

作成承認印

配布許可印



Lite•Touch Zoom 120 ED

FCA45001

FCA45201

FCA45211

FCA45221

REPAIR MANUAL

Nikon | NIKON CORPORATION
Tokyo, Japan

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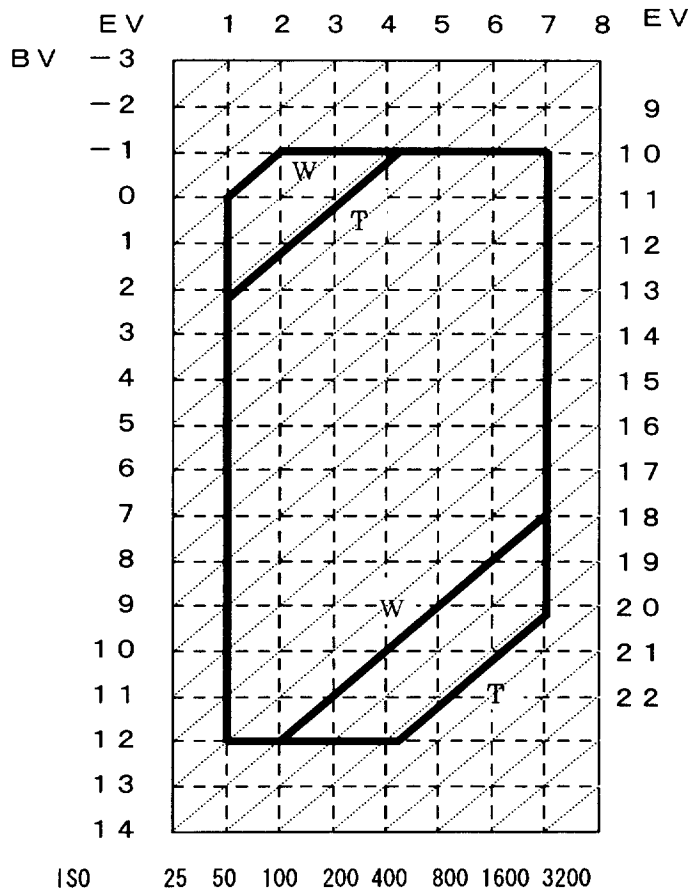
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1. Main specifications

Type	Camera for 35mm film
Photographing lens	
Lens focal distance	f38~120mm/F5.3~10.5
Lens configuration	3 groups zoom type and 5 groups with 7 lenses (G1: ED lens, G5, G6: PGM)
Zoom system	Electric step zoom system and 6 steps
Lens photographing distance	W: 0.75m~∞ T: 0.8m~∞
Finder	
Type	Real image zoom finder
Magnification	W: 0.44 times~T: 1.13 times
Diopter	- 1.5 ~ + 1.5 dpt (at infinity)
Eyepiece	Blur-resistant eyepiece
Automatic focus	
System	Passive system
Base length	5.566mm
Number of AF (Auto focus) step	W: 111 edges T: 273 edges
Exposure control	
Shutter type	Electromagnetic drive program electronic shutter (This is also used as aperture.)
Shutter time	2~1/360 sec
AE (Auto exposure) coupling operation range	W: EV4~17 T: EV6.125~19.125(ISO100)
FM coupling operation range	W: F5.77~F22.63 T: F12~F47.26
Speed light	
Type	Pop-up built-in type
Mode	AUTO, flash prohibition, forced flash and slow synchronization
Guide number	14 (ISO100)
Charging time	Approx. 6 seconds

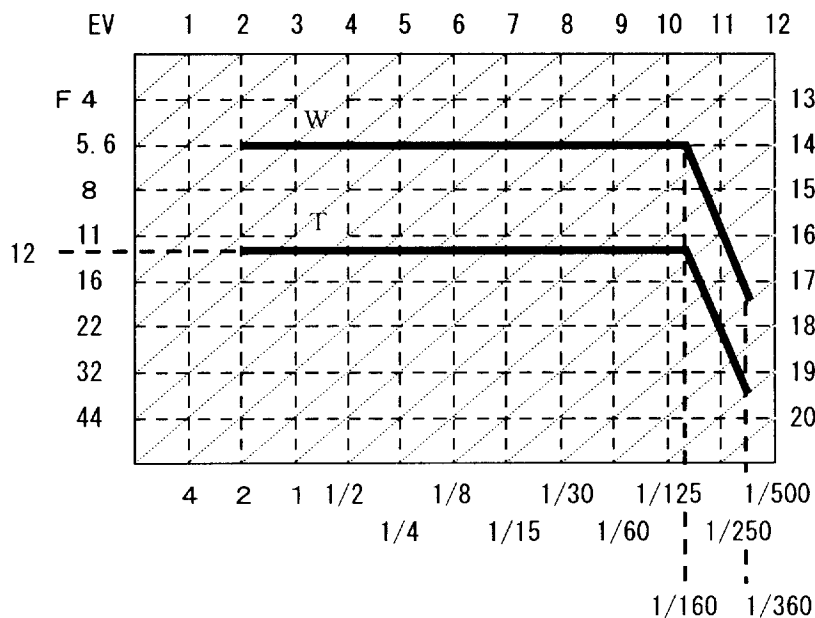
2. AE coupling operation range



Zoom zone		Limit value
W	1	EV 4
	2	EV 4. 8 7 5
	3	EV 5. 2 5
	4	EV 5. 7 5
	5	EV 5. 8 7 5
T	6	EV 6. 1 2 5

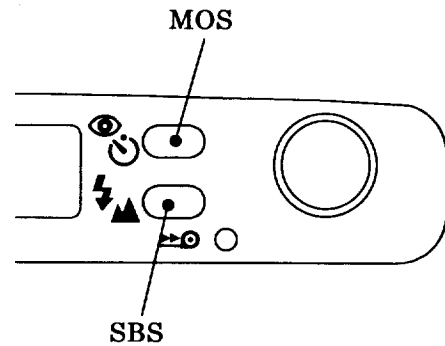
Zoom zone		Limit value
W	1	EV 17
	2	EV 17. 8 7 5
	3	EV 18. 2 5
	4	EV 18. 7 5
	5	EV 18. 8 7 5
T	6	EV 19. 1 2 5

3. Shutter program graph



4. Manual test function

- S 1 : Pre-release
- MSW : Power switch
- MOS : Mode switch
- SBS : Speed light mode switch
- PAR : Panorama switch
- ZUS : Zoom up switch
- ZDS : Zoom down switch



(1) Operation procedure

1) Operation to set the manual test mode

- ①The camera condition should be as follows: MSW is ON and the lens barrel is positioned between W end and T end.
- ②Turn on MOS and turn on SBS within 1 second as turning on MOS. Wait for 10 seconds as turning on the both switches.
- ③After 10 seconds, the battery mark is lit on LCD to indicate that the system is in the manual test mode.

2) Selection of command

- ①Under the manual test mode condition, operate SBS as turning on MOS. According to the operation, the number corresponding to a command (refer to the test command list) is displayed on the film counter. ("0" is displayed as the initial value.) Each time SBS is turned on, the command number is increased one by one. (After "5", "0" is reset.) When the commands 1~5 are set by operating SBS, other commands are reset. When MOS is turned off, the command number is not displayed.

3) Display of set data

- ①Under the manual test mode condition, operate MOS as turning on SBS. AF data or ISO data is displayed according to the display (when a command is set) on the test command list.

4) Bulb setting and AF setting

- ①When "command 1" is displayed, turn off SBS and MOS. Bulb release is possible.
- ②While "command 0" or "command 1" is displayed, operate MOS as turning on SBS. Each time MOS is operated, the AF data is increased one by one. (After the battery is set, the initial value is "000h". When the AF data is increased to "3FFh", the data returns to "000h".) When the desirable data is selected, turn off SBS and MOS. The data setting is completed.

5) Setting of ISO values for commands 3, 4 and 5

- ① Turn off MOS as turning on SBS. While “command 3”, “command 4” or “command 5” is displayed, operate MOS. Each time MOS is operated, the value is increased one by one. (The ISO value which was read from the DX code is displayed as the initial value. When the value is increased to “ISO3200”, it returns to “ISO50”.) When the desirable data is selected, turn off SBS and MOS. Data setting is completed.

6) Execution of test

- ① After the desirable command is set in Procedure 2), operate the camera normally.
- ② The camera operates according to the set command. The test can be executed repeatedly.

7) Display of zoom edge number

- ① In “command 1~5”, operate ZSW to drive the lens barrel. After ZSW is turned off, the edge number between the encoder position and stop position is displayed for 1 second. (It is not displayed while the zoom is driving.)

8) Display of panorama

- ① In “command 1~5”, turn on ZDS at W end. The PAR set status is displayed.

9) Setting of another command

- ① If another command must be executed subsequently under the manual test mode, return to Procedure 1) and set the manual test mode again. In this case, the timer should be set to “3 seconds” for setting.
- ② When a command is newly set, the previous command is reset. (Two commands cannot be executed at the same time.)

1 0) Cancel of test mode

- ① Turn off MSW, and the test mode is canceled.
- ② Select “command 0” and exit from the test mode. The test mode is canceled.
- ③ Even if the lens barrel is driven at W end with the timer at “2 minutes”, the manual test mode is not canceled.
- ④ If the camera back is opened while the bulb is opened, the bulb keeps open.
- ⑤ Even if the test mode is canceled, the set ISO value keeps valid.

(2) Test command list

①The following test commands are provided. When a command number is selected, a command marked with "○" is valid.

Command No					Command	Display		Details of check
1	2	3	4	5		When set	Result	
○					Bulb setting	AF distance data		The lens barrel moves to the edge corresponding to the set AF distance data and a bulb is set.
	○				AF setting	AF distance data		The lens barrel moves to the edge corresponding to the set AF distance data.
		○			Display of AF result		Focusing data	Each time S1 is turned on, the focusing edge is displayed.
			○		EV value reading		EV data	Whenever the S1 is turned on, the calculated AE result is displayed.
				○	BV value reading		BV data	Each time S1 is turned on, the result of SPD metering operation is displayed. The displayed metering operation data is changed with the zoom switch.
		○	○	○	ISO value setting	ISO data	ISO value data	The ISO value read from the DX code is displayed. The ISO value is set and exposure is controlled by the set ISO value.
○	○	○	○	○	Display of zoom		Zoom position	After the lens barrel is driven with ZSW, the edge number of stop position is displayed for 1 second since ZSW was turned off.
○	○	○	○	○	Display of panorama		F/P	When ZDS is turned on at W end, PAR is read and the full size mode or panorama mode is displayed.

(3) Numerical value data

1) AF data

- ①The AF data is displayed with hexadecimal numbers. (000h~3FFh)
 ②"0"~"F" of the lower 2 digits are displayed on the film counter.
 ③"0"~"3" of the highest digit is displayed on the red eye and self-remote control display.

2) EV value

- ①2 digits of the film counter are used. The value is displayed with hexadecimal numbers.

3) Zoom edge

- ①2 digits of the film counter are used. The value is displayed with hexadecimal numbers.

4) ISO set value

①2 digits of the film counter are used and the set ISO value is displayed as follows.

The set ISO value	Displayed data
5 0	0 5
1 0 0	1 0
2 0 0	2 0
4 0 0	4 0
8 0 0	8 0
1 6 0 0	1 6
3 2 0 0	3 2

5. Zoom position

Zone	Focal distance	F N o .
R e	_____	_____
1 (W)	f 39. 9	5. 77
2 (M1)	f 55. 3	7. 55
3 (M2)	f 68. 3	8. 83
4 (M3)	f 81. 6	9. 94
5 (M4)	f 96. 1	11. 0
6 (T)	f 114. 0	12. 0

6. AF distance measurement position and photographing distance

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
0	0 0	∞	∞	∞	∞	∞	∞
1	0 1	80.975	110.247	115.593	129.399	145.698	186.847
2	0 2	40.520	55.160	57.835	64.741	72.894	93.472
3	0 3	27.035	36.798	38.582	43.188	48.625	62.348
4	0 4	20.293	27.617	28.956	32.412	36.491	46.785
5	0 5	16.247	22.108	23.180	25.946	29.211	37.448
6	0 6	13.551	18.435	19.330	21.636	24.357	31.223
7	0 7	11.624	15.812	16.579	18.557	20.891	26.777
8	0 8	10.179	13.845	14.517	16.247	18.290	23.442
9	0 9	9.056	12.315	12.912	14.451	16.268	20.848
1 0	0 A	8.157	11.091	11.629	13.015	14.660	18.773
1 1	0 b	7.421	10.089	10.579	11.839	13.327	17.076
1 2	0 C	6.808	9.255	9.704	10.860	12.224	15.661
1 3	0 d	6.290	8.548	8.963	10.031	11.290	14.464
1 4	0 E	5.845	7.943	8.329	9.320	10.490	13.438
1 5	0 F	5.460	7.419	7.779	8.704	9.797	12.549
1 6	1 0	5.123	6.960	7.297	8.166	9.190	11.771
1 7	1 1	4.826	6.555	6.873	7.690	8.655	11.084
1 8	1 2	4.561	6.195	6.495	7.268	8.179	10.474
1 9	1 3	4.325	5.872	6.157	6.890	7.754	9.928
2 0	1 4	4.112	5.583	5.854	6.549	7.370	9.436
2 1	1 5	3.919	5.320	5.579	6.242	7.024	8.992
2 2	1 6	3.744	5.082	5.329	5.962	6.709	8.588
2 3	1 7	3.584	4.864	5.100	5.706	6.421	8.219
2 4	1 8	3.438	4.665	4.891	5.472	6.157	7.880
2 5	1 9	3.303	4.481	4.699	5.257	5.915	7.569
2 6	1 A	3.179	4.312	4.521	5.058	5.691	7.282
2 7	1 b	3.063	4.155	4.356	4.874	5.483	7.016
2 8	1 C	2.956	4.009	4.204	4.703	5.291	6.769
2 9	1 d	2.857	3.873	4.061	4.543	5.111	6.539
3 0	1 E	2.764	3.747	3.929	4.395	4.944	6.325
3 1	1 F	2.677	3.628	3.805	4.256	4.788	6.124
3 2	2 0	2.595	3.517	3.688	4.125	4.641	5.936
3 3	2 1	2.519	3.413	3.579	4.003	4.503	5.759
3 4	2 2	2.447	3.315	3.476	3.888	4.373	5.592
3 5	2 3	2.379	3.222	3.379	3.779	4.251	5.436

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
3 6	2 4	2. 315	3. 135	3. 287	3. 677	4. 136	5. 287
3 7	2 5	2. 254	3. 052	3. 201	3. 580	4. 026	5. 147
3 8	2 6	2. 197	2. 974	3. 119	3. 488	3. 923	5. 014
3 9	2 7	2. 142	2. 900	3. 041	3. 400	3. 825	4. 888
4 0	2 8	2. 090	2. 829	2. 967	3. 318	3. 731	4. 769
4 1	2 9	2. 041	2. 762	2. 896	3. 239	3. 643	4. 655
4 2	2 A	1. 994	2. 698	2. 829	3. 164	3. 558	4. 547
4 3	2 b	1. 949	2. 637	2. 765	3. 092	3. 478	4. 443
4 4	2 C	1. 907	2. 579	2. 704	3. 024	3. 401	4. 345
4 5	2 d	1. 866	2. 523	2. 646	2. 959	3. 327	4. 250
4 6	2 E	1. 827	2. 470	2. 590	2. 896	3. 257	4. 160
4 7	2 F	1. 789	2. 419	2. 537	2. 837	3. 190	4. 074
4 8	3 0	1. 754	2. 371	2. 486	2. 779	3. 125	3. 991
4 9	3 1	1. 719	2. 324	2. 437	2. 724	3. 063	3. 912
5 0	3 2	1. 686	2. 279	2. 390	2. 672	3. 004	3. 836
5 1	3 3	1. 655	2. 236	2. 344	2. 621	2. 947	3. 762
5 2	3 4	1. 624	2. 194	2. 301	2. 572	2. 892	3. 692
5 3	3 5	1. 595	2. 154	2. 259	2. 525	2. 839	3. 624
5 4	3 6	1. 567	2. 116	2. 219	2. 480	2. 788	3. 559
5 5	3 7	1. 539	2. 079	2. 180	2. 437	2. 739	3. 496
5 6	3 8	1. 513	2. 043	2. 142	2. 395	2. 692	3. 436
5 7	3 9	1. 488	2. 009	2. 106	2. 354	2. 647	3. 377
5 8	3 A	1. 463	1. 975	2. 071	2. 315	2. 603	3. 321
5 9	3 b	1. 440	1. 943	2. 038	2. 278	2. 560	3. 266
6 0	3 C	1. 417	1. 912	2. 005	2. 241	2. 519	3. 214
6 1	3 d	1. 395	1. 882	1. 974	2. 206	2. 479	3. 163
6 2	3 E	1. 374	1. 853	1. 943	2. 172	2. 441	3. 113
6 3	3 F	1. 353	1. 825	1. 914	2. 139	2. 404	3. 066
6 4	4 0	1. 333	1. 798	1. 885	2. 107	2. 368	3. 019
6 5	4 1	1. 314	1. 771	1. 857	2. 075	2. 333	2. 975
6 6	4 2	1. 295	1. 745	1. 830	2. 046	2. 299	2. 931
6 7	4 3	1. 277	1. 721	1. 804	2. 016	2. 266	2. 889
6 8	4 4	1. 259	1. 696	1. 779	1. 988	2. 234	2. 848
6 9	4 5	1. 242	1. 673	1. 754	1. 961	2. 203	2. 808
7 0	4 6	1. 225	1. 650	1. 731	1. 934	2. 173	2. 770
7 1	4 7	1. 209	1. 628	1. 707	1. 908	2. 144	2. 732

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
7 2	4 8	1.193	1.607	1.685	1.883	2.115	2.695
7 3	4 9	1.178	1.586	1.663	1.858	2.088	2.660
7 4	4 A	1.163	1.565	1.642	1.834	2.061	2.625
7 5	4 b	1.148	1.546	1.621	1.811	2.035	2.592
7 6	4 C	1.134	1.526	1.601	1.788	2.009	2.559
7 7	4 d	1.120	1.508	1.581	1.766	1.984	2.527
7 8	4 E	1.107	1.489	1.562	1.745	1.960	2.496
7 9	4 F	1.094	1.471	1.543	1.724	1.937	2.466
8 0	5 0	1.081	1.454	1.525	1.703	1.914	2.437
8 1	5 1	1.069	1.437	1.507	1.684	1.891	2.408
8 2	5 2	1.057	1.421	1.490	1.664	1.869	2.380
8 3	5 3	1.045	1.404	1.473	1.645	1.848	2.352
8 4	5 4	1.033	1.389	1.456	1.627	1.827	2.326
8 5	5 5	1.022	1.373	1.440	1.609	1.807	2.300
8 6	5 6	1.011	1.358	1.425	1.591	1.787	2.274
8 7	5 7	1.000	1.344	1.409	1.574	1.768	2.249
8 8	5 8	0.990	1.329	1.394	1.557	1.749	2.225
8 9	5 9	0.979	1.315	1.379	1.541	1.730	2.201
9 0	5 A	0.969	1.302	1.365	1.524	1.712	2.178
9 1	5 b	0.960	1.288	1.351	1.509	1.694	2.155
9 2	5 C	0.950	1.275	1.337	1.493	1.677	2.133
9 3	5 d	0.941	1.262	1.324	1.478	1.660	2.111
9 4	5 E	0.931	1.250	1.311	1.464	1.643	2.090
9 5	5 F	0.922	1.237	1.298	1.449	1.627	2.069
9 6	6 0	0.914	1.225	1.285	1.435	1.611	2.048
9 7	6 1	0.905	1.214	1.273	1.421	1.596	2.028
9 8	6 2	0.897	1.202	1.261	1.408	1.580	2.009
9 9	6 3	0.888	1.191	1.249	1.394	1.566	1.990
1 0 0	6 4	0.880	1.180	1.237	1.381	1.551	1.971
1 0 1	6 5	0.872	1.169	1.226	1.369	1.536	1.952
1 0 2	6 6	0.864	1.158	1.215	1.356	1.522	1.934
1 0 3	6 7	0.857	1.148	1.204	1.344	1.509	1.917
1 0 4	6 8	0.849	1.138	1.193	1.332	1.495	1.899
1 0 5	6 9	0.842	1.128	1.183	1.320	1.482	1.882
1 0 6	6 A	0.835	1.118	1.172	1.309	1.469	1.866
1 0 7	6 b	0.828	1.108	1.162	1.297	1.456	1.849

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
1 0 8	6 C	0.821	1.099	1.152	1.286	1.443	1.833
1 0 9	6 d	0.814	1.089	1.142	1.275	1.431	1.817
1 1 0	6 E	0.807	1.080	1.133	1.264	1.419	1.802
1 1 1	6 F	0.801	1.071	1.123	1.254	1.407	1.786
1 1 2	7 0	0.794	1.062	1.114	1.244	1.395	1.772
1 1 3	7 1		1.054	1.105	1.233	1.384	1.757
1 1 4	7 2		1.045	1.096	1.223	1.373	1.742
1 1 5	7 3		1.037	1.087	1.214	1.362	1.728
1 1 6	7 4		1.029	1.079	1.204	1.351	1.714
1 1 7	7 5		1.021	1.070	1.195	1.340	1.701
1 1 8	7 6		1.013	1.062	1.185	1.330	1.687
1 1 9	7 7		1.005	1.054	1.176	1.319	1.674
1 2 0	7 8		0.997	1.046	1.167	1.309	1.661
1 2 1	7 9		0.990	1.038	1.158	1.299	1.648
1 2 2	7 A		0.982	1.030	1.150	1.290	1.635
1 2 3	7 b		0.975	1.023	1.141	1.280	1.623
1 2 4	7 C		0.968	1.015	1.133	1.270	1.611
1 2 5	7 d		0.961	1.008	1.124	1.261	1.599
1 2 6	7 E		0.954	1.000	1.116	1.252	1.587
1 2 7	7 F		0.947	0.993	1.108	1.243	1.575
1 2 8	8 0		0.940	0.986	1.100	1.234	1.564
1 2 9	8 1		0.934	0.979	1.092	1.225	1.553
1 3 0	8 2		0.927	0.972	1.085	1.217	1.542
1 3 1	8 3		0.921	0.966	1.077	1.208	1.531
1 3 2	8 4		0.914	0.959	1.070	1.200	1.520
1 3 3	8 5		0.908	0.953	1.063	1.192	1.509
1 3 4	8 6		0.902	0.946	1.055	1.183	1.499
1 3 5	8 7		0.896	0.940	1.048	1.175	1.489
1 3 6	8 8		0.890	0.934	1.041	1.168	1.479
1 3 7	8 9		0.884	0.928	1.034	1.160	1.469
1 3 8	8 A		0.879	0.921	1.028	1.152	1.459
1 3 9	8 b		0.873	0.916	1.021	1.145	1.449
1 4 0	8 C		0.867	0.910	1.014	1.137	1.440
1 4 1	8 d		0.862	0.904	1.008	1.130	1.430
1 4 2	8 E		0.856	0.898	1.001	1.123	1.421
1 4 3	8 F		0.851	0.893	0.995	1.116	1.412

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
1 4 4	9 0		0. 846	0. 887	0. 989	1. 109	1. 403
1 4 5	9 1		0. 840	0. 881	0. 983	1. 102	1. 394
1 4 6	9 2		0. 835	0. 876	0. 977	1. 095	1. 385
1 4 7	9 3		0. 830	0. 871	0. 971	1. 088	1. 377
1 4 8	9 4		0. 825	0. 866	0. 965	1. 082	1. 368
1 4 9	9 5		0. 820	0. 860	0. 959	1. 075	1. 360
1 5 0	9 6		0. 815	0. 855	0. 953	1. 069	1. 351
1 5 1	9 7		0. 811	0. 850	0. 948	1. 062	1. 343
1 5 2	9 8		0. 806	0. 845	0. 942	1. 056	1. 335
1 5 3	9 9		0. 801	0. 840	0. 937	1. 050	1. 327
1 5 4	9 A			0. 835	0. 931	1. 044	1. 319
1 5 5	9 b			0. 831	0. 926	1. 038	1. 312
1 5 6	9 C			0. 826	0. 921	1. 032	1. 304
1 5 7	9 d			0. 821	0. 915	1. 026	1. 296
1 5 8	9 E			0. 817	0. 910	1. 020	1. 289
1 5 9	9 F			0. 812	0. 905	1. 014	1. 281
1 6 0	A 0			0. 808	0. 900	1. 009	1. 274
1 6 1	A 1			0. 803	0. 895	1. 003	1. 267
1 6 2	A 2				0. 890	0. 997	1. 260
1 6 3	A 3				0. 886	0. 992	1. 253
1 6 4	A 4				0. 881	0. 987	1. 246
1 6 5	A 5				0. 876	0. 981	1. 239
1 6 6	A 6				0. 871	0. 976	1. 232
1 6 7	A 7				0. 867	0. 971	1. 226
1 6 8	A 8				0. 862	0. 966	1. 219
1 6 9	A 9				0. 858	0. 961	1. 213
1 7 0	A A				0. 853	0. 956	1. 206
1 7 1	A b				0. 849	0. 951	1. 200
1 7 2	A C				0. 845	0. 946	1. 193
1 7 3	A d				0. 840	0. 941	1. 187
1 7 4	A E				0. 835	0. 936	1. 181
1 7 5	A F				0. 832	0. 932	1. 175
1 7 6	b 0				0. 828	0. 927	1. 169
1 7 7	b 1				0. 824	0. 922	1. 163
1 7 8	b 2				0. 820	0. 918	1. 157
1 7 9	b 3				0. 815	0. 913	1. 151



Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
1 8 0	b 4				0. 812	0. 909	1. 146
1 8 1	b 5				0. 808	0. 904	1. 140
1 8 2	b 6				0. 804	0. 900	1. 134
1 8 3	b 7				0. 800	0. 896	1. 129
1 8 4	b 8					0. 891	1. 123
1 8 5	b 9					0. 887	1. 118
1 8 6	b A					0. 883	1. 113
1 8 7	b b					0. 879	1. 107
1 8 8	b C					0. 875	1. 102
1 8 9	b d					0. 871	1. 097
1 9 0	b E					0. 867	1. 092
1 9 1	b F					0. 863	1. 087
1 9 2	C 0					0. 859	1. 082
1 9 3	C 1					0. 855	1. 077
1 9 4	C 2					0. 851	1. 072
1 9 5	C 3					0. 848	1. 067
1 9 6	C 4					0. 844	1. 062
1 9 7	C 5					0. 840	1. 057
1 9 8	C 6					0. 837	1. 053
1 9 9	C 7					0. 833	1. 048
2 0 0	C 8					0. 829	1. 043
2 0 1	C 9					0. 826	1. 039
2 0 2	C A					0. 822	1. 034
2 0 3	C b					0. 819	1. 030
2 0 4	C C					0. 815	1. 025
2 0 5	C d					0. 812	1. 021
2 0 6	C E					0. 809	1. 016
2 0 7	C F					0. 805	1. 012
2 0 8	d 0					0. 802	1. 008
2 0 9	d 1						1. 004
2 1 0	d 2						0. 999
2 1 1	d 3						0. 995
2 1 2	d 4						0. 991
2 1 3	d 5						0. 987
2 1 4	d 6						0. 983
2 1 5	d 7						0. 979

Edge	Display	W Distance [m]	M 1 Distance [m]	M 2 Distance [m]	M 3 Distance [m]	M 4 Distance [m]	T Distance [m]
2 1 6	d 8						0. 975
2 1 7	d 9						0. 971
2 1 8	d A						0. 967
2 1 9	d b						0. 963
2 2 0	d C						0. 960
2 2 1	d d						0. 956
2 2 2	d E						0. 952
2 2 3	d F						0. 948
2 2 4	E 0						0. 945
2 2 5	E 1						0. 941
2 2 6	E 2						0. 938
2 2 7	E 3						0. 934
2 2 8	E 4						0. 930
2 2 9	E 5						0. 927
2 3 0	E 6						0. 923
2 3 1	E 7						0. 920
2 3 2	E 8						0. 917
2 3 3	E 9						0. 913
2 3 4	E A						0. 910
2 3 5	E b						0. 906
2 3 6	E C						0. 903
2 3 7	E d						0. 900
2 3 8	E E						0. 897
2 3 9	E F						0. 893
2 4 0	F 0						0. 890
2 4 1	F 1						0. 887
2 4 2	F 2						0. 884
2 4 3	F 3						0. 881
2 4 4	F 4						0. 878
2 4 5	F 5						0. 875
2 4 6	F 6						0. 872
2 4 7	F 7						0. 869
2 4 8	F 8						0. 866
2 4 9	F 9						0. 863
2 5 0	F A						0. 860
2 5 1	F b						0. 857

DISASSEMBLING

REAR COVER	D 1
ELECTRIC DISCHARGE FROM MAIN CAPACITOR	D 2
FRONT COVER	D 2
MAIN FPC	D 3
SB UNIT, MAIN CAPACITOR	D 4
CAMERA BACK	D 5
FINDER ASSEMBLY	D 5
DATE MODULE UNIT, DIOPTER COMPENSATION DIAL	D 6
LENS BARREL UNIT	D 6
PANORAMA LEVER, PANORAMA UNIT	D 7
FILM ADVANCE GEAR, SPOOL COVER	D 8
SPOOL, FILM ADVANCE MOTOR	D 9
DX CONTACT, FILM HOLDER, TRIPOD SOCKET	D 9
SB LEVER, GEAR COVER	D 1 0
REMOVAL OF THE LENS BARREL	D 1 0
HELICOID RING, CAM RING	D 1 1
FPC HOLDER PLATE	D 1 2
1 st LENS GROUP	D 1 2
SHUTTER UNIT, 3 rd LENS HOUSING UNIT	D 1 2

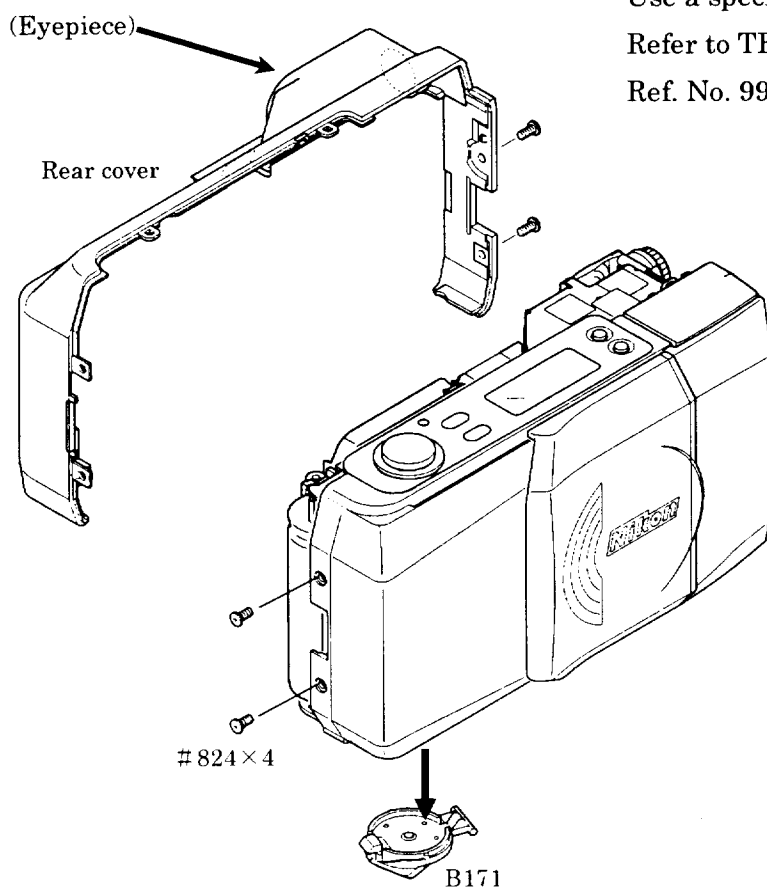
DISASSEMBLING/ASSEMBLING/ADJUSTMENT

 WARNING	
	<ul style="list-style-type: none"> ● Due to internal high voltage area, make sure to check the safety when removing the cover. ● Be sure to discharge the static electricity from the main condenser according to the instruction in the repair manual after removing the rear cover

- Note :**
- ① Be sure to take off the battery before disassembly.
 - ② At disassembly, make sure to memorize how to arrange the wires, how to fix the screws, and the types of used screws.
 - ③ Be sure to get yourself grounded because of the static electricity which exerts any serious adverse effect to ICs.
 - ④ Make sure which side is back or forth when taking off the gear.
 - ⑤ Special processing (blur-resistant processing) is applied to the eyepiece unit of this camera. The eyepiece unit is liable to damage. Don't damage it during cleaning.

1. DISASSEMBLING

REAR COVER



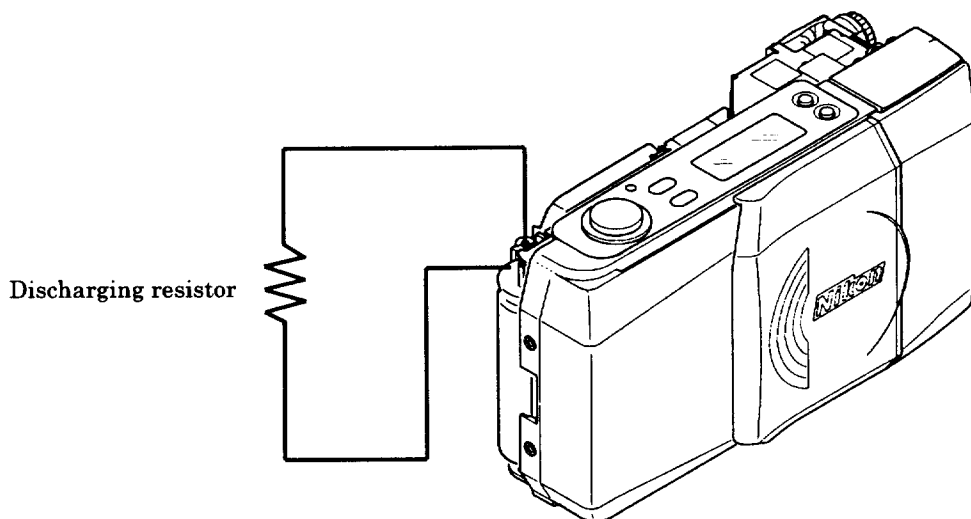
Caution : Don't touch the eyepiece unit directly.

Use a special cloth for cleaning.

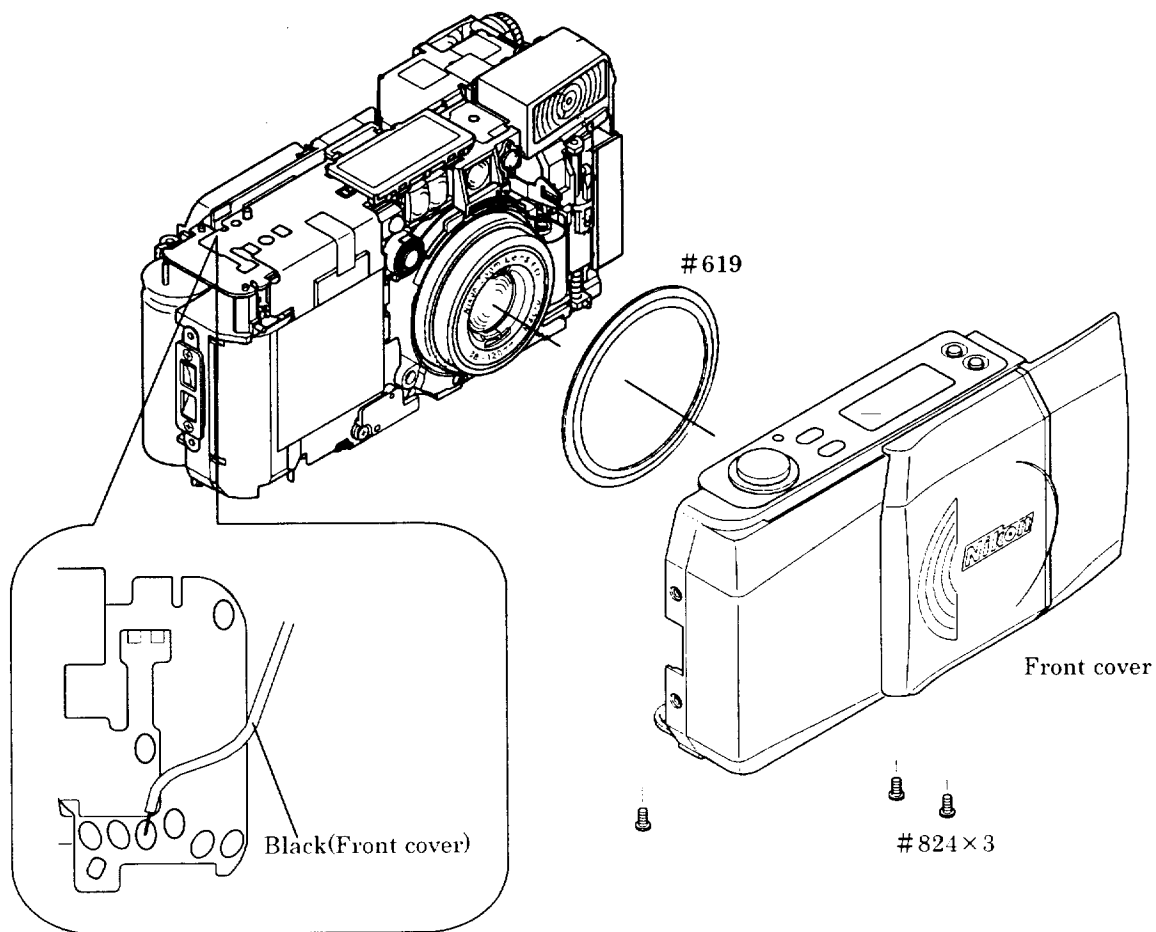
Refer to TECHNICAL INFORMATION
Ref. No. 99086.

ELECTRIC DISCHARGE FROM THE MAIN CAPACITOR

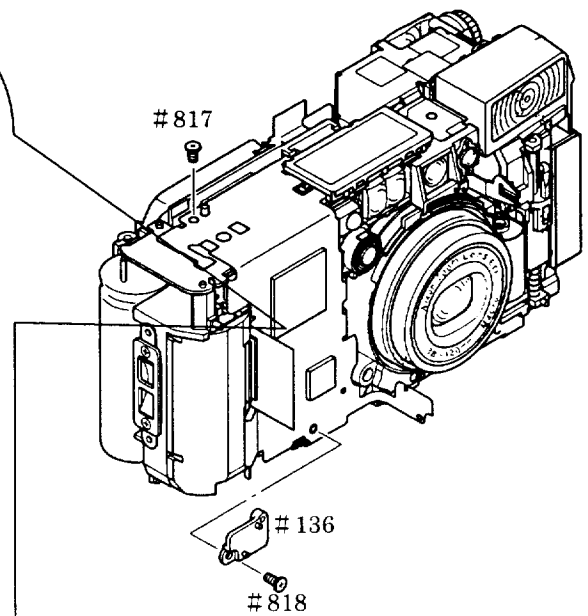
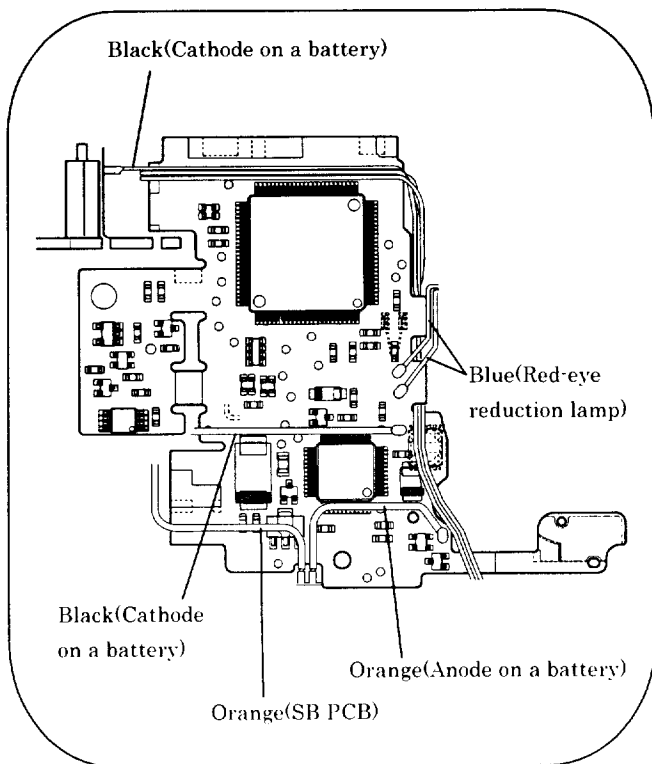
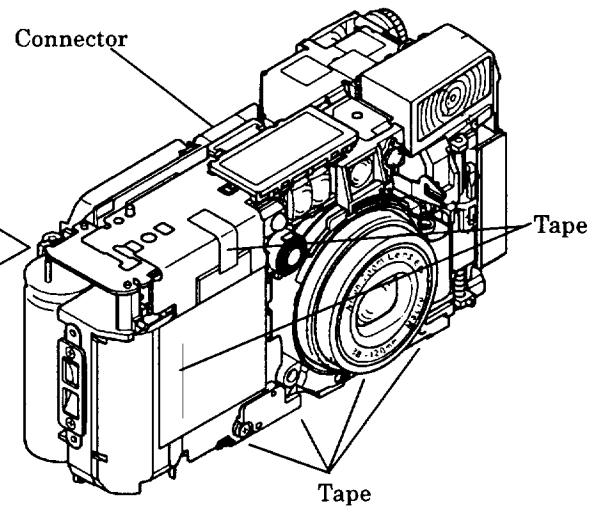
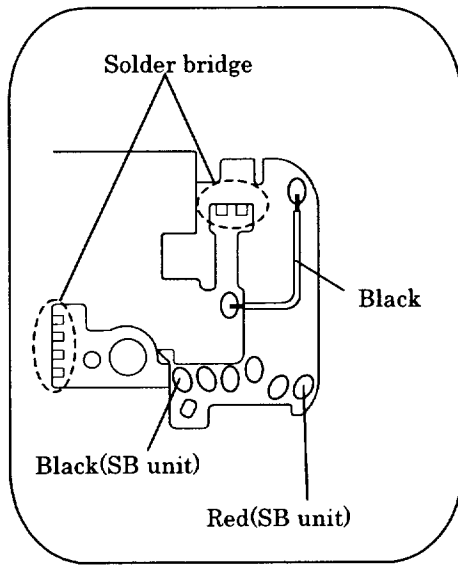
- Discharge the electricity between the both terminals of Xe tubes.
- For the electric discharge, employ the resistor of approximately $2\text{ k}\Omega / 5\text{ W}$.

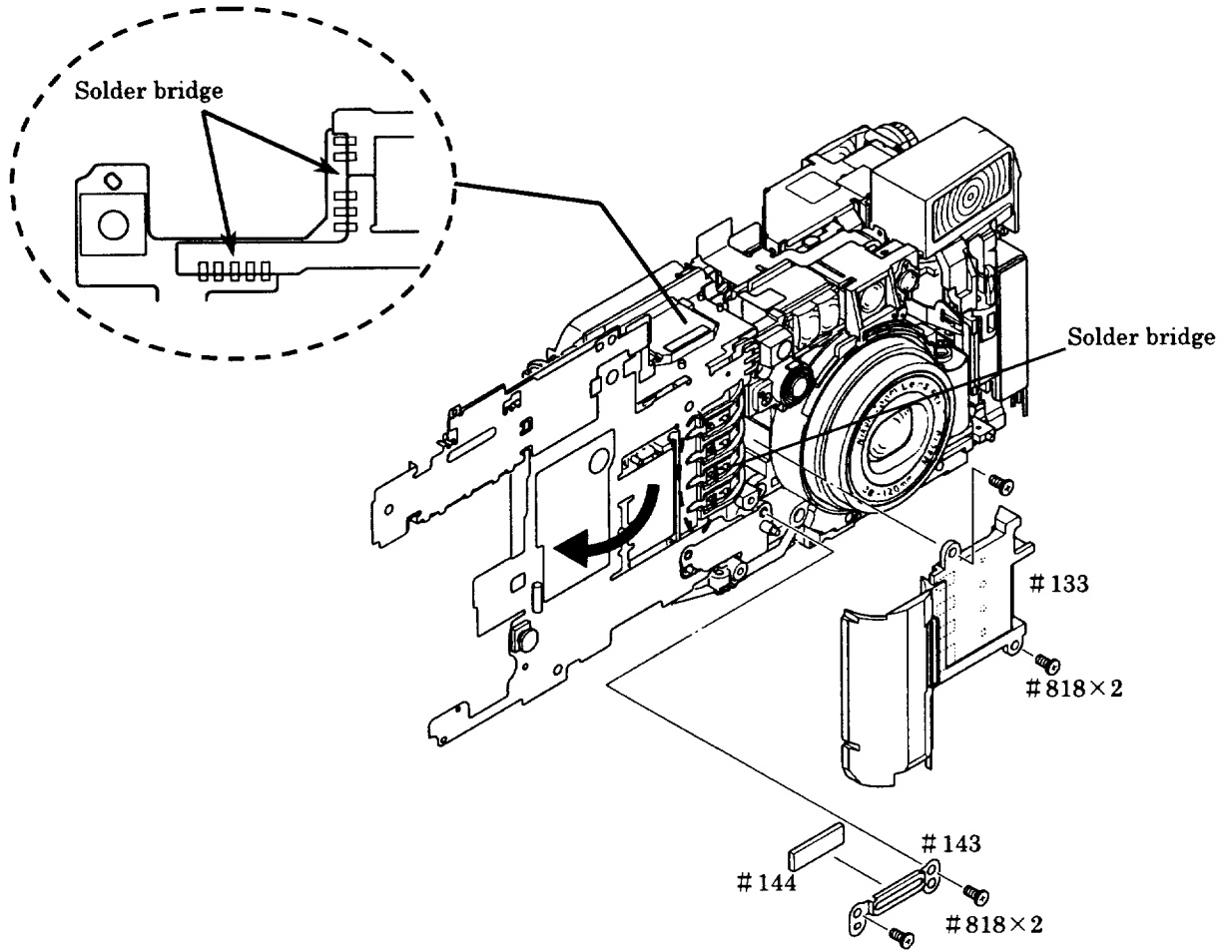


FRONT COVER

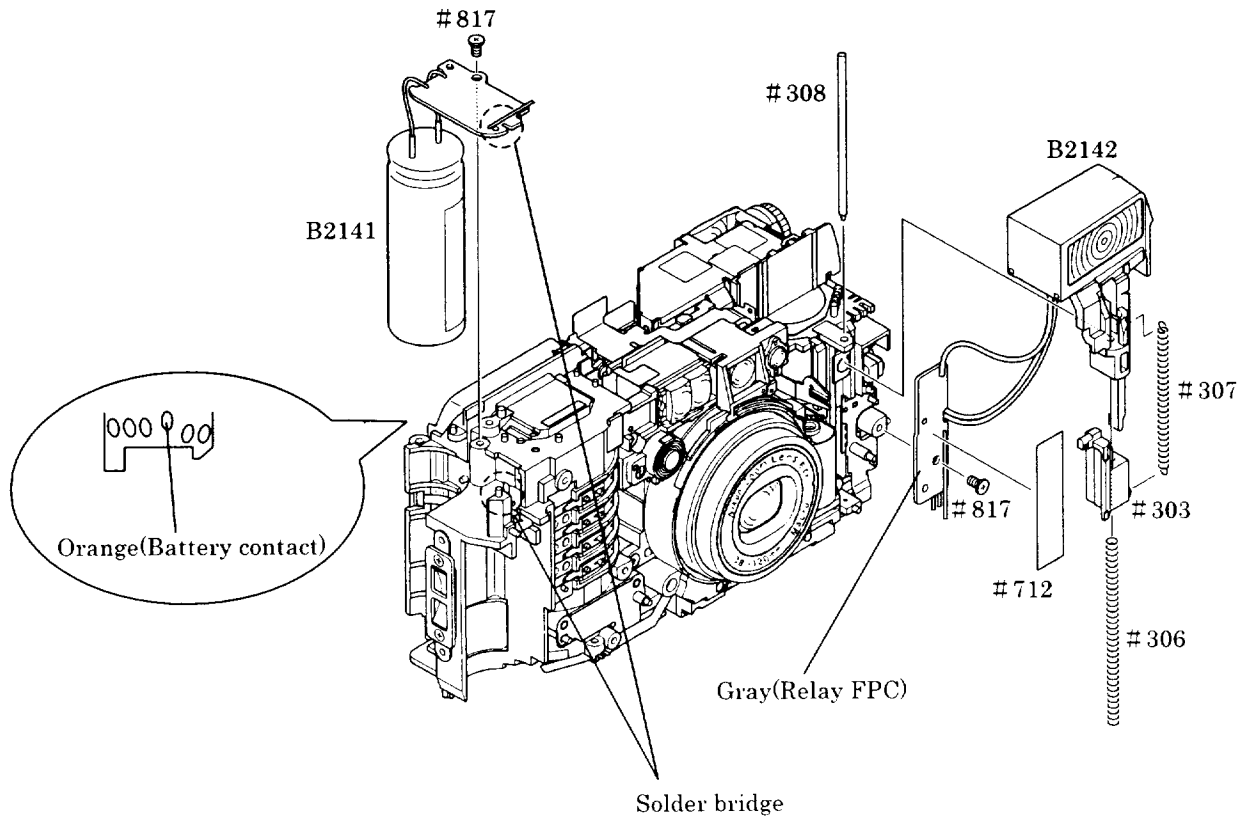


MAIN FPC

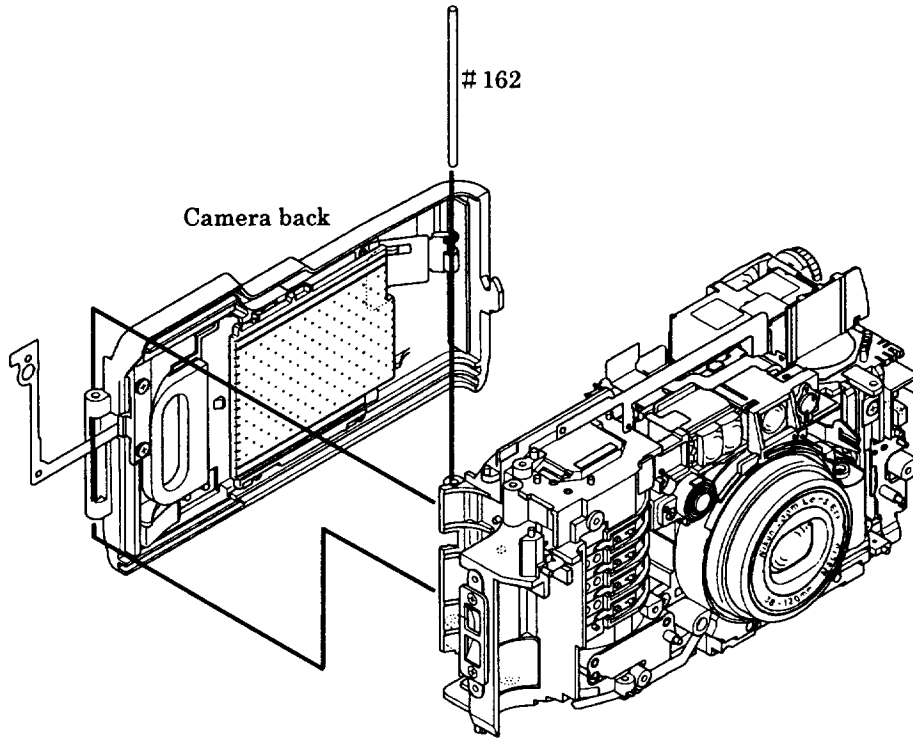




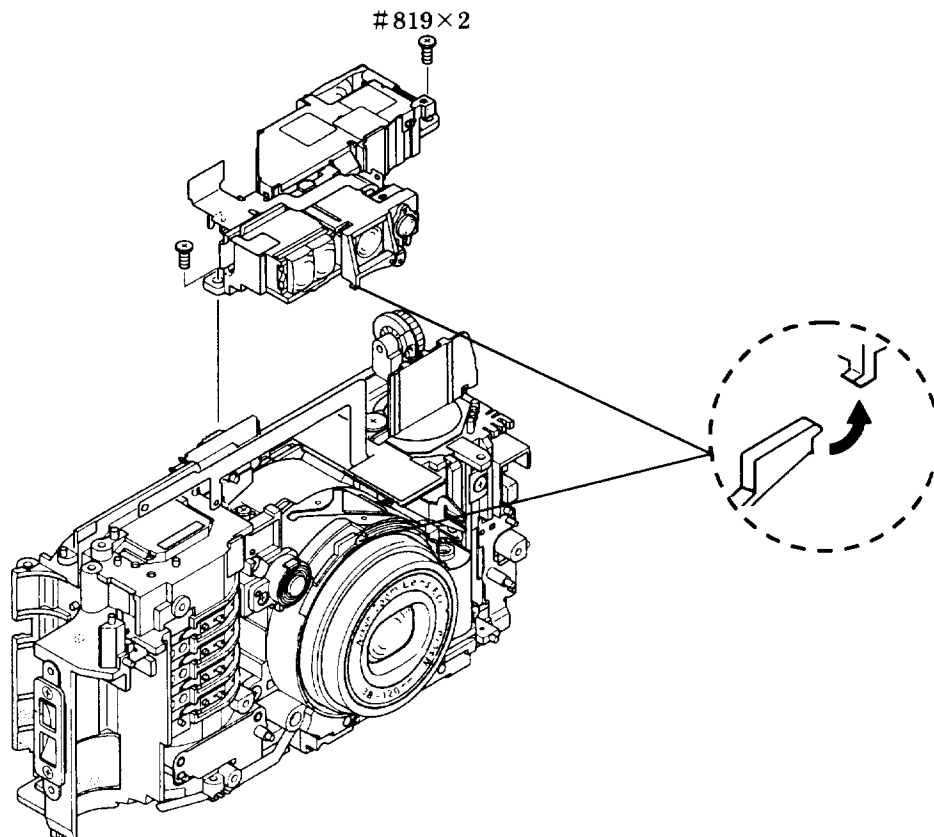
SB UNIT, MAIN CAPACITOR



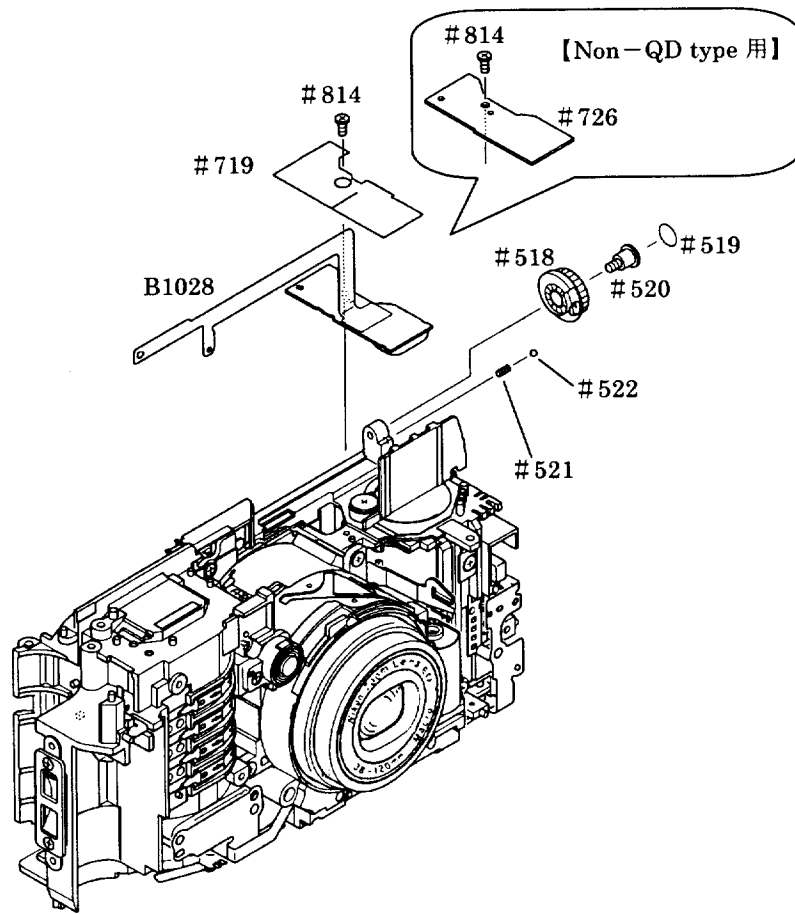
CAMERA BACK



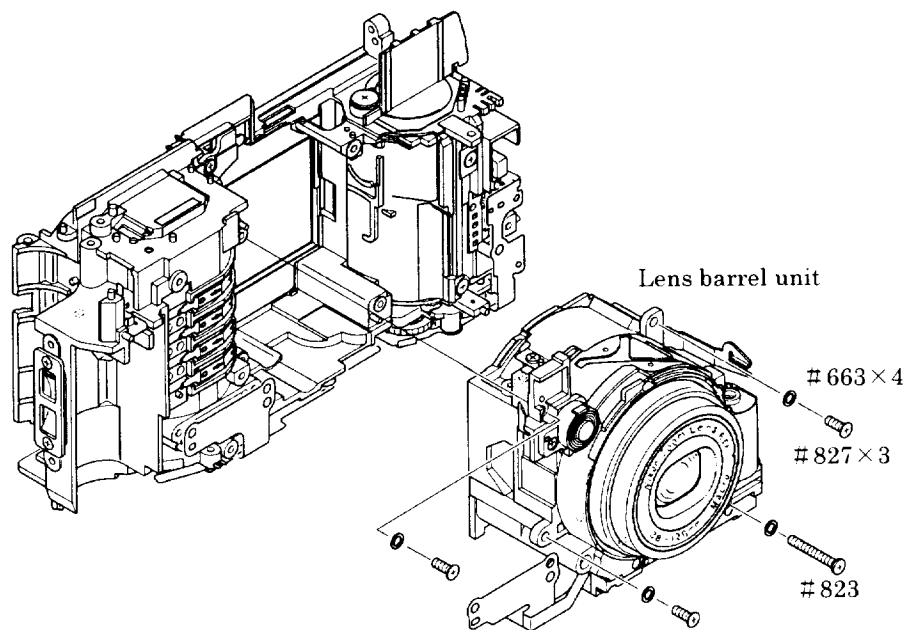
FINDER ASSEMBLY



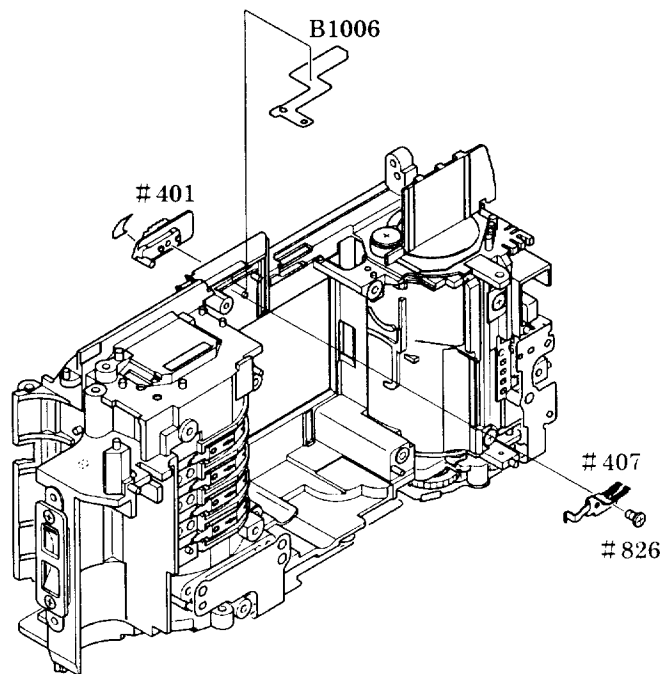
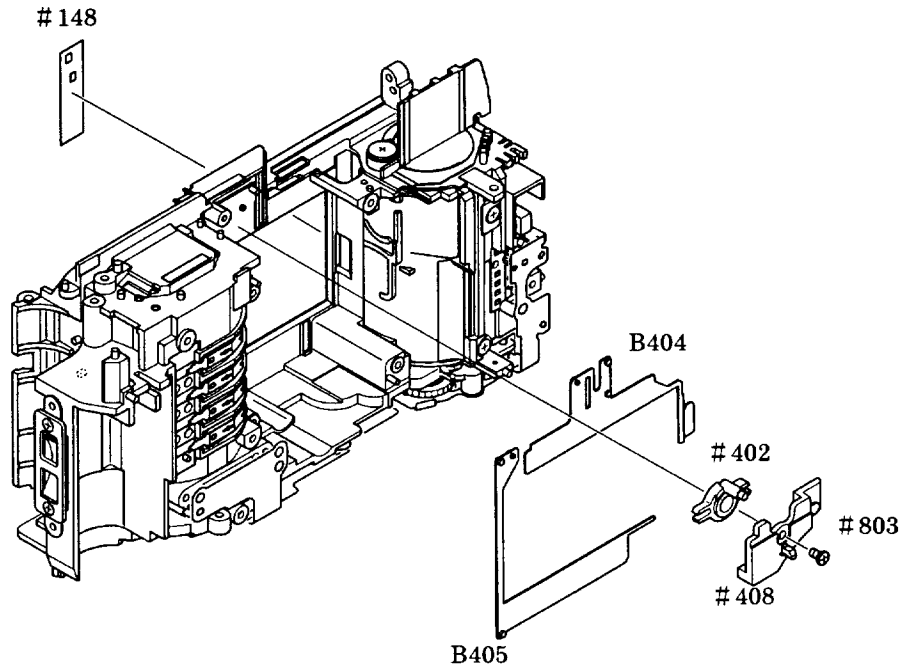
DATE MODULE UNIT, DIOPTR COMPENSATION DIAL



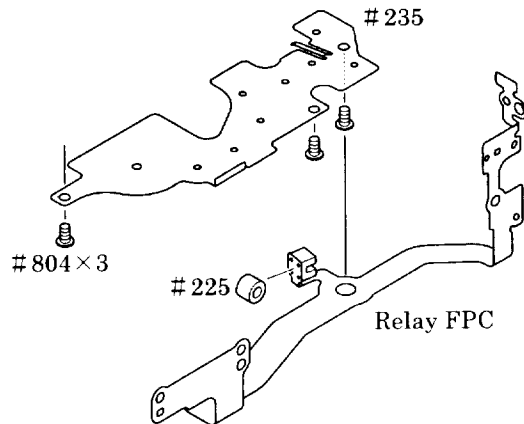
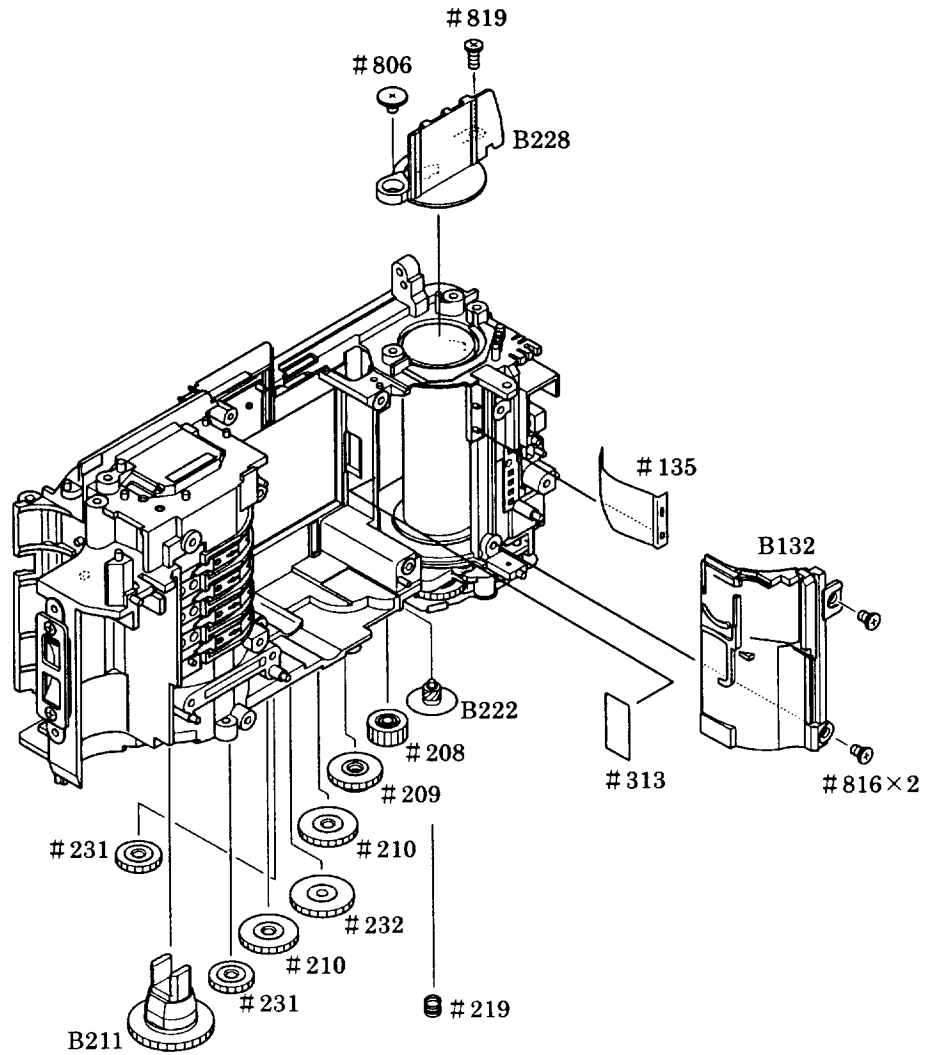
LENS BARREL UNIT



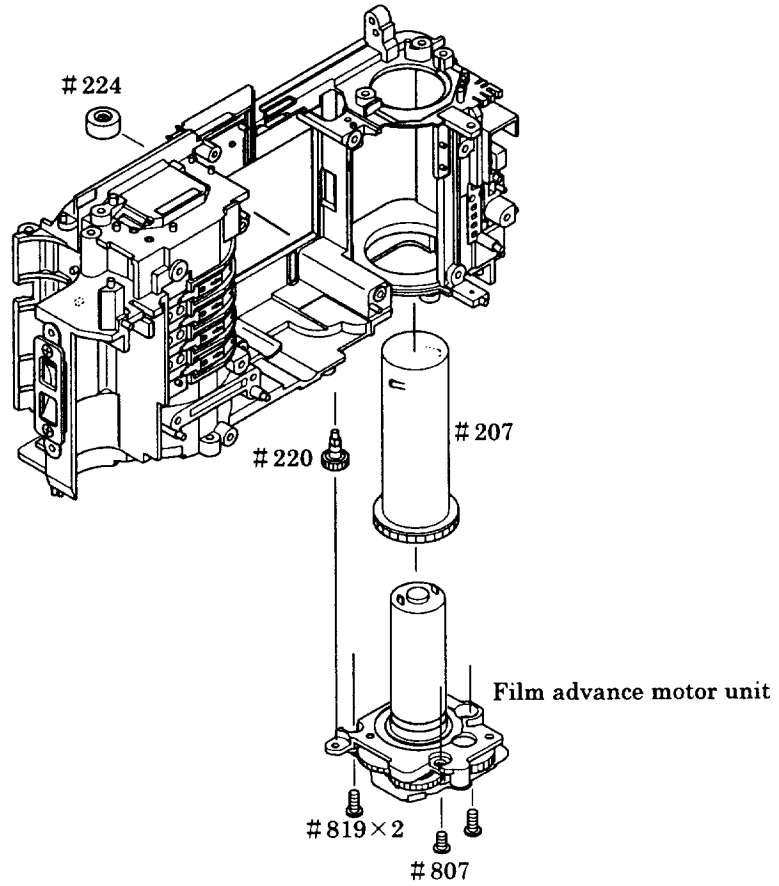
PANORAMA LEVER, PANORAMA UNIT



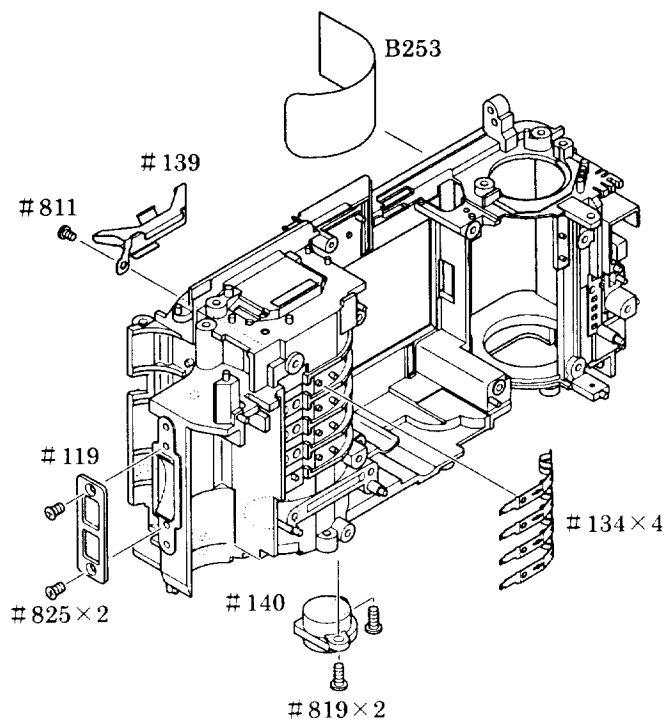
FILM ADVANCE GEAR, SPOOL COVER



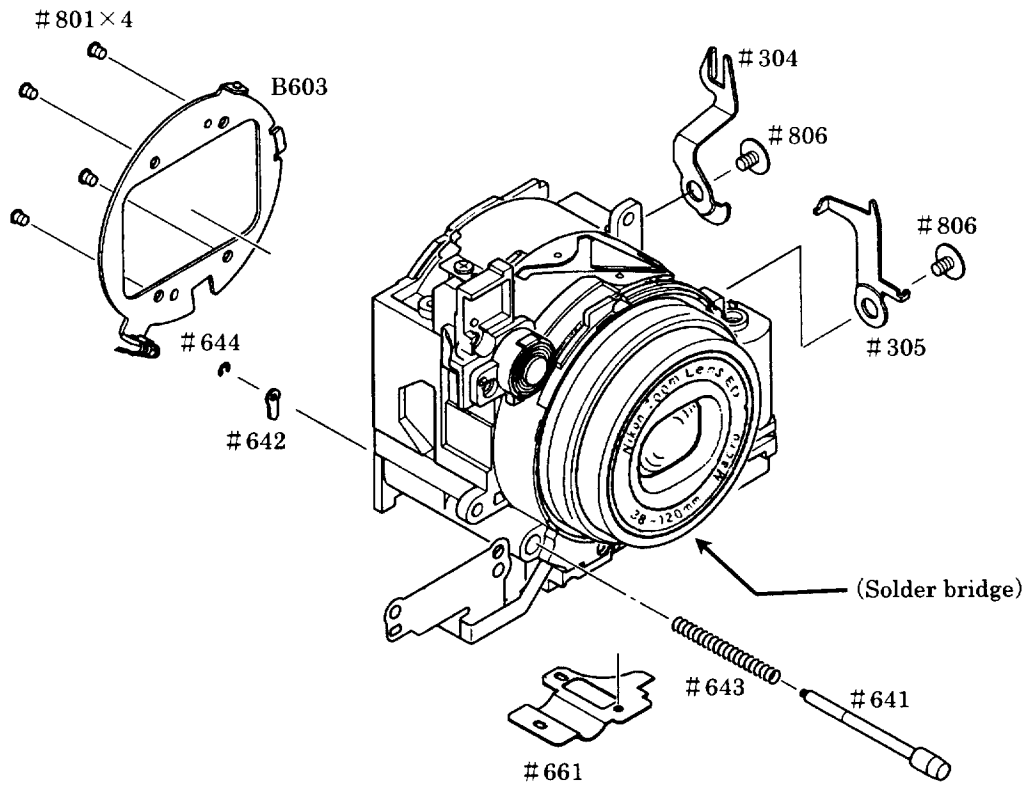
SPOOL, FILM ADVANCE MOTOR



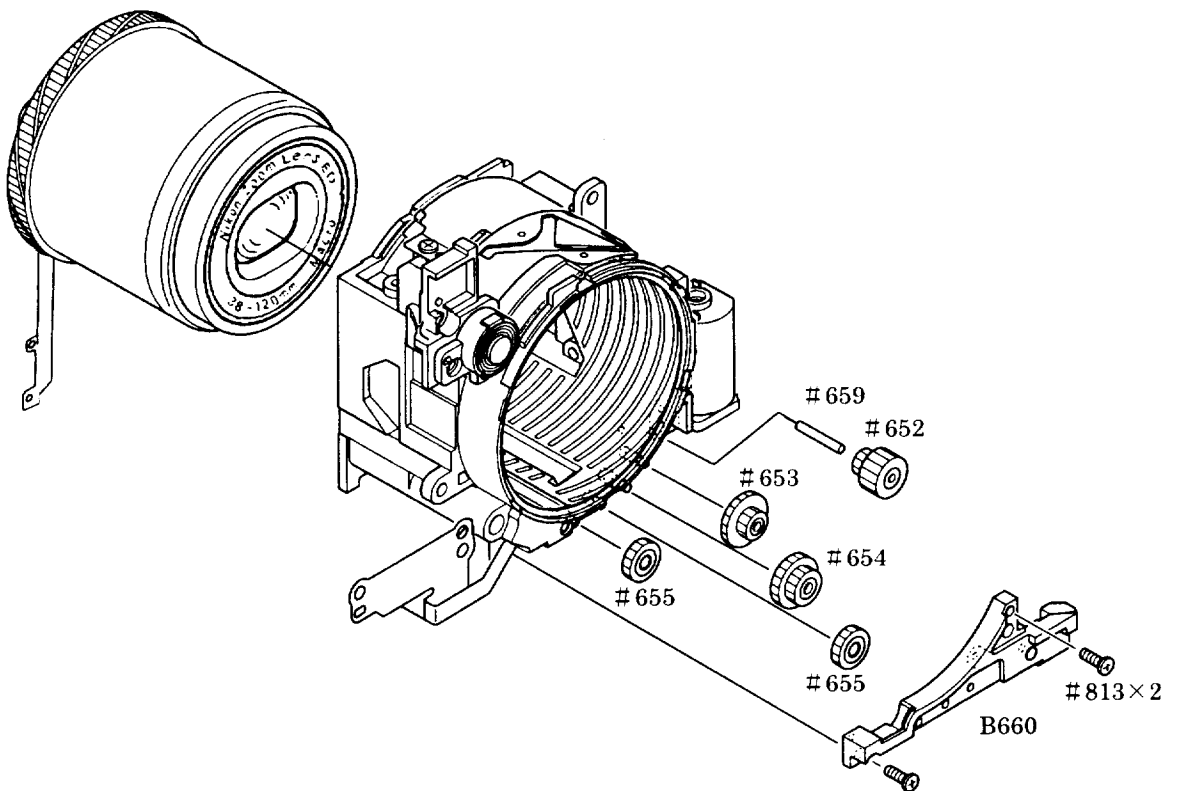
DX CONTACT, FILM HOLDER, TRIPOD SOCKET



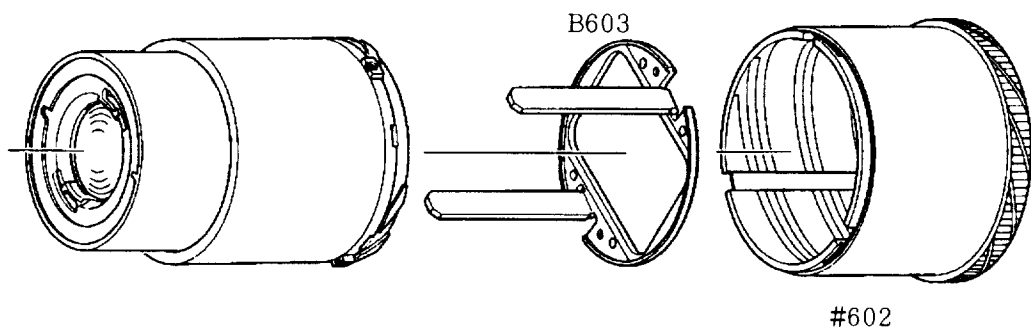
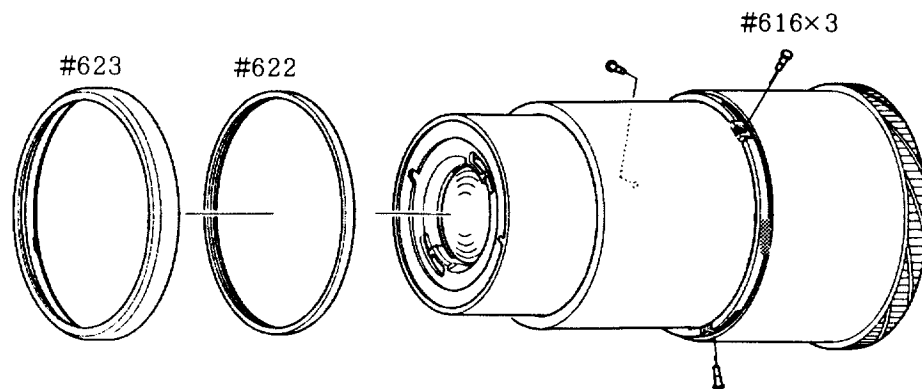
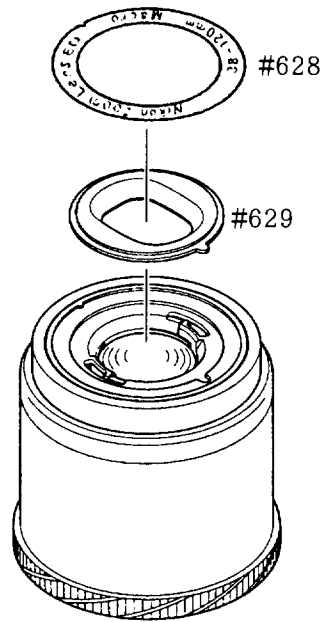
SB LEVER, GEAR COVER

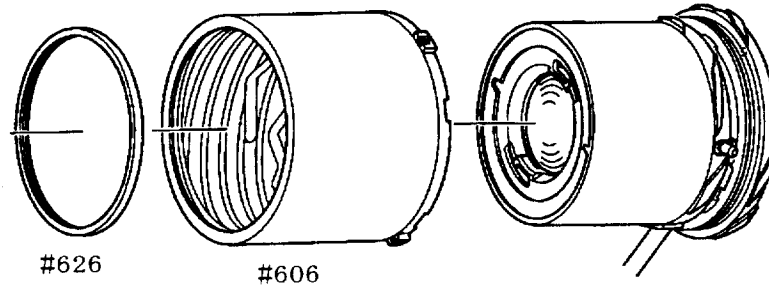


REMOVAL OF THE LENS BARREL

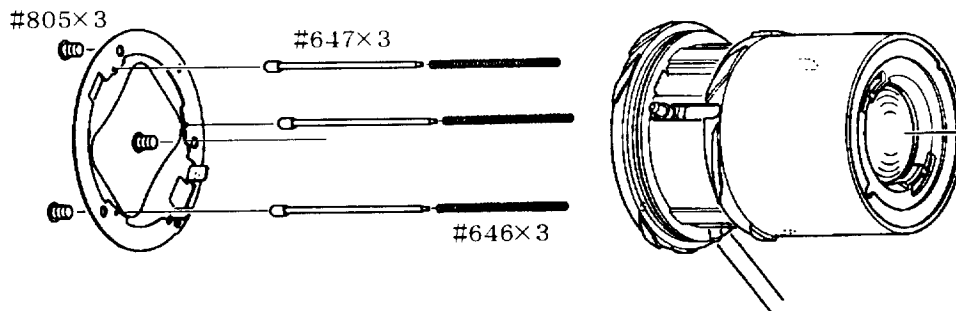


HELICOID RING, CAM RING

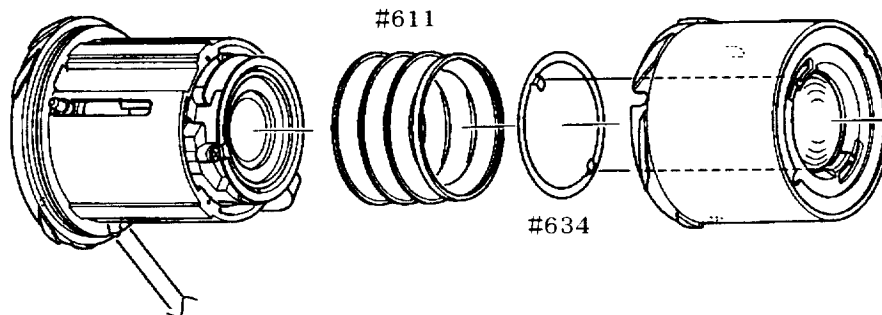




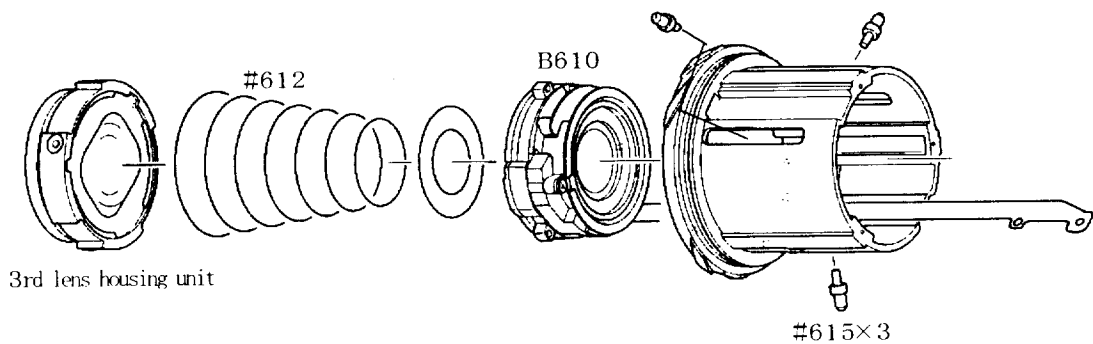
FPC HOLDER PLATE



1st LENS GROUP



SHUTTER UNIT, 3rd LENS HOUSING UNIT



Caution: In B610, the 2nd lens group is already centered while it includes the shutter. Don't disassemble B610 to keep the accuracy. All the parts are set as assembly.

ASSEMBLING/ADJUSTMENT

1. LENS BARREL

SUTTER UNIT, 3rd LENS HOUSING UNIT	A 1
1st LENS GROUP	A 1
FPC HOLDER PLATE	A 2
HELICOID RING, CAM RING	A 2 ~ A 3
LENS BARREL MOTOR, LENS BARREL GEAR GROUP	A 4
LENS BARREL FPC	A 5
FINDER CAM GROUP	A 6
LENS BARREL	A 6
SB LEVER	A 7

2. REAR BODY

DX CONTACT, FILM HOLDER, TRIPOD SOCKET	A 8
SPOOL, FILM ADVANCE MOTOR	A 8
SPOOL COVER, FILM ADVANCE HOLDER	A 9
FILM ADVANCE GEAR GROUP	A 9 ~ A 10
PANORAMA LEVER, PANORAMA UNIT	A 11
BATTERY CONTACT	A 12
HOW TO ASSEMBLE THE LENS BARREL AND THE REAR BODY	A 12
DATE MODULE UNIT	A 13
DIOPTER COMPENSATION DIAL	A 13
FINDER ASSEMBLY	A 14
CAMERA BACK SW	A 14
CAMERA BACK	A 15
SB UNIT, MAIN CAPACITOR	A 15
MAIN FPC	A 16
ARRANGE WIRES	A 17
CAMERA BACK LOCK-RELEASE LEVER	A 18
FRONT COVER	A 19
REAR COVER	A 20
BATTERY CHAMBER COVER	A 20

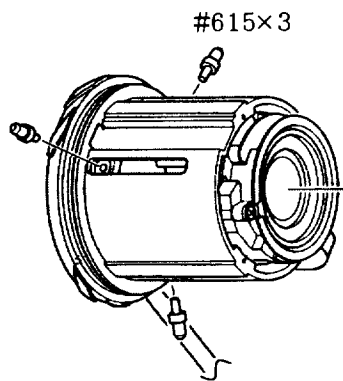
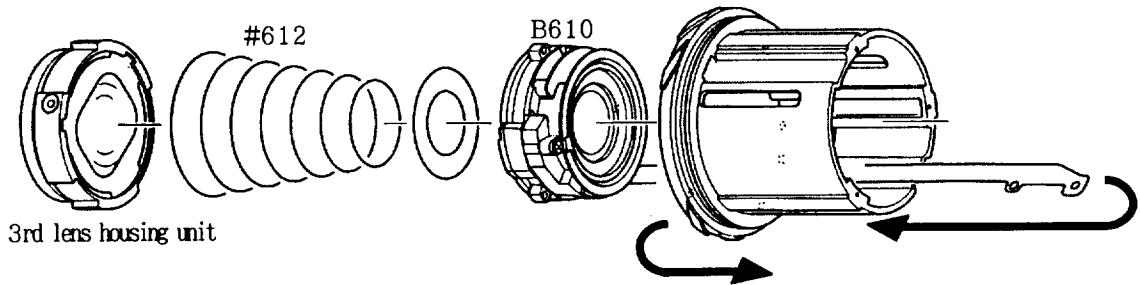
3. INSPECTION AND ADJUSTMENT

HOW TO CONNECT THE CAMERA WITH THE COMMUNICATION TOOL(S)	A 21
INSPECTION AND ADJUSTMENT OF BACK FOCUS	A 22
AE INSPECTION AND ADJUSTMENT	A 23
ADJUSTMENT FOR SETTING DELAY TIME IN THE SHUTTER MECHANISM	A 23
AF INSPECTION AND ADJUSTMENT	A 23

2. ASSEMBLING/ADJUSTMENT

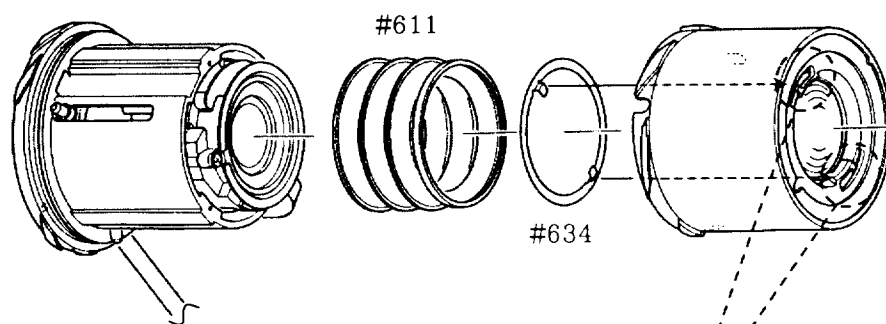
1. LENS BARREL

SHUTTER UNIT, 3rd LENS HOUSING UNIT

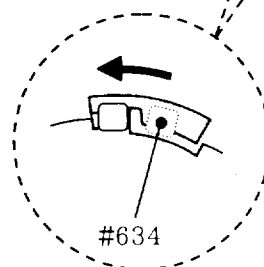


Caution: In B610, the 2nd lens group is already centered while it includes the shutter. Don't disassemble B610 to keep the accuracy. All the parts are set as assembly.

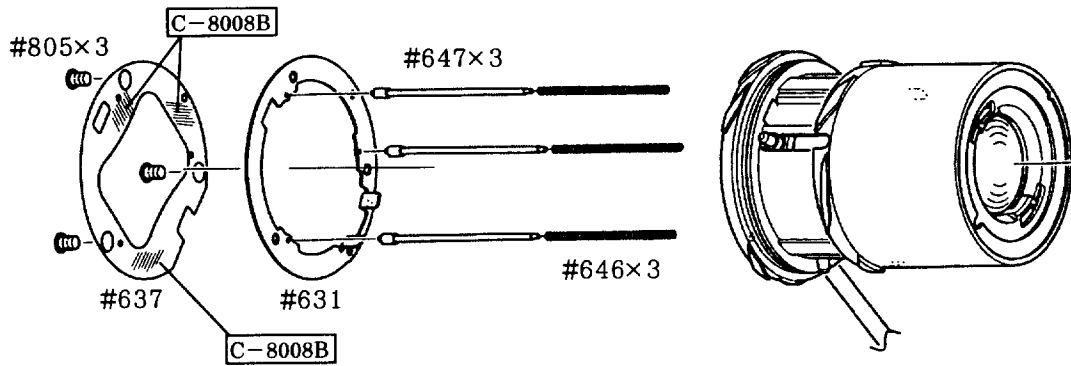
1st LENS GROUP



• Move #634 in the arrow mark direction to position it as illustrated in the right.

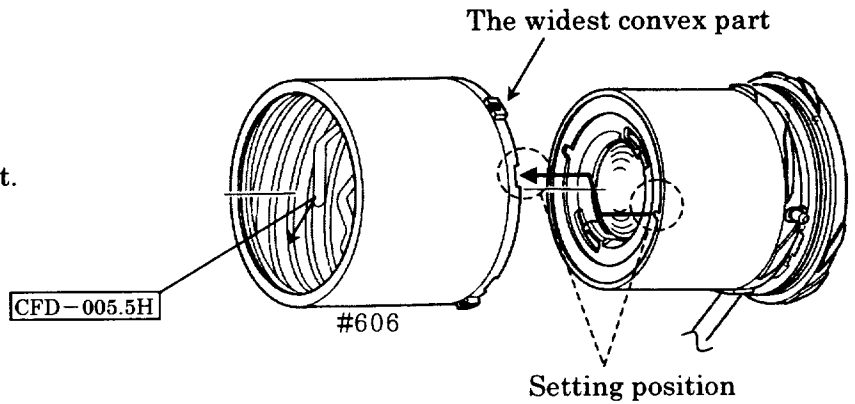


FPC HOLDER PLATE

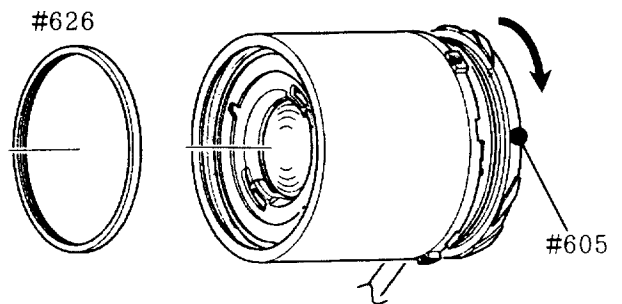


HELICOID RING, CAM RING

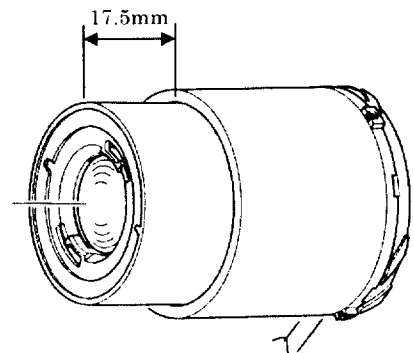
① Fit the setting positions as illustrated in the right.

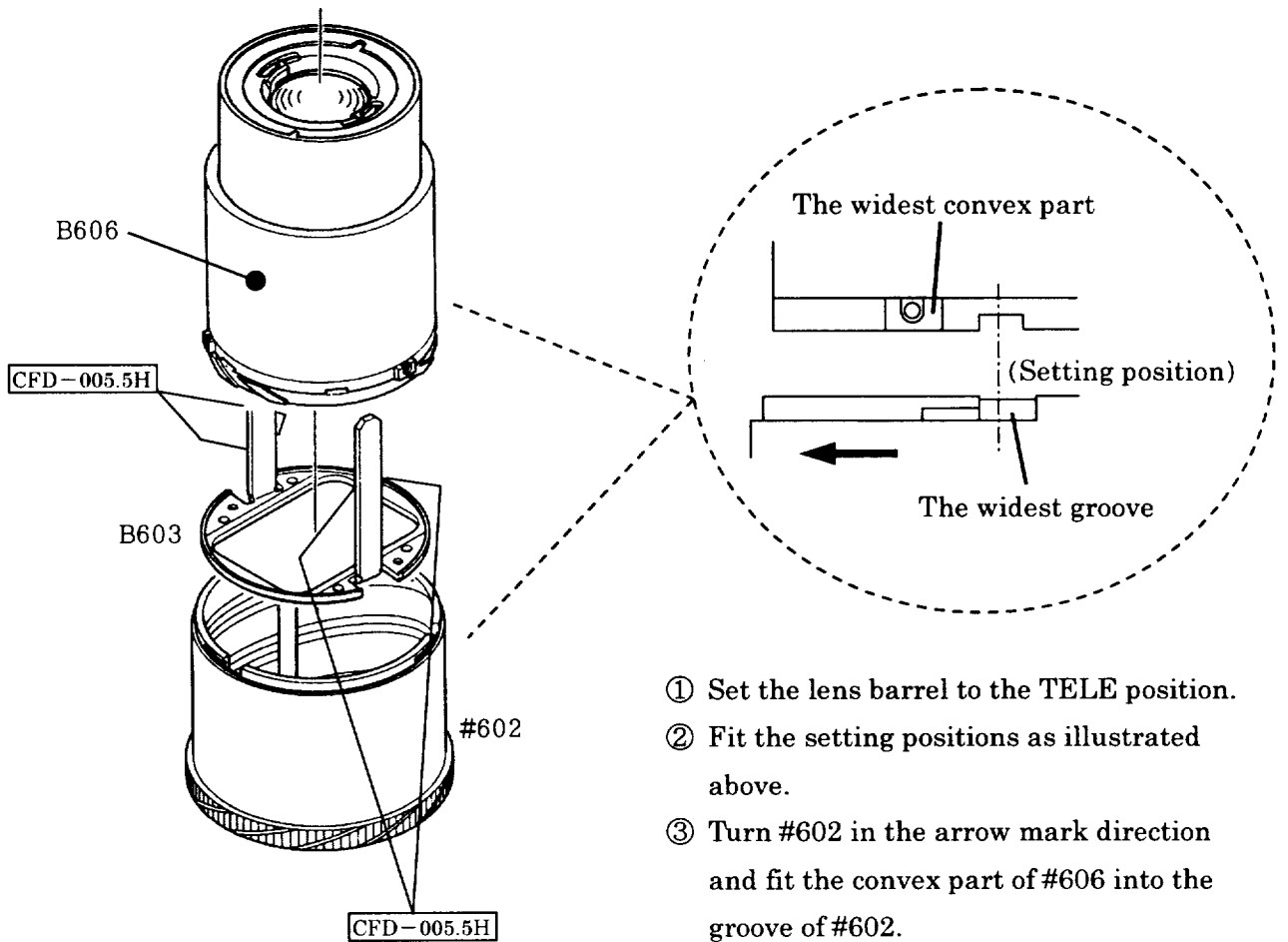


② Put in #626 and turn #605 in the arrow mark direction.

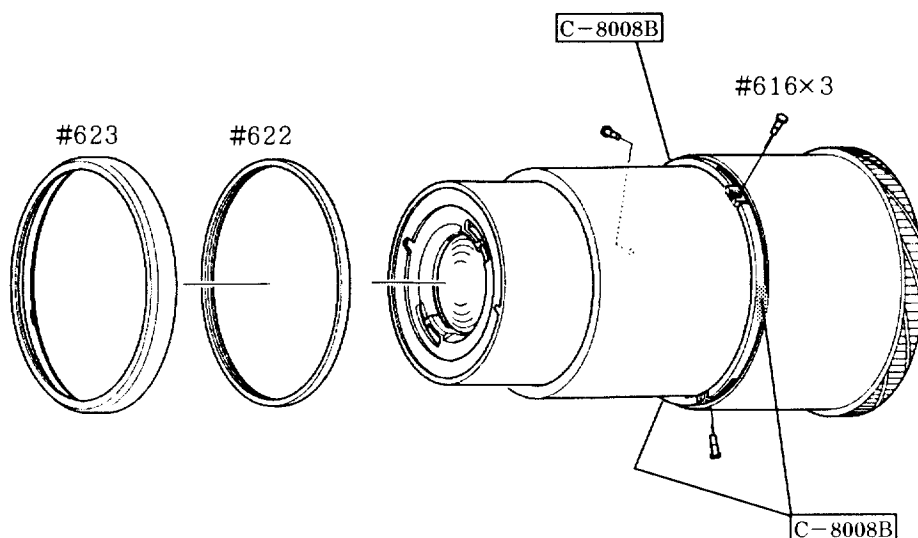


③ Turn #605 till it touches the stopper and make sure that the 1st lens group chamber is protruded by approx. 17.5mm.

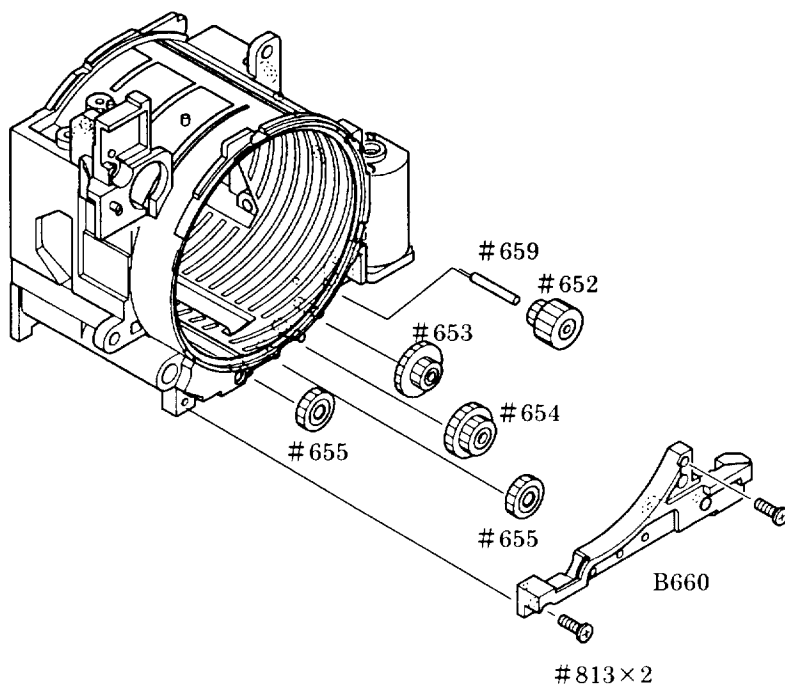
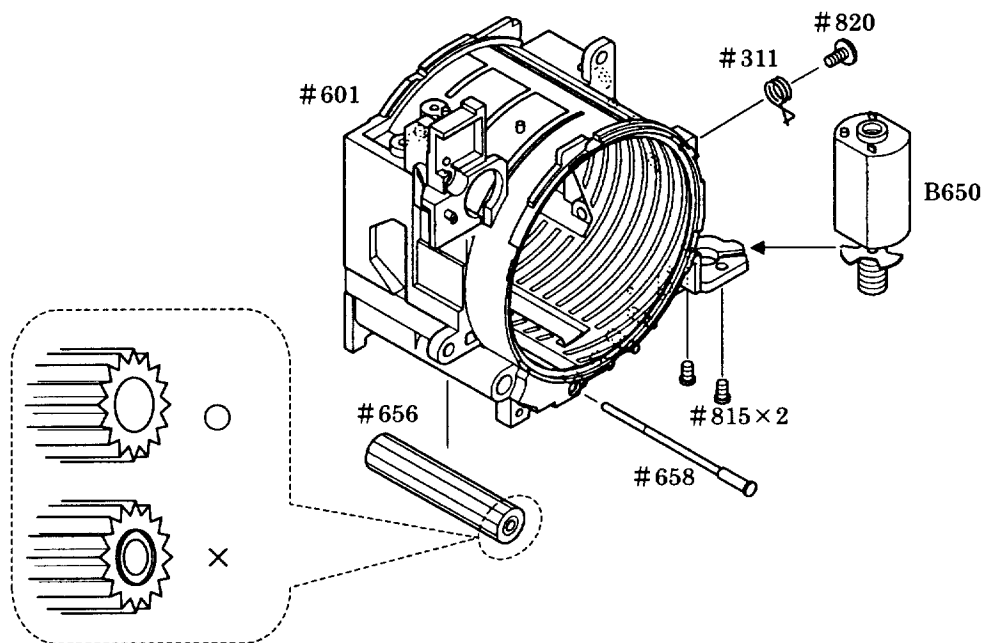




- ① Set the lens barrel to the TELE position.
- ② Fit the setting positions as illustrated above.
- ③ Turn #602 in the arrow mark direction and fit the convex part of #606 into the groove of #602.



LENS BARREL MOTOR, LENS BARREL GEAR GROUP



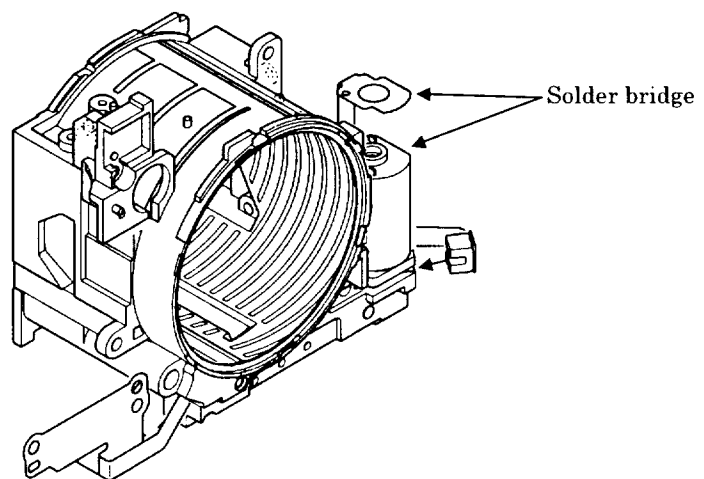
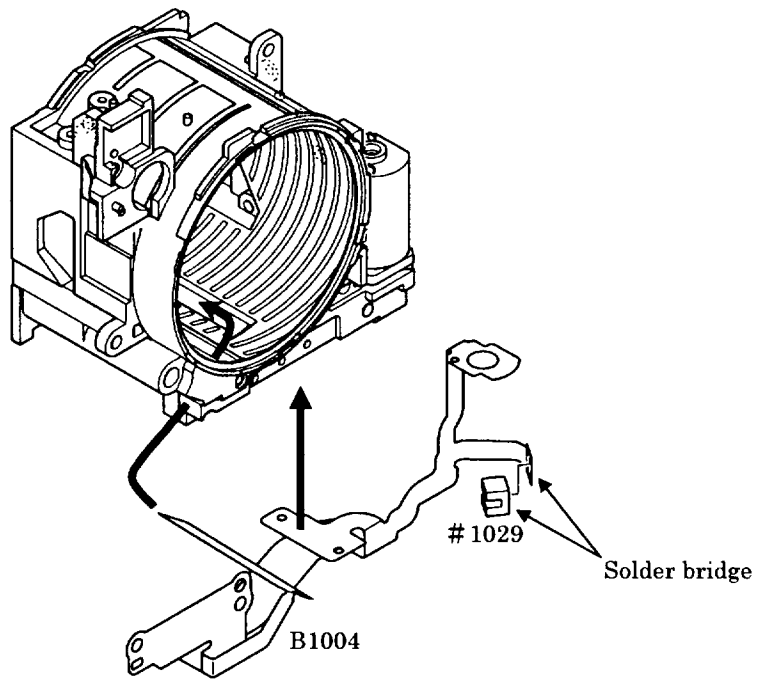
· Apply G474C to gears and gear shafts.

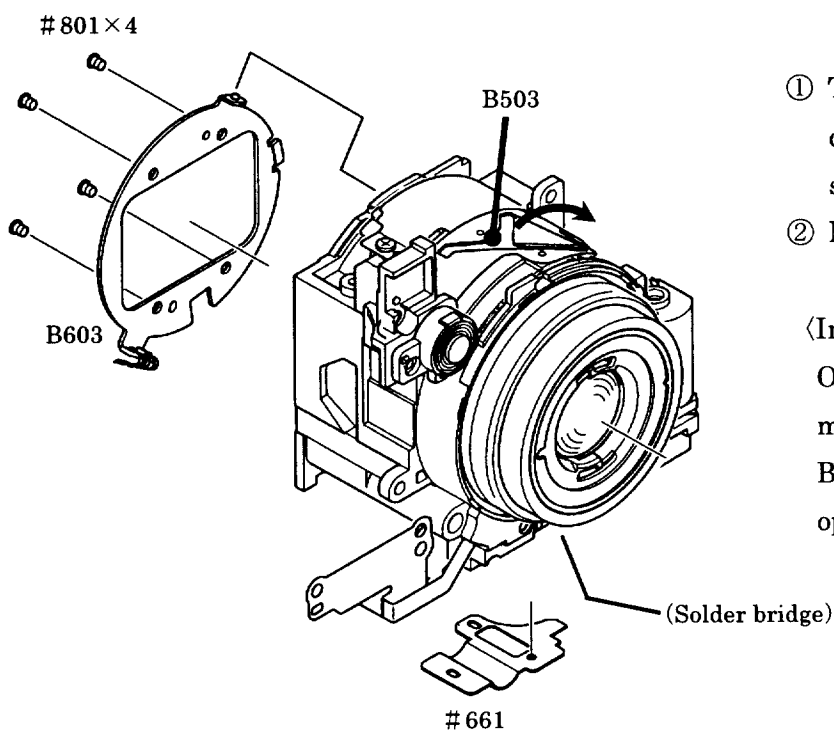
【Reference】

If one of the two gears (#655) is removed, the work is easier.

The procedures in the subsequent pages are described on the assumption that the above has already been done.

LENS BARREL FPC



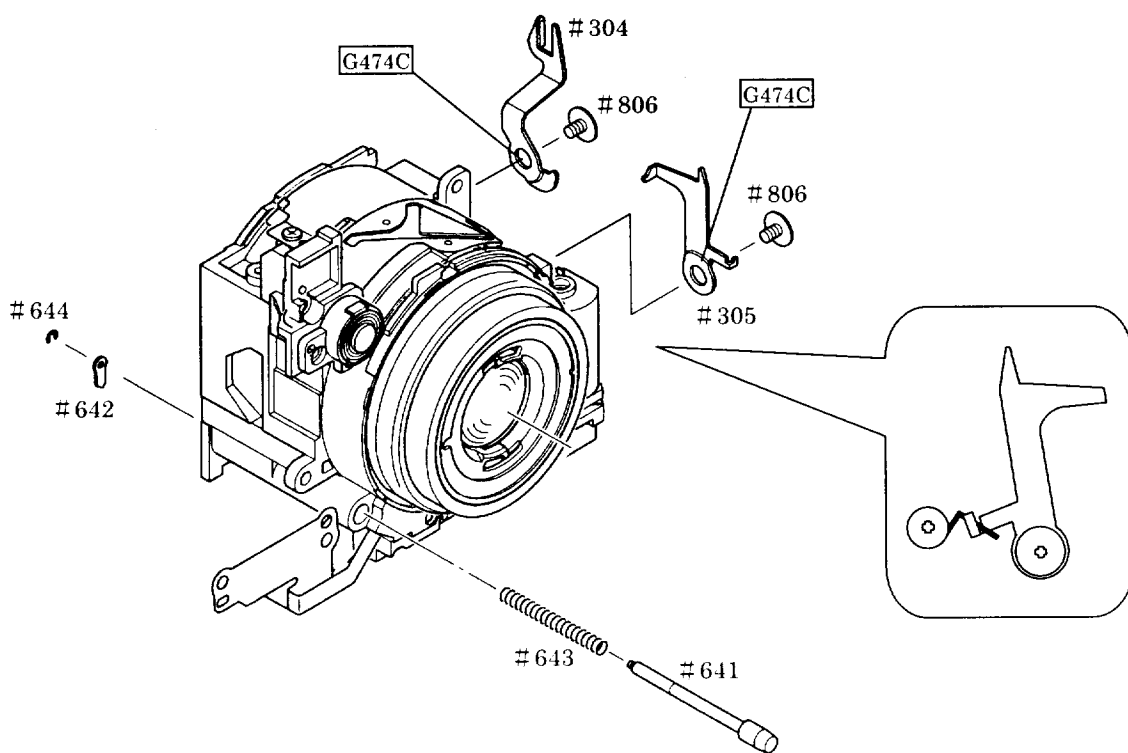


- ① Turn B503 in the arrow mark direction till it touches the stopper.
- ② Mount B603.

〈Inspection〉

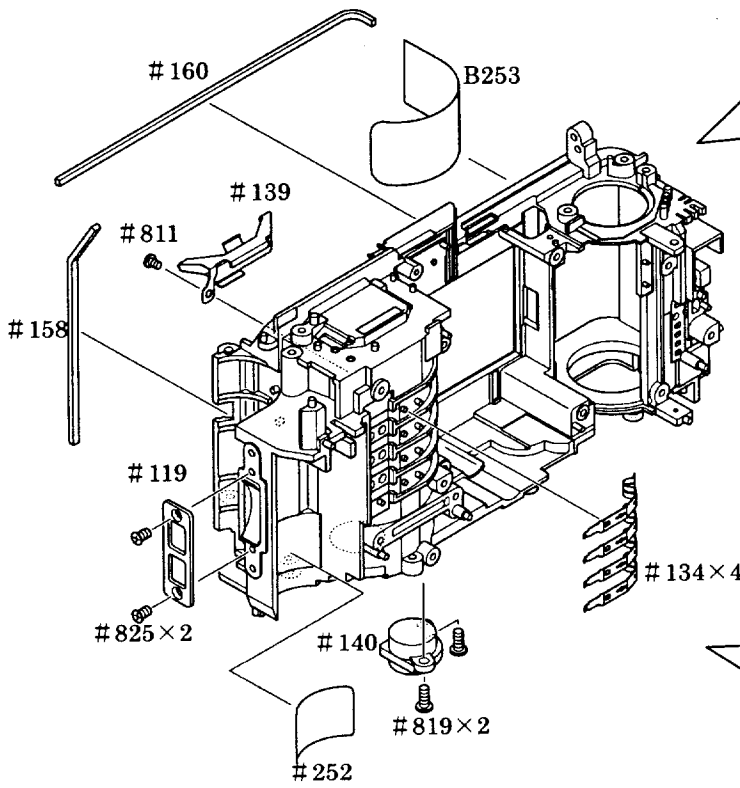
Operate the lens barrel unit manually and make sure that B503 is actuated in a coupling operation.

SB LEVER

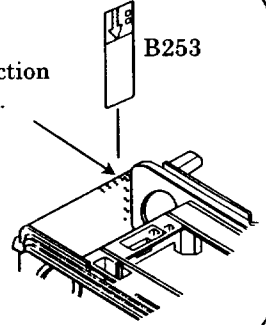


2. REAR BODY

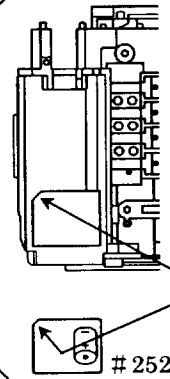
DX CONTACT, FILM HOLDER, TRIPOD SOCKET



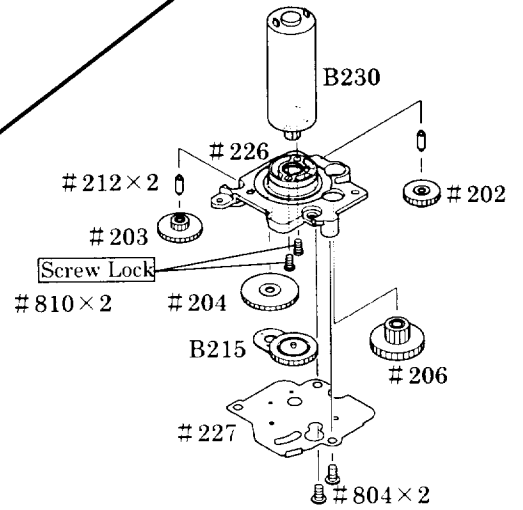
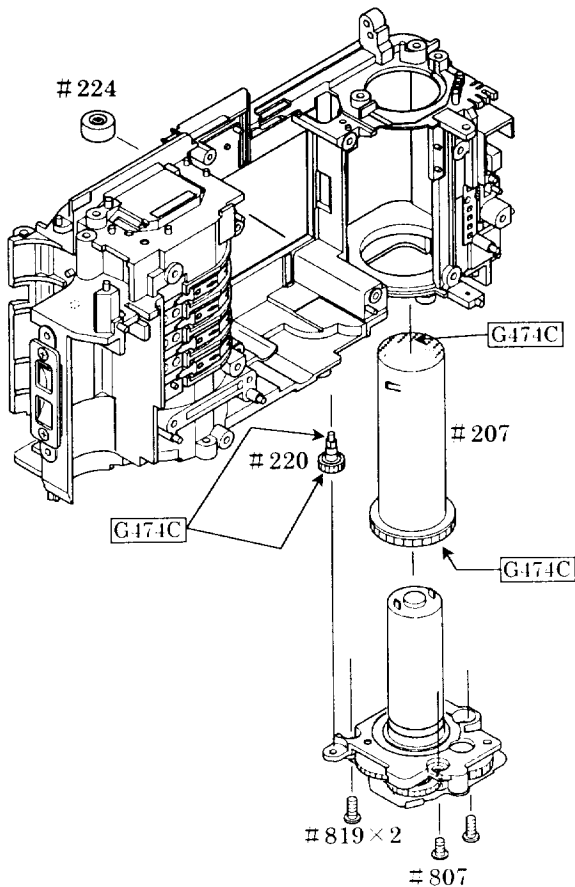
• Regard the hatching section as standard.



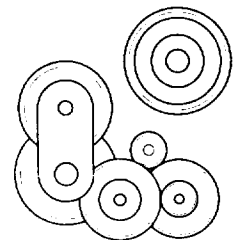
• Fit these end faces to each other.



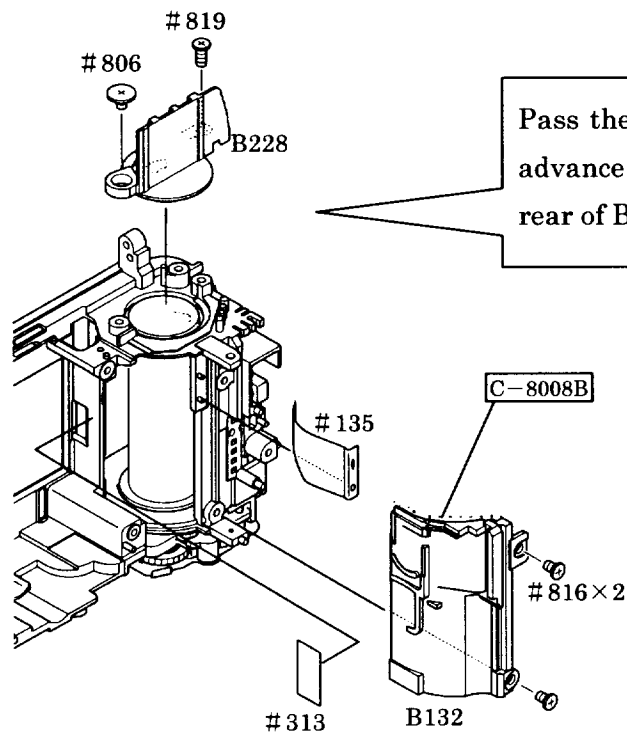
SPOOL, FILM ADVANCE MOTOR



• Apply G474C to gears.

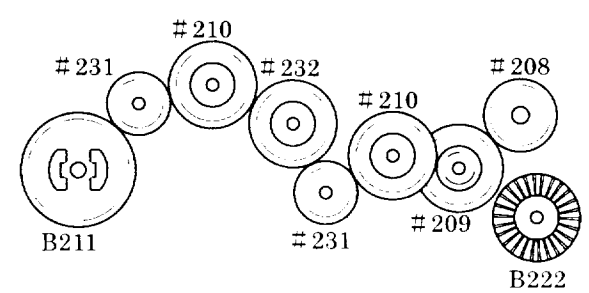
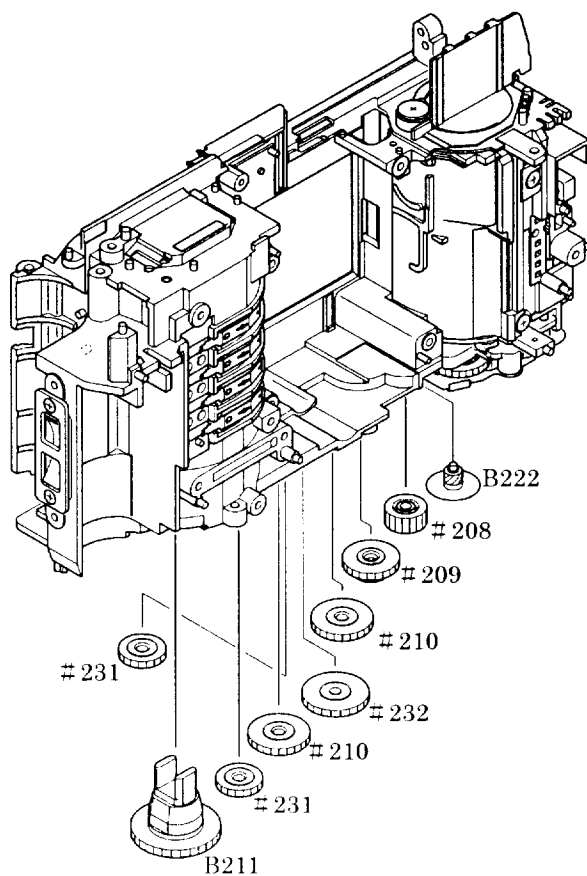


SPOOL COVER, FILM ADVANCE HOLDER

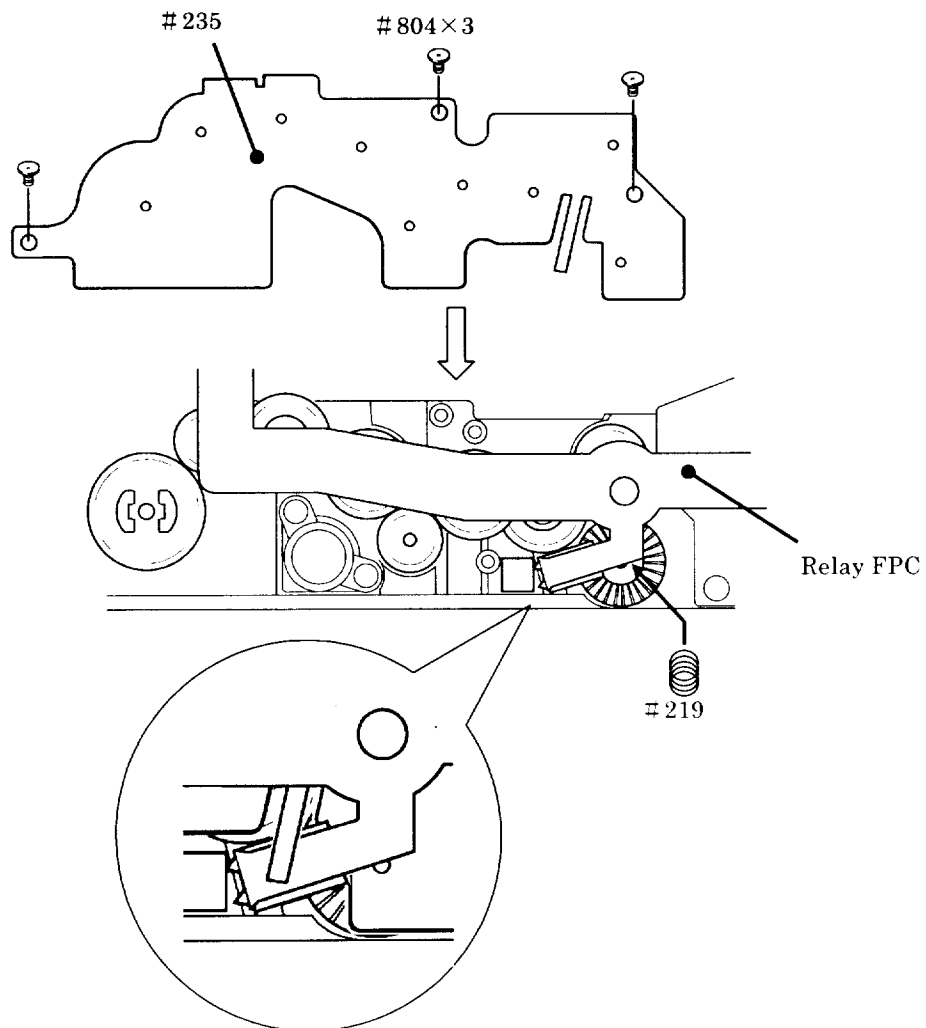
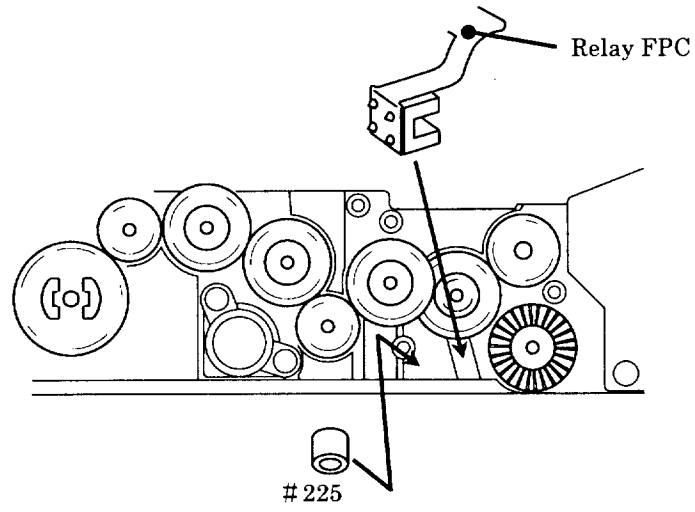


Pass the red and black wires of the film advance motor through the hole on the rear of B228 to outside.

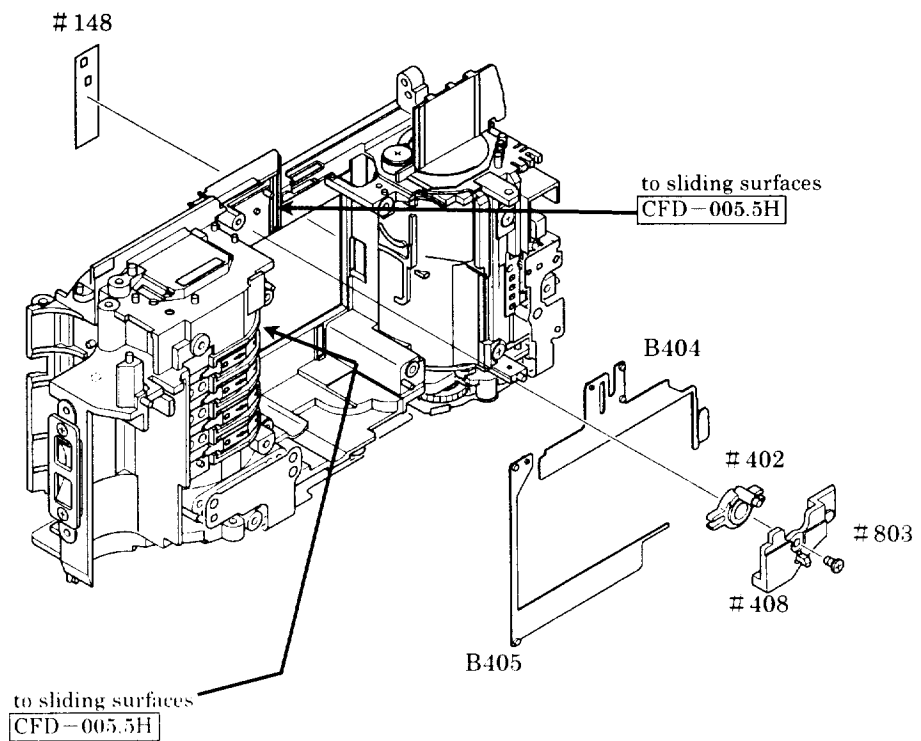
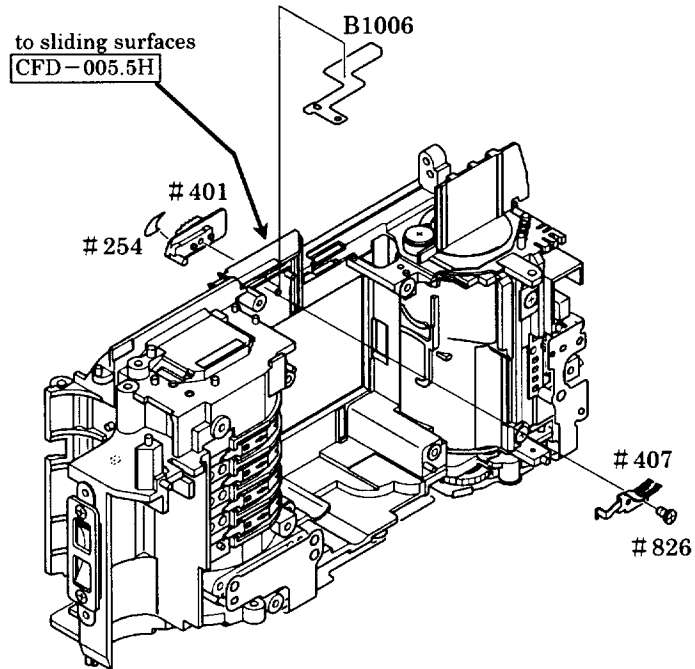
FILM ADVANCE GEAR GROUP



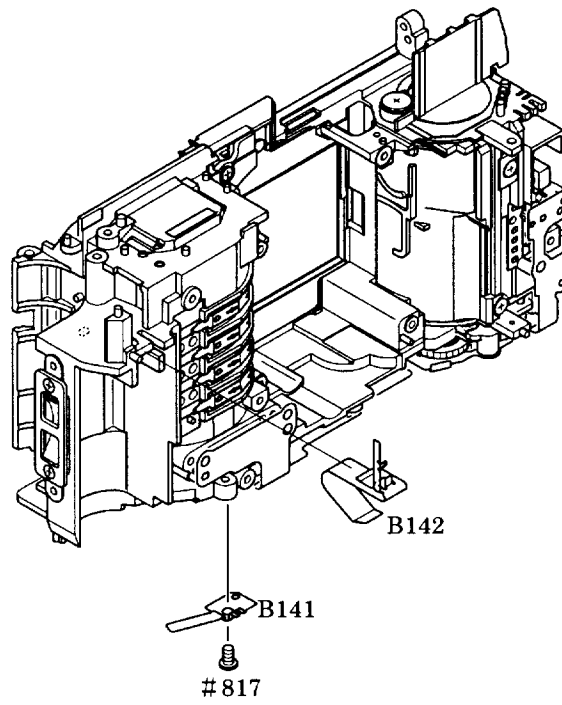
• Apply CFD-005.5H to gears and gear shafts.



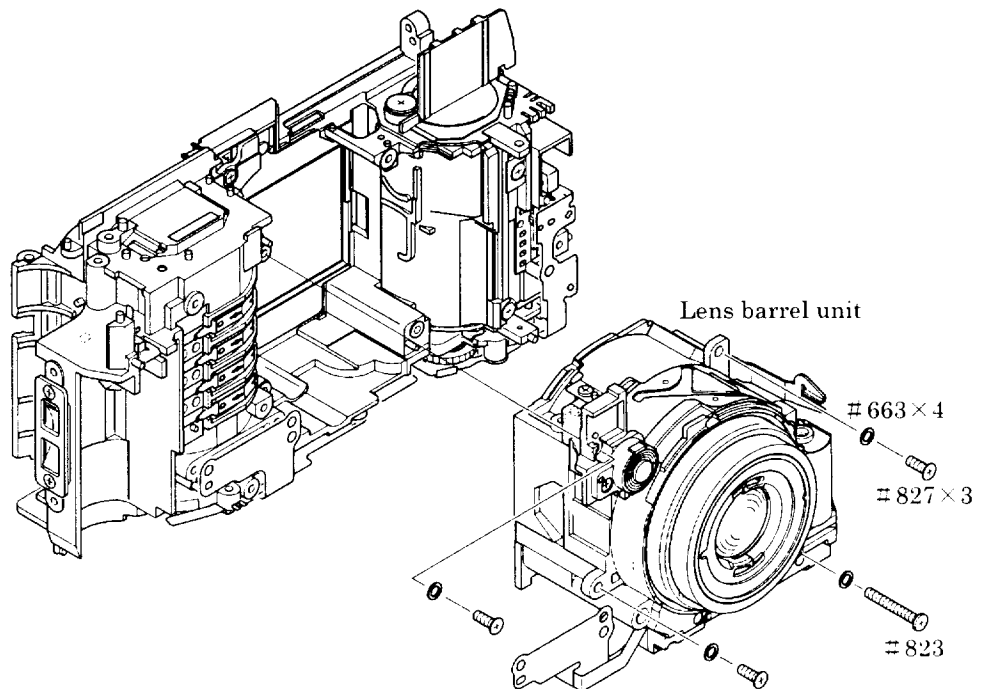
PANORAMA LEVER, PANORAMA UNIT



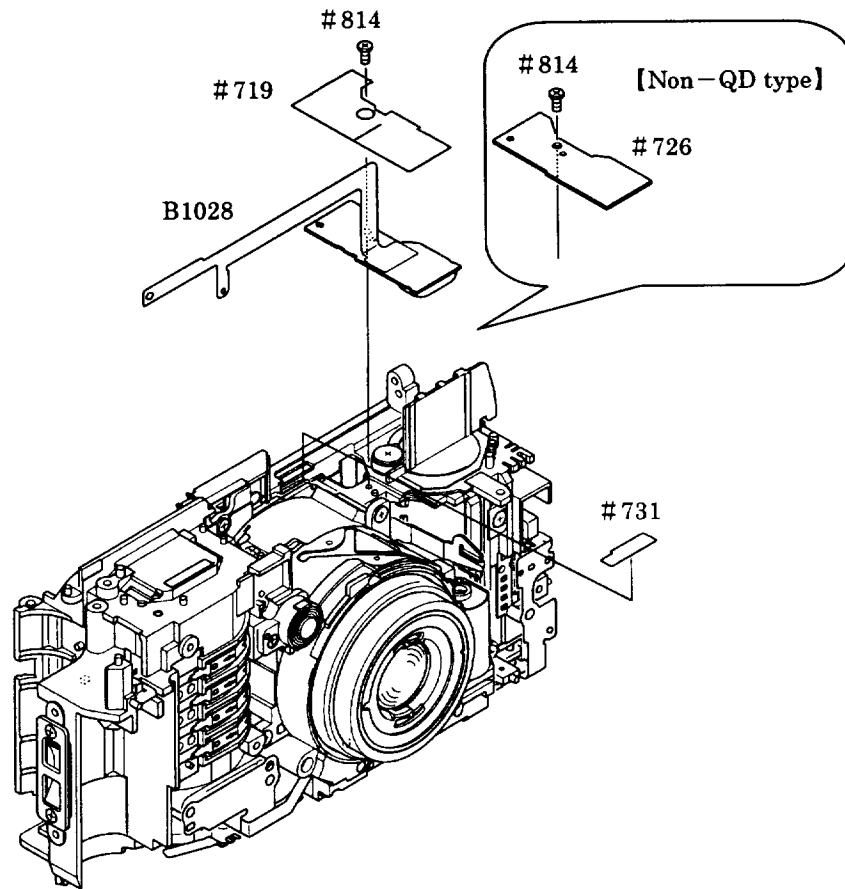
BATTERY CONTACT



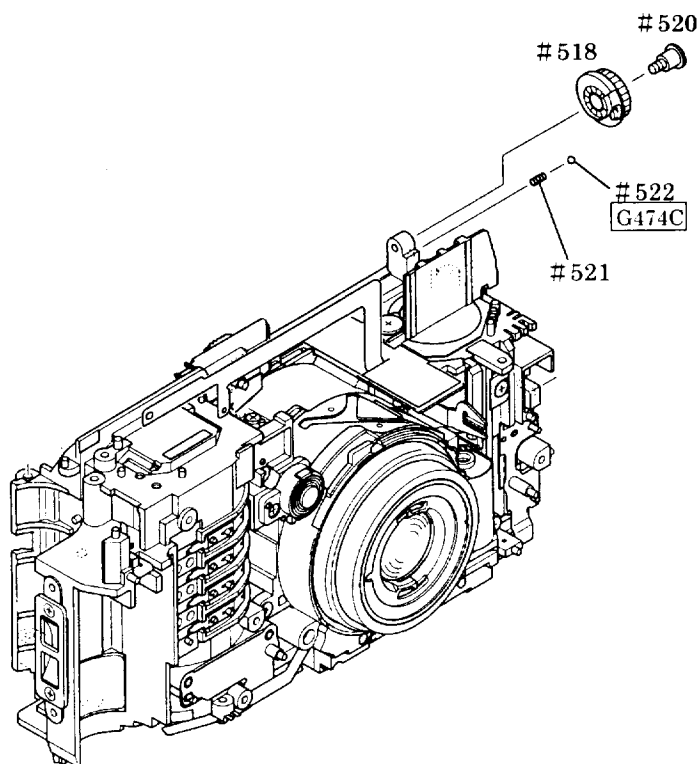
HOW TO ASSEMBLE THE LENS BARREL AND THE REAR BODY



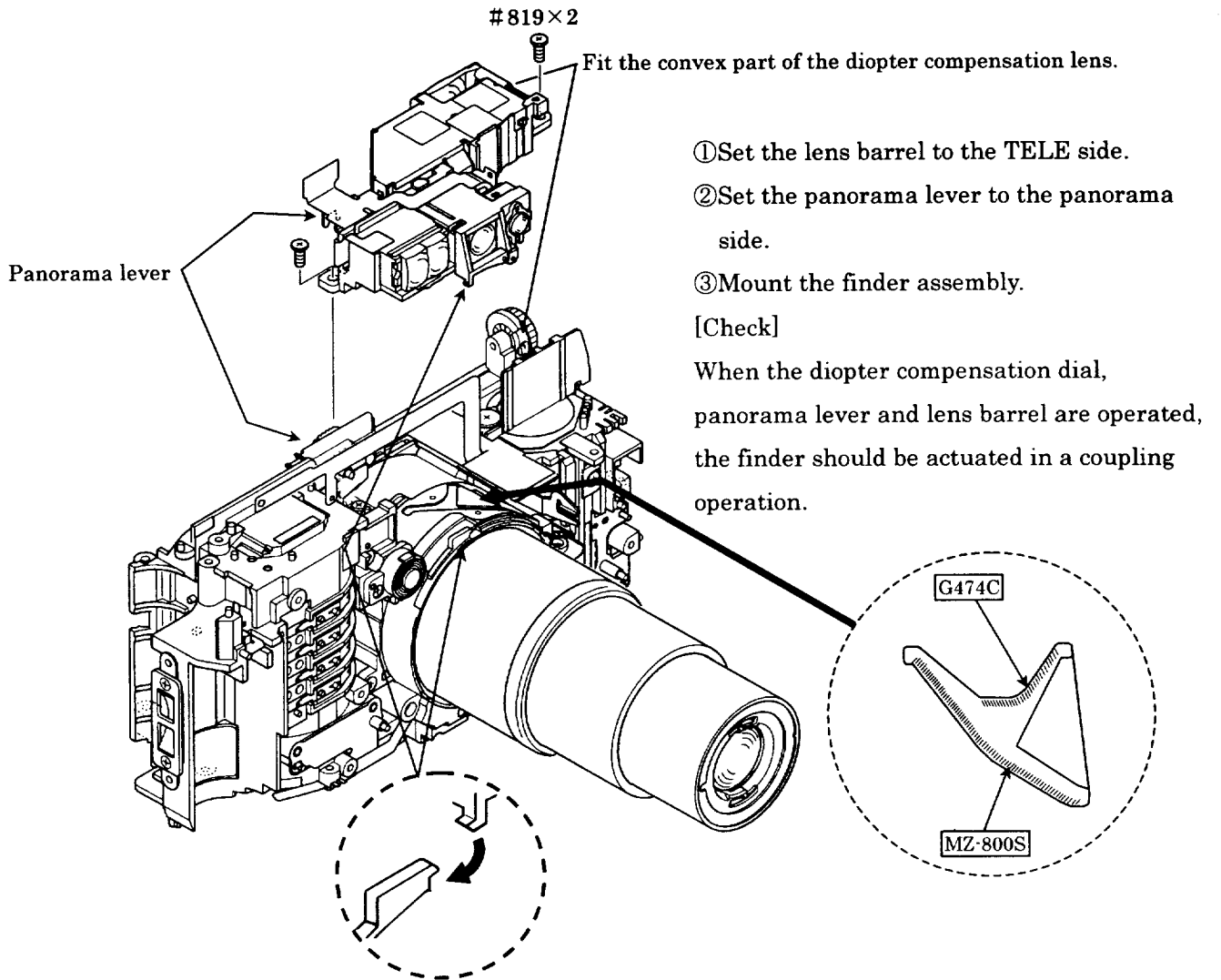
DATE MODULE UNIT



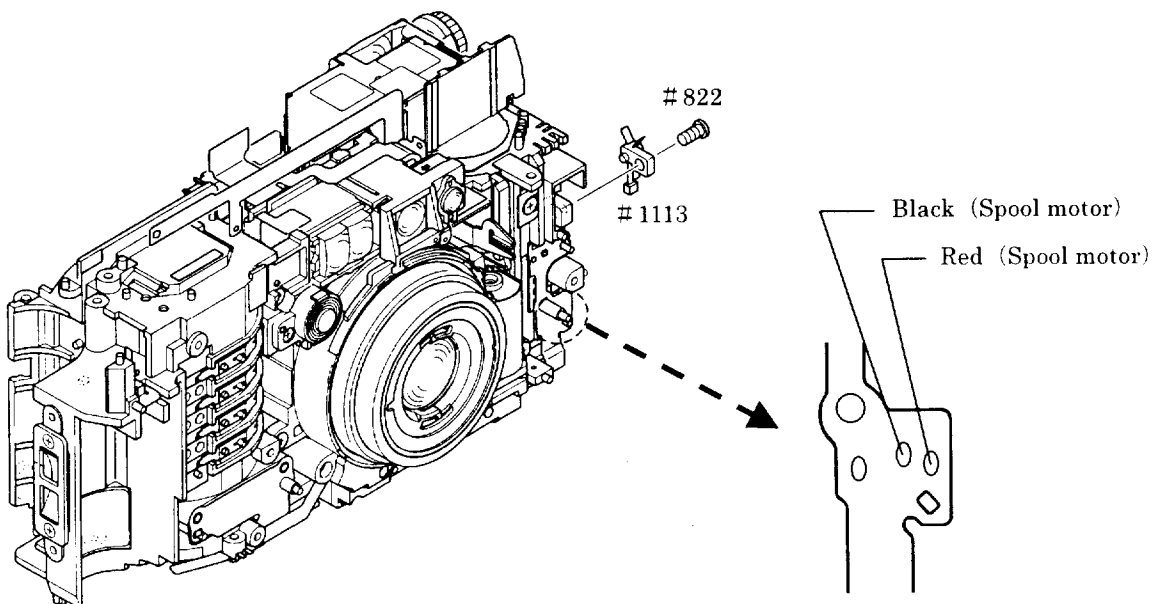
DIOPTRIC COMPENSATION DIAL



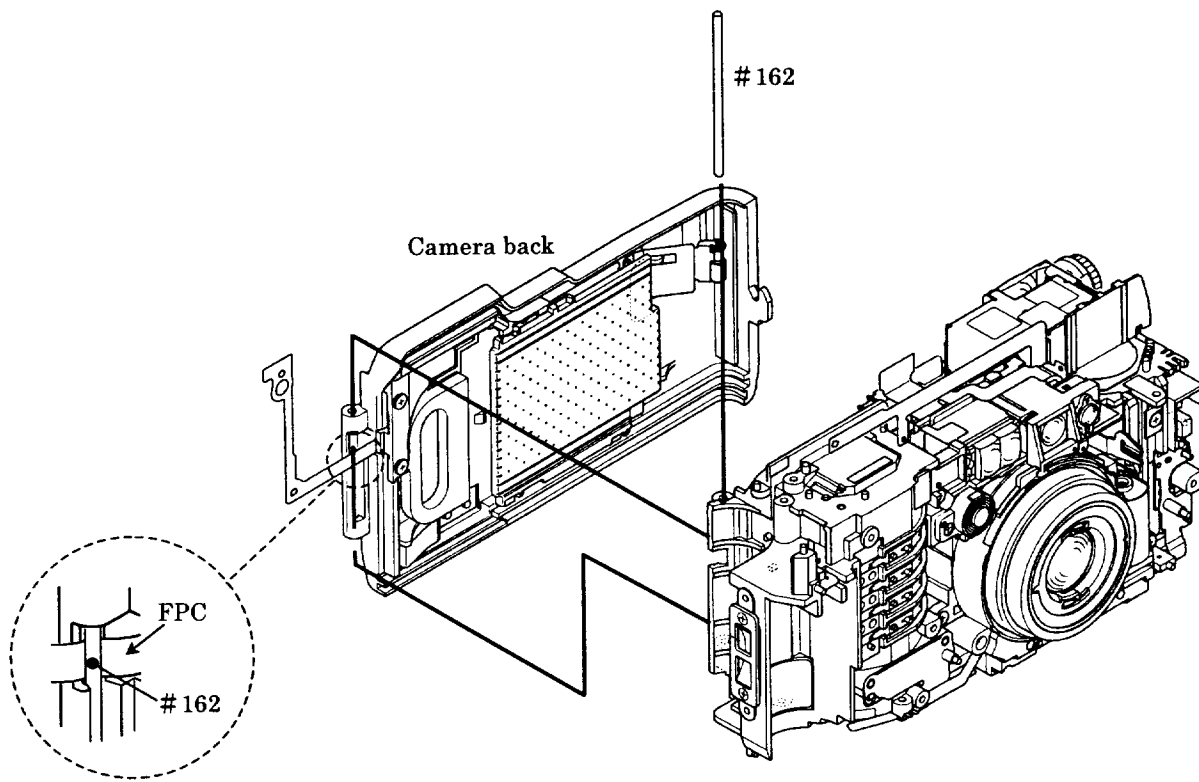
FINDER ASSEMBLY



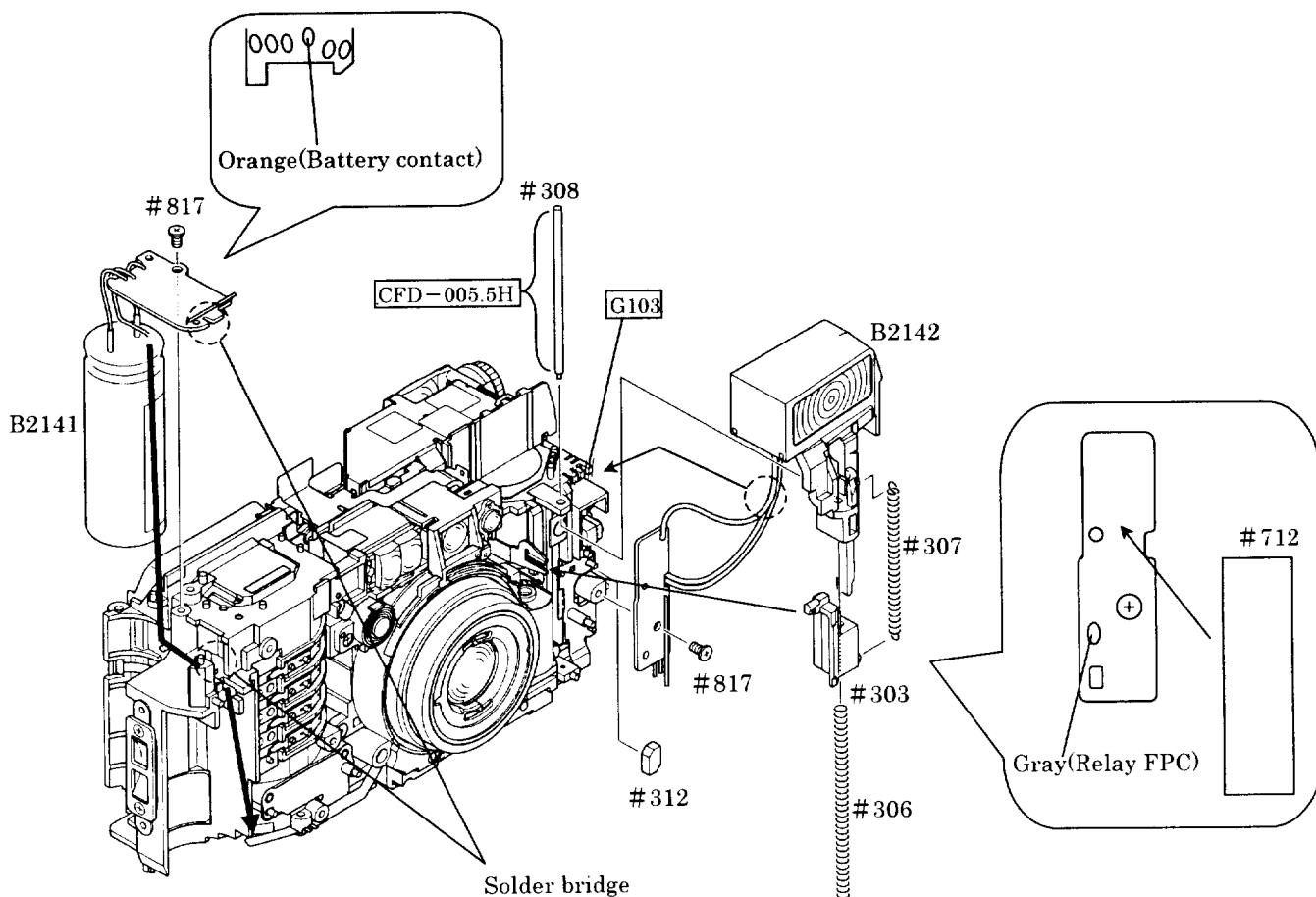
CAMERA BACK SW



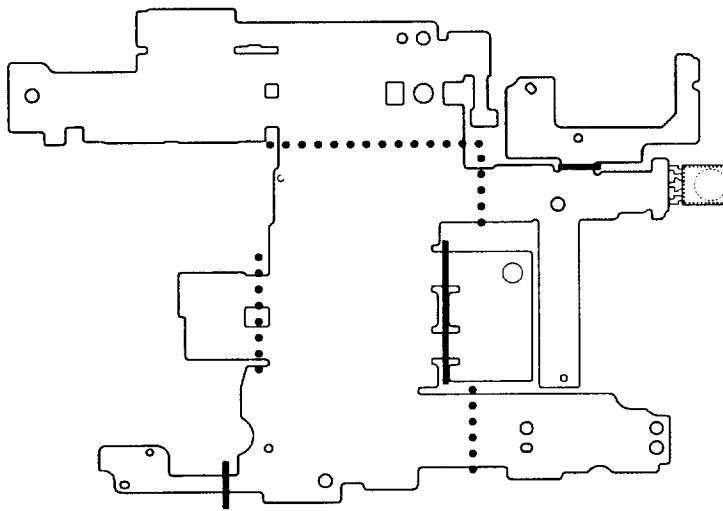
CAMERA BACK



SB UNIT, MAIN CAPACITOR



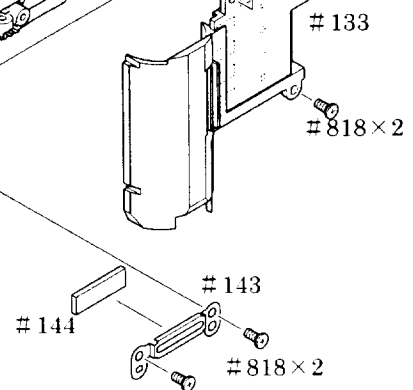
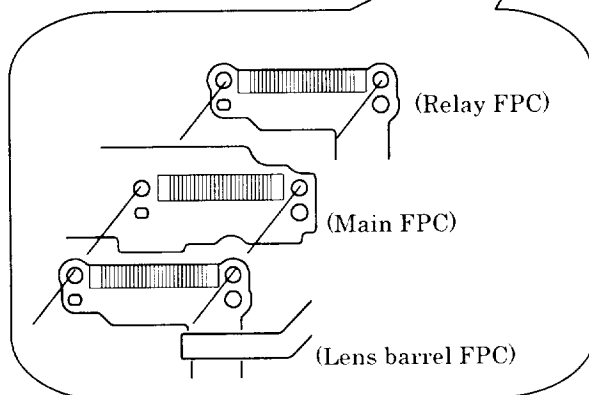
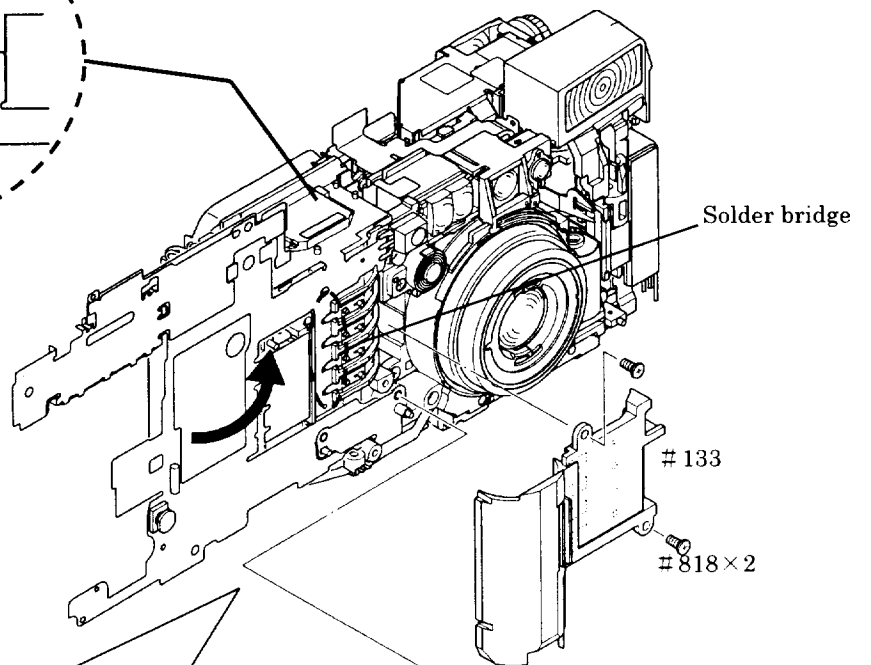
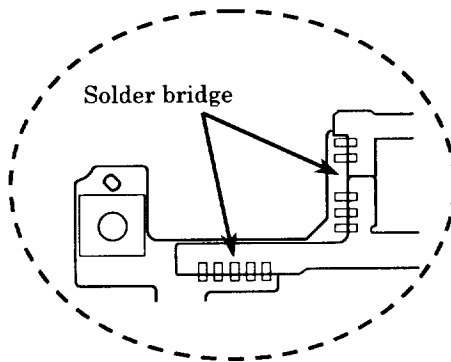
MAIN FPC



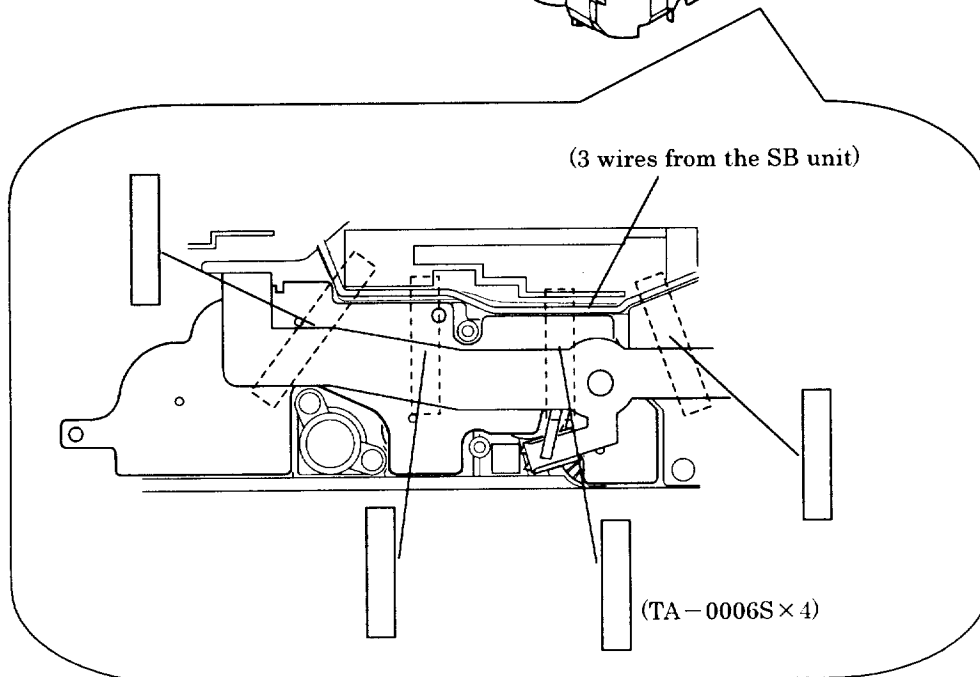
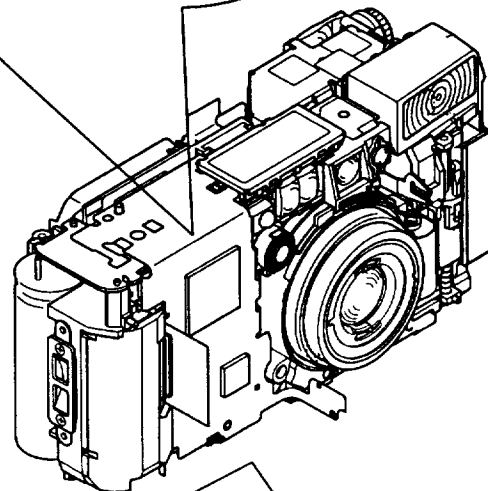
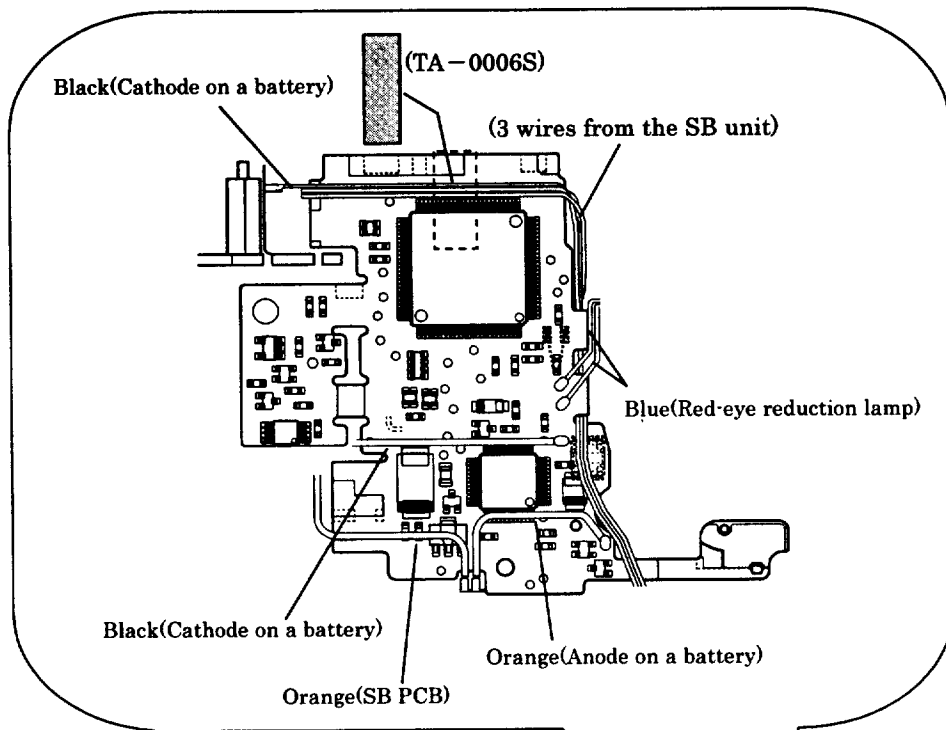
(Main FPC)

— Fold outside

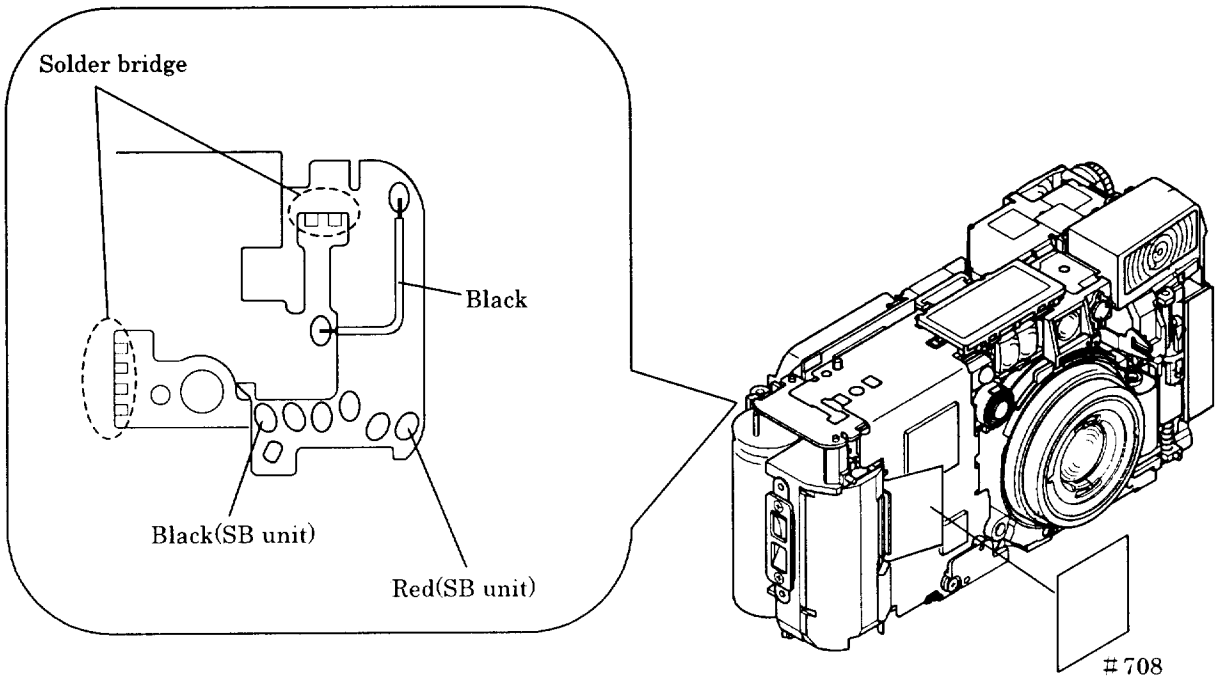
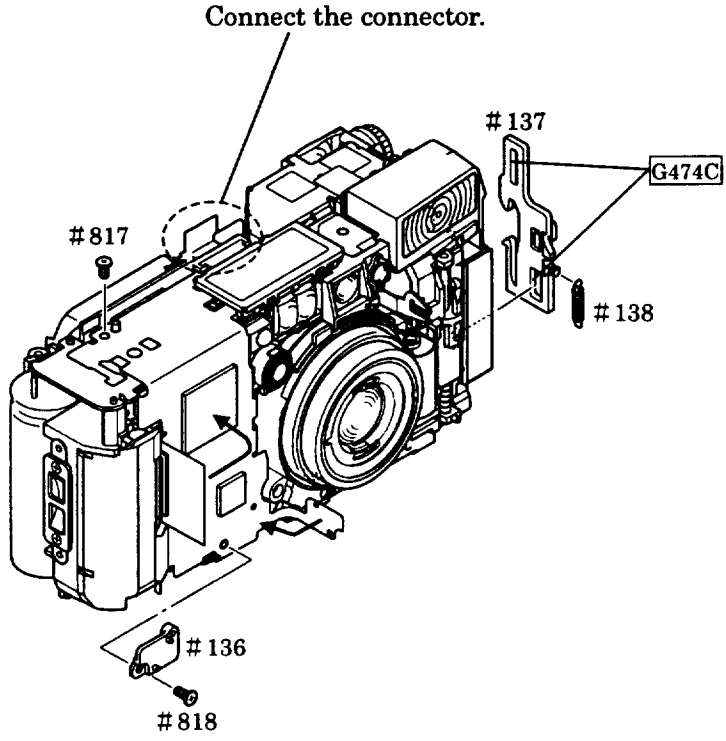
..... Fold inside



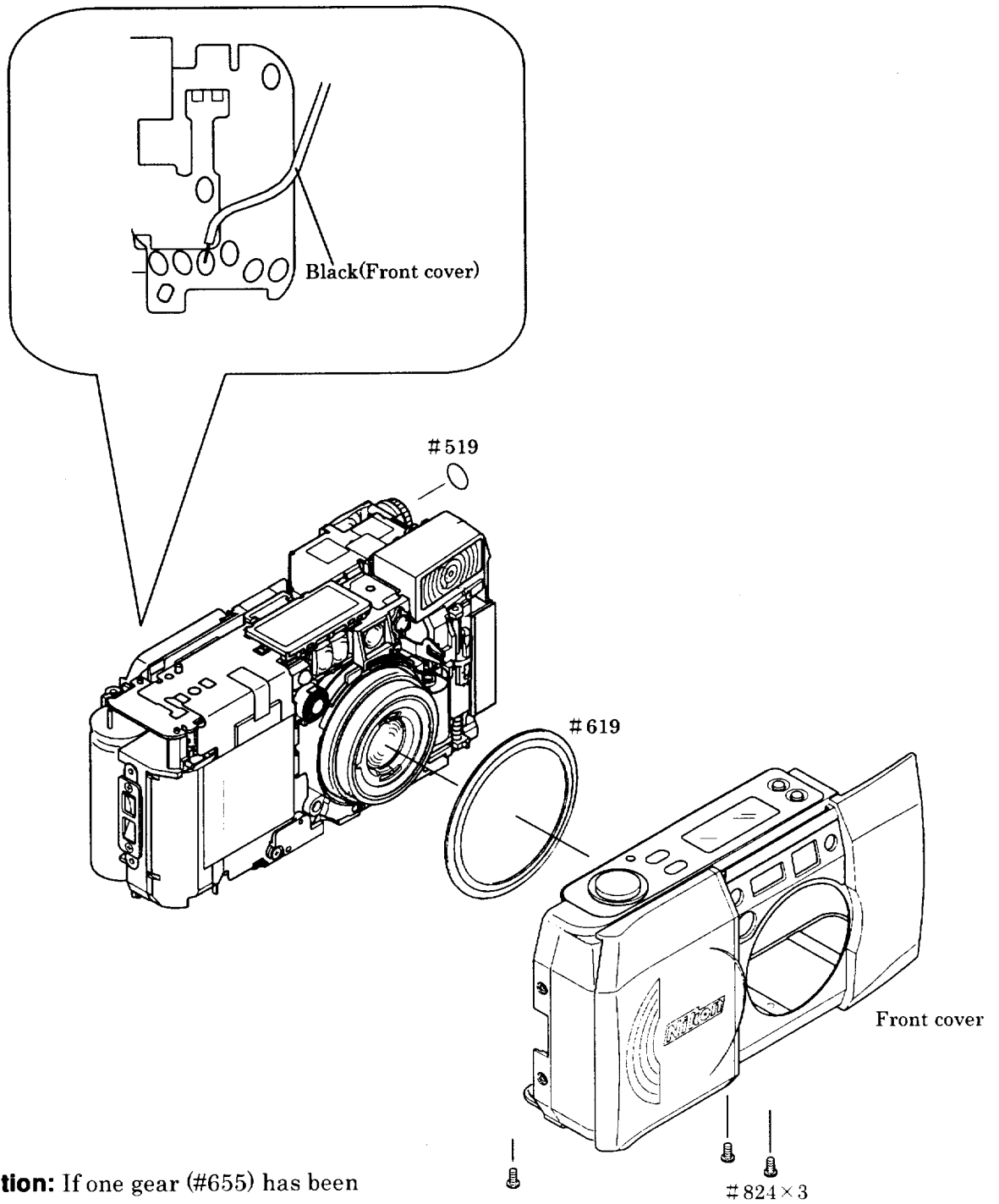
ARRANGE WIRES



CAMERA BACK LOCK-RELEASE LEVER

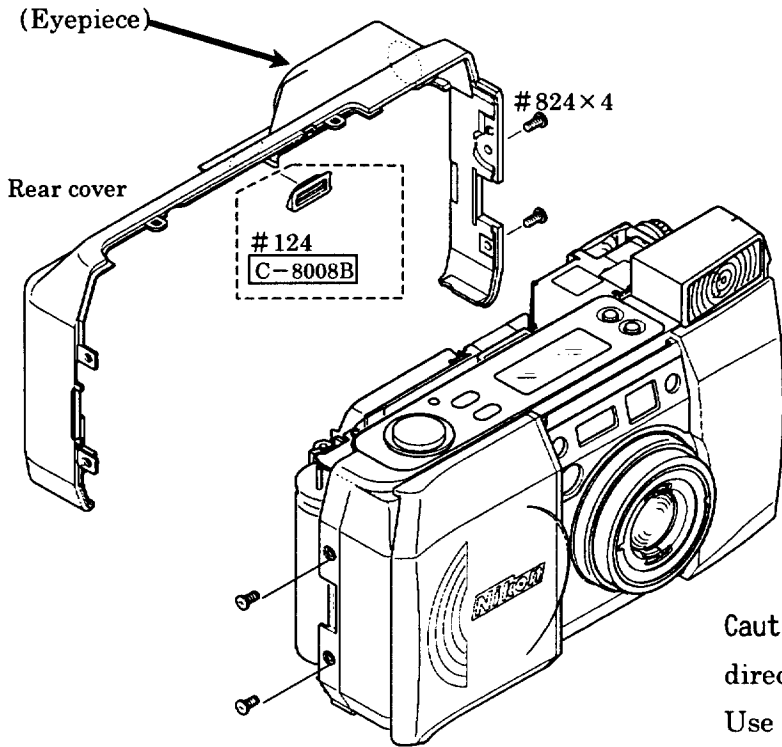


FRONT COVER



Caution: If one gear (#655) has been removed in Page A4, set it at this time.

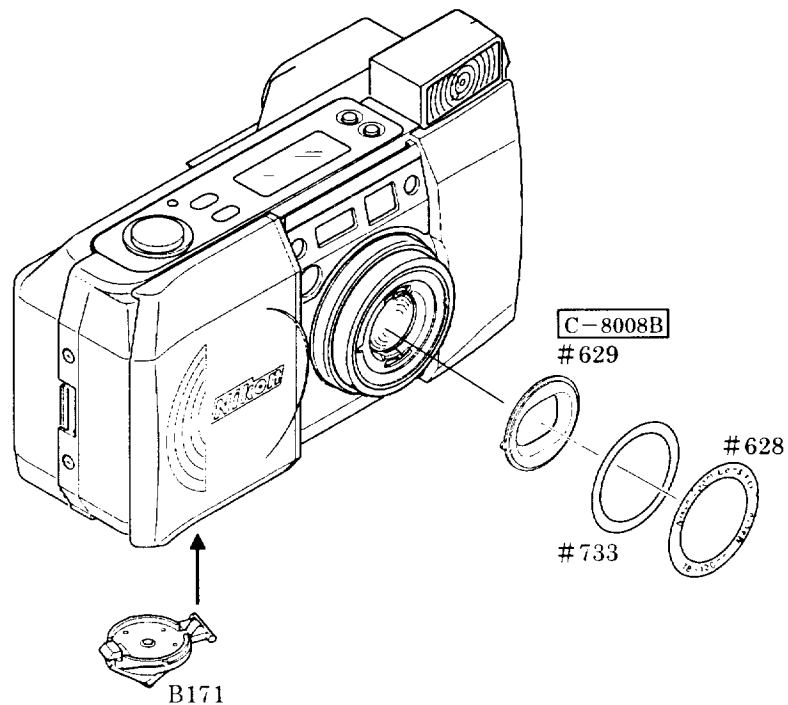
REAR COVER



• #124 is used only for the body without panorama.

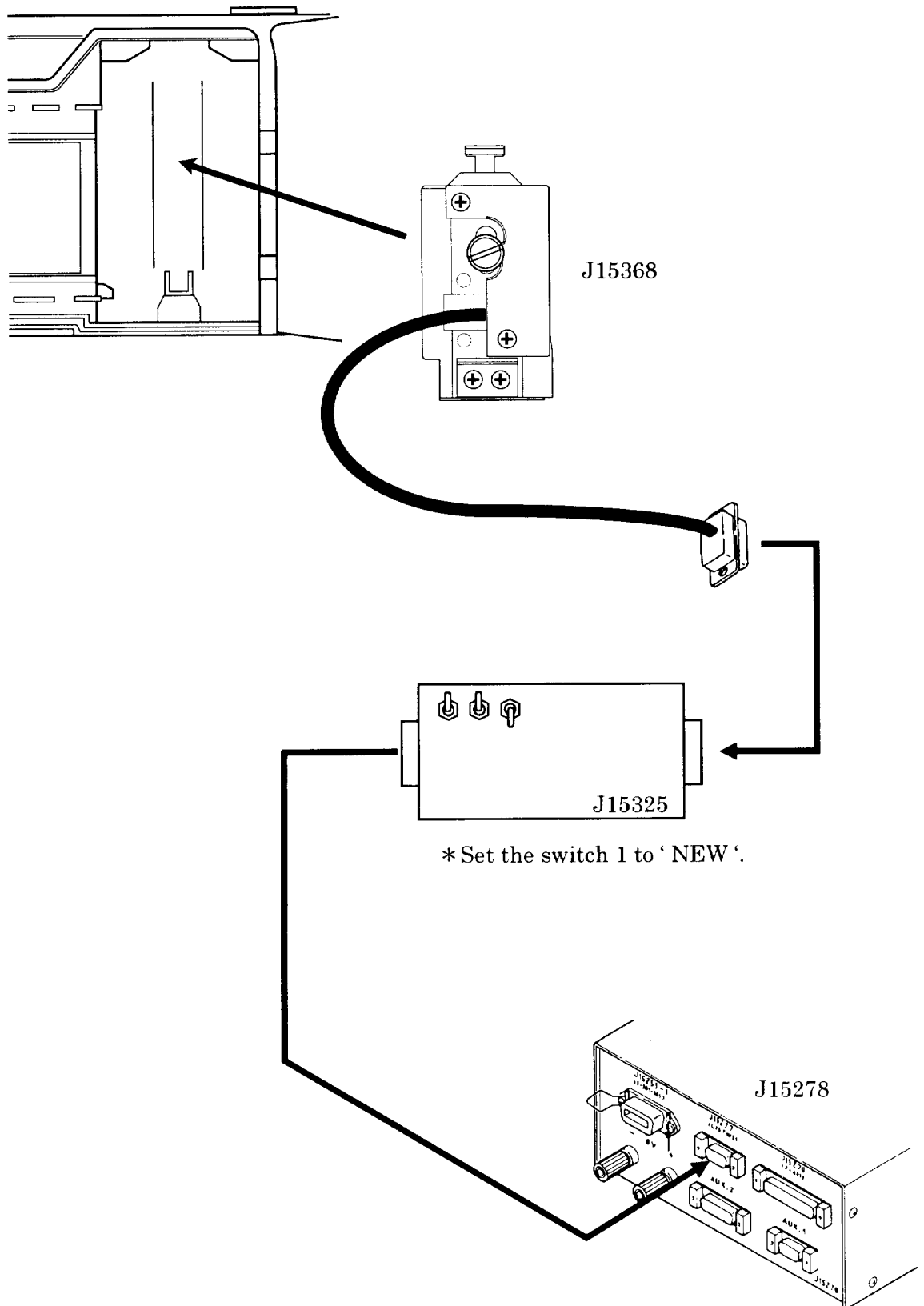
Caution : Don't touch the eyepiece unit directly.
Use a special cloth for cleaning.
Refer to TECHNICAL INFORMATION
Ref. No. 99086.

BATTERY CHAMBER COVER



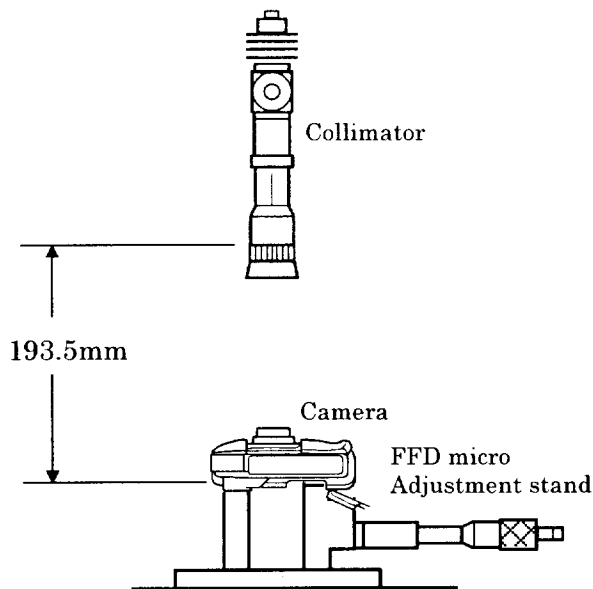
3. INSPECTION AND ADJUSTMENT

HOW TO CONNECT THE CAMERA WITH THE COMMUNICATION TOOL(S)



INSPECTION AND ADJUSTMENT OF BACK FOCUS

- Adjustment using a personal computer



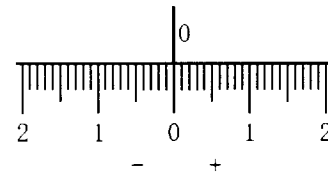
Zoom position	Standard (μm)
1 (WIDE end)	15 ± 260
2	20 ± 370
3	25 ± 420
4	15 ± 460
5	0 ± 460
6 (TELE end)	-65 ± 500

- Inspection in manual inspection mode

- ① See the above-mentioned to set inspection tool.
- ② Set the camera to bulb and infinity focus(00h) in manual inspection mode (see page M3,4,5)
- ③ Read the micrometer indication of the FFD adjustment micro stand(J15327) and make sure it is within standard.

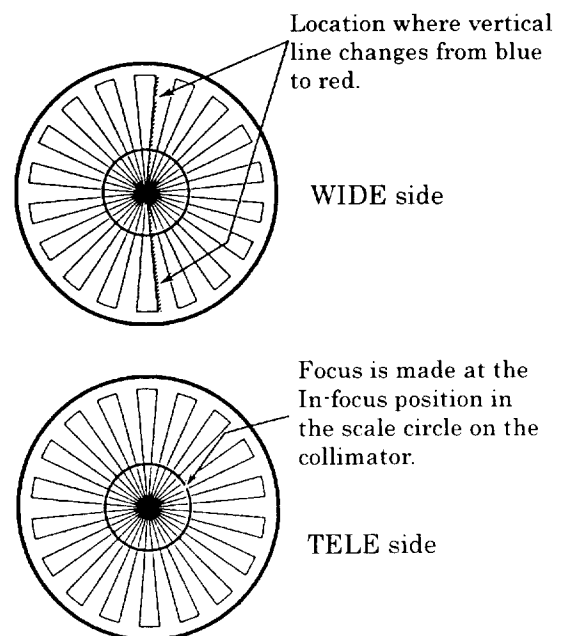
If the result is out of the standard range, be sure to perform inspection and adjustment using a personal computer.

- ① Rotate the objective lens of collimator(J19019) to set the scale to 0mm(0 calibration). Do not rotate the objective lens afterward.



- ② Set the display of the FFD adjustment micro stand(J15291) to "0.000".
- ③ Run the inspection and adjustment software and connect between the camera and the personal computer.
- ④ Select "Back focus inspection and adjustment", and make each adjustment as indicated on the computer display.

* Collimator focusing position



AE INSPECTION AND ADJUSTMENT

- Inspection and adjustment through PC operation

Perform the inspection and adjustment in accordance with what is instructed on the PC screen.

Precautions

Because the camera is automatically set to ISO 100 by the adjustment software, the shutter tester should be set to ISO 100 as well.

- Inspection in the manual inspection mode

1. Check the EV by with the manual inspection mode. (Refer to page M3, 4, 5)

2. Check the AE by with the shutter tester.

In the out-of-criteria case, make sure to perform its inspection and adjustment through PC.

Standard	$0 \pm 0.9 \text{ EV (LV 6)}$
	$0 \pm 1.2 \text{ EV (LV 1 2)}$
	$0 \pm 1.6 \text{ EV (LV 1 5)}$

ADJUSTMENT FOR SETTING DELAY TIME IN THE SHUTTER MECHANISM
--

- For replacement of the shutter mechanism unit or the main FPC unit, be sure to adjust it.

Besides, after rewriting, conduct an inspection for AE.

1. Start up the inspection and adjustment software and then connect the camera with PC.
2. Follow the instructions on the PC screen for adjustment.

AF INSPECTION AND ADJUSTMENT

- Inspection and adjustment through PC operation

According to what PC says on the screen, perform adjustment and inspection on the AF's accuracy.

- Inspection in the manual inspection mode

1. Set up to the AF result display mode in the manual inspection mode. (Refer to page M3, 4, 5)

2. Confirm whether or not the AF step is within its criteria in the specified range. (Refer to page M7)

In the out-of-criteria case, make sure to perform its inspection and adjustment through PC.

ANY CERTAIN ADJUSTMENT ITEM(S) TO BE REQUIRED WHEN REPLACING
--

	Inspection and adjustment of backfocus	AE inspection and adjustment	AF inspection and adjustment	Delay time in the shutter mechanism
MAIN FPC	○	○	○	○
SHUTTER UNIT	○	○		○
LENS BARREL UNIT	○			
ENCODER FPC UNIT	○	○		
FINDER UNIT			○	

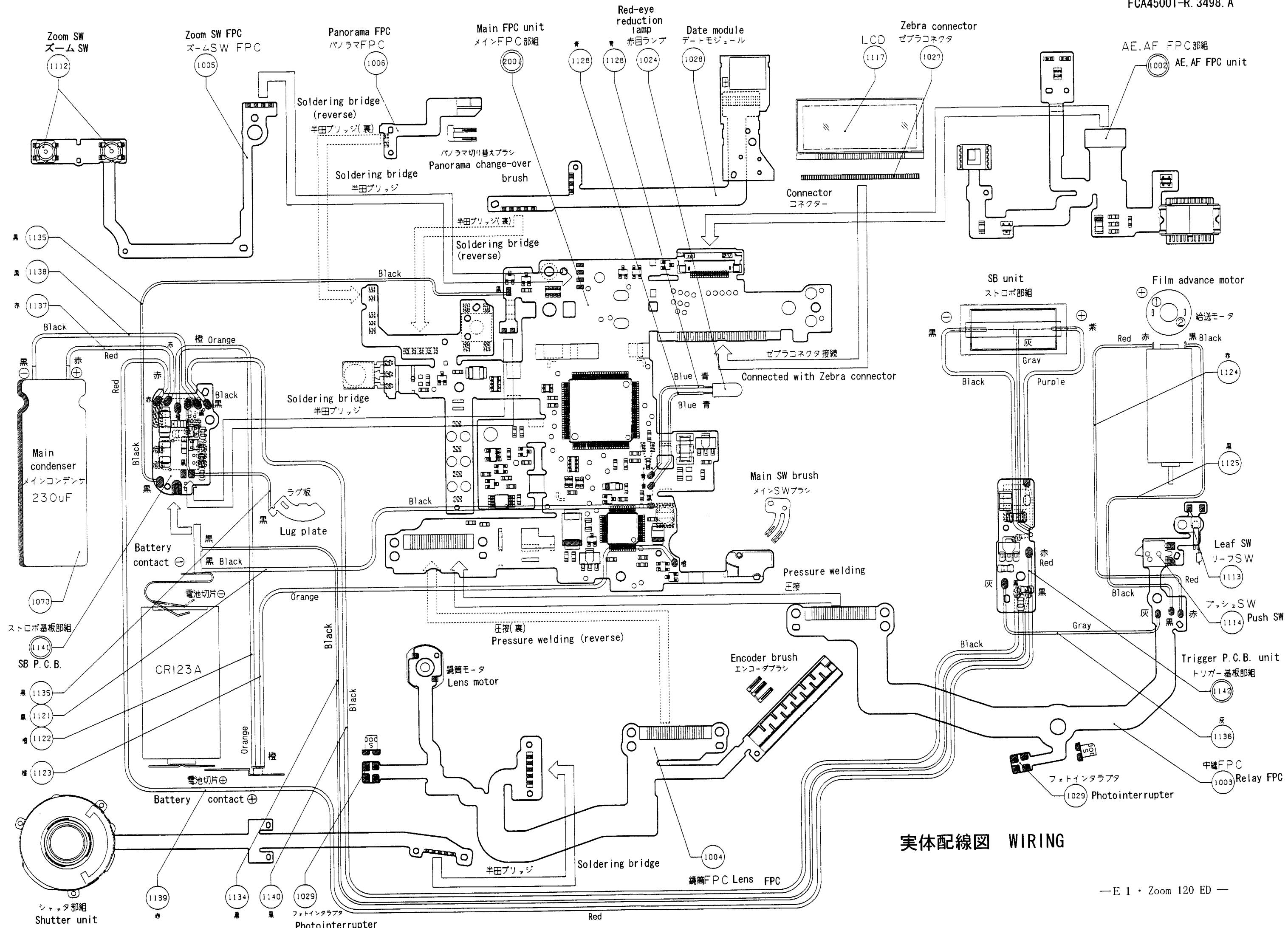
電気編/ELECTRIC CIRCUIT

目 次

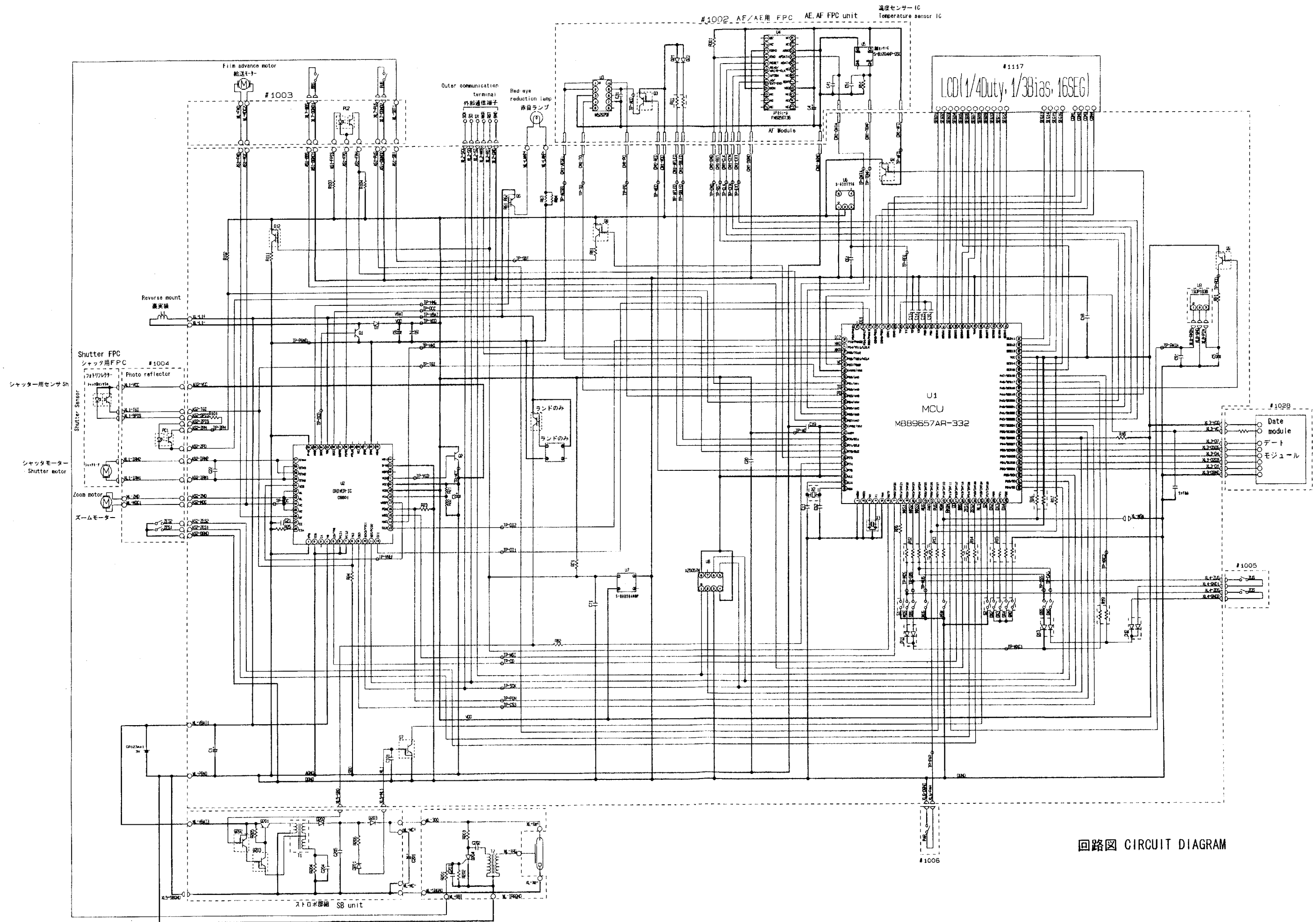
実体配線図	E 1
回路図	E 2
メインFPC	E 3～E 5
ストロボ基板	E 6～E 7
トリガー基板	E 8～E 9
EEPROM DATA	E 10

CONTENTS

WIRING	E 1
CIRCUIT DIAGRAM	E 2
MAIN FPC	E 3～E 5
SB P.C.B.	E 6～E 7
TRIGGER P.C.B.	E 8～E 9
EEPROM DATA	E 10

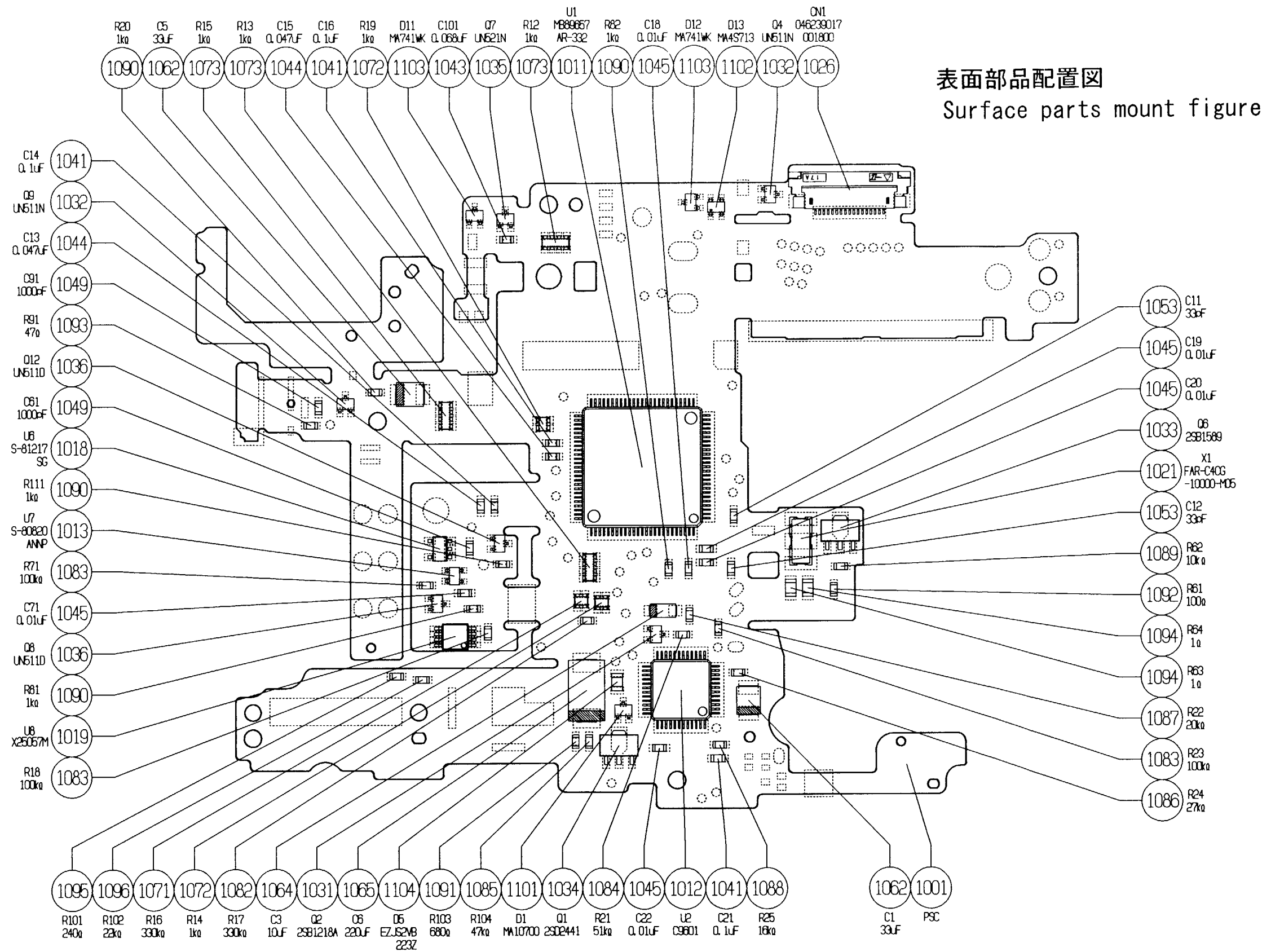


実体配線図 WIRING

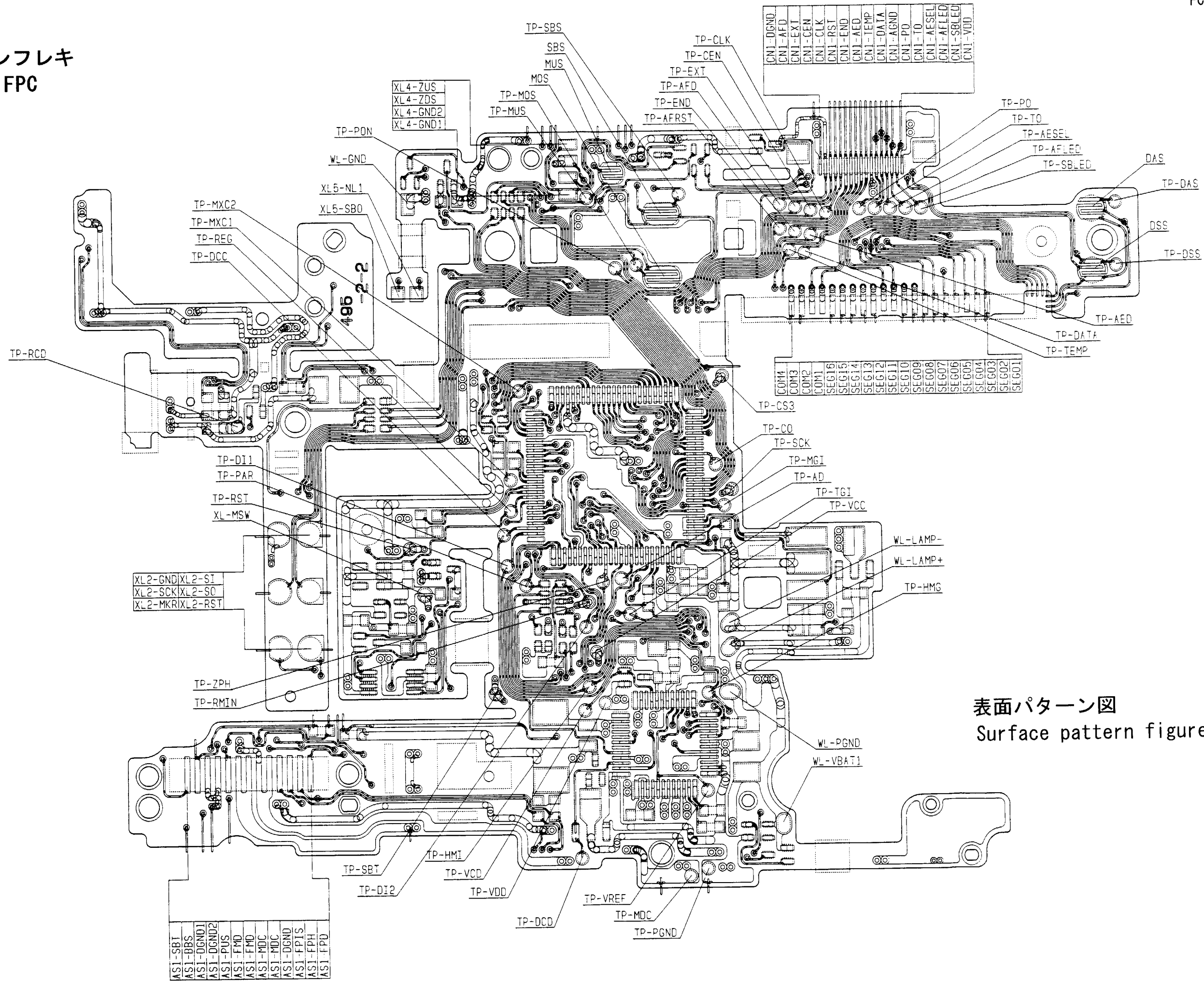


回路図 CIRCUIT DIAGRAM

メインフレキ
MAIN FPC

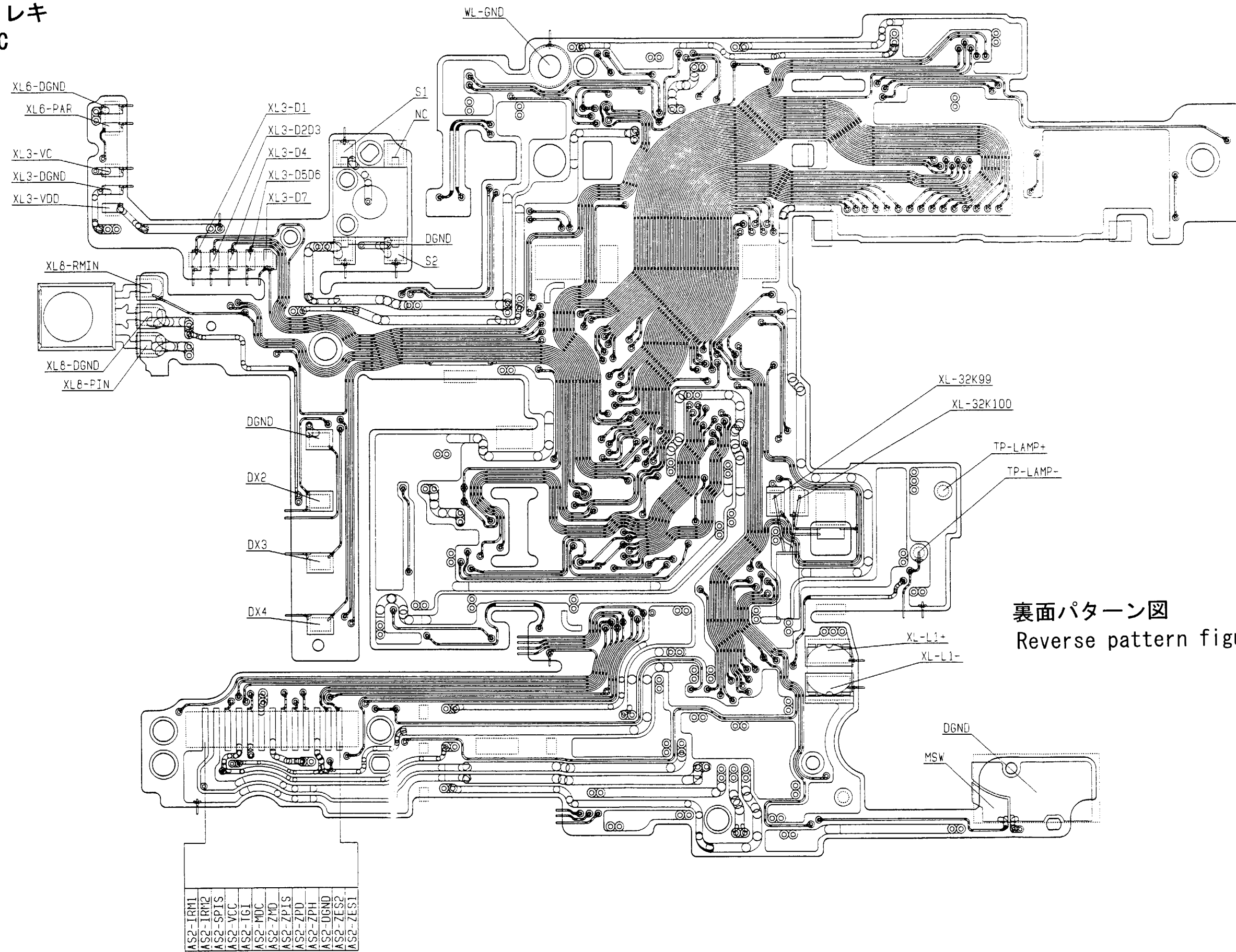


メインフレキ
MAIN FPC



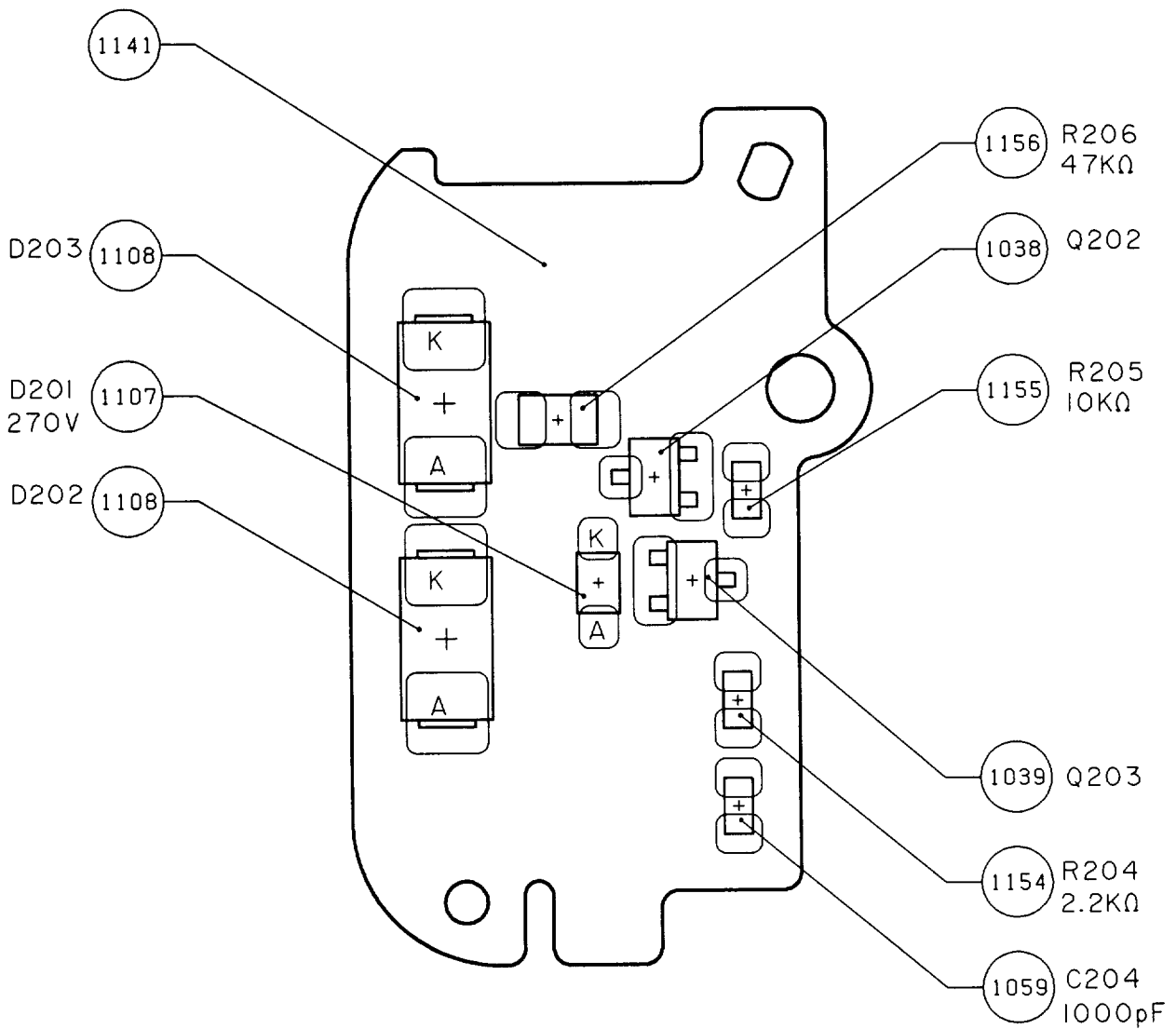
表面パターン図
Surface pattern figure

メインフレキ
MAIN FPC



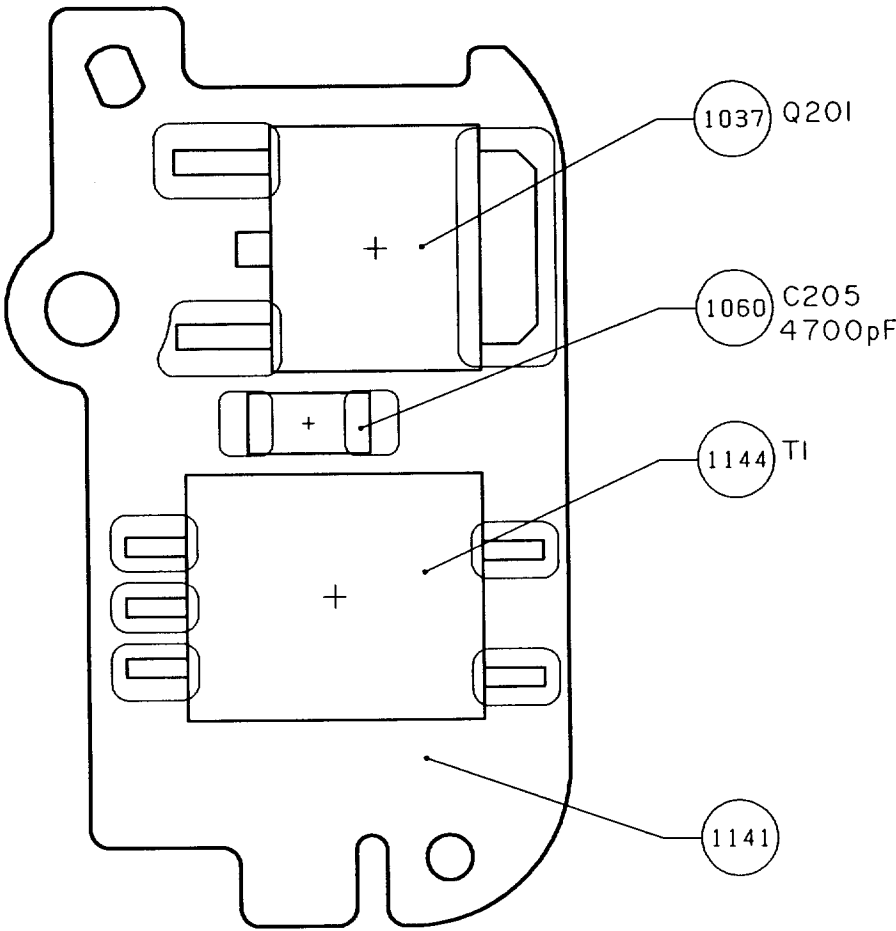
裏面パターン図
Reverse pattern figure

ストロボ基板
SB P.C.B.



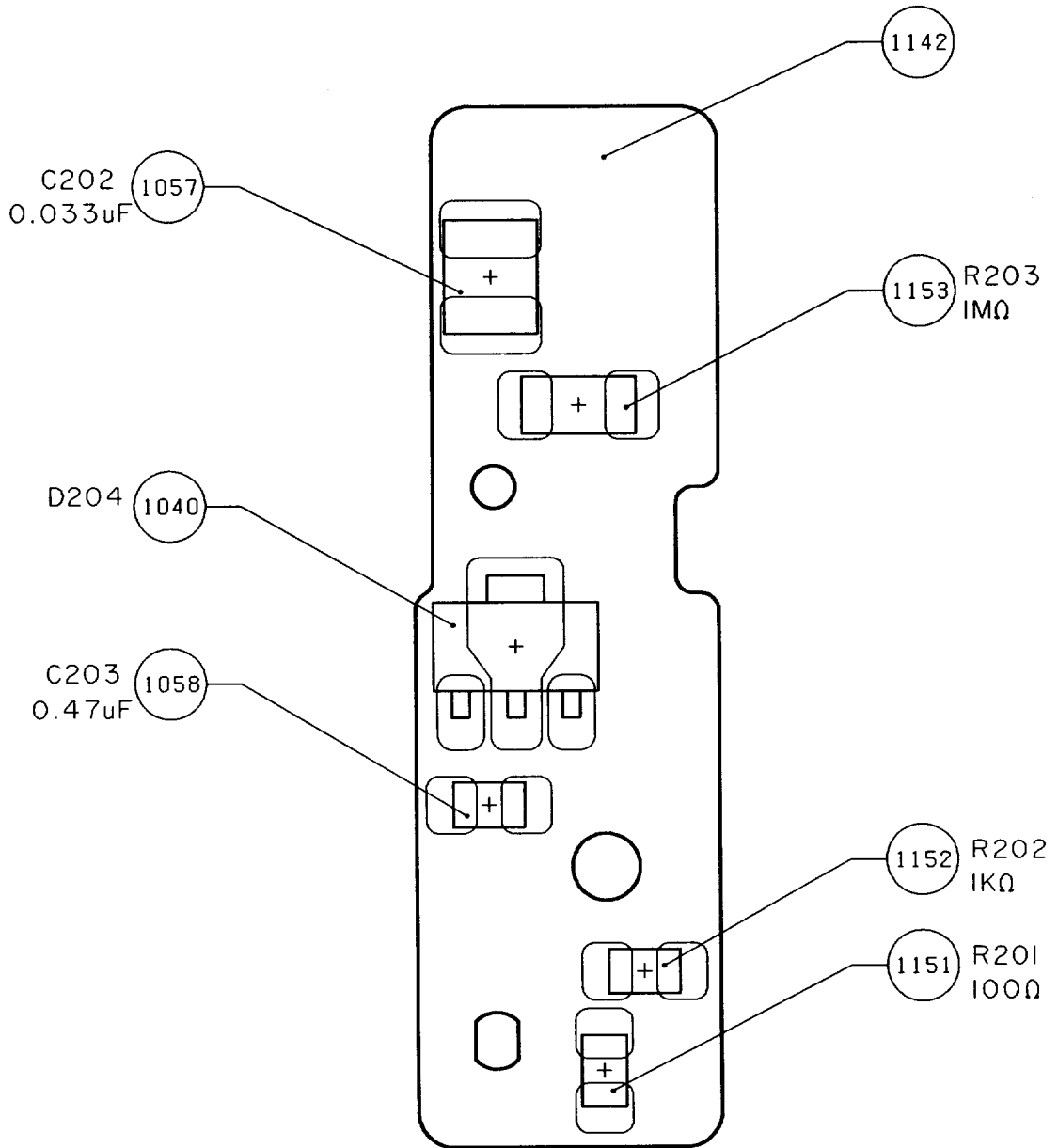
表面部品配置図
Surface parts mount figure

ストロボ基板
SB P.C.B.

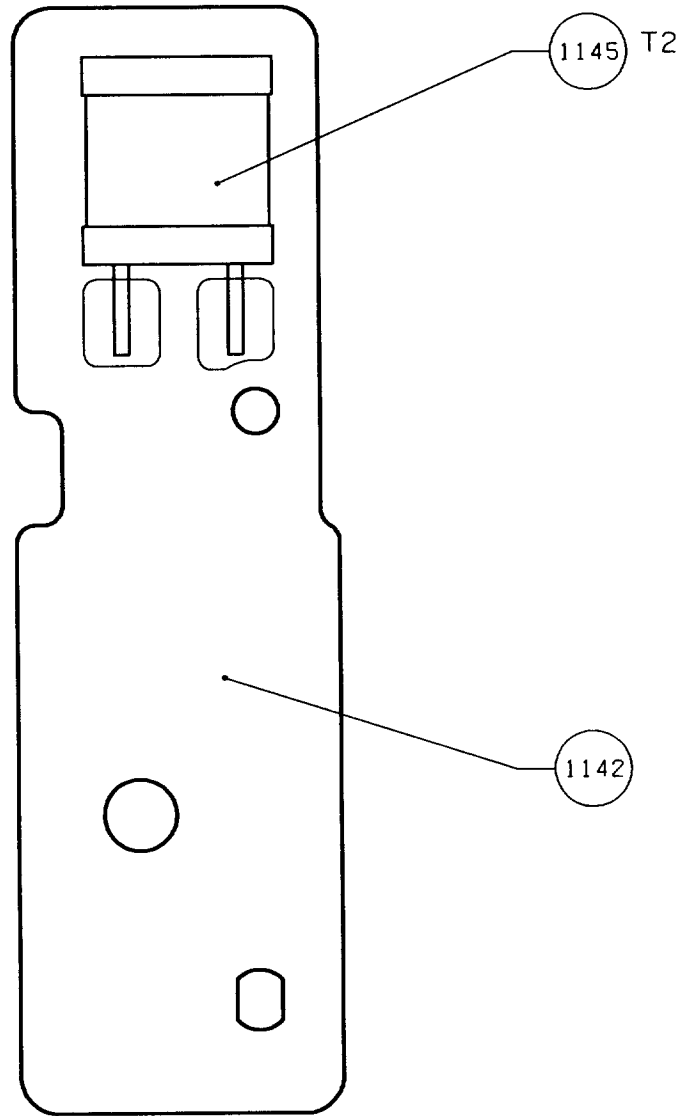


裏面部品配置図
Reverse parts mount figure

トリガー基板
TRIGGER P. C. B.



表面部品配置図
Surface parts mount figure



裏面部品配置図

Reverse parts mount figure

EEPROM DATA

Address	Data
0 [0H] 37 [25H]	カメラ制御値 CAMERA CONTROL DATA
38 [26H] 47 [2FH]	A E 調整値 AE ADJUSTMENT DATA
48 [30H] 60 [3CH]	カメラ制御値 CAMERA CONTROL DATA
61 [3DH] 64 [40H]	シャッターメカディレイ調整値 SHUTTER MECH DELAY ADJUSTMENT DATA
65 [41H] 72 [48H]	カメラ制御値 CAMERA CONTROL DATA
73 [49H] 122 [7AH]	AF 調整値 AF ADJUSTMENT DATA
123 [7BH] 184 [B8H]	カメラ制御値 CAMERA CONTROL DATA
185 [B9H] 196 [C4H]	バックフォーカス調整値 BACK FOCUS ADJUSTMENT DATA
197 [C5H] 292 [124H]	カメラ制御値 CAMERA CONTROL DATA
293 [125H] 295 [127H]	バックフォーカス調整値 BACK FOCUS ADJUSTMENT DATA
296 [128H] 507 [1FBH]	カメラ制御値 CAMERA CONTROL DATA
508 [1FCH] 511 [1FFH]	製造工程用 FOR PRODUCTION STAGE

INSPECTION STANDARD AND TOOLS

{1} Inspection standard R 1

{2} Tools T 1

CONDITION FOR INSPECTION

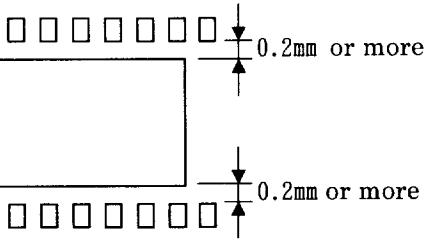
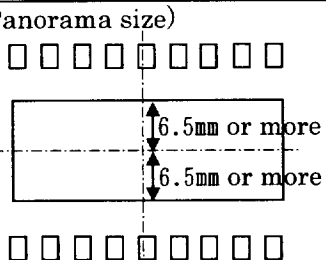
Normal temperature : $25 \pm 5^\circ\text{C}$ (Relative humidity : $65 \pm 20\%$)

Power source : $3.0 \pm 0.03\text{V}$ 5 A or more at $0.5\ \Omega$ load

Light source : Surface light source 2854°K

K coefficient : 1.3

[1] Standard of inspection

	Item	Standard of judgment	Method and tools
Photography	Picture size	Length: $24.0^{+0.8}_{-0.3}$ mm Width: $36.0^{+0.8}_{-0.3}$ mm Short side of panorama: $13.3^{+2.7}_{-0.3}$ mm	Vernier calipers
	Picture position	(Full size) 	Scale
		(Panorama size) 	
Light leak		When exposure of 400000 lux Min (4000 lux or more × time) is given from every direction, there should be no light leak.	Light leak tester
		Apply illuminance 80000 lux or more × time to one surface. Execute this procedure to 6 surfaces. The camera condition is as follows: ①The lens barrel is reset. (The barrier is closed.) ②The lens barrel is set at Wide. ③The lens barrel is set at Tele. ④The reciprocation from ① to ③ is done 5 times.	Sunlight ISO400 Film
FM accuracy	FM limiter time	· When forced flash or AUTO mode is set: Wide: $1/32 \text{ sec} \pm 10\%$ Tele: $1/64 \text{ sec} \pm 10\%$ · When slow synchronization is done: $2 \text{ sec} \pm 0.2 \text{ sec}$	
AF accuracy	AF distance measurement position	* Refer to the chapter of specifications.	
	Error in distance measurement accuracy	± 4 edges	

	Item	Standard of judgment			Method and tools
AE accuracy	The demands of the following table must be fulfilled. AE tester				EF-511N EF8000
	<ul style="list-style-type: none"> Set the camera near the luminance surface of the AE tester and measure the aperture surface at each luminance. It is permitted to check density by taking a picture of the luminance surface. Visual check must be done by comparison with the reference film.				
	EV	Error	Difference	Neighboring difference	
	W: 4<EV≤11 T: 6.125<EV≤13.125	±0.9EV	Within 0.5EV	No reverse	
	W: 11<EV≤15 T: 13.125<EV≤17.125	±1.2EV	Within 0.9EV		
W: 15<EV≤17 T: 17.125<EV≤19.125	±1.6EV	Within 1.2EV			
Remarks <ul style="list-style-type: none"> Error Error of the exposure average value obtained by continuous 5 measuring operations Difference Difference between the maximum and minimum values obtained by continuous 5 measuring operations Neighboring difference Average value obtained by measuring the neighboring exposure values (difference: 1EV) 5 times continuously 					
AE high luminance real ability		Sector should be opened at BV12. (ISO3200 film)			
Lens barrel	Lens barrel change time and electric current	Lens barrel position	Drive time	Drive electric current	Oscilloscope Digital multimeter Stop watch
		W ↔ T	Within 4.0 sec	600mA or less	
Focus back	Focus back	Refer to the chapter of assembly and adjustment.			Collimator(J19019) FFD adjusting micro-stand (J15327)
Operating units	Force	Item		Force	Tension gauge
		Slide cover opening/closing		6.8N± 2N	
		S1		1.0N± 0.34N	
		S2		3.4N± 0.7N	
		SBS		1.0N± 0.5N	
		MOS		1.0N± 0.5N	
		MUS		3.1N± 0.5N	
		Zoom SW		2.9N± 0.5N	
		Camera back opening		5.9N± 1.0N	
		Camera back closing		2.9N± 1.0N	
PAR lever		2.9N± 1.0N			

	Item	Standard of judgment	Method and tools				
Speed light	Guide number (ISO 100 · m)	Perform charging with a fresh battery for 18 seconds, flash the speed light within 1 second and measure the guide number. FULL:G No. $14 \pm 0.4 E V$ Perform release continually in 2 times/sec under the uncharged condition and obtain the minimum value by flashing 3 times. NL1:G No. 9.9 or more	Fresh battery Speed light meter Standard reflection plate Stop watch				
	Speed light division characteristics (Wide end and 2m at the optical axis center)	· Angle of view for picture: $-1EV$ or less · The positive side must not have a disturbance of $0.3EV$ or more. · There should be no extreme unevenness in the light distribution. «Wide; 28mm»					
				Up	Down	Left	Right
		$-1EV$ or less		18°	19.5°	25°	25.5°
	Color temperature	$5900 \pm 300^\circ K$	Color thermometer				
Recycling time	· Within 8 seconds at initial 4th flash						
Finder	Diopter	Distant view (for both Wide and Tele) Negative stopper position: $-1.5 Dpt$ or less Positive stopper position: $+1.5 Dpt$ or more	Diopter telescope				
	Field of viewfinder	· When distance is 3m In the up-and-down, and right-and-left directions, 75% or more and less than 100% Only for panorama size In the up-and-down direction, 66% or more and less than 100% (Standard 13.3mm)	Scale Chart Projector				
	Magnification	Wide: $0.44 \text{ times} \pm 0.066 \text{ times}$ Tele: $1.13 \text{ times} \pm 0.16 \text{ times}$					

	Item	Standard of judgment			Method and tools
Motor drive	Film advance		Operating time	Operating electric current	Oscilloscope Constant-voltage power supply Film Stop watch
		Winding	Within 1.5 sec	Within 600mA	
		Rewinding	Within 50 sec		
	※Winding time for 36th pictures				
	Counter display	<ul style="list-style-type: none"> · The displayed value on the counter is reduced by 1 frame in coupling operation with film advance. · The "E" mark blinks when winding is completed. 			
Lamp display	Self-timer	<ul style="list-style-type: none"> · 10 seconds \pm 1 second · The lamp blinks for 8 seconds and lights for 2 seconds. 			Stop watch Visual check
Electric characteristics	BC voltage	B.C 1	$2.4 \pm 0.1V$	Battery mark starts blinking.	Constant-voltage power supply (5A or more) Ammeter Stop watch
		B.C 2	$2.2 \pm 0.1V$	LCD is turned off and release lock	
	Electric current consumption	Standby: $25\mu A$ or less after 60 seconds since the main switch was turned off. Note: Short circuit must not occur for each operation.			

[2] TOOLS

1. Major general tools and tester

Tool No.	Name	Specifications
	DC regulated power supply	0~18V. 2A(Model 526) 0~18V. 5A(Model MTR)
	Digital multimeter	Model 3200 Model CD-780C
J15369-1	AF ADJUSTMENT CHART	For 3.027m
J15369-2	AF ADJUSTMENT CHART	For 2.027m
J15369-3	AF ADJUSTMENT CHART	For 1.027m
J15369-4	AF ADJUSTMENT CHART	For 0.827m
J15369-5	AF ADJUSTMENT CHART	For 0.627m
J19019	Collimator	24LT-2DTS f=193.5mm
J19036 J19042	Multi shutter tester	EF-8000
J15291	FFD micro adjustment stand	
J15368	Connection tool	
J18313A	Inspection and adjustment program	NEC 5 inch
J18313B	Inspection and adjustment program	NEC 3.5 inch
J18313C	Inspection and adjustment program	IBM 5 inch
J18313D	Inspection and adjustment program	IBM 3.5 inch