

HIGH-POWER INTERCOM SYSTEM
AP-M Series

SERVICE MANUAL

MODELS: AP-10M
: AP-1M

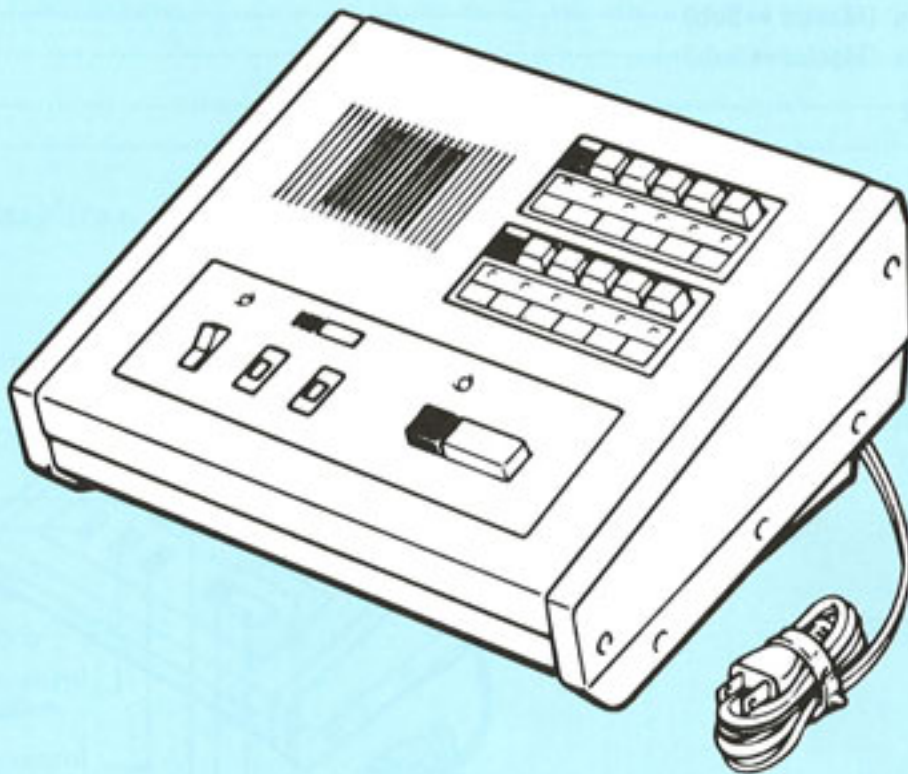
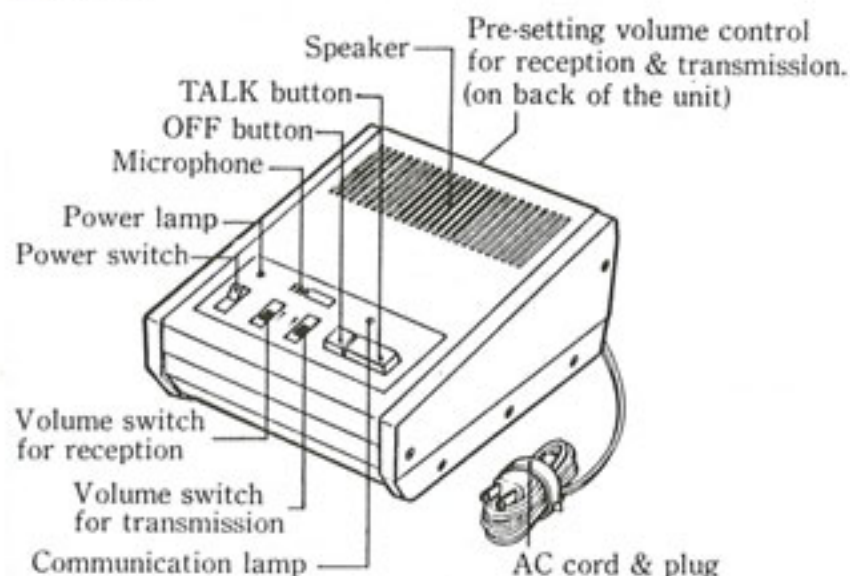


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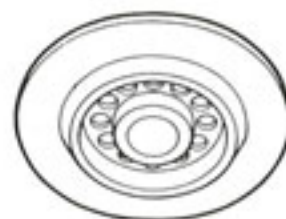
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NAMES & FUNCTIONS

■ AP-1M



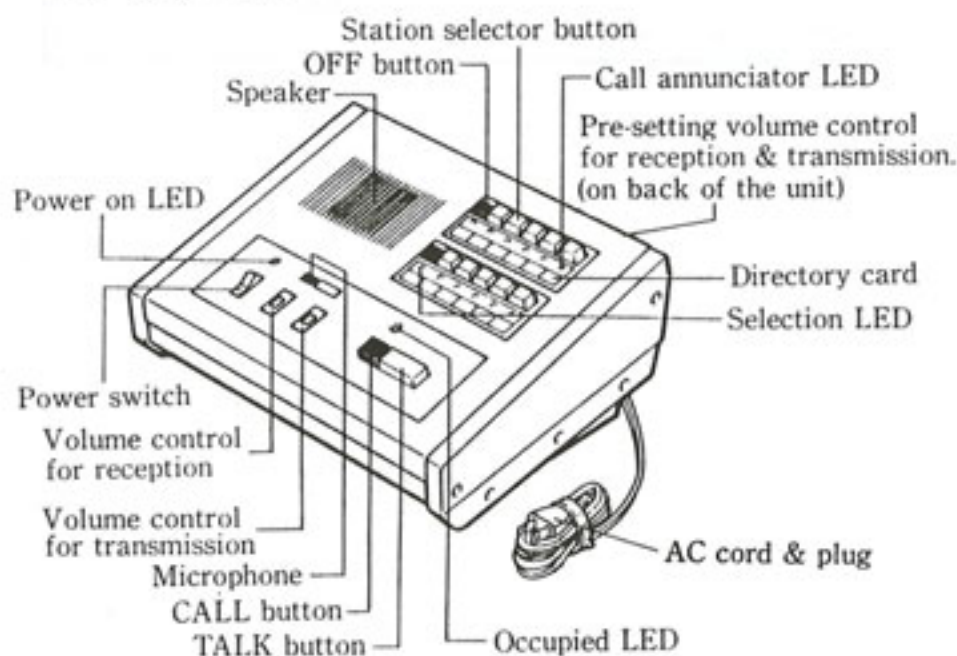
■ AS-3N (CEILING MOUNT SUB)



■ NP-B (CALL BUTTON)



■ AP-5M/10M



■ AS-3WA (2-CALL SUB)

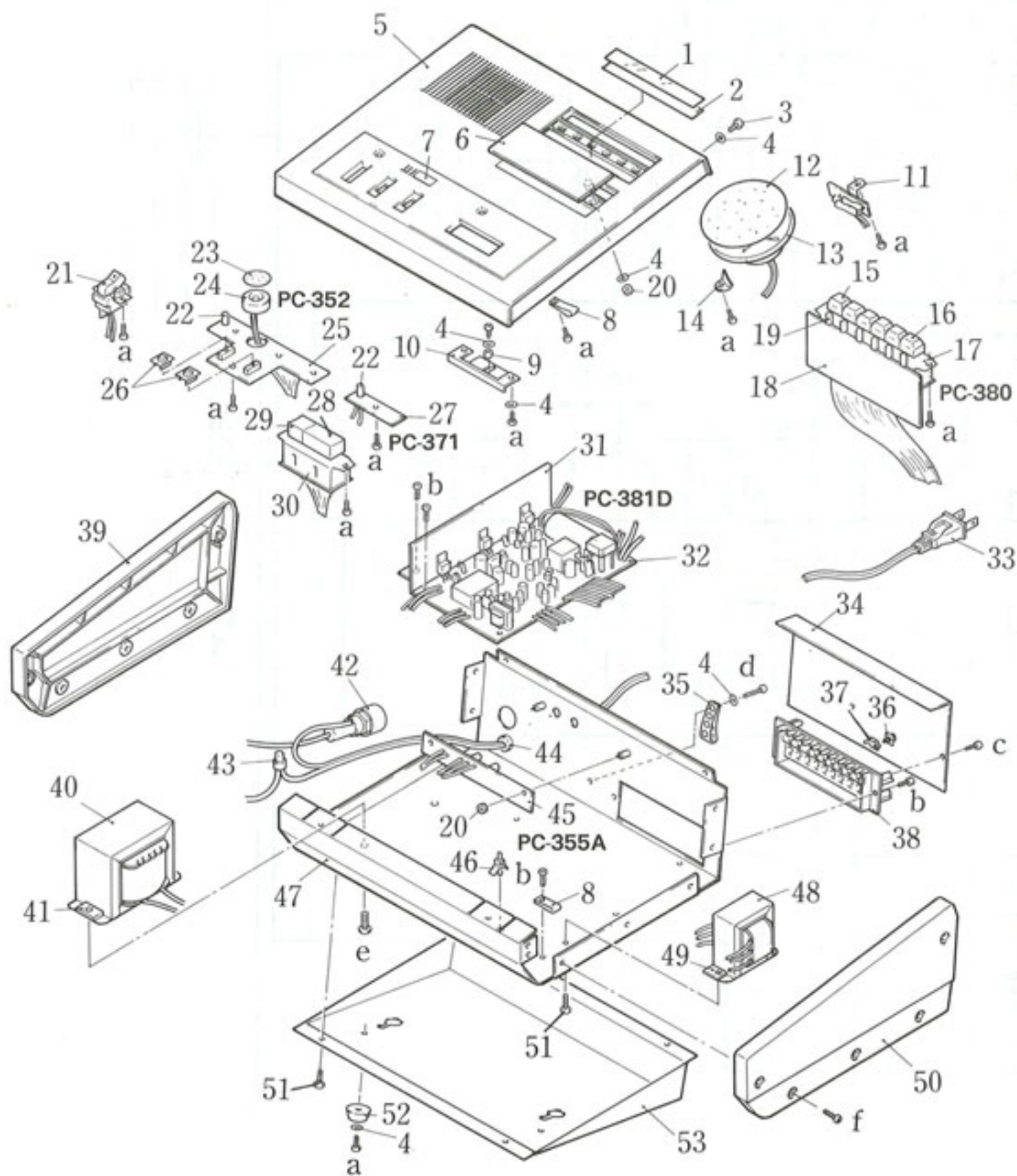


■ AS-3A (1-CALL SUB)



SPECIFICATIONS

	AP-5M/10M	AP-1M
Power source	AC110~125V, 220~240V 50/60Hz.	
Power consumption (Maximum)	45W	
Communication output (Master to sub)	10W	10W
(Sub to master)	0.3W	0.3W
(Master to master)	0.3W	(Not available)
Type of communication	Press-to-talk. Release-to-listen	
Station capacity	Up to 5 (AP-5M) Up to 10 (AP-10M)	1
Wiring (Master to sub)	A single pair of wires (Twisted pair)	
(Master to master)	Five conductors (Twisted pair)	(Not available)
Calling (Master to sub)	Electronic tone or Voice direct	
(Sub to master)	Electronic tone and LED annunciation	Electronic tone
(Master to master)	Electronic tone or Voice direct	(Not available)
Impedance	8 ohm or 16 ohm	
Communication distance	Up to 150m (490') with the 0.65mm dia. Wires (22AWG)	
Weight (Approx)	4.0kg (8.82lbs) : AP-5M 4.2kg (9.26lbs) : AP-10M	3.2kg (7.1lbs)



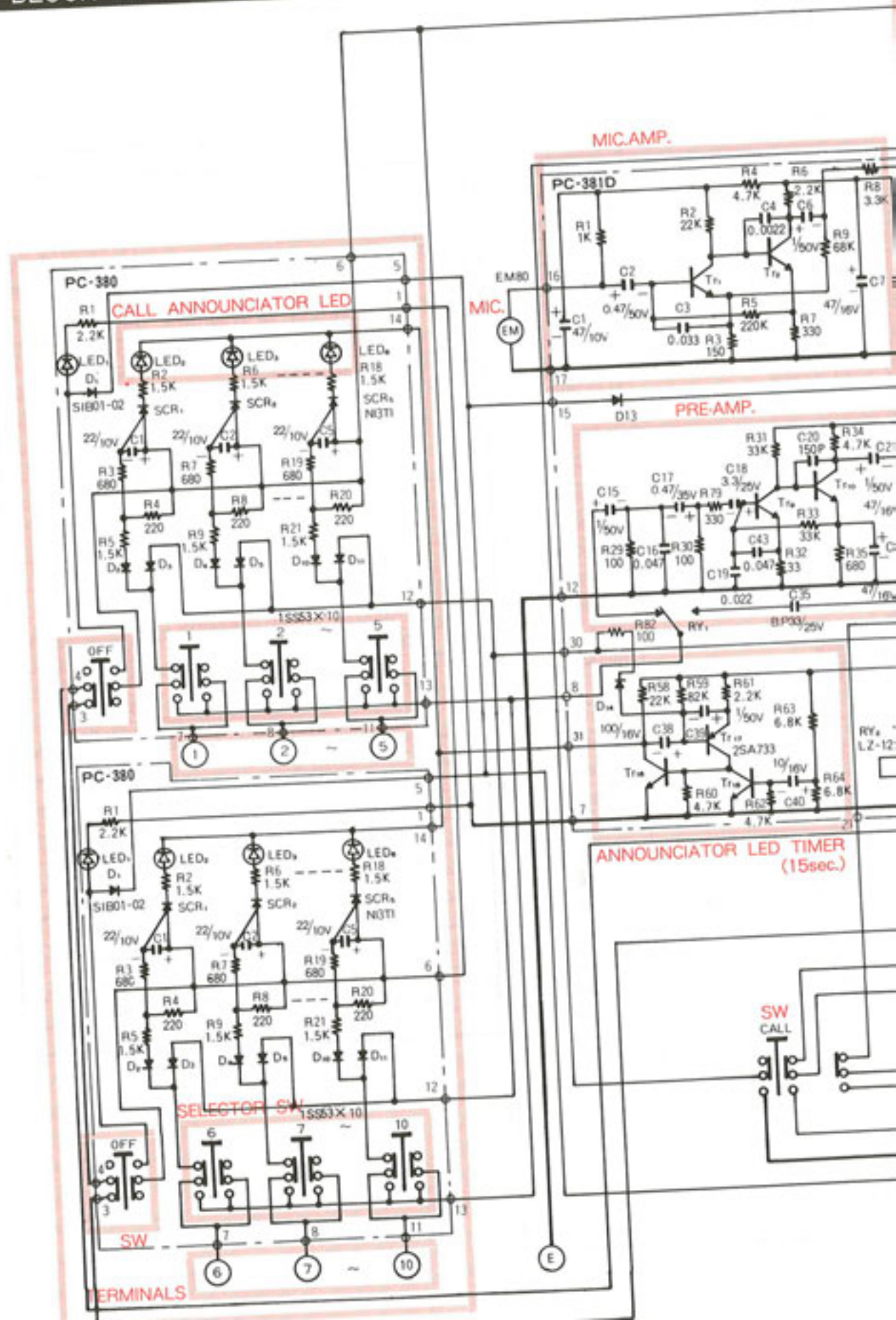
***** PARTS LIST *****

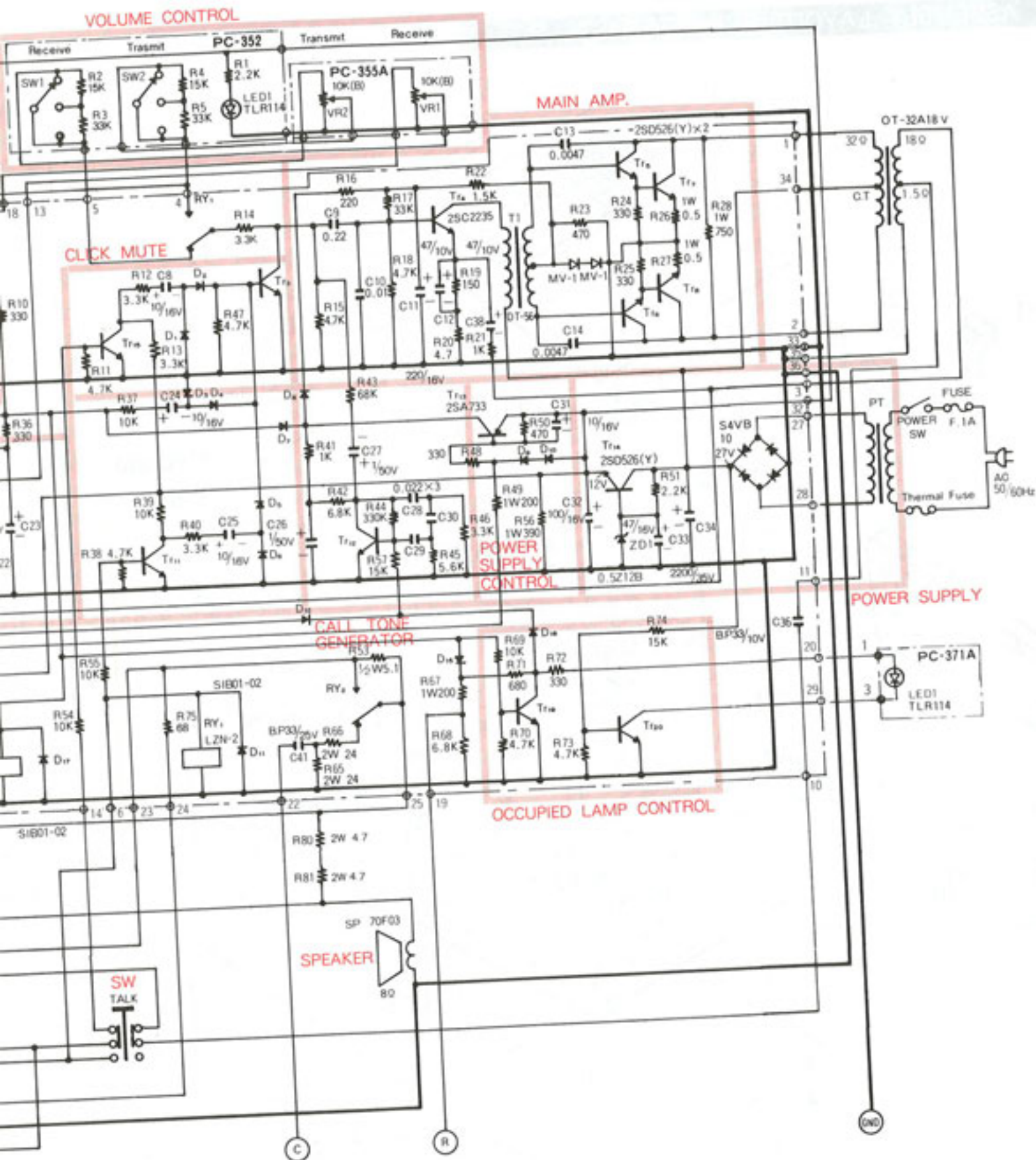
MODEL = AP-5M, 10M

No	P A R T S	CODE	NOTE
1	NBM directory card cover	23333400	
2	TB-nT directory card	20192400	
3	SN3X6 BINI	10061000	
4	SN 3X8X0.5 HW	10064900	
5	APM panel	22124900	
6	APM blind panel (AP-5M)	13222200	
7	AP-5M name plate	11495600	
	AP-10M name plate	11496900	
8	LY cord clamp	21153600	
9	NBM spacer	10026100	
10	NBM hinge	26004200	
11	2W 4.7	03093700	
	1L-3P lug terminal	09014000	
12	70 ϕ net	20149000	
13	70F03 speaker	00012700	
14	BX SP clamp	14177800	
15	NBM button black	23014400	
16	NBM button white	23015700	
17	6BW-36/ASW	16058800	
18	PC-380 APNM complete	97027300	
19	SR-503W LED	04080000	
20	FE 3 NT NI	10063600	
21	SDE-1S 3020 SW	01249800	
22	TLR 114A	04019000	
23	IB filter	20182300	
24	MIC EM-80	00043300	
	ECM holder-ESM	23289000	
25	PC-352/5A AP-nM complete	97028600	
26	IBS knob N	23367900	
27	PC-371A APNM complete	97029900	
28	PC-30 button N	23212200	
29	PC-15 button N(black)	23013100	
30	2B-15/N SW	16065000	
31	APM heatsink	14579200	
32	PC-381D AP-nM complete	97030300	
33	SAA cord (D/SAA)	40102700	
	3C AUSTRALIA cord (D/NP)	40103000	
	KP205A cord (A/E, B/BK, M/E)	41002300	
	CEE. KP419CB cord (B/S)	41010800	
	CEE. KP4819V cord (B/CEE)	41021200	

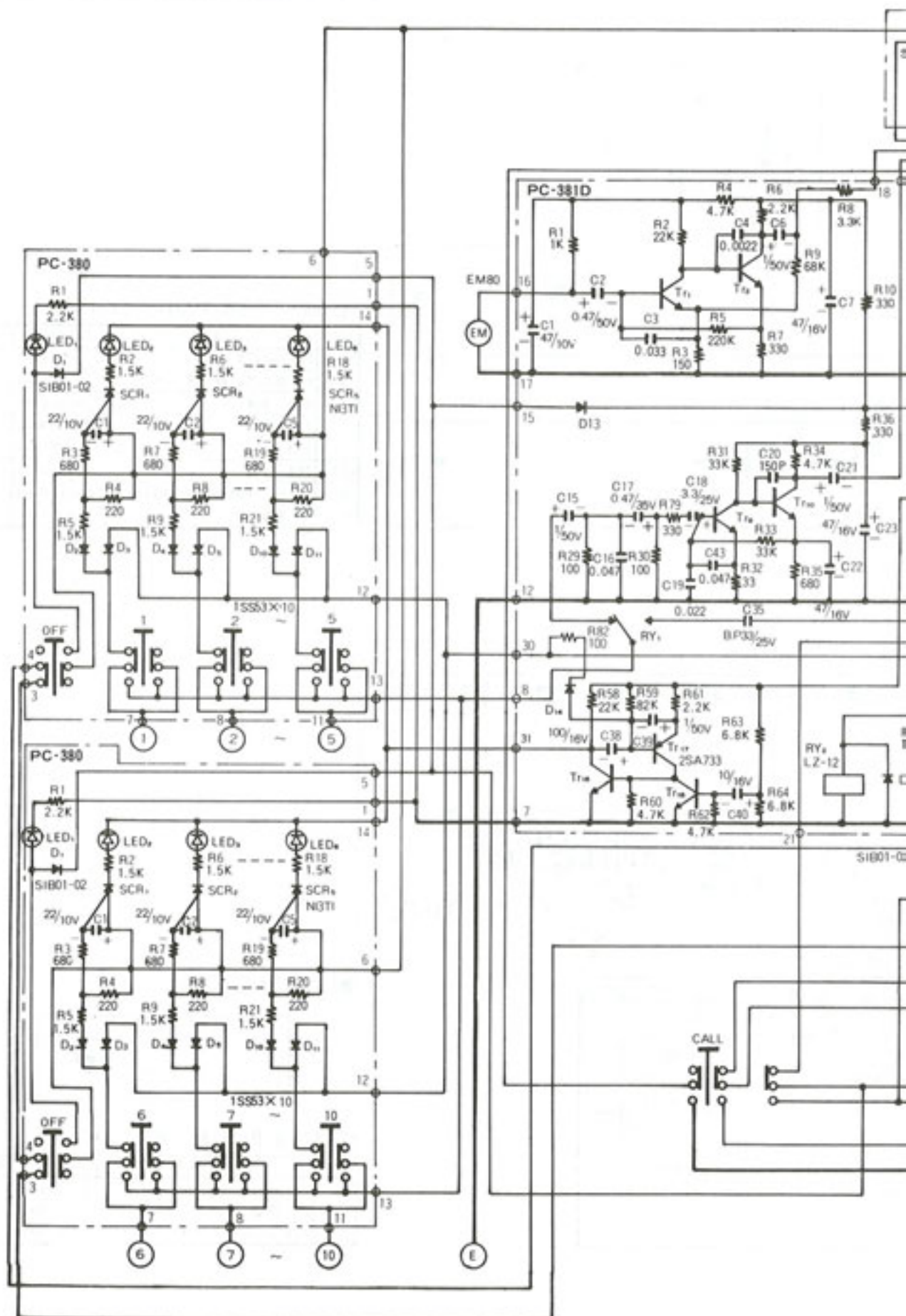
No	P A R T S	CODE	NOTE
33	UL cord SPT-2 (C/UL)	64004000	
34	TB-10T terminal cover	13687100	
35	APS wire band L-80	21065600	
36	IC-FE terminal screw	10106600	
37	B terminal bracket	12021200	
38	NBM terminal 20 complete	93051600	
	NBM-14P terminal (AP-5M)	93053200	
39	NBM side panel L	23009800	
40	PT-3319B (A/E, M/E)	00071000	
	PT-3319C (C/UL)	00072300	
	PT-3319D (D/NP, B/BK, B/S)	00073600	
	PT-3319D (B/CEE, D/SAA)	00073600	
41	M4 nut	10068100	
42	SN2059 fuse holder	60033800	
43	1614-2SD pressure nut	60010700	
44	SR-5P-4 bushing	60009300	
45	PC-352/5A AP-nM complete	97028600	
46	KGLS-4S spacer	62013200	
47	AP-5M chassis/A	13642200	
	AP-5M chassis/CEE (B/CEE)	13748700	
	AP-5M chassis/CEE (D/SAA)	13748700	
48	OT-32A18V	07077900	
49	QA103 nut	14185300	
51	SN3X6 BIZN	10059300	
52	BU-692F rubber foot	09016600	
53	TB-20T sub chassis	13684200	
a	FE 3X8 SE ZN	F3081100	
b	FE3X6 TTZN	F3062100	
c	FE3X10 NANI	F3105200	
d	FE3X14 NANI	F3145200	
e	FE4X10 TRZN	F4103100	
f	FE3X8 NANI	F3085200	

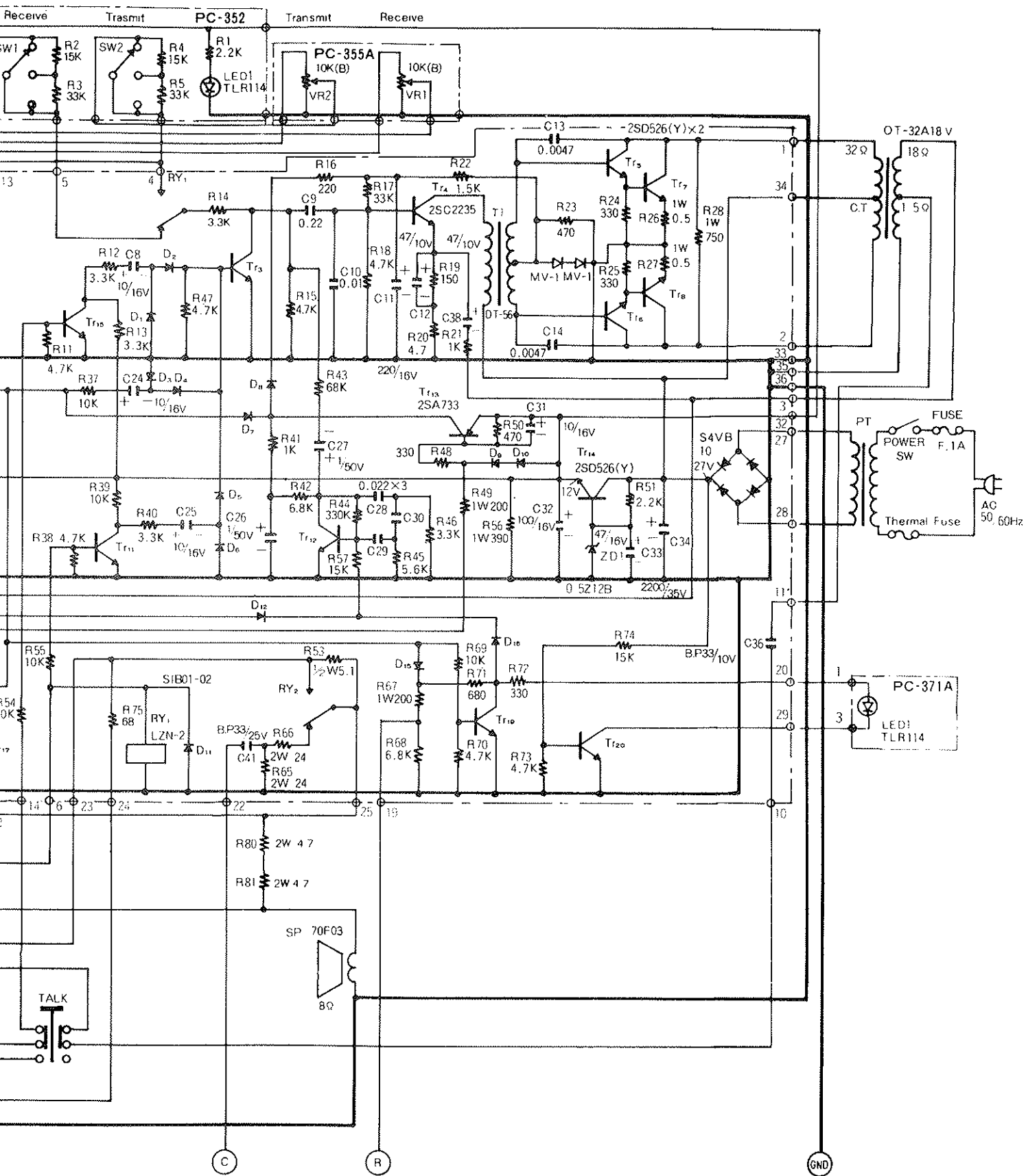
BLOCK DIAGRAM





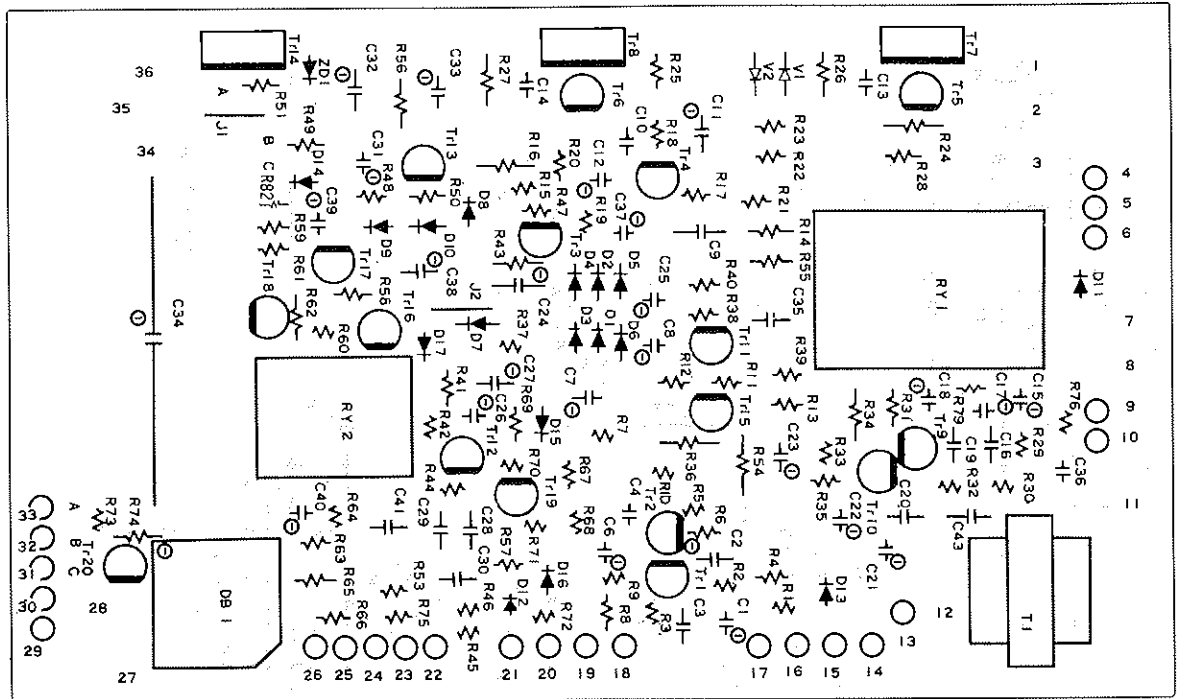
CIRCUIT DIAGRAM





PCB ASSEMBLY LAYOUT & PARTS LIST

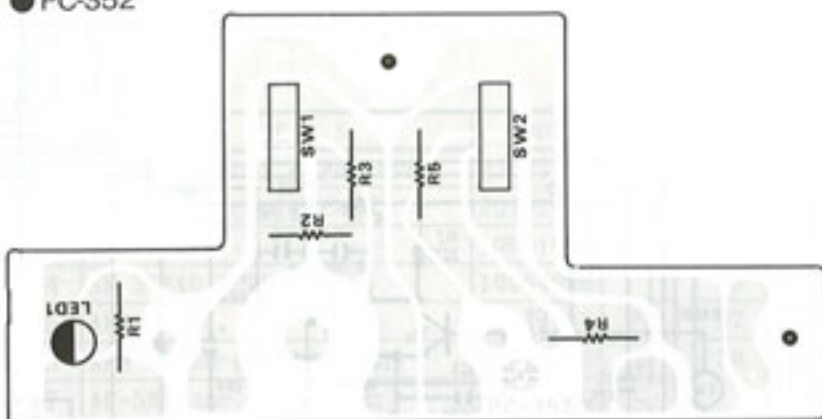
● PC-381D



ITEM	PARTS	CODE	NOTE
XC	PC-381D	24079800	
	PC-381D AP-nM complete	97030300	
R	1/2 5.1	03050400	
	1W 200	03085200	
	1W 750	03089400	
	1W 0.5	03092400	
	2W 24	03100600	
	1/4 330	03314300	
	1/4 4.7	03604300	
	1/4 33	03610200	
	1/4 68	03613100	
	1/4 100	03617300	
	1/4 150	03618600	
	1/4 220	03620300	
	1/4 330	03622900	
	1/4 470	03623200	
	1/4 680	03625800	
	1/4 1K	03626100	
	1/4 1.5K	03627400	
	1/4 2.2K	03628700	
	1/4 3.3K	03630400	
	1/4 4.7K	03631700	
	1/4 5.6K	03633300	
	1/4 6.8K	03634600	
	1/4 10K	03636200	
	1/4 15K	03637500	
	1/4 22K	03639100	
	1/4 33K	03641800	
	1/4 68K	03644700	
	1/4 82K	03646300	
	1/4 220K	03650600	
	1/4 330K	03651900	

ITEM	PARTS	CODE	NOTE
C	50V 1	02027900	
	16V 47	02030900	
	16V 100	02033800	
	35V 2200	02034100	
	50V 0.47	02036700	
	35V 0.47(tantalum)	02070300	
	50V 150P	02110400	
	10V 47	02139300	
	16V 10	02142300	
	16V 220	02146500	
	16V 33 BP	02171300	
	25V 33 BP	02173900	
	50V 3.3	02196000	
	0.022	02302300	
	0.047	02303600	
	0.01	02305200	
	0.033	02307800	
	0.022	02309400	
	50V 0.0047	02342700	
D	1S-2473.FV	03402300	
	S5500D	04100900	
	MV-1	04124300	
	S4 VB-10	04141600	
ZD	0.0022	04144500	
	05A712-Z	04932400	
TR	2SC-2235(Y)	04008600	
	2SA-1015Y	04051000	
	2SC-945(A)Q	04066600	
RY	1.7-12	08004600	
	1.7N-2 RY DC12V	08032300	
T	DT-56P	07013100	

● PC-352



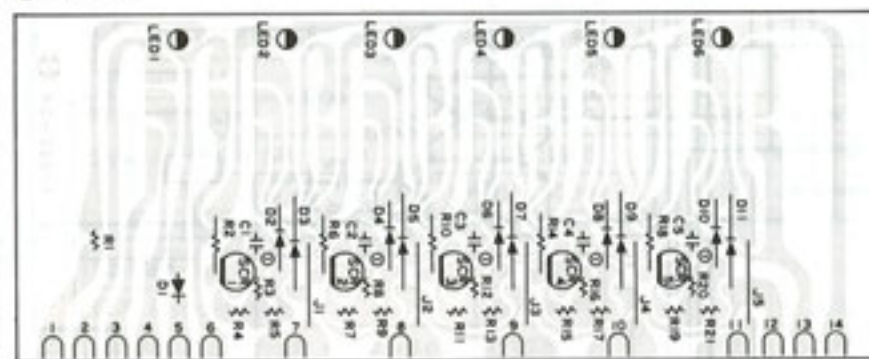
PC-352/355A PARTS LIST

ITEM	PARTS	CODE	NOTE
XC	PC-352/5A	24078500	
	PC-352/5A AP-nM complete	97028600	
R	1/4 15K	03024300	
	1/4 2.2K	03319800	
	1/4 33K	03327300	
LED	TLR 114A	04019000	
VR	VR EVL-V3A-S11B 10K(B)	02120500	
SW	SW SSSS-913	01038000	

● PC-355A



● PC-380



PC-380 PARTS LIST

ITEM	PARTS	CODE	NOTE
XC	PC-380	24080200	
	PC-380 APNM complete	97027300	
R	1/4 220	03620300	
	1/4 680	03625800	
	1/4 1.5K	03627400	
	1/4 2.2K	03628700	
C	10V 22	02051400	
D	1SS-53	04075400	
	S5500D	04100900	
SCR	N13T1	04068200	
LED	LN21WPH	04090100	

● PC-371A

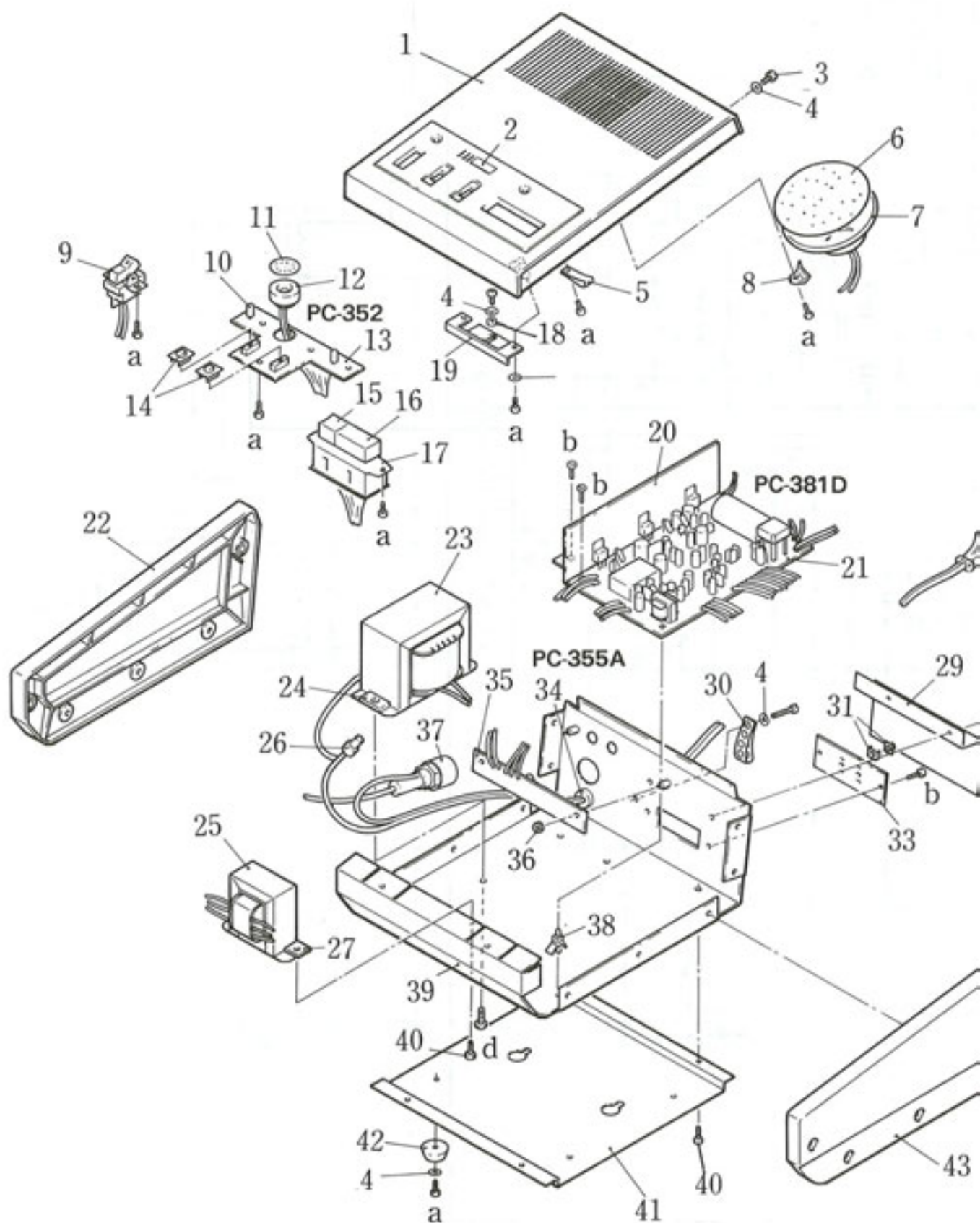


PC-371A PARTS LIST

ITEM	PARTS	CODE	NOTE
XC	PC-371A	24124500	
	PC-371A APNM complete	97029900	
LED	TLR 114A	04019000	

MODEL AP-1M

ASSEMBLY LAYOUT & PARTS LIST



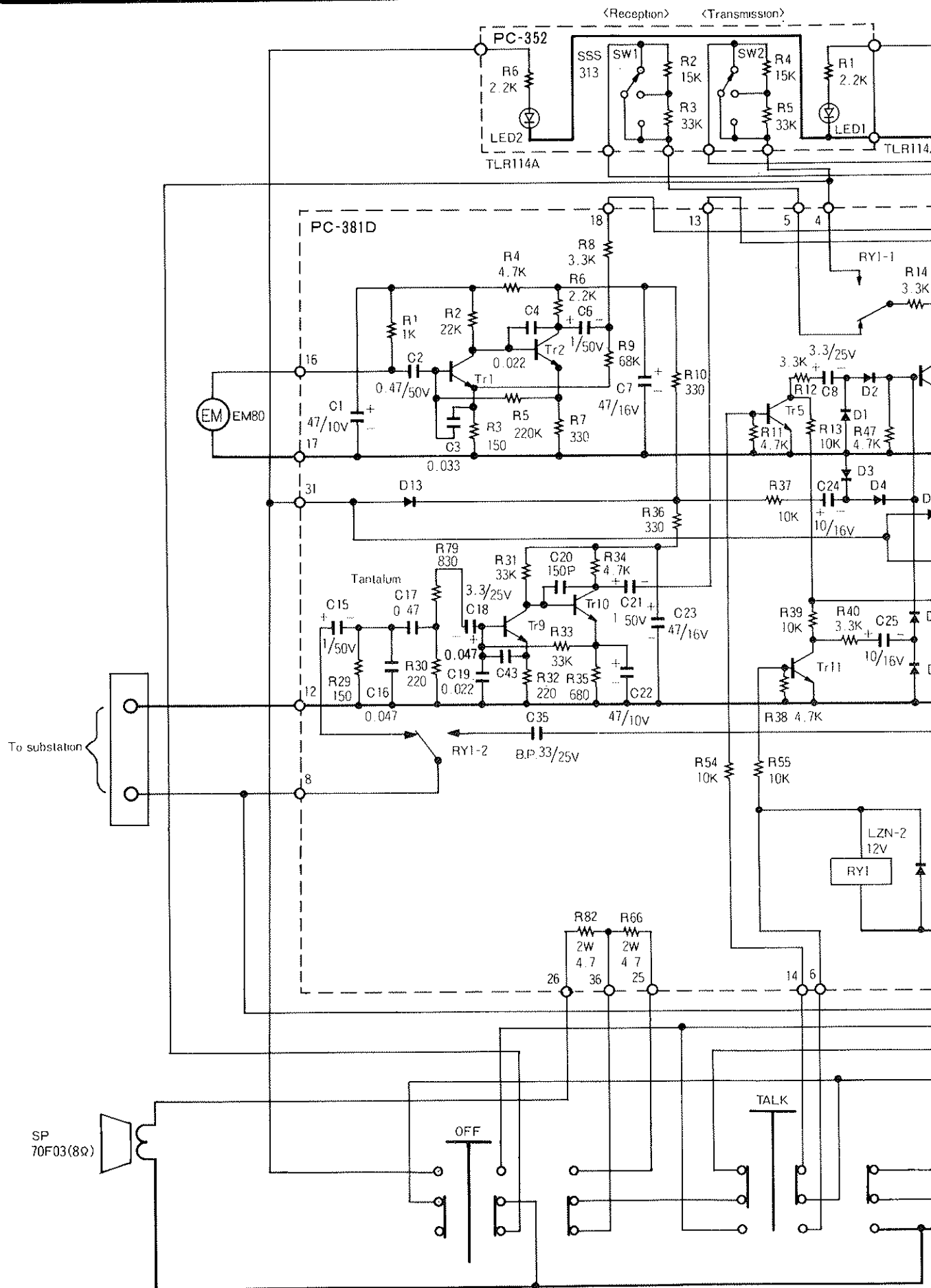
***** PARTS LIST *****

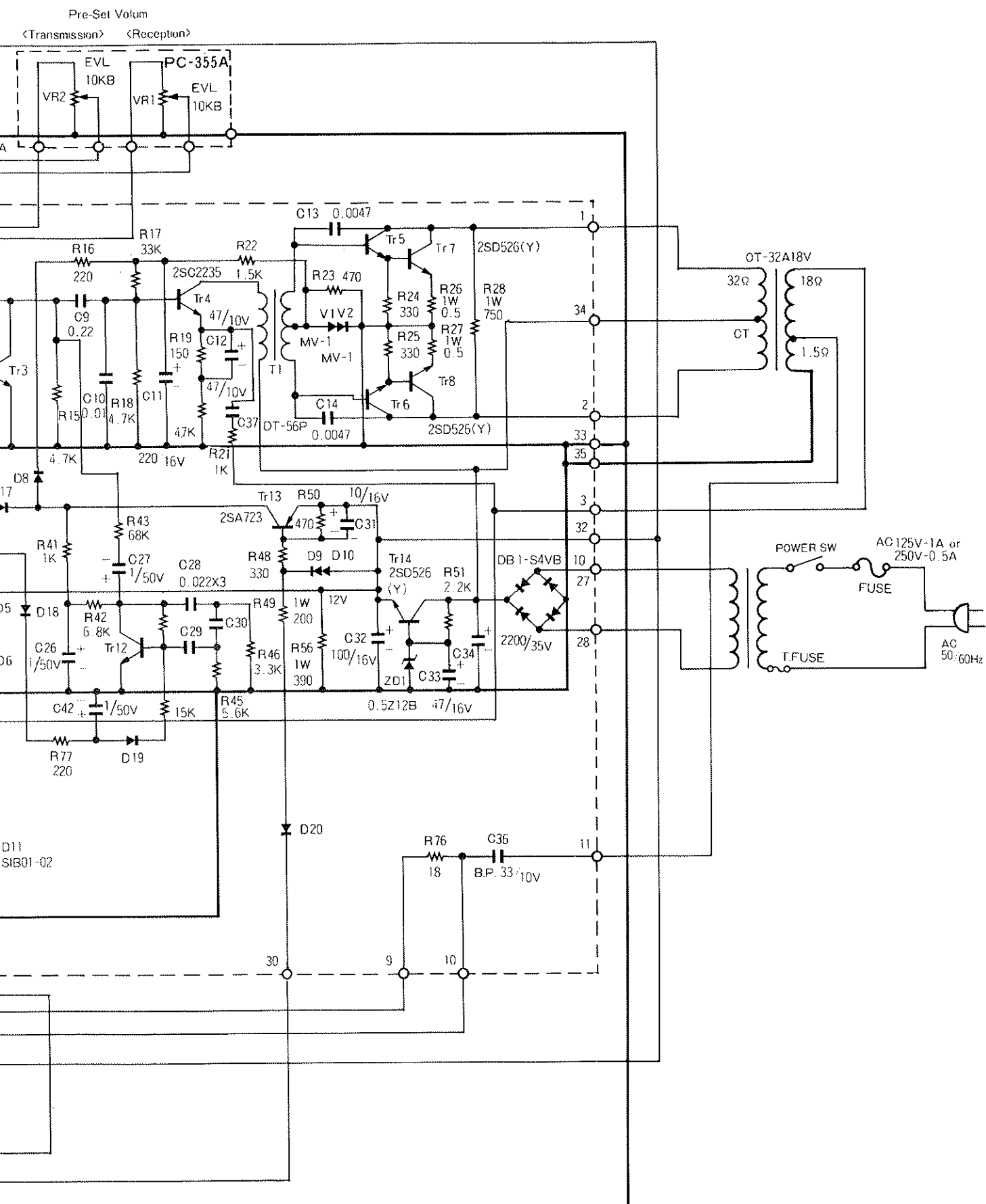
MODEL = AP-1M

No	P A R T S	CODE	NOTE
1	AP-1M panel	22526300	
2	AP-1M name plate	11144700	
3	SN3X6 BINI	10061000	
4	SN 3X8X0.5 HW	10064900	
5	LY cord clamp	21153600	
6	70 ϕ net	20149000	
7	70F03 speaker	00012700	
8	BX SP clamp	14177800	
9	SDE-1S 3020 SW	01249800	
10	TLR 114A	04019000	
11	IB filter	20182300	
12	MIC EM-80	00043300	
	ECM holder-ESM	23289000	
13	PC-352/5A AP-1M complete	97025700	
14	IBS knob N	23367900	
15	PC-15 button N(black)	23013100	
16	PC-30 button N	23212200	
17	2B-18P/A SW	16057500	
18	NBM spacer	10026100	
19	NBM hinge	26004200	
20	APM heatsink	14579200	
21	PC-381D AP-1M complete	97026000	
22	NBM side panel L	23009800	
23	PT-3319B(A/E,M/E)	00071000	
	PT-3319C(C/UL)	00072300	
	PT-3319D(D/NP,B/BK,B/S)	00073600	
	PT-3319D(B/CEE,D/SAA)	00073600	
24	M4 nut	10068100	
25	OT-32A18V	07077900	
26	1614-2SD pressure nut	60010700	
27	QA103 nut	14185300	
28	SAA cord(D/SAA)	40102700	
	3C AUSTRALIA cord(D/NP)	40103000	
	KP205A cord(A/E,B/BK,M/E)	41002300	
	CEE. KP419CB cord(B/S)	41010800	
	CEE. KP4819Y cord(B/CEE)	41021200	
	UL cord SPT-2(C/UL)	64004000	
29	AP-1M terminal cover	13640600	
30	APS wire band L-80	21065600	
31	IC-SN terminal screw	10105300	

No	P A R T S	CODE	NOTE
33	CS-2P terminal complete	61019700	
34	SR-5P-4 bushing	60009300	
35	PC-352/5A AP-1M complete	97025700	
36	FE 3 NT NI	10063600	
37	SN2059 fuse holder	60033800	
38	KGLS-4S spacer	62013200	
39	AP-1M chassis/A	13639200	
	AP-1M chassis(B/CEE,D/SAA)	13749000	
40	SN3X6 BIZN	10059300	
41	AP-1M sub chassis	13641900	
42	BU-692F rubber foot	09016600	
43	NBM side panel R	23008500	
a	FE 3X8 SE ZN	F3081100	
b	FE3X6 TTZN	F3062100	
c	FE3X14 NANI	F3145200	
d	FE4X10 TRZN	F4103100	
e	FE3X8 NANI	F3085200	

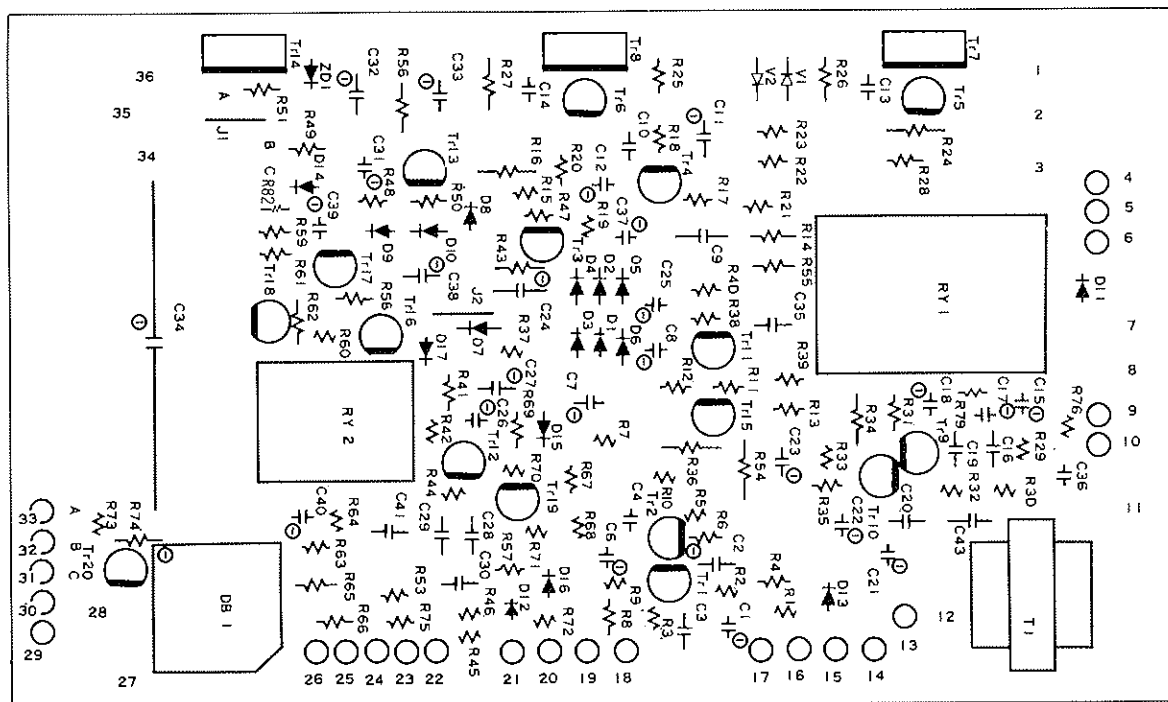
CIRCUIT DIAGRAM





PCB ASSEMBLY LAYOUT & PARTS LIST

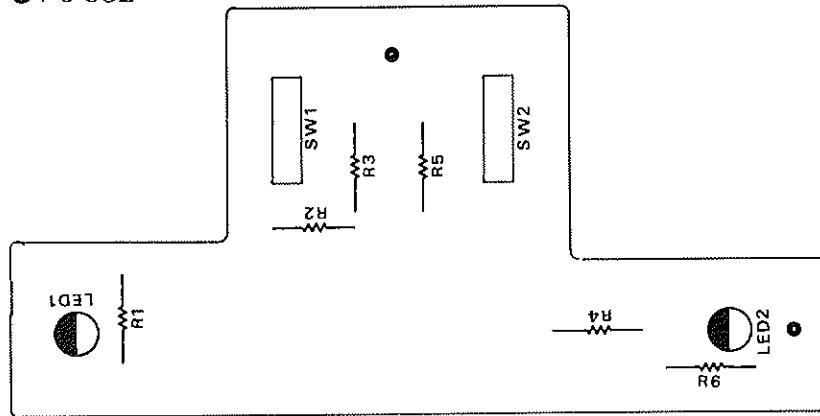
● PC-381D



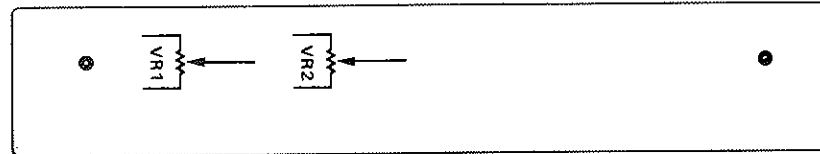
ITEM	PARTS	CODE	NOTE
XC	PC-381D	24079800	
	PC-381D AP-1K complete	97026000	
R	1W 200	03085200	
	1W 390	03087800	
	1W 750	03089400	
	1W 0.5	03092400	
	2W 4.7	03093700	
	1/4 330	03314300	
	1/4 4.7	03604300	
	1/4 68	03613100	
	1/4 150	03618600	
	1/4 220	03620300	
	1/4 330	03622900	
	1/4 470	03623200	
	1/4 680	03625800	
	1/4 1K	03626100	
	1/4 1.5K	03627400	
	1/4 2.2K	03628700	
	1/4 3.3K	03630400	
	1/4 4.7K	03631700	
	1/4 5.6K	03633300	
	1/4 6.8K	03634600	
	1/4 10K	03636200	
	1/4 15K	03637500	
	1/4 22K	03639100	
	1/4 33K	03641800	
	1/4 220K	03650600	
	1/4 330K	03651900	
C	50V 1	02027900	
	16V 47	02030900	
	16V 100	02033800	
	35V 2200	02034100	

ITEM	PARTS	CODE	NOTE
C	50V 0.47	02036700	
	35V 0.47 (tantalum)	02070300	
	50V 150P	02110400	
	10V 47	02139300	
	16V 10	02142300	
	16V 220	02146500	
	10V 33 BP	02171300	
	25V 33 BP	02173900	
	50V 3.3	02196000	
	0.022	02302300	
	0.047	02303600	
	0.01	02305200	
	0.033	02307800	
	0.022	02309400	
	50V 0.0047	02342700	
	0.0022	04144500	
D	1S-2473, FV	03402300	
	S5500D	04100900	
	HV-1	04124300	
	S4 VB-10	04141600	
ZD	05A712-Z	04932400	
TR	2SC-2235 (Y)	04008600	
	2SA-1015Y	04051000	
	2SC-945 (A)Q	04066600	
RY	LZN-2 RY DC12V	08032300	
T	DT-56P	07013100	

● PC-352



● PC-355A

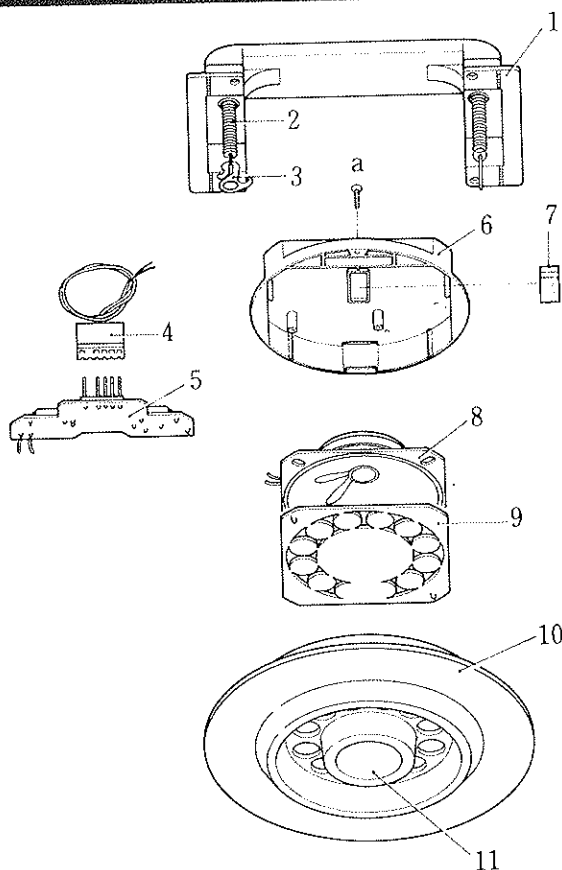


PC-352/355A PARTS LIST

ITEM	P A R T S	CODE	NOTE
XC	PC-352/5A	24078500	
	PC-352/5A AP-1M complete	97025700	
R	1/4 15K	03024300	
	1/4 2.2K	03319800	
	1/4 33K	03327300	
LED	TLR 114A	04019000	
VR	VR EVL-V3A-S11B 10K(B)	02120500	
SW	SSSS913 SW	01038000	

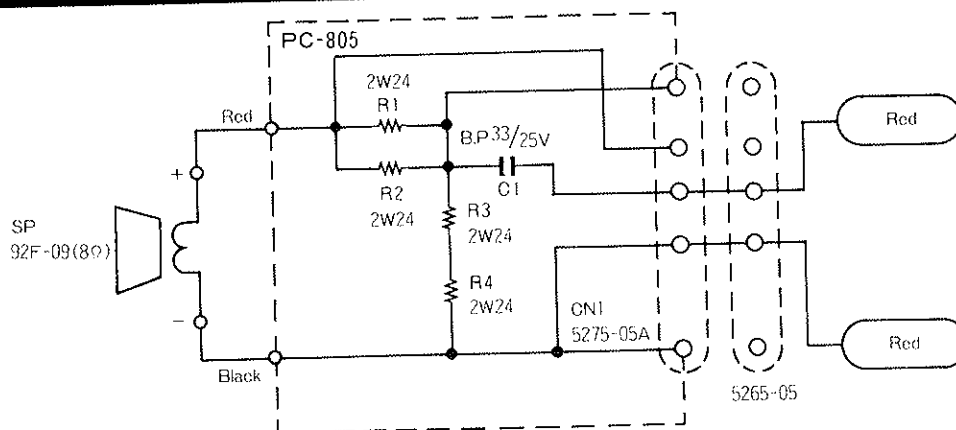
SUB STATIONS

AS-3N ASSEMBLY LAYOUT & PARTS LIST

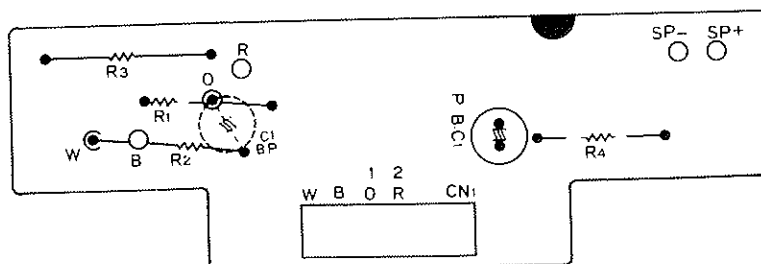


No	P A R T S	CODE	NOTE
1	NB-L holder	22291400	
2	NB-L spring	12032600	
3	NB-L hook	14646700	
4	AS-3N connector complete	40541600	
5	25V 33 BP	02173900	
	2W 24	03100600	
	PC-805	24186700	
	5275-05A plug	46198200	
6	NB-L cover	22290100	
7	TA cushion N	22103400	
8	92F09	00083700	
9	NB-L sub panel	22292700	
10	NB-L panel case	22289700	
11	SP-3N DEC panel	13908700	
a	FE 3X8 SE 7N	F3081100	

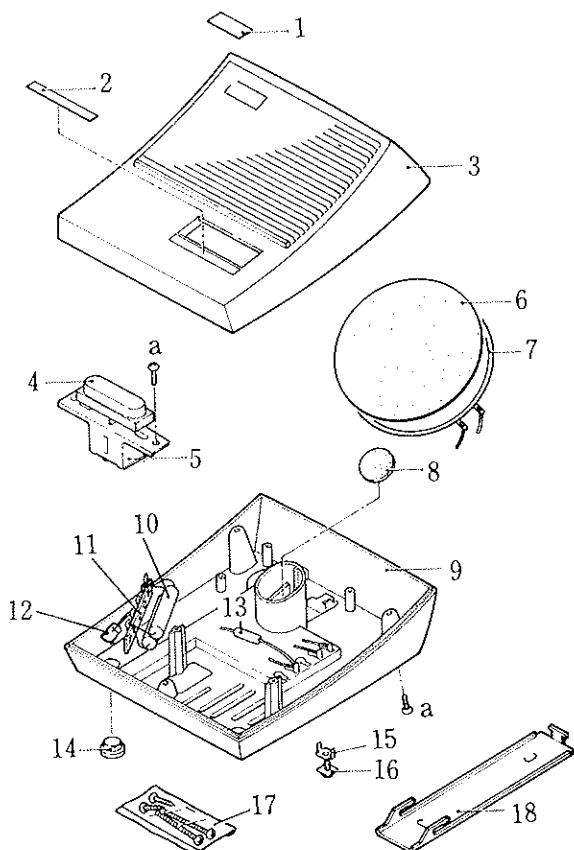
AS-3N CIRCUIT DIAGRAM



AS-3N PCB ASSEMBLY LAYOUT & PARTS LIST

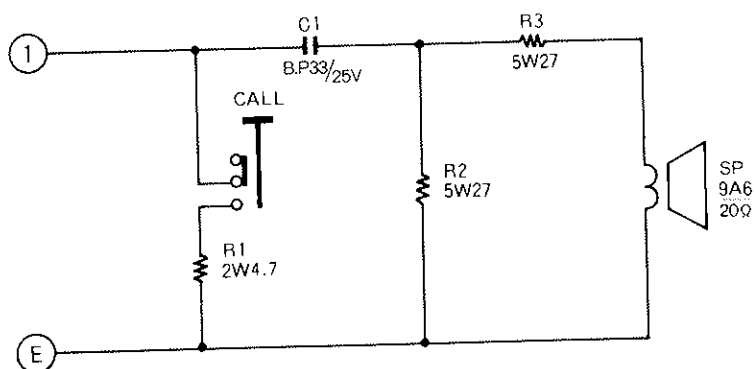


AS-3A ASSEMBLY LAYOUT & PARTS LIST



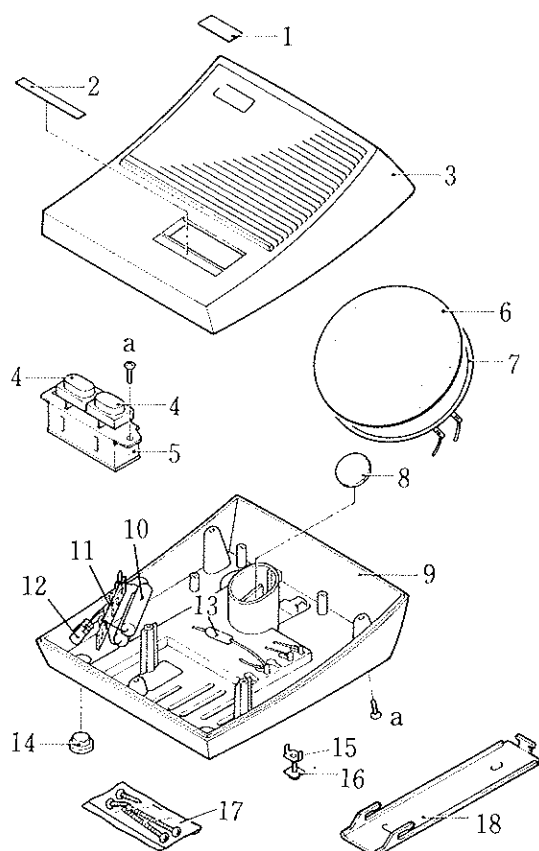
No	P A R T S	CODE	NOTE
1	AS-3A name plate	11415800	
2	LA-A call plate	11047900	
3	LA-A case N	22212900	
4	LP button(brown)	23224900	
5	1B-3P/ASW	16029800	
6	1AMF 91 ϕ net	20116800	
7	9A-6 speaker	00008400	
8	N0.8 rubber packing	20010300	
9	LA-A chassis N/A	22213200	
10	5W 27	03103500	
11	1L-4P terminal lug	09015300	
12	25V 33 BP	02173900	
13	2W 4.7	03093700	
14	1.0W rubber foot	20002800	
15	B terminal bracket	12021200	
16	IC-FE terminal screw	10106600	
17	IBM mounting screws	19029700	
18	LF mounting bracket	14107100	
a	FE 3X8 SE ZN	F3081100	

AS-3A CIRCUIT DIAGRAM



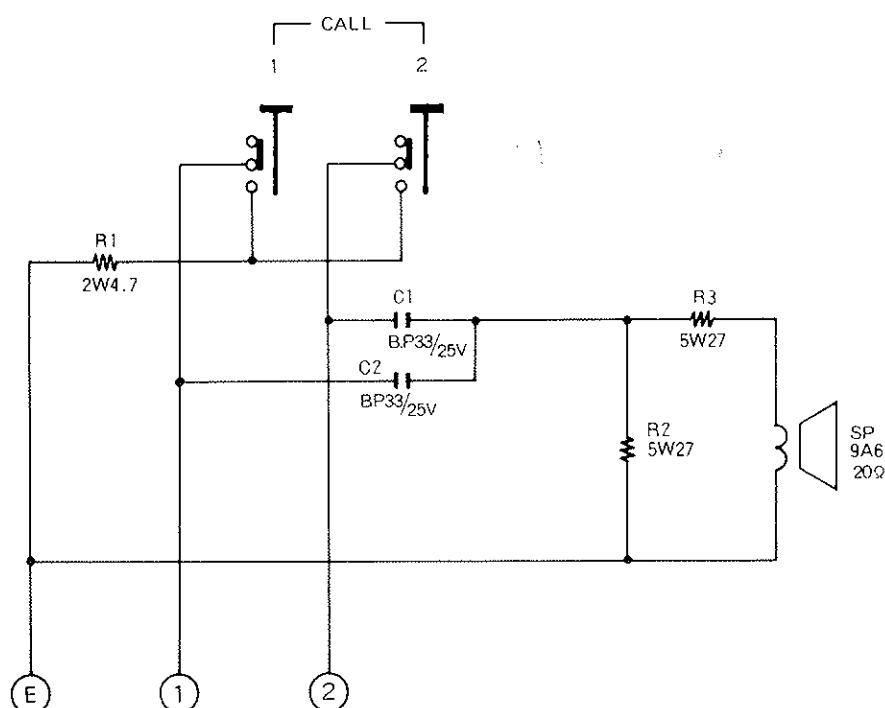
AS-3WA ASSEMBLY LAYOUT & PARTS LIST

NOTE

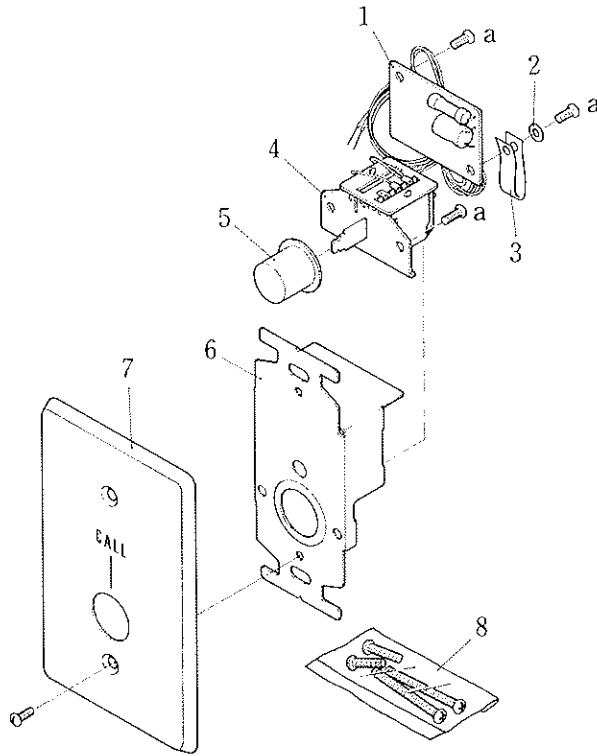


No	P A R T S	CODE	NO
1	AS-3WA name plate	11475400	
2	AS-3WA call plate	11474100	
3	LA-A case N	22212900	
4	3WA button	22005300	
5	2B-6SW	16055900	
6	LAMF 91φ net	20116800	
7	9A-6 speaker	00008400	
8	NO.8 rubber packing	20010300	
9	LA-A chassis N/A	22213200	
10	5W 27	03103500	
11	1L-4P terminal lug	09015300	
12	25V 33 BP	02173900	
13	2W 4.7	03093700	
14	LOW rubber foot	20002800	
15	B terminal bracket	12021200	
16	IC-FE terminal screw	10106600	
17	IBM mounting screws	19029700	
18	LF mounting bracket	14107100	
a	FE 3X8 SE ZN	F3081100	

AS-3WA CIRCUIT DIAGRAM

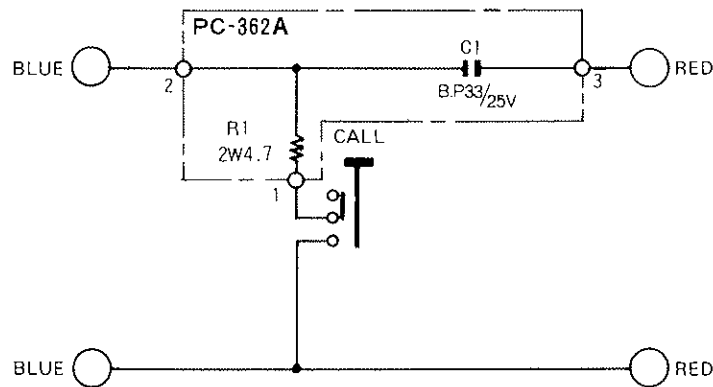


NP-B ASSEMBLY LAYOUT & PARTS LIST

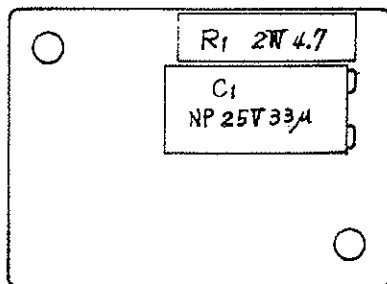


No	P A R T S	CODE	NOTE
1	PC-362A NP-B complete	91180700	
2	SN 3X8X0.5 HW	10064900	
3	LY cord clamp	21153600	
4	1B-3N SW	16054600	
5	NAR button(black)	23191000	
6	NAR-7LA adjuster	14560400	
7	NP-B plate E	11510000	
8	NAR screws	19056100	
a	FE3X6 TTZN	F3062100	

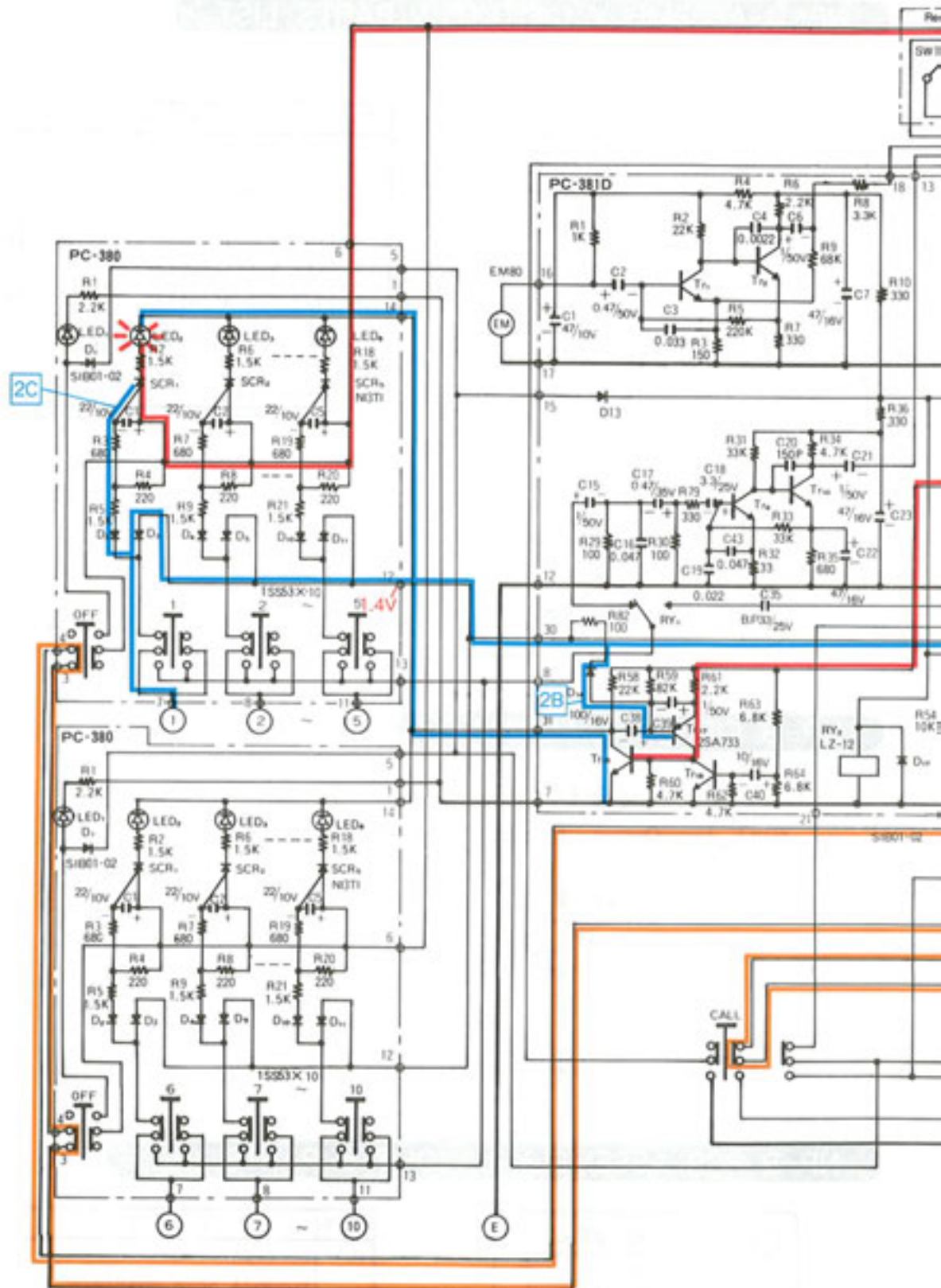
NP-B CIRCUIT DIAGRAM



NP-B PCB ASSEMBLY LAYOUT & PARTS LIST



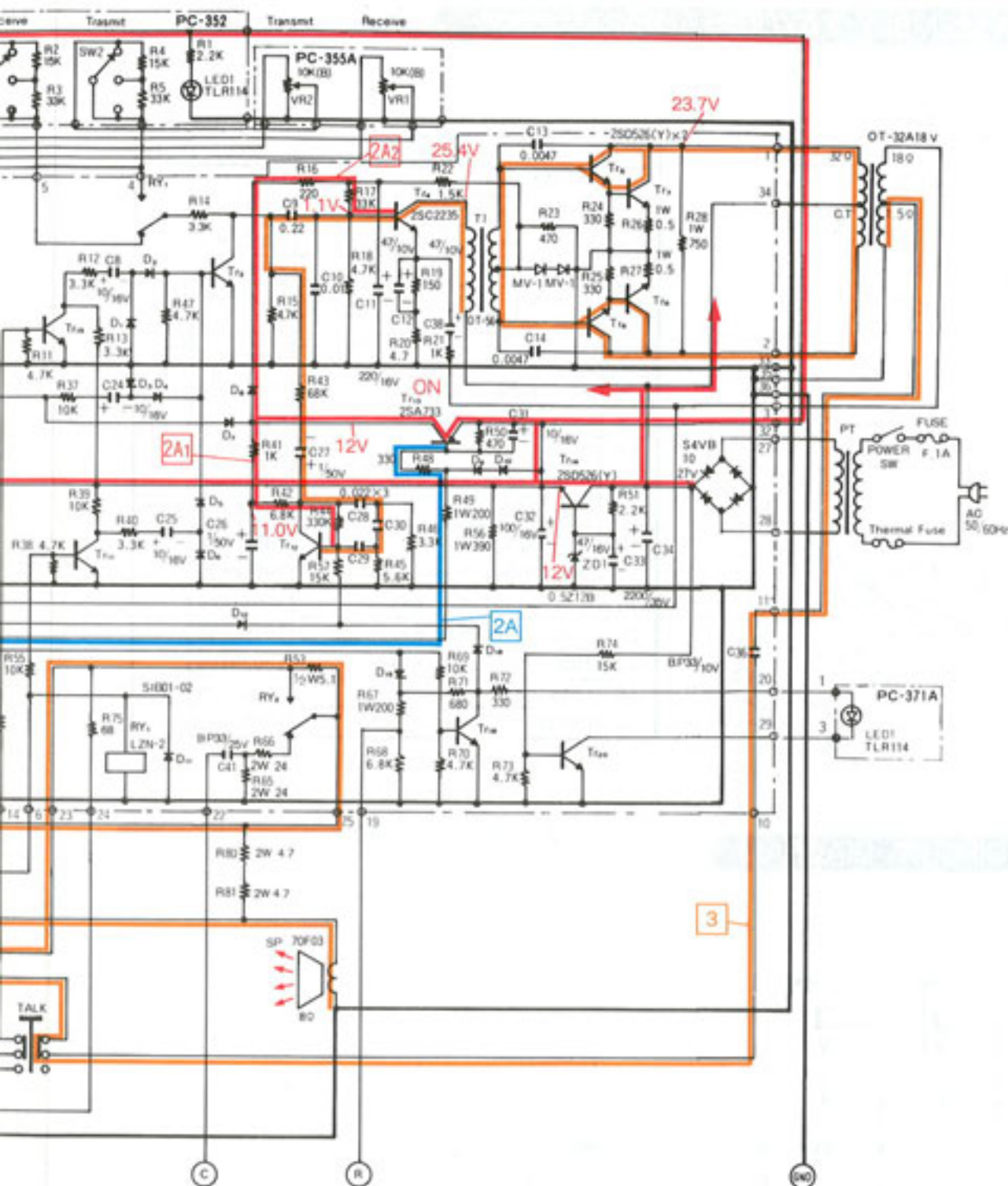
ITEM	P A R T S	CODE	NOTE
XC	PC-362A	24504100	
	PC-362A NP-B complete	91180700	
R	2W 4.7	03093700	
C	25V 33 BP	02173900	



1. When called from sub, negative voltage is applied to number terminal of master station.
2. The negative voltage from number terminal goes—
 - A) thru D_3 , R_{49} , and R_{48} to the base of T_{13} switching transistor, turning it on while sub's call button is depressed.

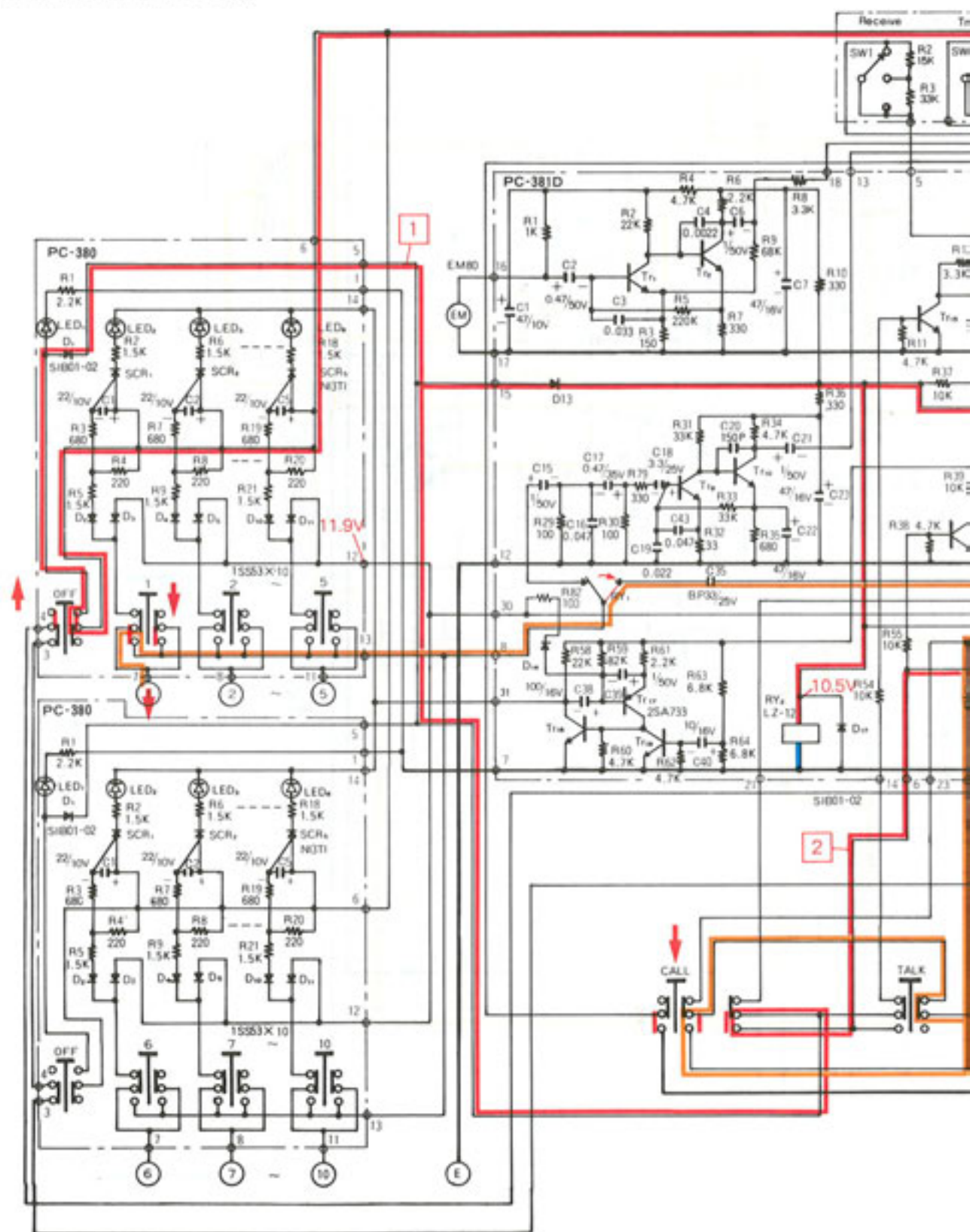
Having T_{13} turned on, positive voltage is applied to T_{12} in oscillating circuit. (2A1)

At the same time positive voltage is supplied to the base of driver transistor T_{14} . (2A2)

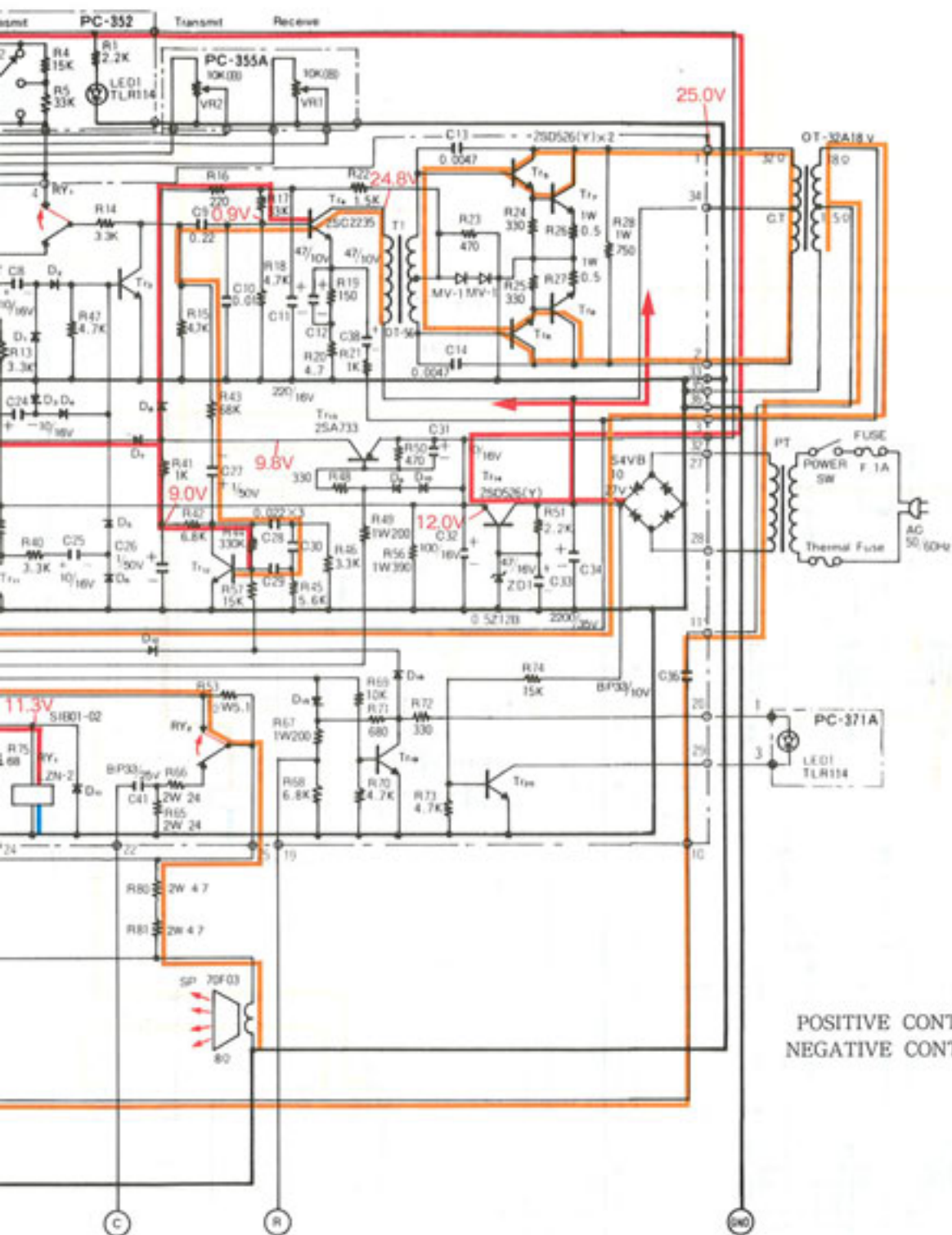


- B) thru D_3 , D_{14} , and holds the lamp memory circuit consisting of Tr_{16} and Tr_{17} for about 15 seconds until C_{38} is charged.
- C) thru D_2 , R_5 , R_3 , and triggers the gate of SCR_1 turning it on, thru lamp memory circuit and lights LED_2 call lamp while lamp memory circuit is held.(15 seconds)
3. Call tone produced by Tr_{12} oscillating circuit is amplified by $Tr_{14} \sim Tr_8$ and announced from 70F03SP.

2. CALLING (Master → Sub)

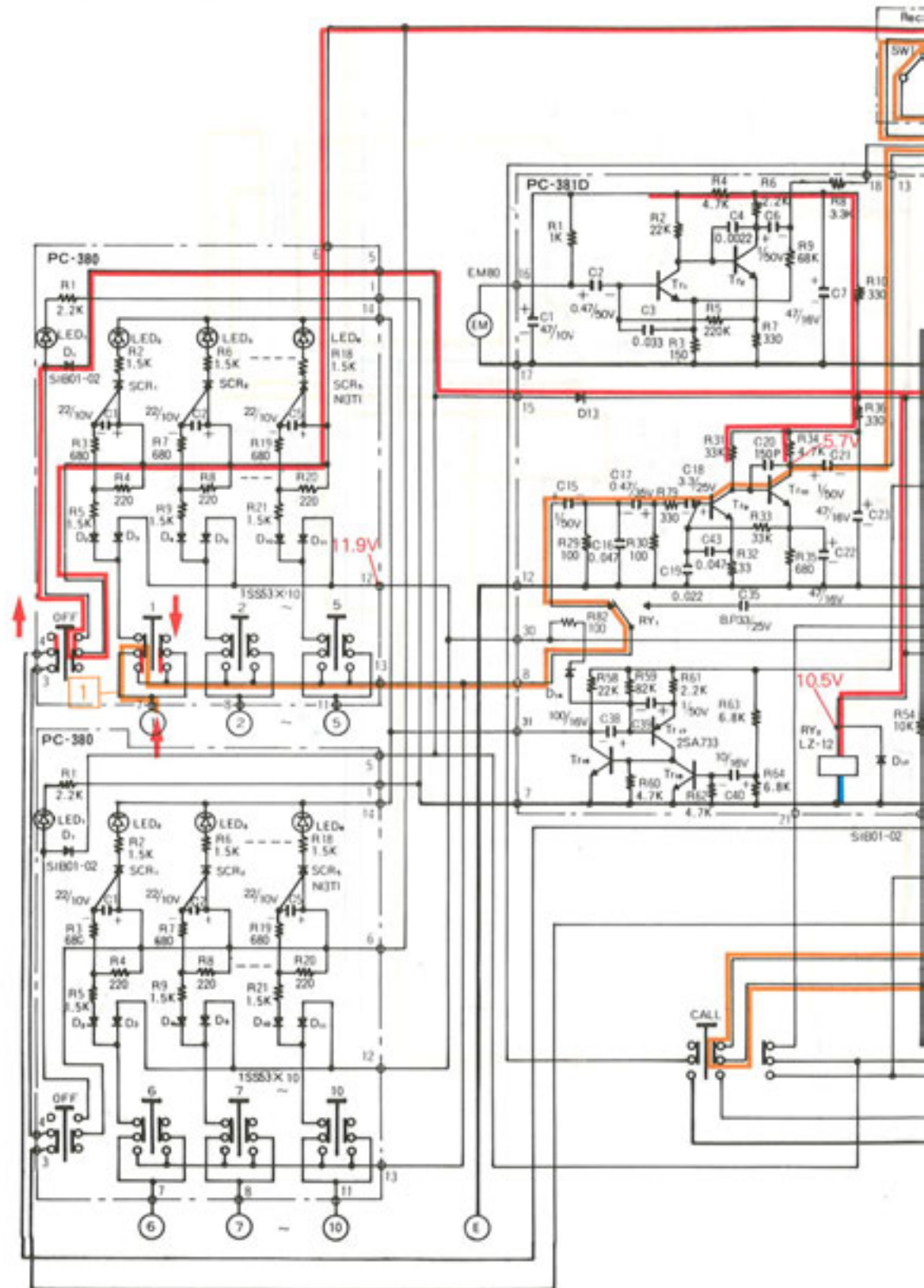


1. By depressing selector button, off button pops up and positive voltage is applied to Tr_{12} oscillating circuit, Tr_4 amplifier and LED_1 .
2. When depressing a call button, positive voltage thru D_1 makes RY_1 relay on. Calling signal is transmitted OT-32A18V, C_{35} , RY_1 contact to number terminal and announced from the speaker of sub.

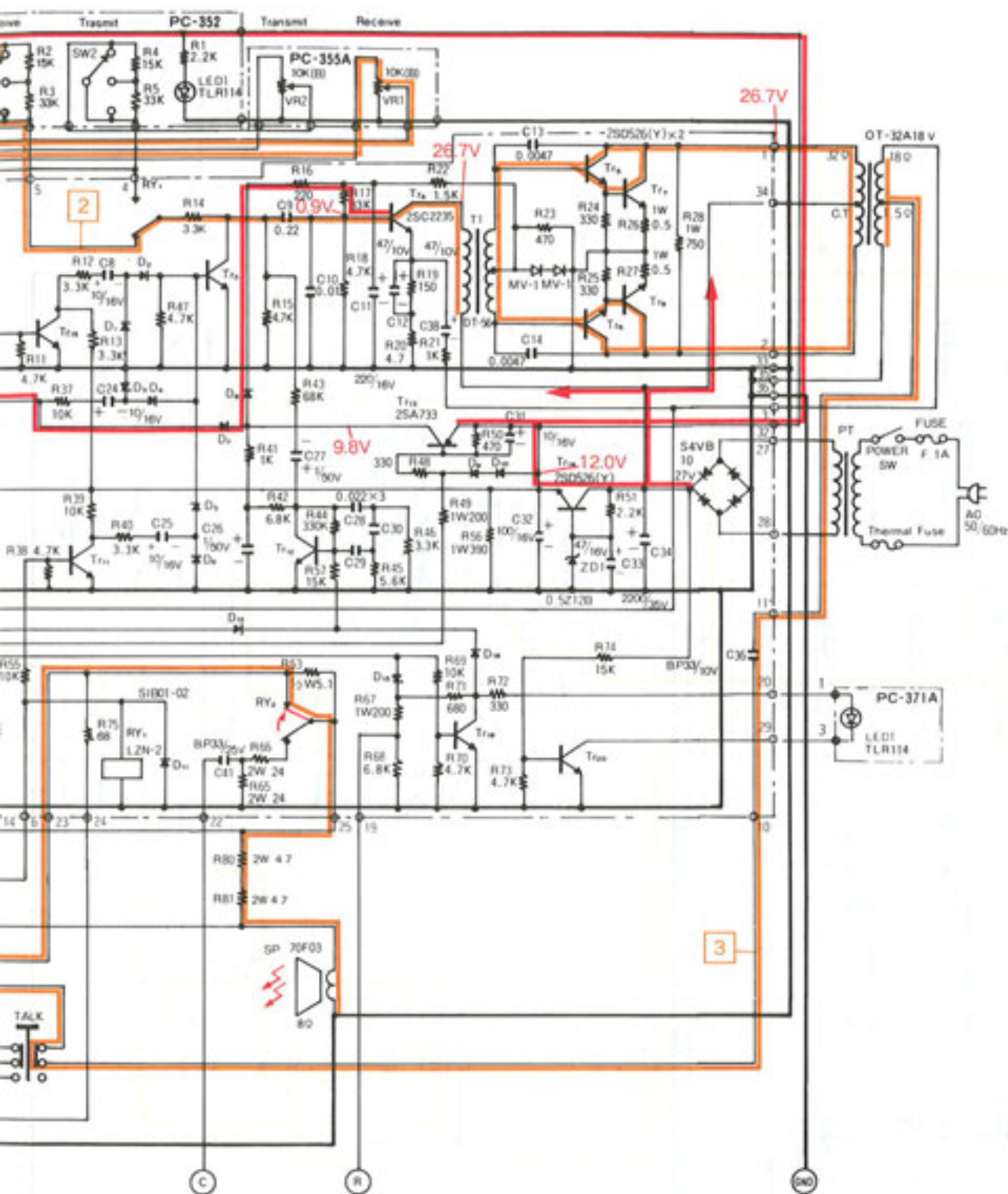


POSITIVE CONTROL VOLTAGE ⊕ ————
 NEGATIVE CONTROL VOLTAGE ⊖ ————
 AUDIO SIGNAL ————

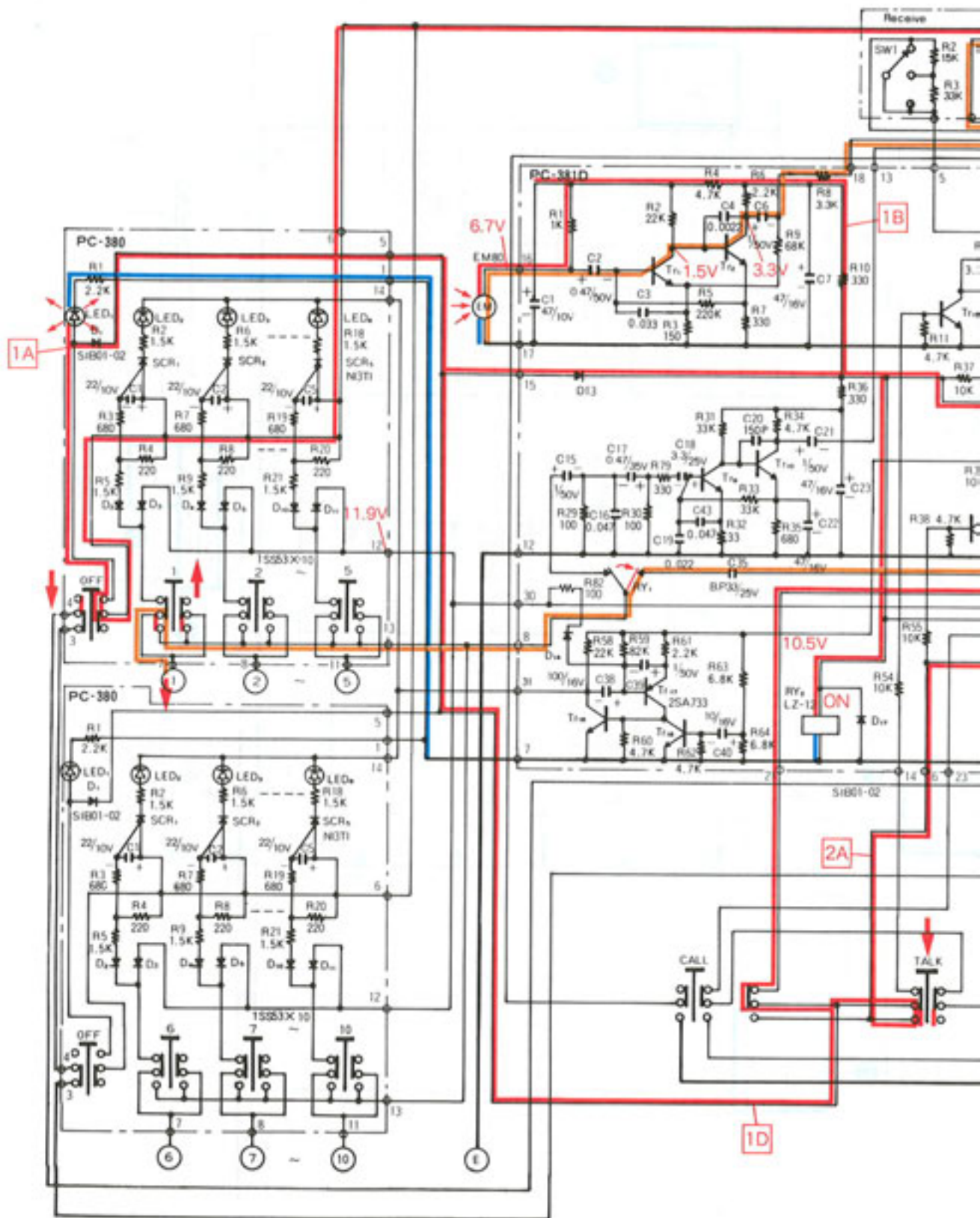
3.COMMUNICATION (Master ↔ Sub)



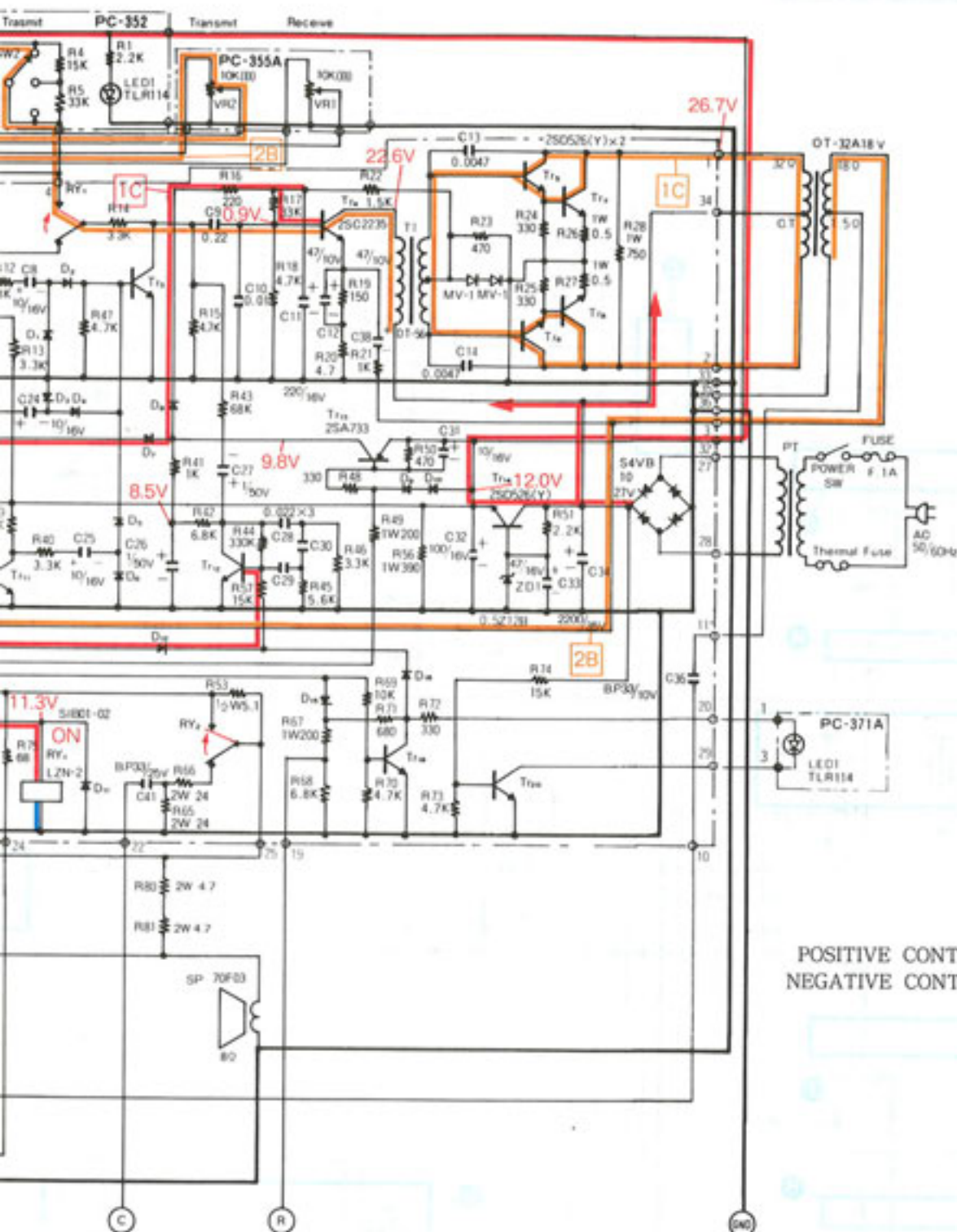
1. When master depresses selector button corresponding to calling sub, voice signal (applied to number terminals 1-10) from the sub flows thru RY₁, C₁₅, C₁₇, C₁₈ and is fed to the amplifier consisting of Tr₉ and Tr₁₀.
2. Output of Tr₁₀ flows thru PC-355A, PC-352 and is fed to amplifier consisting of Tr₄ ~ Tr₈.
3. Voice signal is transmitted thru OT-32A18V, C₃₆, TALK SW, CALL SW, CALL SW, RY₂ and announced from 70F03 speaker.



4.COMMUNICATION (Master → Sub)



1. When master depresses selector button, positive voltage flows—
- A) thru LED₁, R₁ to GND (ground) and lights LED₁.
- B) thru D₁, D₁₃ to amplifier consisting of Tr₁ and Tr₂ which amplifies voice signal from ECM.
- C) thru D₁, D₁₃, D₇ to the base of Tr₄.
(Voice signal supplied to the base of Tr₄ is amplified by Tr₄~Tr₈.)
- D) thru D₁ to TALK SW.



POSITIVE CONTROL VOLTAGE ⊕ — (red line)
 NEGATIVE CONTROL VOLTAGE ⊖ — (blue line)
 AUDIO SIGNAL — (orange line)

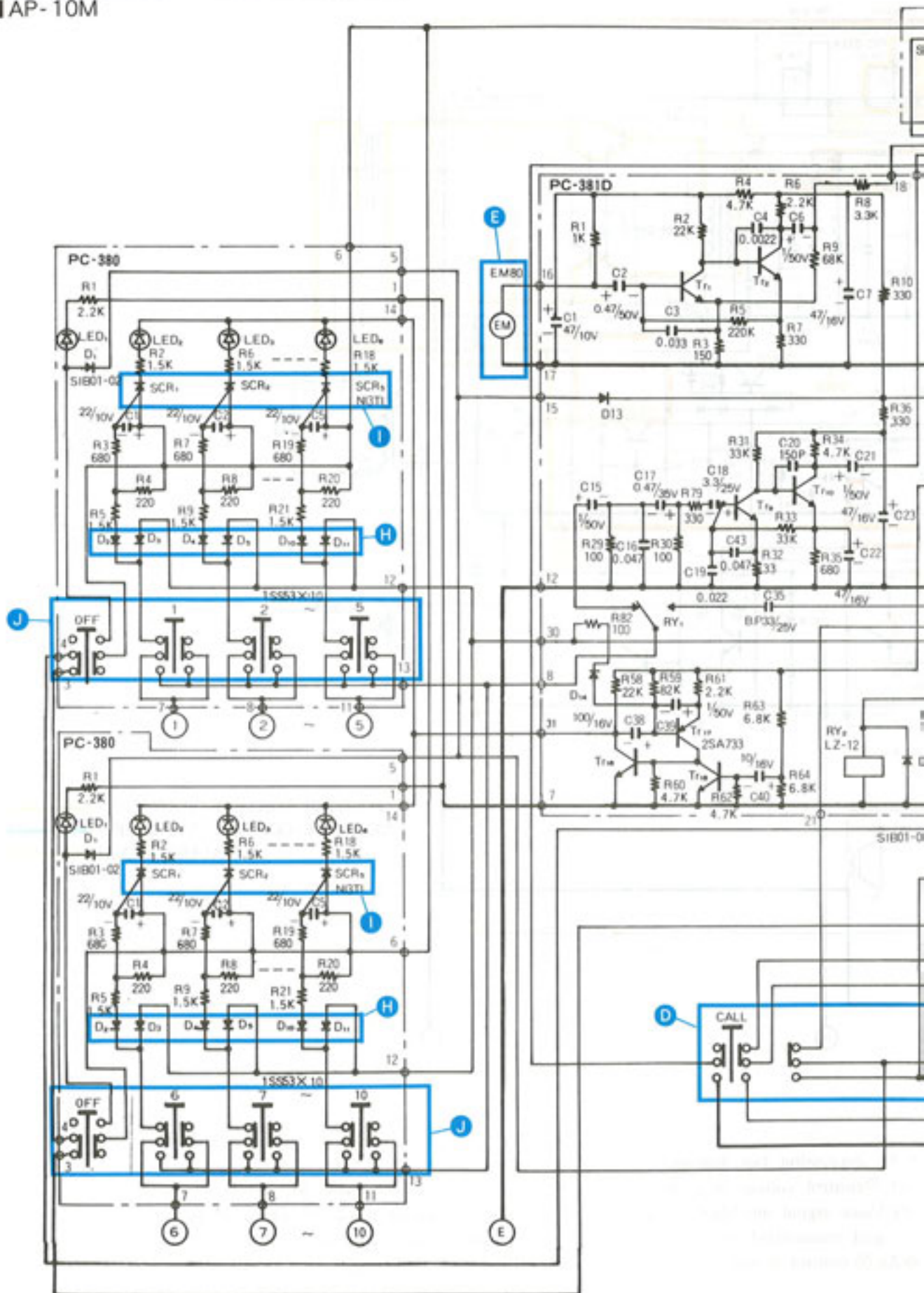
2. By depressing talk button;

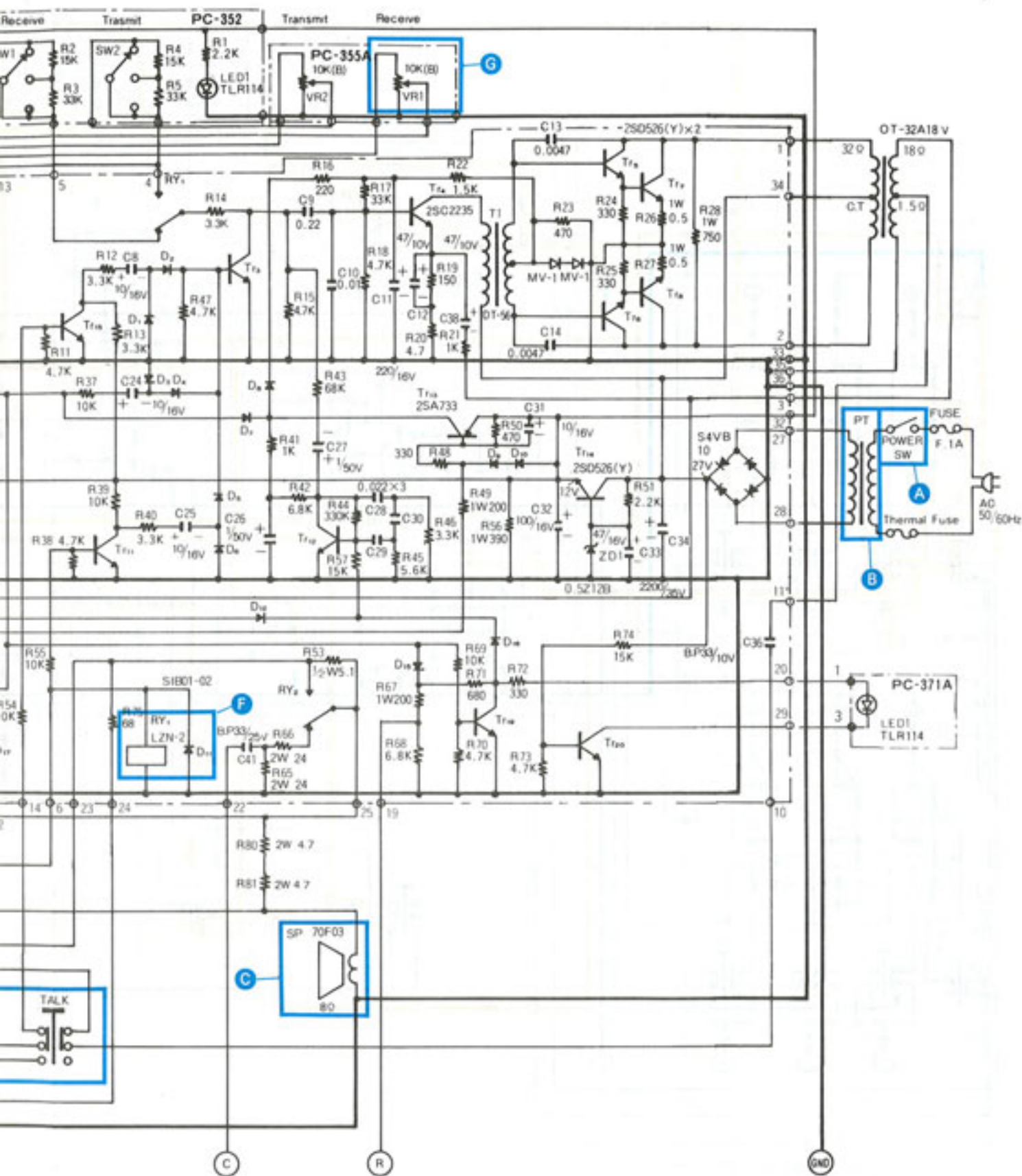
- ⊕ control voltage is applied to RY_1 thru TALK SW, which turns RY_1 on.
- Voice signal amplified by Tr_1, Tr_2 is fed to the amplifier consisting of $Tr_4 \sim Tr_8$ and transmitted thru OT-32A18V and C_{35} to the number terminal.

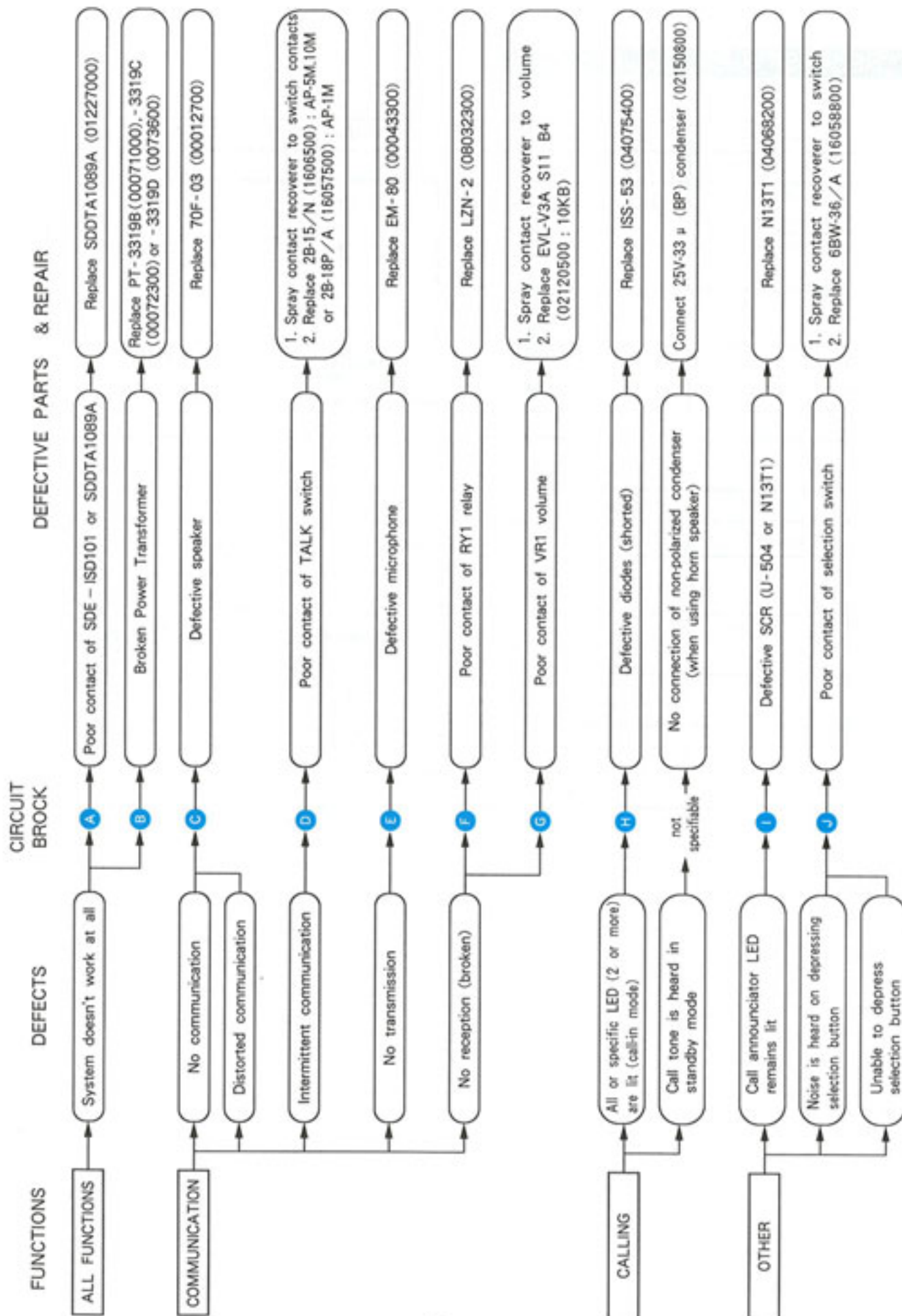
※ As ⊕ control voltage is applied to Tr_{12} (base), Tr_{12} oscillating circuit is cut off.

TROUBLE SHOOTING

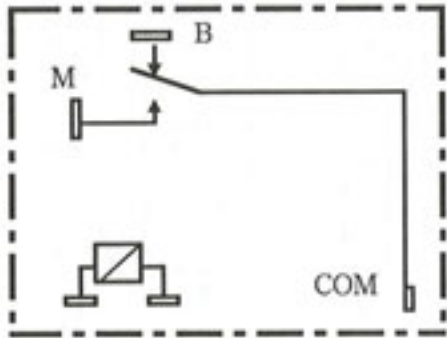
■ AP-10M

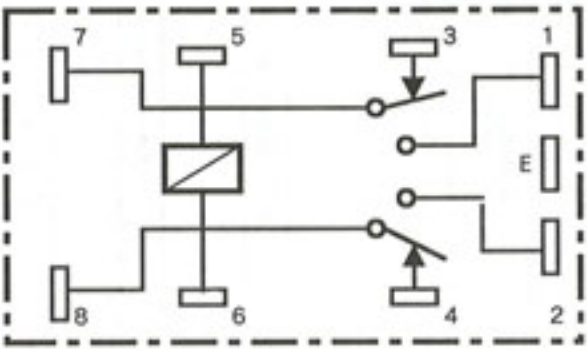






RELAYS

MODEL	LZ - 12	TERMINAL CONNECTION
RATING	DC 12 V	
COIL RESISTANCE	320 Ω (10 %)	
OPERATING VOLTAGE	DC 7.80 V	
RESET VOLTAGE	DC 0.60 V	
Max. CONTACTS CAPACITY AT LOAD RESISTANCE	AC120V, 3.0A DC 30V, 3.0A	

MODEL	LZN - 2	TERMINAL CONNECTION
RATING	DC 12 V	
COIL RESISTANCE	500 Ω (10 %)	
OPERATING VOLTAGE	DC 8.40 V	
RESET VOLTAGE	DC 1.20 V	
Max. CONTACTS CAPACITY AT LOAD RESISTANCE	AC110V, 0.5A DC 24V, 1.0A	

* All the information contained in this manual is up-to-date at the time of publication, and we reserve the right to make any changes without further notice.

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