OLYMPUS

FULL-SYNCHRO FLASH

F280

REPAIR MANUAL

OLYMPUS OPTICAL CO., LTD.

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A. GENERAL OUTLINE

1. Outline of product

Model name : OLYMPUS FULL SYNCHRO FLASH F280
House code : APF28

2. Main Specification

Type : Full synchro flash, Normal "OFF-THE-FILM" flash or manual flash
Guide No. : 28 (ISO 100·m)
Coverage angle : 53°(vertical), 74°(horizontal) (covering picture frame of 24m lens)
Flash duration : Normal Flash 1/40000 ~ 1/1000 S
Super FP Flash 14 ~ 30 ms (OM707)
Super FP Flash 20 ~ 40 ms (OM-4Ti)

Recycling time (Unit: sec.) :

Power source	Super FP Flash	"OTF" Flash	Manual
AA"Penlight" Batteries	5~10	0.2~10	10
Ni-Cd Batteries	4~8	0.2~8	8

Number of flashes (Unit: Number of times) :

Power source	Super FP Flash	"OTF" Flash	Manualb
AA"Penlight"	80~260	80~600	80
Ni-Cd Batteries	70~150	70~600	70

Flash mode selection :

Type of camera	OM-707	OM-4Ti	Other OM camera
Selecting system	Automatic selection by isgnal from the camera	Manual selection by mode setting	Usable for flashing only

* Flash mode: Super FP Flash, X Flash

Super FP Flash :

	OM-707	OM-4Ti
F value setting	F4 automatic setting	No stage selection (Usable any diaphragm)
Synchro speed	(1/100)~1/2000	1/60~1/2000
Guide No. 1/2000	3.1	2.6
1/1000	4.3	3.7
1/500	6.2	5.2
1/250	8.8	7.3
1/125	12.4	10.4

"OFF-THE-FILM" Flash (This term is abbreviated to "OTF" Flash, below.)

F value setting : No stage selection (Usable any diaphragm)
Light intake angle : Automatic switching to picture frame angle of the lens being used

Working distance : 0.25m ~ 23m (ISO 100, F 1.2 with Standard lens)

F No.	Object distance	F No.	Object distance
1.2	3.4 ~ 23	5.6	0.7 ~ 5
1.4	2.8 ~ 20	8	0.5 ~ 3.5
2	2 ~ 14	11	0.36 ~ 2.5
2.8	1.4 ~ 10	16	0.25 ~ 1.8
4	1 ~ 7	22	0.18 ~ 1.3

Guide No. : 4 ~ 28 (ISO 100m)
Manual flash Guide No. : 28 (ISO 120 m)
Charge indication : Flash ; back side (turning on of CHARGE lamp)
Camera ; in the finder (turning on of signal light)
Flash control : Flash ; back side (turning on of symbol mark of Normal Flash or Super FP Flash)
Camera ; in the finder (Blinking of signal light)
Connection to camera : (1) Clip on type ; Inserting a shoe, and locking by a screw
(2) Bracket type ; (POWER BOUNCE GRIP 2 • TTL AUTO CORD F are used)
(3) Free type ; (TTL AUTO CORD F is used)
Electrical connection with camera : (1) Clip on type ; Direct contact type
(2) Bracket type, Free type;
(Connecting terminal)
① X terminal(Trigger signal)
② TTL terminal
③ Charge completion and Auto-checking signal terminal
④ Common terminal(Earth)
⑤ ⑥ Communication of data between the flash and the camera
⑦ LED terminal for AF illuminator
Color temperature : 5800°K
Power source SW : ON-OFF slide type
Testing flash : Tested by test button
Terminal for external code : Attachable and removable by one action with 7 contacts
Power source : "Pen Light" R6(AA) battery × 4 (Ni-Cd batteries can be used)
AF illuminator : Automatic flash in case of low light condition and low contrast around of the object(less than BV4)
Distance range 1.5m ~ 5m (50mm F1.8 lens ISO100) possible to flash in state of POSW-OFF
Dimensions : 110 × 68 × 71
Weight : 250g (without battery)

*** Note**

1. Super FP cannot be flashed in case of combination with a camera except OM-4Ti and OM707.
2. This flash has no bounce function as single unit.
3. Zoom adapter T32, Color filter set T32, and Wide adapter ND filter set T32 of accessories cannot be used for this flash.
4. Multi Flash photography is not possible.
5. External power source cannot be used.
6. TTL auto-code(option) is required when this flash is attached to the POWER BOUNCE GRIP 2.
7. This does not flash sometimes despite pressing the test button after turning on of CHARGE LED, if the test button is pressed 2 3 times during charging.

*** Characteristics**

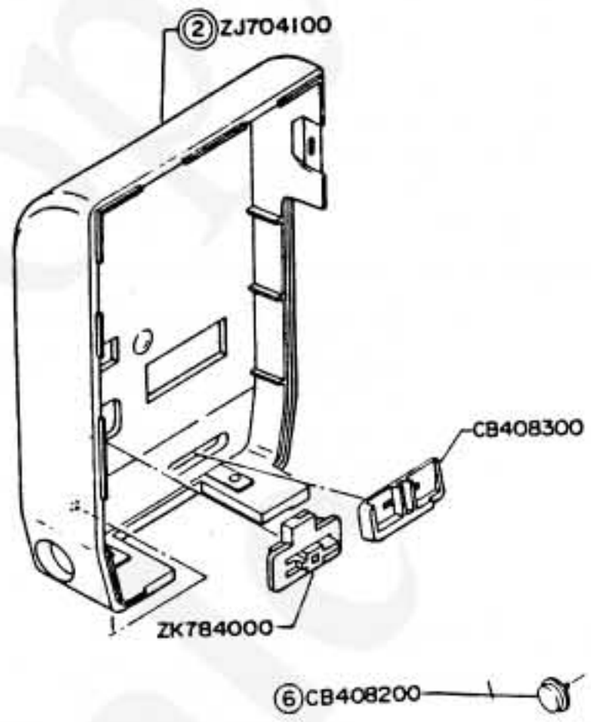
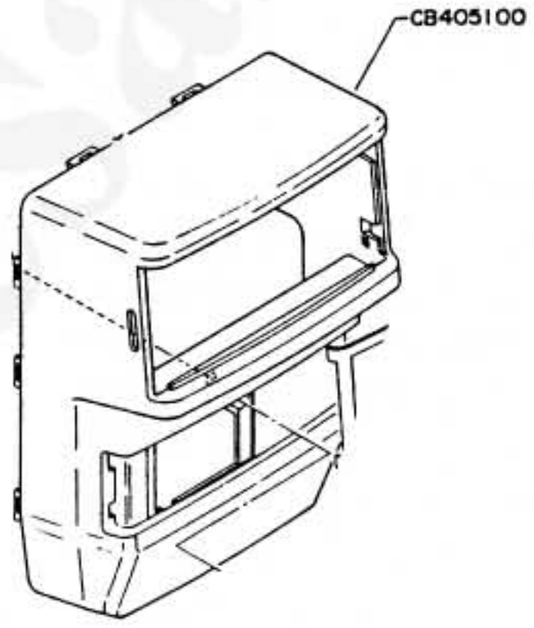
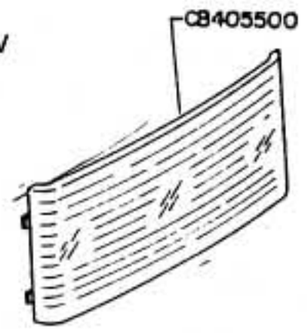
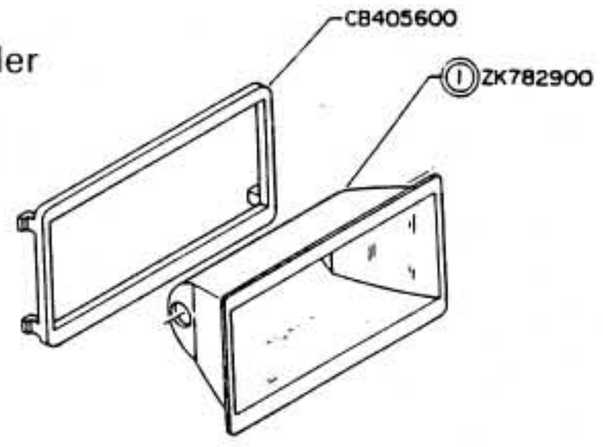
1. Synchro flash in the daylight can be attained by the Super FP flash function which synchronize with all kinds of the shutter speed, for the first time in the world.
2. This apparatus has function of "Easy Operation Flash" which requires no operation on the flash side except operation of the power switch ON, when this is used with OM-707.
3. This apparatus has mechanism of AF illuminator which automatically flash at less than BV4, when this is used with OM-707.
4. It can be checked by the mode indicator on the back panel that which mode is selected super FP flash or Normal Flash after fire.
5. "OTF" flash is possible when this apparatus is used with cameras(OM-2, OM-2N, OM-4, OM-2SP, OM-40, OM-4Ti, om-707) having TTL auto function.
6. This apparatus has coverage angle corresponding to picture frame of 21mm lens.
   (When the Wide Adapter F280 (optional) is used)

B. INSPECTION STANDARDS (APF28)

Inspection items		Standards	Remarks
Insulation resistance	:	500V, more than 30MΩ (Normal temperature, and humidty)	
Battery contact force	:	550g ±10g	force required for loading battery
Force required for pulling out the battery case cover	:	±150g (when over click position)	
Tolerance for attaching	:	±0.2° (horizontal), ±0.5° (vertical)	
Control of flash and exposure			
Number of flashes	:	more than 60 times	· should be used new type alkaline battery and manual operation. Number of flashes until charging voltage cannot cause flash despite passing 30 sec, after recycling of flash with 30 sec. interval.
Quantity of flashing light	:	G. No. 28 ±0.75EV	· 30 sec. after turning on of the charge lamp
		G. No. 28 −1.2EV	· Immediately after turning on of the charge lamp
Recycling time	:	Manual; less than 12.5 sec. TTL auto; less than 0.2 sec.	(New type alkaline battery) (0.5m, F4, New type alkaline battery)
Coverage angle	:	53° (vertical) 74° (horizontal)	· Angle such that quanity of flash decrease by 1EV comparing with the that of the central section.
Auto check blinking	:	Blinking duration; 2 sec.	

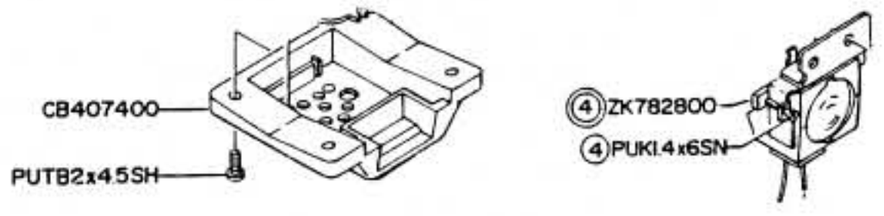
Inspection items		Standards	Remarks
Super FP flash			
Flash duration	:	OM707; + 1 ms (Flash control signal of the camera side) OM-4Ti; 20 + 5 ms	
Exposure Tolerance	:	±0.3 EV	
Quantity of flashing light	:	G. No. ±0.75 EV	
Color temperature	:	5800° ±200°K	
TTL auto code			
Force for attaching and removing	:	Force for attaching; 1.0±0.5 Kg Force for removing; 1.3±0.5 Kg	
Force for attaching	:	Non-linear force; more than 5 Kg	
Current at completion of charging	:	less than 150 mA (idling charge current)	· 2 minutes after power SW is turned ON.
Dark current	:	less than 20μA	· At power SW is turned OFF.

C. DISASSEMBLY PROCEDURE

Main parts	Parts removed	QTY	Parts removed naturally	Remarks
1. Rear cover	PUTB2 ×4.5SN (Note) Foot baseon (CB407400) should not be removed. (To required no AF adjustment)	2	ZJ704100 Rear cover CB408200 T Button CB408300 M Knob ZK784000 P Knob	
2. Front cover	J202 (shoe Jack) each lead wire REJ9-110 (Trg) REJ0-37 (LED for AF) REJ2-37 (LED for AF) REJ2-132 (BATT) REJ0-167 (BATT) REJ4-92 (X) REJ6-92 (XE)	1 7	Front cover Assy. (CB4051)	
3. Flash Diffuser Window	・Push out the Flash Diffuser window from the Front cover Assy. (CB4051), pressing the claw of it to inside direction. ・The Flash Diffuser Window is attached by the claw and both side adhesive tape.		CB40550 Flash Diffuser Window	
4. Reflector	・CB405600 Reflector Holder ・Push out the Reflector from outside of the Front cover, bending 4 claws of Reflector Holder inside direction.		CB405600 Reflector Holder ZK782900 Reflector	

(Note)

Shoe section (CB407400=Foot Base) and AF LED (ZK7828=AF frame) section should not be removed from the Front cover Assy. (CB4051). When it is removed, check and adjust AF after assembling it.



D. ASSEMBLY AND ADJUSTMENT PROCEDUR

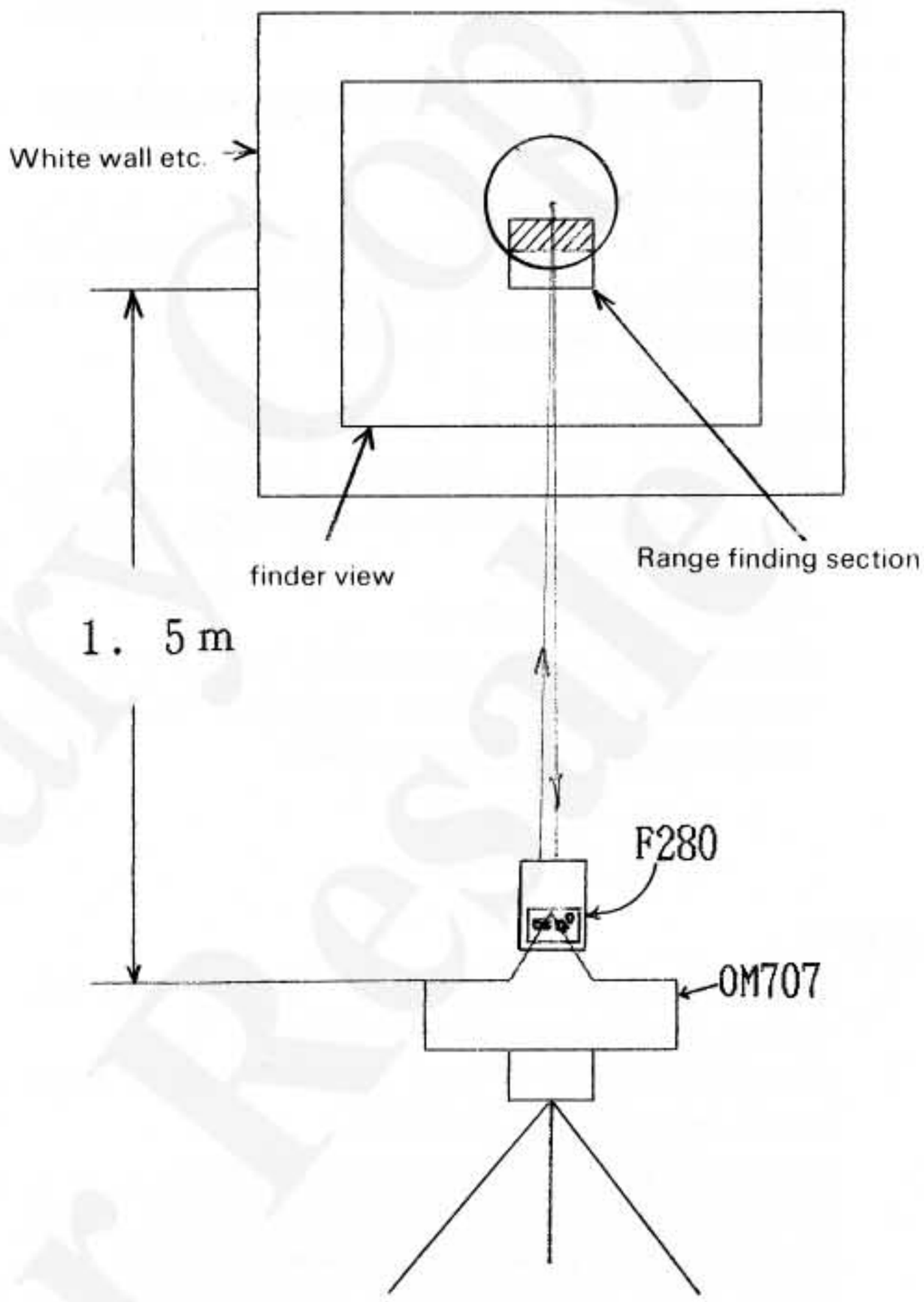
1. Adjustment of AF frame ASS'Y

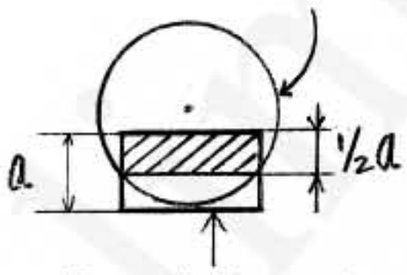
- Af frame ASS'Y should be checked and adjusted in case of mentioned below.
  - ① When the Foot base(CB407400) is removed from the Front cover.
  - ② AF frame ASS'Y (ZK7828) is replaced.

- Adjustment Procedure
  - ① Prepare object(such as white wall)
  - ② Set exposure to low light condition (less than BV 4V)
  - ③ Set F280 to OM707, and attach them to the tripod.
  - ④ Use AF 50mm F1.8 lens.
  - ⑤ Set the camera etc. same as shown in the right figure.
  - ⑥ Press the shutter release button, and turn AFLED ON.
  - ⑦ Check that circle section of AFLED light cover the range finding section or not.

    Standard

    Circle section of AFLED should cover more than 1/2 of the range finding section. (Refer to the follwing figure)

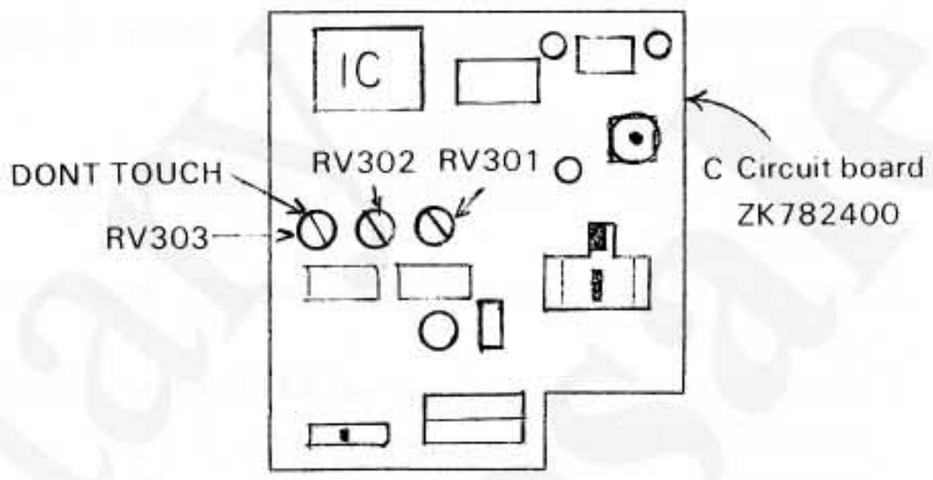




2. Adjustment of circuit board

① Adjustment of charging completion LED lighting voltage
Adjust the main capacitor voltage to 235±5V by turning RV301.
(Adjustment procedure)
Charge the main capacitor measuring its voltage by a circuit tester, and adjust its voltage so that LED turns on at 235V.

② Adjustment of charging stop voltage
Adjust the main capacitor voltage so that charging is stopped at voltage of 265 ±5V by turning RV302.
(Adjustment procedure)
Charge the main capacitor measuring its voltage by a circuit tester, and adjust its voltage so that charging stops at 265V.



S62.2.18 RM3209

(Note)

1. RV303 has never to be turned. When it is turned, replace the IC circuit board ZK782400.
2. When quantity of FP light is insufficient, replace the IC circuit board ZK782400.
   Adjusting quantity of light is impossible.
3. When either P circuit board ZK782300 or IC circuit board ZK782400 is replaced with the new board, carry out adjustment again according as adjusting procedure of No. 2- ①, ② .
4. (Standard of Quantity of FP light)
   When it is measured by the flash meter for flashing : F8 approximately (OM-4Ti, manual operation, more than 1/60, distance = 1m)

E. TROUBLE SHOOTING PROCEDURE

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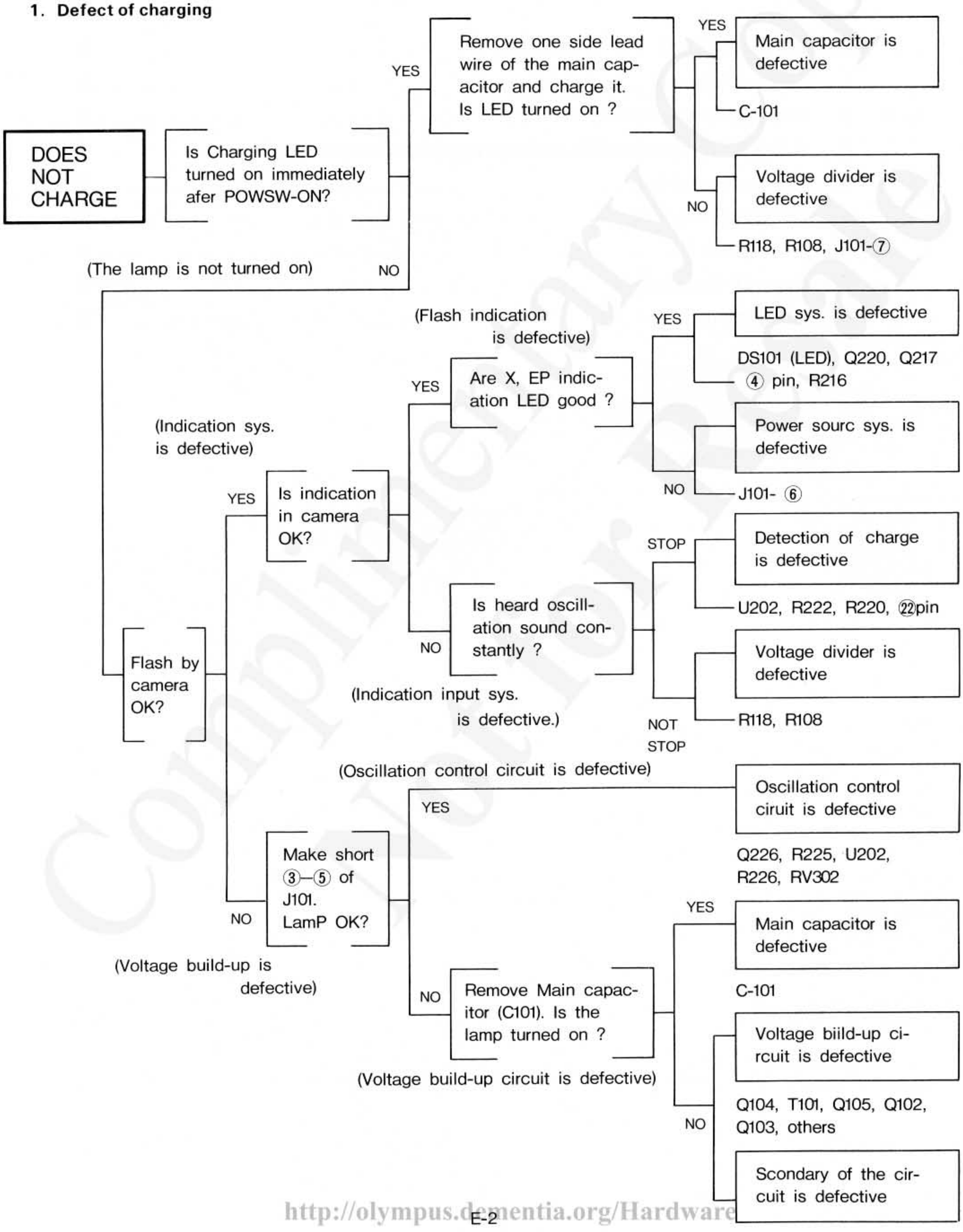
I. TROUBLE SHOOTING

- Number in mark is pin No. of U201.
- When pin of IC and resister etc. are checked, remove one side of soldering.

1. Defect of charging



Charging is not stopped

(means : stopped at 265V)

Make short⑤—② of J101. Does oscillation stop ?

YES

- Oscillation control circuit is defective
  - Q226, R224
  - RV302
  - U202

NO

- Booster circuit is defective
  - Q102, Q103

Re-charging start immediately

- Oscillation control circuit is defective
  - Q225, R223
  - RV302

2. Charging lamp is not turned on

○ Firing of the flash is possible

Charge lamp in the camera view-finder and the flash are not turned on

(Indication input system is defective)

- Charging detection circuit is defective
  - R118, R108, J101-⑦
  - U202, R222, R220

The flash is charged, but only charging LED is not turned on.

Indication LED of the flash X, FP are turnd on ?

YES

- LED system is defective
  - DS101, Q220, Q217
  - ④ pin, R216

NO

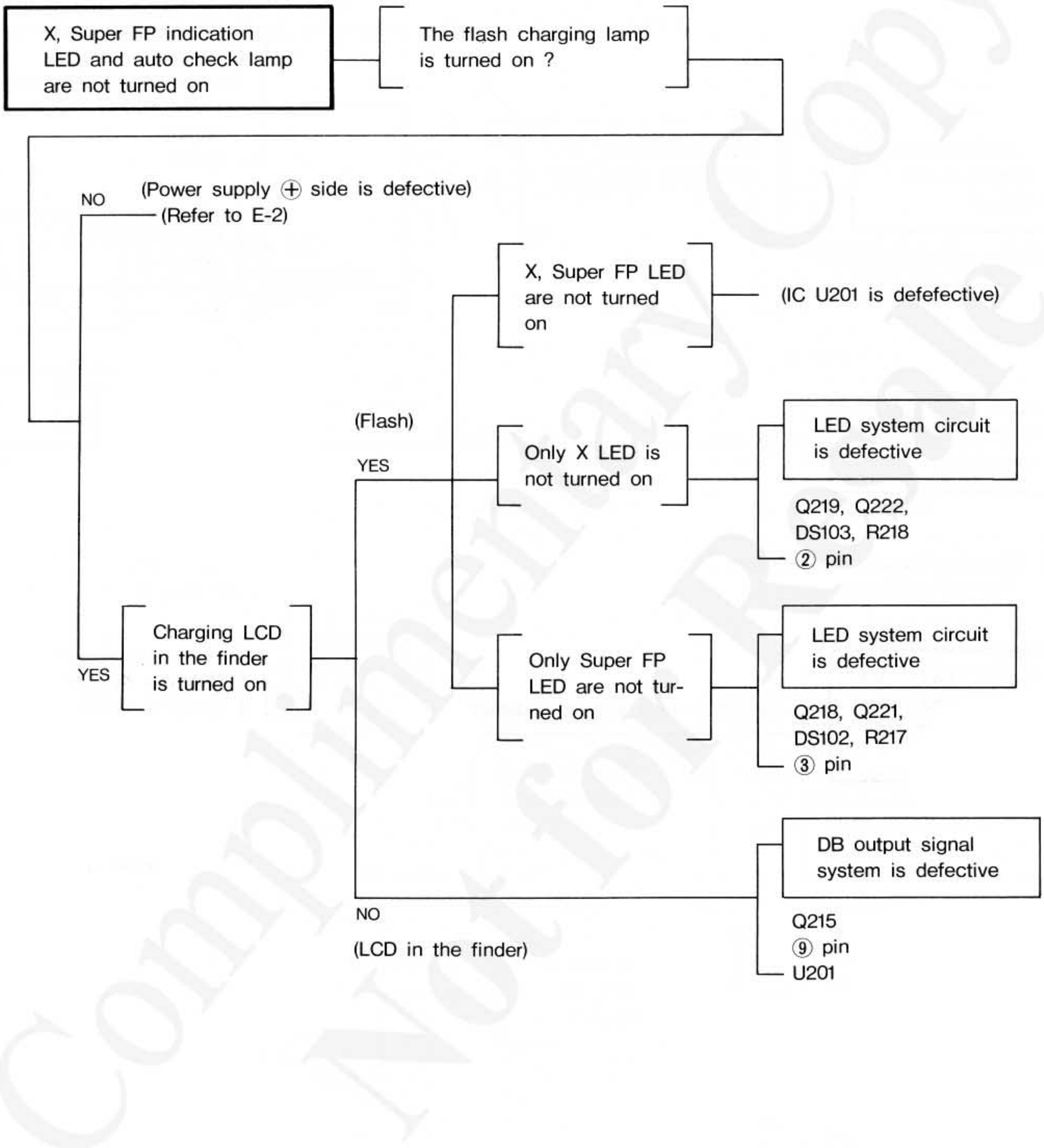
- Power supply system of LED is defective
  - J101, ⑥

Only LCD in the finder is not turned on.

(Camera is allright)

- DB output signal system is defective
  - J201, ③
  - Q215, ⑨ pin
  - U201

3. X, Super FP indication LED and auto check lamp are not turned on



4. The flash is not fired
(with OM707)

X does not fire
(SW-NORMAL)

Measure voltage between ②—④ of J101. Adout 25V ?

NO → Power supply of firing Trg. is defective
D301, C104, R107

YES → Is FP fired ?

(Firing circuit is defective)

Make short between Xe ⊖ and GND, then fire the flash. OK ?

NO → Trg. system is defective
D401, C107
T102

YES → C106 system is defective
Ci06 , D403, R111
D107, C109, R115
R119, C110, C111

(No firing)

Make short between ⑨pin and ③ pin of J101. Is the flash fired slightly ?

YES → Firing Trg. circuit is defective
Q202, D204
R207
J101⑨

(Firing Trg. circuit is defective)

(Fire slightly)

Make short A-k of thyristor D405, Does the flash fire ?

NO → Firing Trg. circuit is defective
Q207, R247, Q204
C307

YES → Is the flash fired by test button ?

NO → Firing Trg. circuit is defective
D405, R245, Q240, Q209

YES → Make short between ⑤pin and ⑥ pin of J201. then Is the flash fired with OM707 ?

NO → TTL circuit is defective
Q237, Q238, Q239

YES → X-SW input system is defective
J201④, Q214
R212, C316, R244

Other circuits is defective
Q231, Q209

(with OM707)

Super FP does not fire

(SW-NORMAL)

Fire the flash 1 time by test button. Does X indication LED is turned on always after firing ?

YES

U201CLK Oscillation circuit is defective

Y101, C312, C313
R202, R241

NO

Set the flash to Super FP mode, and make short between ⑤—⑦ of U201. Does the flash fire ?

NO

Super FP signal output system is defective

Q206, ⑱pin, U201

YES

CLK signal input system is defective

J201②, Q212
R210, D206

Super FP does not fire only with OM-4Ti

(OM707 OK ?)

NO

(Refer to the above)

YES

(S103, ⑪pin, ①pin, U201)

5. Full firing every time
(with OM707)

Firing fully by X

(SW-NORMAL)

Normal operation with OM-4Ti

YES

(CLK sighal system is defective)

(IC U201 is defective)

NO

(TTL system is defective)

Make short between J101 ⑩—⑧, then fire the flash

FULLY

TTL circuit of firing section is defective

D404, C110, D403, C111

SLIGHTLY

Make short between U201⑪ and J101⑧. Then fire the flash. Slightly ?

FULLY

TTL section of firing trigger is defective

Q203, Q208, D205
Q2451, Q211

SLIGHTLY

TTL circuit is defective

J201 ⑤, Q237
Q239, Q233
C317

Full firing by X and Super FP

Make short between J101⑧—②, then fire the flash. Slightly ?

FULLY

Firing circuit is defective

C109, C108, D402

SLIGHTLY

Firing trigger circuit is defective

Q201, Q205, D201

Full firing only with OM-4Ti

X fires fully

Mode switch system is defective

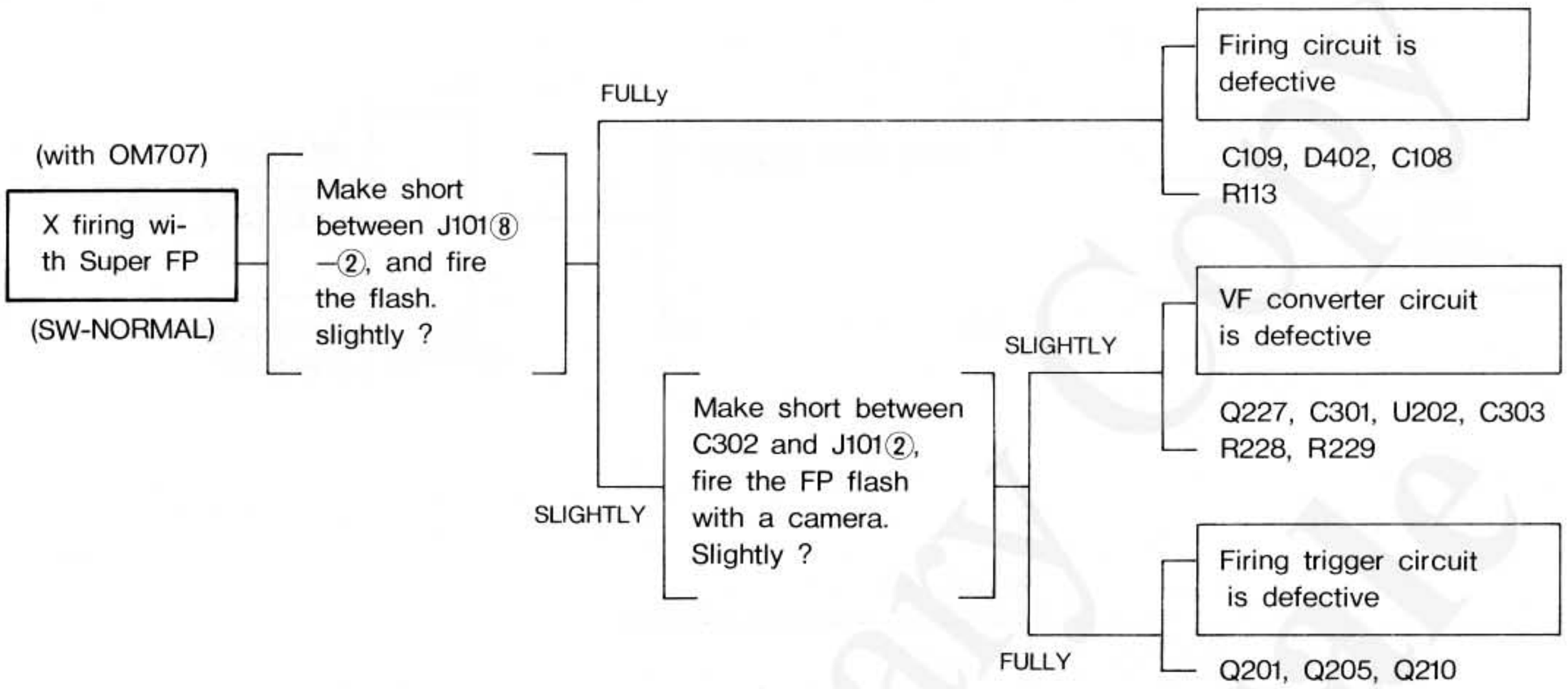
S103, ⑪, ①pin

Super FP fires fully

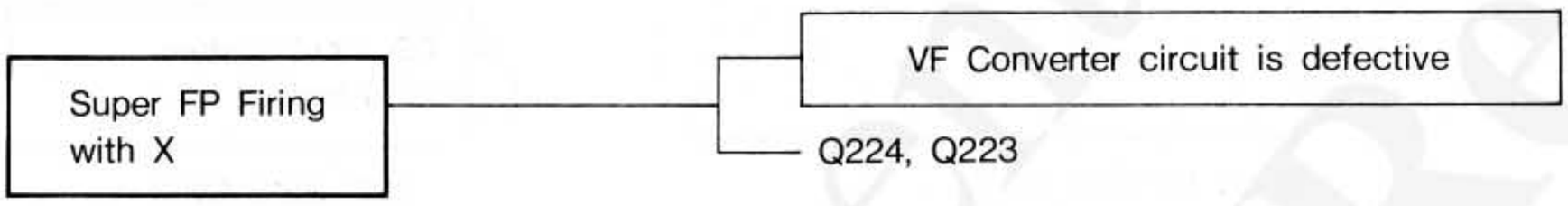
DB input system is defective

D207, R211, Q213
⑧pin, U201

6. X firing with FP

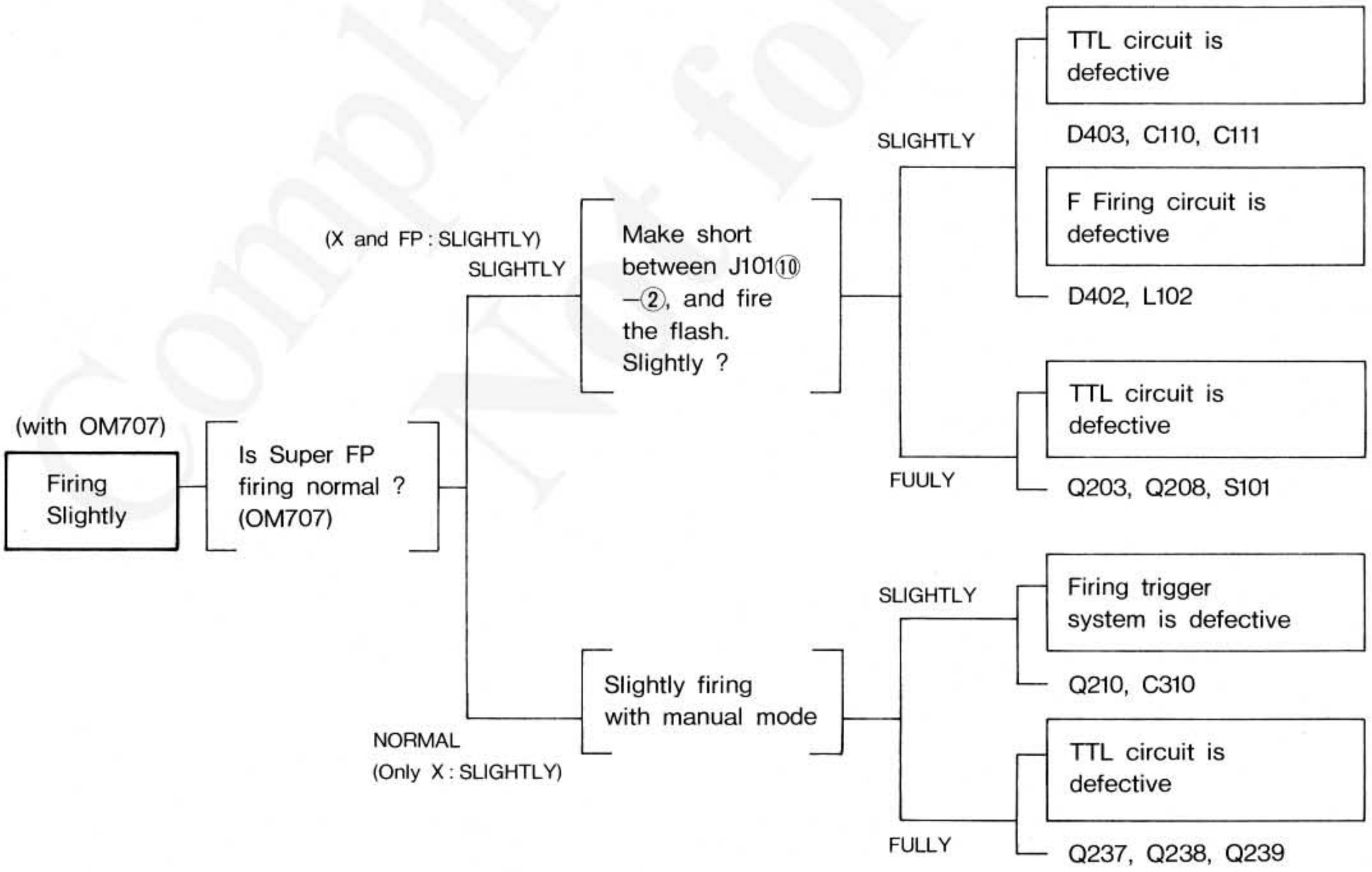


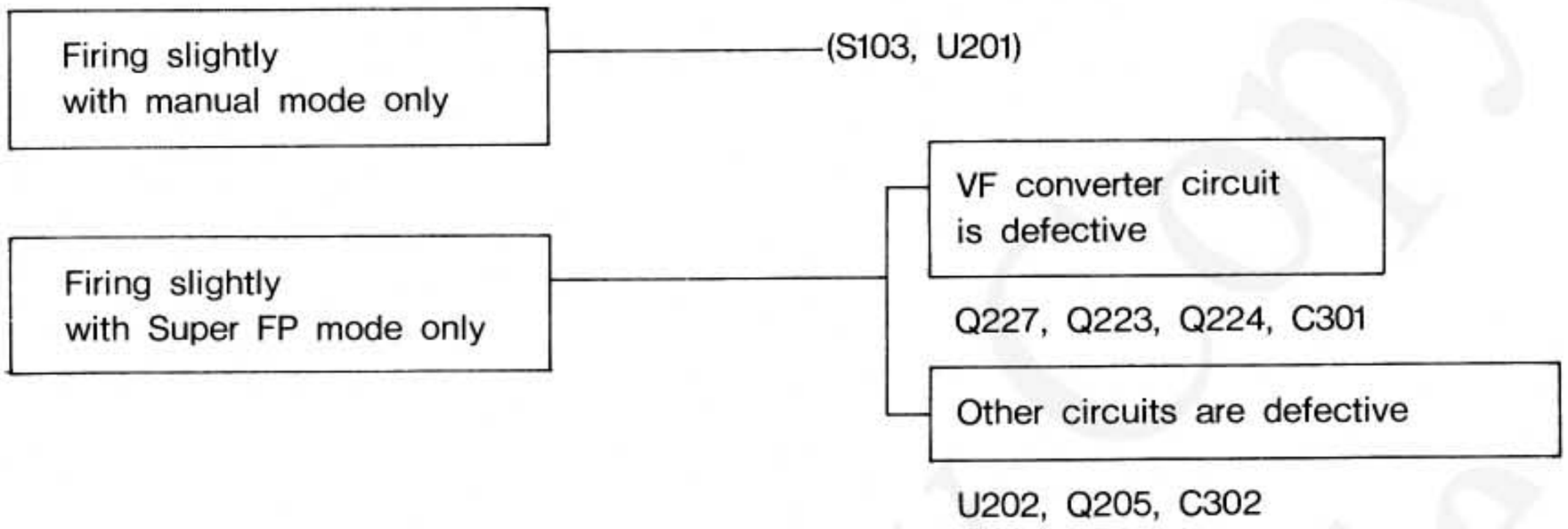
7. Super FP firing with X



8. Firing slightly

(Remark)
The flash is subjected to fire slightly, in case of insufficient battery capacity.





I. THEORY OF OPERATION

I. CHARACTERISTICS

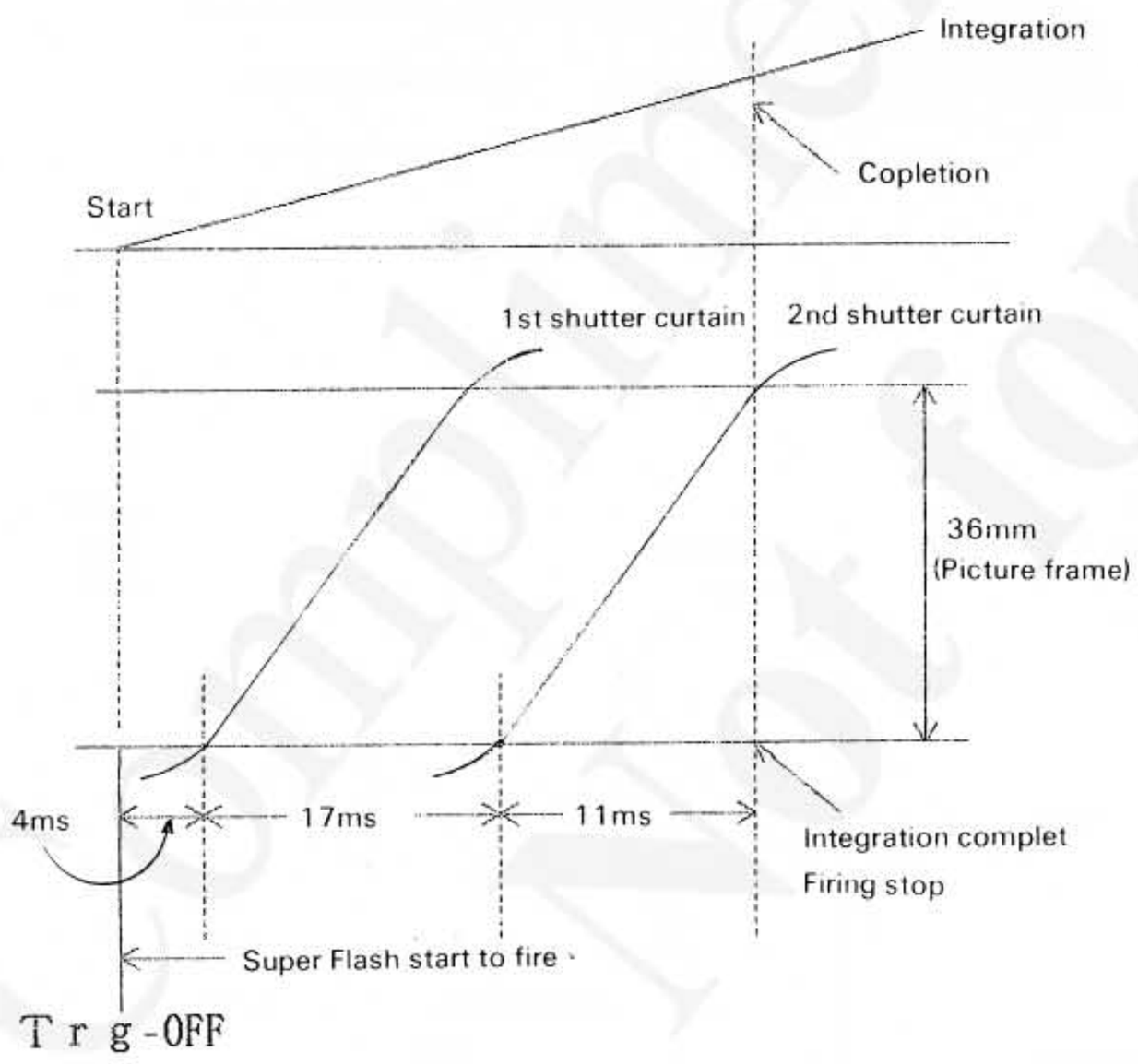
F280 Flash is the innovative flash which is expected to renovate conventional concept concerning a flash.
This technique which enables the flash to synchronize to the shutter releasing till 1/2000 sec. is the first invention in the world.
Characteristis are as follows.

1. possible to synchronize to all shutter speed(till max. shutter speed)
2. Cordless
3. Compact

It might be said that these characteristics suggest the future trend of the flash.

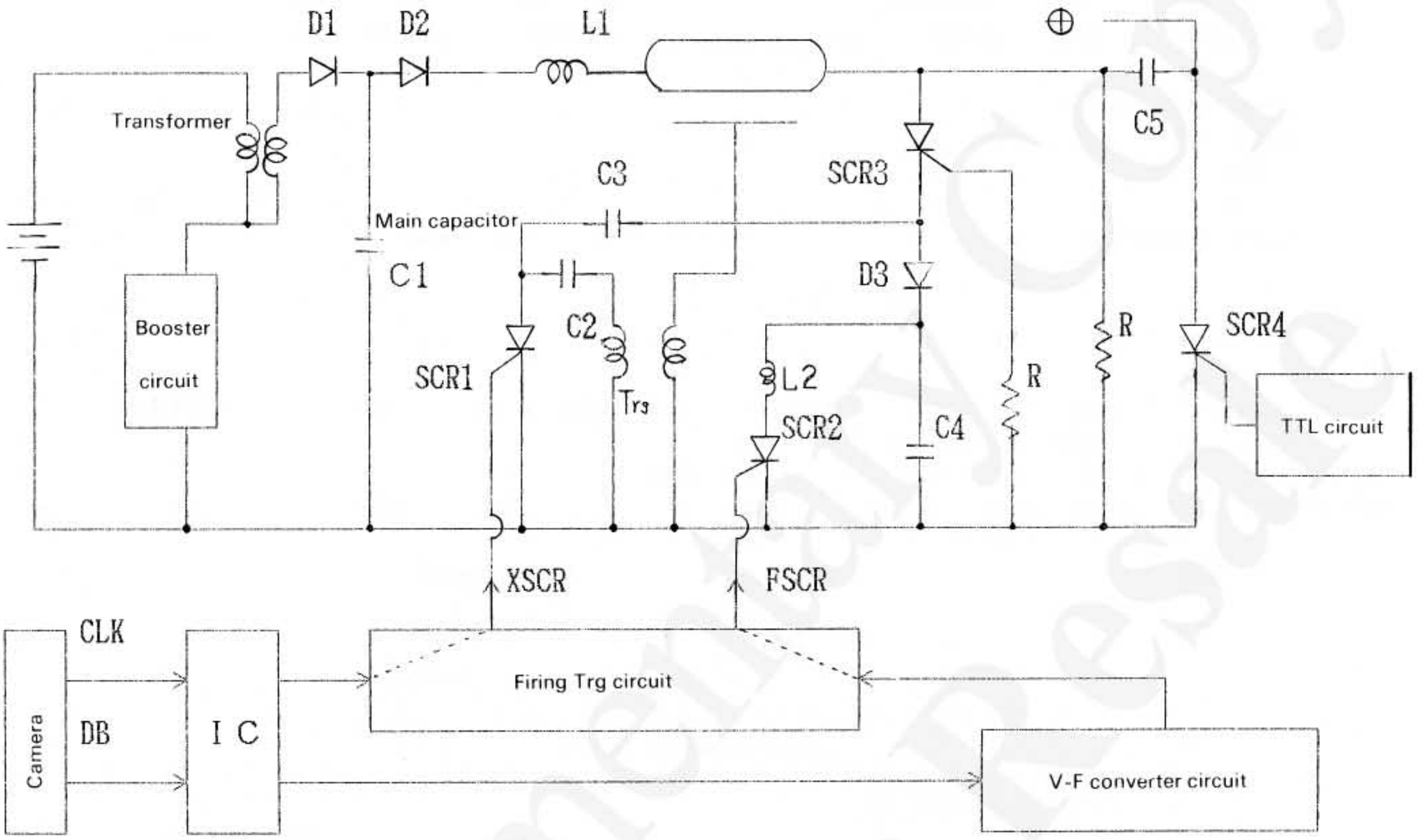
II. Outline of the Super FP Flash

1. The Super FP Flash is the flash which keep firing during running of the shutter curtain (about 40 msec.). (The Super FP Flash is abbreviated to "S. FP", below.)
2. Quantity of firing light is full firing light.(not automatic operation)
3. X SW of the shutter is turned to ON immediately before start of the 1st curtain. (Turned to ON immediately after completion of running of the 1st curtain up to now)
4. Firing is stopped by firing completion signal(integration completion signal).
5. GNo. is varied according as the shutter speed.
6. This flash discriminates OM-4Ti(4T)from OM707(77AF)

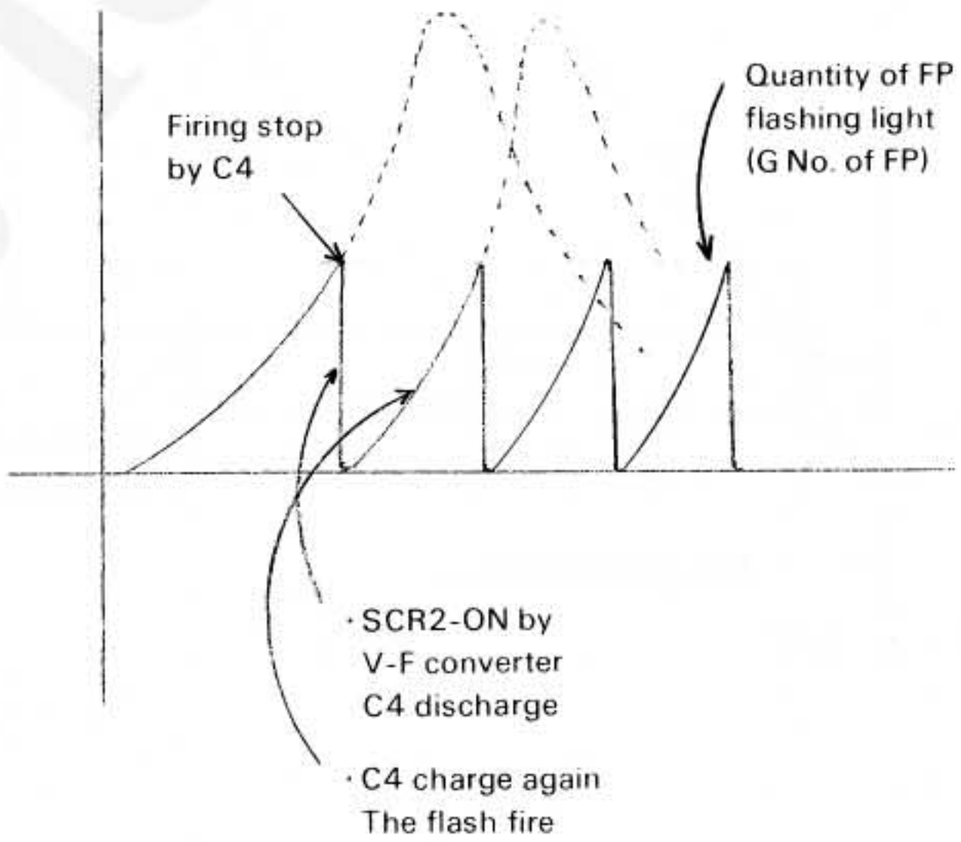


Shutter Speed	GNo.	
	OM4Ti /4T	OM707 /77AF
1/2000	2.6	3.1
1/1000	3.7	4.3
1/500	5.2	6.2
1/250	7.3	8.8
below 1/125	10.4	12.4
below 1/60	14.7	15.6

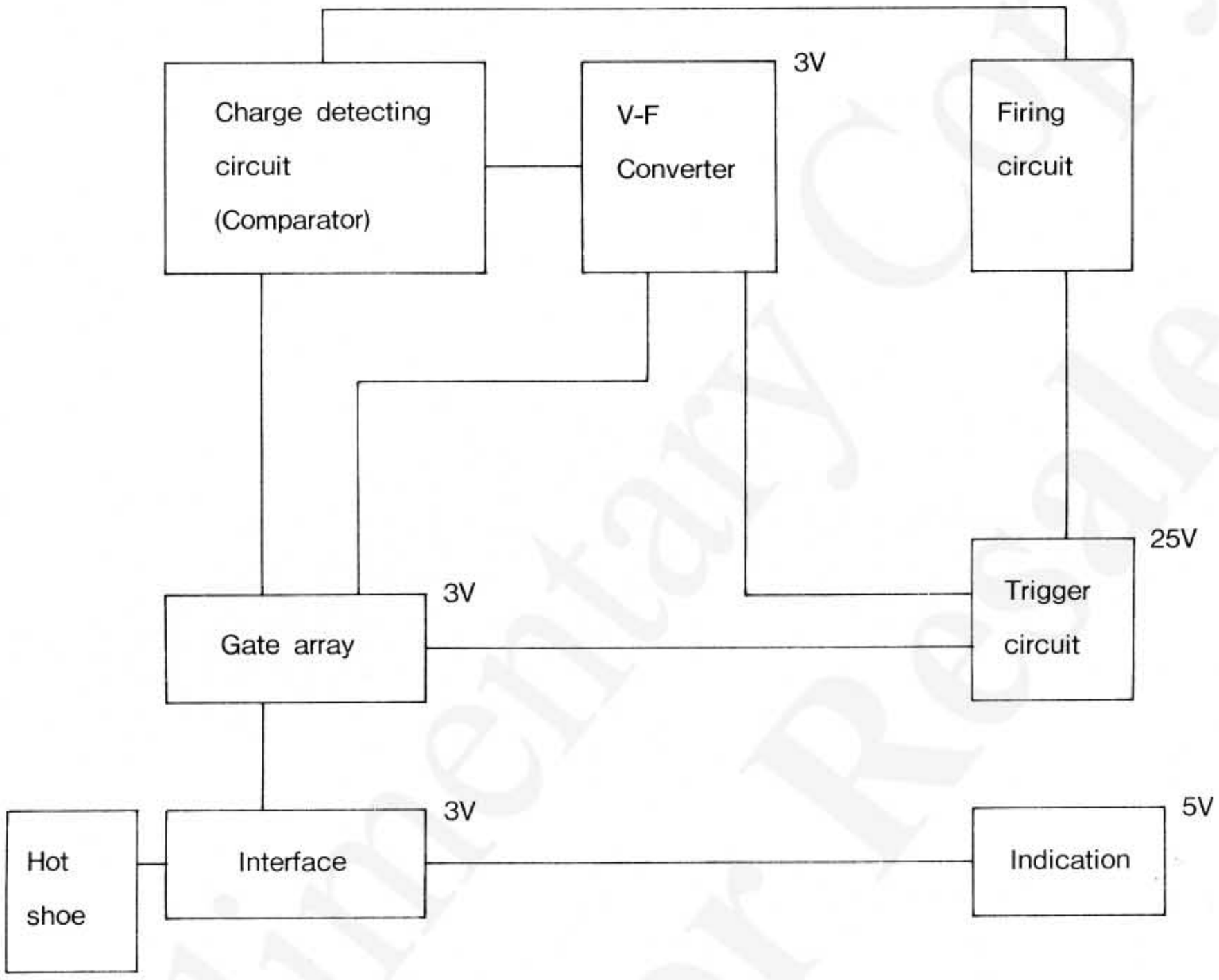
III. BASIC THEORY OF FP FIRING



1. Trigger is turned to OFF state by the 1st curtain of the camera, at this time CKL signal is turned to L state and is input to IC of the flash.
2. According as the above, XSCR signal is output from the firing Trg circuit, SCR1 is turned to ON state, firing starts.
3. But, firing current stop at completion of charging to C4.
4. At this time, signal from IC of the flash let the V-F converter to operate. (1st pulse is output)
5. FSCR is output by V-F converter, SCR2 is turned to ON state. Therefore C4 dischage.
6. During this discharging, SCR3 is thrned to ON state again. And C4 is charged again, the flash fires.
7. Next, Firing stop again according as completion of C4 charging.
8. At this time, 2nd pulse is output from the V-F converter, C4 is dischaged again.
9. These operation is repeated many times.



IV. BLOCK DIAGRAM



1. Gate array : This circuit outputs command signal to each circuit and control them according to requirement, discriminating the input signal from the camera and the signal from the flash.
2. Interface : This circuit converts polarity (+, −) of the input signal from the camera.
3. Charge detecting circuit : Main capacitor voltage of the firing circuit is input to this ecting circuit, and this circuit discriminates that the voltage reach circuit to 265V or not. Then the results is output to the gate array.
   (Signal stopping increase of voltage is output to the firing circuit, when the voltage reach to 265V, at the gate array. At less than 265V, voltage increase.)
4. V-F converter : At firing of the S. FP, Discharge tube and firing Trg (FSCR) are turned to ON state and OFF state alternately.
   This operation is repeated periodically.
5. Trigger circuit : This circuit let the dischage tube to fire, and output X signal and FP signal to the firing circuit.
6. Indication circuit : This circuit let the indication LED to turn on, when charging is completed and S. FP, flash is used.

* Charging stop voltage : 265V(Charging completion voltage at increase)
  Charging resumption voltage : 260V(Charging start voltage at decrease)

J. OTHERS

○ FIRING STATE OF THE FLASH AND THE CAMERA

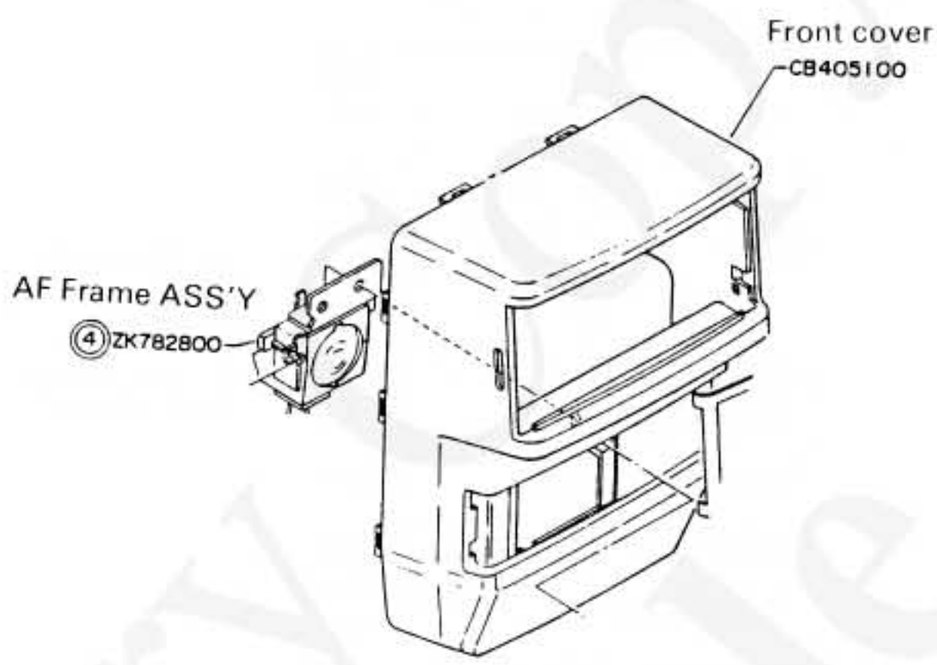
The Flash		OM707			OM-4Ti			OTHER OM CAMERA		
					Auto			Auto		
		Low Light condition	High Light condition	Remarks	Low Light condition	High Light condition	Manual	Low Light condition	High Light condition	Manual
F280	·SUPER FP	—	T-FP	F4 : Fixed X,FP:Auto. selecting F4 : Fixed F4 : Fixed	T-FP	T-FP	Full-FP	—	—	—
	·NORMAL	T-X	T-FP		T-X	—	Full-X	T-X	—	Full-X
	·MANUAL	Full-X	T-FP		Full-X	—	Full-X	Full-X	—	Full-X
F280 Other Lens used	·SUPER FP	—	—							
	·NORMAL	T-X	—	F4 : Fixed						
	·MANUAL	Full-X	—	F4 : Fixed						
Flash Grip 300		FM-X	—	FM system						
T series Flash	·Flash Auto	T-X	—	F4 : Fixed	T-X	—	Flash Auto	T-X	—	Flash Auto
	·Manual	T-X	—	F4 : Fixed	T-X	—	Full-X	T-X	—	Full-X
Fixed to F4 except Flash Grip 300										

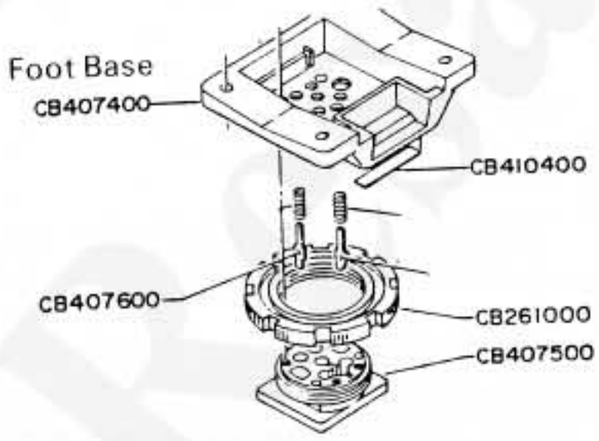
* 1. Flash Grip 300 can be used with F-280 or T series flash in case of using OM707 camera, and they fire by T-X. But, F280 cannot be used with other any Flash. (used only as single unit)
2. "—" marks in the above table indicate the state of no firing.
3. "T" of T-X or T-FP indicate TTL direct measuring of exposure. TTL signal cut quantity of light.
4. "Full" of Full-X or Full-FP means quantity of flashing light.
5. Threshold level of discrimination of low light condition or high light condition in case of OM707 is 1/60 with F280 and 1/100 with Flash Grip 300.
6. Flash duration is 1/100 with X and 1/60 with FP.
7. OM707 should be set to NORMAL mode when F280 is used with.
When OM4Ti is set to Super FP mode, only Super FP flash is used with.

◇ NOTE FOR REPAIR

◎ Foot Base (CB407400) should not be removed as possible on repair.

1. As F280 has AF FRAME ASS'Y (ZK782800), projected light position by AF FRAME ASS'Y is deviated in case of removing the Foot Base. AF system becomes squint.
2. Therefore, it is recommended that F280 should be disassembled and repaired without removing Shoe section (Foot base = CB407400).
3. In case of removing Shoe section or AF FRAME ASS'Y (ZK782800), position adjustment of AF FRAME ASS'Y must be done without fail.
   (Refer to item of D. ASSEMBLING AND AJUSTMENT)





◇ S. FP FLASH does not fire with OM707————————REPAIR METHOD

1. State
   FP does not fire on high luminance mode, when F280 is attached to OM707.
   Indication in the view finder remains as × flash indication.
2. Cause
   As the gap between No.5 and No.6 pattern of the FOOT circuit board (ZK783200) is narrow, TTL spring (CB261500) let the pattern to make short depending upon state of the S PLATE (CB407600).
3. Repair method (for only troubled Flash)
   Troubled Flash will be replaced with FOOT circuit board.
   * Troubled cases are very few.
   * Checking method
     TTL spring and S plate are attached to No.5 pattern, and it is checked that TTL spring touches to No.6 pattern or not by leaning of TTL.