If not, MG1 is not holding its armature.

11. Shutter-speed readout and diaphragm readout do not agree with settings, or shutter hangs open and LED always displays "bulb" — works on stop-down function

    A/T brush, poor contact

    A/T flex connector, poor contact

    A/T flex damaged

12. Shutter hangs open, other functions o.k.

    SW4, constantly closed or shorted to ground

13. Camera does not operate properly with motor drive

    Check the continuity between ground and the motor-drive terminals, Fig. 2.

    Terminal 1—to ground with SW1 closed

    Terminal 2—to ground with shutter released (SW5') — check SW5

    Terminal 3—always ground

    Terminal 4—to ground with SW2 closed

OTHER COMMENTS:

1. You can drop out the focusing screen from inside the mirror box. Remove the screw at the top front of the lens opening.
2. A replacement A/T flex comes as a complete unit including the main-switch board and the A/T board. You can replace the main flex as a complete unit or you can replace individual parts.
3. The OPT IC in the A-1 will interchange with PX-1 in the AE-1. However, Canon has higher specifications for the OPT IC. Installing a PX-1 in the A-1 could limit the metering range.
4. The revised shutter assembly for the A-series Canons includes the battery box as part of the unit. It is no longer possible to replace the battery box without also replacing the shutter.
5. MG1 in the A-1 has always had the plastic cover (a modification to the AE-1). Consequently, you cannot clean MG1 from the bottom of the camera as in the earlier AE-1's. Remove the mirror box to clean MG1.
6. Release magnet MG2 may occasionally be bad even though it checks properly with DC tests. If the reactance of the coil is too high, the shutter may not release; the tests described in the "troubleshooting" section may not always isolate a defective MG2. If the shutter will not release — yet the camera passes the troubleshooting tests described — try replacing MG2.