

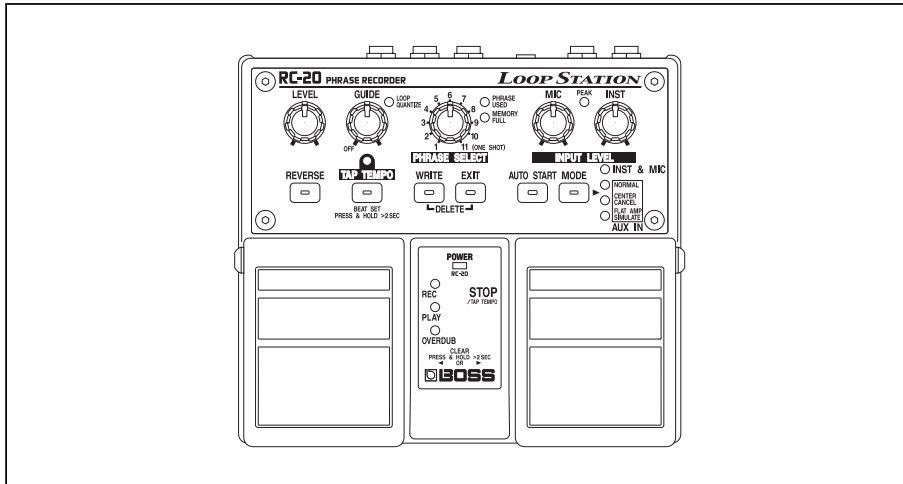
RC-20

PHRASE RECORDER

SERVICE NOTES

First Edition
Issued by RJA

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SPECIFICATIONS

RC-20 : PHRASE RECORDER

- Nominal Input Level**
 INPUT : -20 dBu (variable)
 MIC : -40 dBu (variable)
 AUX IN : -10 dBu
- Input Impedance**
 INPUT : 1M ohm
 MIC : 1k ohm
 AUX IN : 47k ohm
- Nominal Output Level**
 OUTPUT : -20 dBu
- Output Impedance**
 1k ohm
- Recommended Load Impedance**
 10k ohm or greater
- Internal Memory**
 Recording Time : 5 min. 30 sec. (max.)
 10 loop phrases + 1 one-shot phrase (max.)
- Controls**
 REC/PLAY/OVERDUB Pedal
 STOP/TAP TEMPO Pedal
 INST Knob
 MIC Knob
 PHRASE SELECT Knob
 GUIDE Knob
 LEVEL Knob
 REVERSE Button
 TAP TEMPO Button
 WRITE Button
 EXIT Button
 AUTO START Button
 MODE Button
- Connectors**
 INST Jack
 MIC Jack
 AUX IN Jack (Stereo miniature phone type)
 PHRASE SHIFT Jack
 REVERSE Jack
 OUTPUT Jack
- Power**
 DC 9V : Dry battery (AA type) x 6, AC Adaptor
- Power Consumption**
 85 mA (9 V max.)
 * Expected battery life under continuous use:
 Carbon : 9 hours
 Alkaline : 25 hours
 These figures will vary depending on the actual conditions of use.
- Dimensions**
 173 (W) x 158 (D) x 57 (H) mm
 6-13/16 (W) x 6-1/4 (D) x 2-1/4 (H) inches
- Weight**
 1.2 kg / 2 lbs 7 oz (including batteries)
- Accessories**
 Owner's Manual English (#G6017294)
 Dry battery <AA type> x 6 (#*****)
 Sound Library for RC-20 <Sample Phrase CD-ROM> (#G2567113)
 Sound Library for RC-20 <Sample Phrase CD LEAFLET> (#G6017447)
- Options**
 AC Adaptor (PSA-series)
 Foot Switch (FS-5U)
- Indicators**
 POWER (serves also as battery check indicator)
 REC
 PLAY
 OVERDUB
 PHRASE USED
 MEMORY FULL
 LOOP QUANTIZE
 TAP TEMPO
 REVERSE
 WRITE
 EXIT
 AUTO START
 INST & MIC
 NORMAL
 CENTER CANCEL
 FLAT AMP SIMULATE

* 0 dBu = 0.775 Vrms

* In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without prior notice.

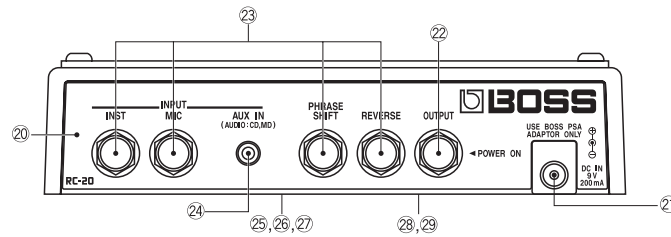
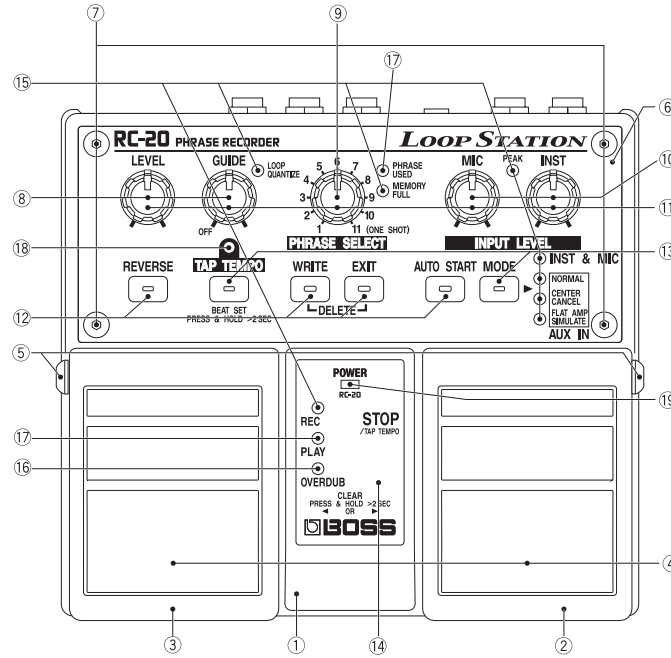
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A LOCATION OF CONTROLS

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[Parts]

No.	Part Code	Part Name	Q'ty
1	G2017146	CASE	1
2	G2187530	PEDAL R	1
3	G2187531	PEDAL L	1
4	G2357116	PEDAL PLATE	2
5	H5029851	PEDAL SHAFT	2
6	G2217133	PANEL	1
7	H5029850	HEXAGON SOCKET BUTTON HEAD SCREW M4x6	4
8	F3279802	POT. RD901-40-125F-B54-00D	2
9	F3279803	POT. RD901-40-125F-B54-11D	1
10	F3279805	POT. RD901-40-125F-AF5-00D	2
11	G2477122	R-KNOB	5
12	G247751001	KEYTOP S BLACK WITH LENS	4
13	G247751301	KEYTOP S WITHOUT LENS	2
14	G2217137	LED PANEL	1
15	1502928100	LED (RED) L-34HD8L	8
16	F5029125	LED (YELLOW) L-34YDSL	1
17	F5029124	LED (GREEN) L-34GDSL	2
18	15029342	LED (RED/GREEN) GL3ED8	1
19	F5029126	POWER LED L-113GDT	1
20	G2217135	REAR PANEL	1
21	F344940301	ADAPTOR JACK DJ-0711B-020	1
22	13449150MF	6.5MM JACK HTJ-064-12D	1
23	13449155MF	6.5MM JACK HTJ-064-12I	4
24	F3440404	MINI JACK AJ324A-3C	1
25	G2017621	BATTERY COVER	1
26	G2017148	BOTTOM COVER	1
27	G2357118	BOTTOM FOOT	2
28	F2539803	LABEL CAUTION	1
29	G2537848	QUICK MANUAL LABEL	1



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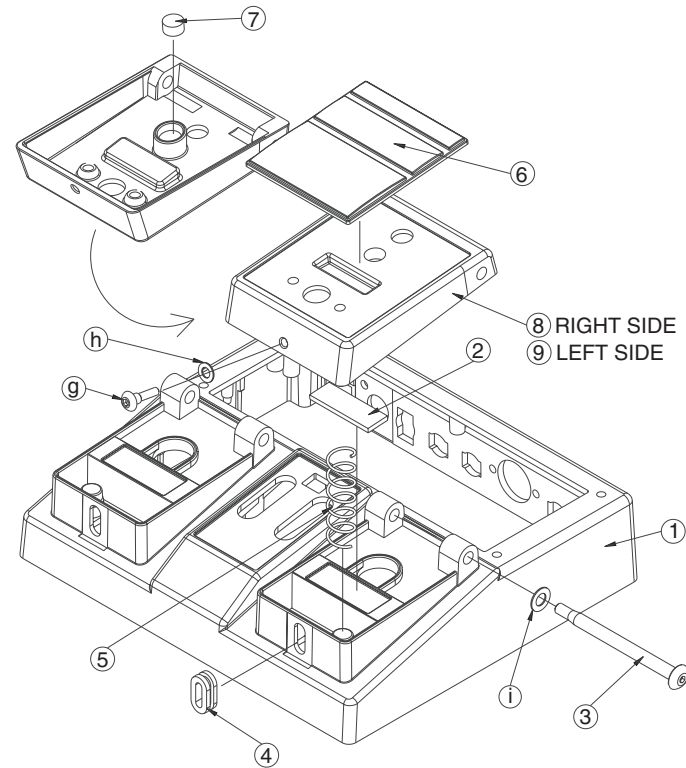
A EXPLODED VIEW

[Parts]

No.	Part Code	Part Name	Q'ty
1	G2017146	CASE	1
2	G2357111	CUSHION R	2
3	H5029851	PEDAL SHAFT	2
4	2215770201	PEDAL GUIDE BUSH	2
5	G2177104	SPRING	2
6	G2357116	PEDAL PLATE	2
7	G2357115	PEDAL FOOT	2
8	G2187530	PEDAL R	1
9	G2187531	PEDAL L	1
10	G2017148	BOTTOM COVER	1
11	G2357118	BOTTOM FOOT	2
12	G2017621	BATTERY COVER	1
13	G2017620	BATTERY CASE V6	1
14	G2177308	BATTERY TERMINAL(+)	1
15	G2177309	BATTERY TERMINAL(-)	1
16	G2177307	BATTERY TERMINAL(+/-)	1
17	G2257130	BATTERY INSULATING SHEET	1
18	F2539803	LABEL CAUTION	1
19	G2537848	QUICK MANUAL LABEL	1
21	G2477122	R-KNOB	5
22	G2257129	INSULATING SHEET CENTER	1
23	G2257131	INSULATING SHEET BOTTOM	1
24	G2217133	PANEL	1
25	G2217135	REAR PANEL	1
26	G2217137	LED PANEL	1
32	G247751301	KEYTOP S WITHOUT LENS	2
33	G247751001	KEYTOP S BLACK WITH LENS	4
43	G2197502	MINI JACK HOLDER	1

[Screws]

No.	Part Code	Part Name	Q'ty
a	H5019115	SCREW 3x8 PAN TAPPING-2 BZC	2
b	H5019110	SCREW 3x6 PAN TAPPING-2 FEZC	13
c	H5029850	SCREW M4x6 HEXAGON SOCKET BUTTON HEAD FENI	4
d	40011923	INTERNAL TOOTH WASHER M9.5x12.5x0.5 FENI	3
e	40016467	JACK WASHER M9.2x14x0.5 FENI	5
f	40123545	JACK NUT M9x11x2 NI	5
g	H5029852	SCREW 4M3 HEXAGON SOCKET BUTTON HEAD FEBZC	2
h	H5039413	NYLON WASHER M4.1x7.5x0.5 BLACK	2
i	H5039414	NYLON WASHER M5.1x9.5x0.5 BLACK	2
j	H5019430	SCREW 2.6x5 BINDING TAPTITE P FEZC	2
k	H5039521	VR ACCESSORY NUT M7	5
m	H5029325	SCREW 3x6 PAN HEAD TAPTITE-2 BZC	5
n	H5039324	MINI JACK NUT M6 FENI	1

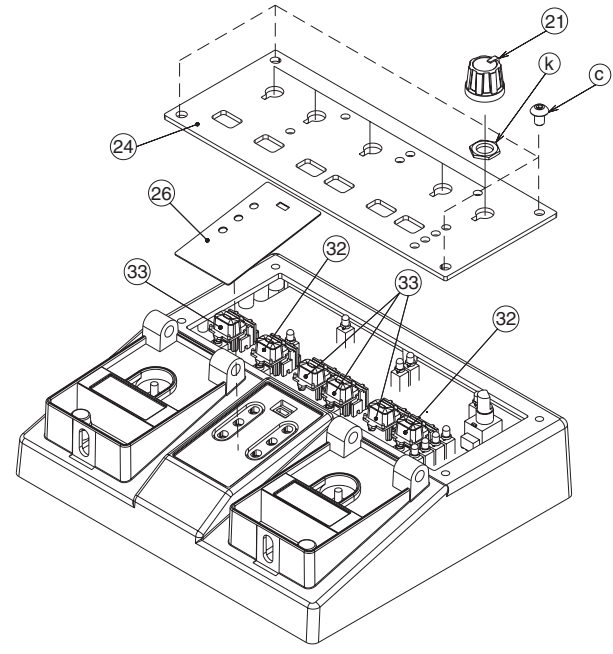
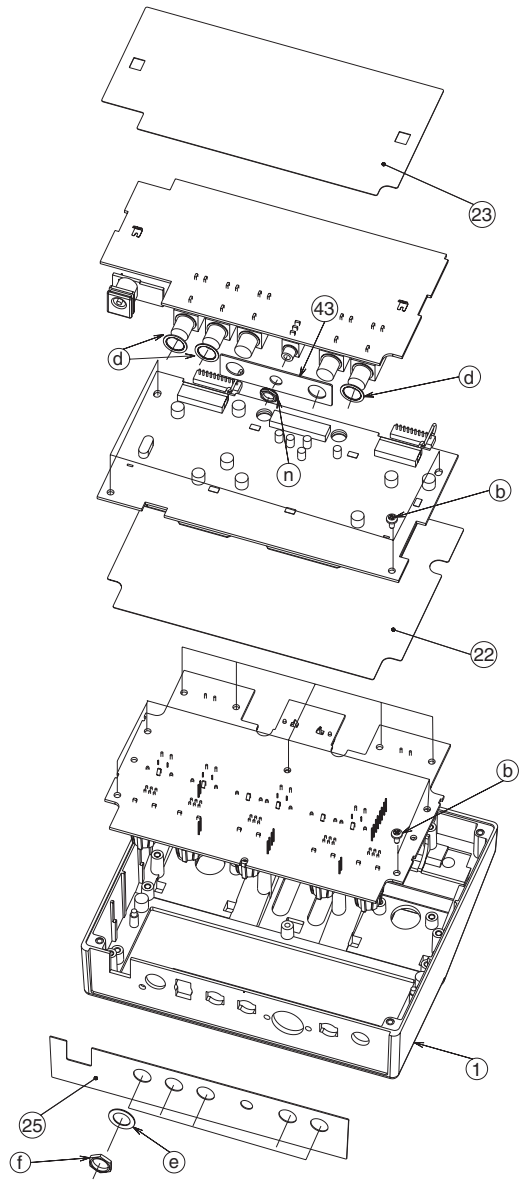


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A EXPLODED VIEW

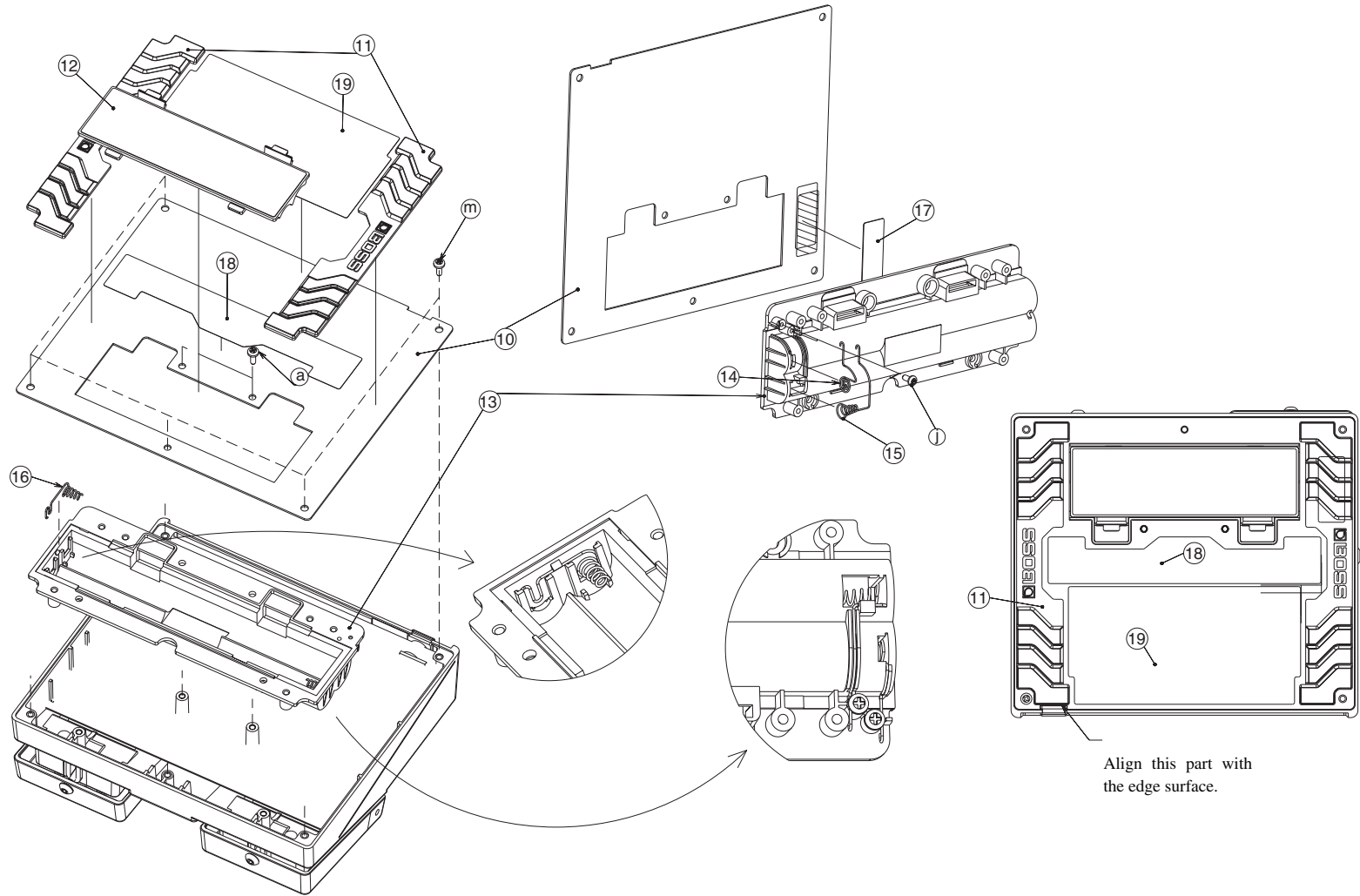
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A EXPLODED VIEW

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PARTS LIST

<p>SAFETY PRECAUTION: The parts marked Δ have safety-related characteristics. Use only listed parts for replacement.</p>	<p>The parts marked # are new (initial parts).</p>	<p>CONSIDERATIONS ON PARTS ORDERING When ordering any parts listed in the parts list, please specify the following items in the order sheet.</p> <table border="1"> <thead> <tr> <th>QTY</th> <th>PART NUMBER</th> <th>DESCRIPTION</th> <th>MODEL NUMBER</th> </tr> </thead> <tbody> <tr> <td>Ex. 10</td> <td>22575241</td> <td>Sharp key</td> <td>C-2050</td> </tr> <tr> <td>15</td> <td>2247017300</td> <td>Knob (orange)</td> <td>DAC-15D</td> </tr> </tbody> </table> <p>Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.</p>	QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER	Ex. 10	22575241	Sharp key	C-2050	15	2247017300	Knob (orange)	DAC-15D	<p>CB -> CENTER BOARD ASSY. PB -> PANEL BOARD ASSY. JK -> JACK BOARD ASSY</p>
QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER												
Ex. 10	22575241	Sharp key	C-2050												
15	2247017300	Knob (orange)	DAC-15D												

CASING				Q'ty	
G2017620	BATTERY CASE V6			1	
G2017621	BATTERY COVER			1	
G2017148	BOTTOM COVER			1	
G2357118	BOTTOM FOOT			2	
G2017146	CASE			1	
G2217137	LED PANEL			1	
G2217133	PANEL			1	
G2187531	PEDAL L			1	
G2357116	PEDAL PLATE	62x53		2	
G2187530	PEDAL R			1	
H5029851	PEDAL SHAFT			2	
G2217135	REAR PANEL			1	
KNOB, BUTTON					
G247751001	KEYTOP S BLACK WITH LENS			4	
G247751301	KEYTOP S WITHOUT LENS			2	
G2477122	R-KNOB			5	
SWITCH					
01780101	SKQKAB	TACT SWITCH	SW1,SW2,SW4,SW6-SW8 on PB	6	
13129778	SKQKAH	TACT SWITCH	SW3,SW5 on PB	2	
JACK, EXT TERMINAL					
13449150MF	HTJ-064-12D	6.5MM JACK (STEREO)	JK7 on JB	1	
13449155MF	HTJ-064-12I	6.5MM JACK (MONO)	JK1,JK2,JK4,JK5 on JB	4	
F3440404	AJ324A-3C	MINI JACK	JK3 on JB	1	
F344940301	DJ-0711B-020	ADAPTOR JACK	JK6 on JB	1	
PWB ASSY					
#	E 75D433M000	CENTER PWB ASSY	(EXG)	1	
#	75D433P001	PANEL PWB ASSY		1	
NOTE : 'PANEL PWB ASSY' includes the following parts.					
***** PANEL BOARD ASSY					
***** JACK BOARD ASSY					
IC					
#	02780089	UPD703102GJ-33-W05 VER1.01	IC (CPU)	IC1 on CB	1
#	02563023	TC58V64AFT	IC (FLASH MEMORY)	IC6 on CB	1
	02451434	AK4552VT	IC (AD/DA)	IC5 on CB	1
	02453389	LC32V4265T-25	IC (DRAM)	IC4 on CB	1
	02121556	LC24085B-SD1	IC (I/F)	IC3 on CB	1
	00346445	NJM2100M(Te3)	IC (BIPOLAR OP AMP)	IC2 on CB	1
	15189261	M5218AFP-600E	IC (BIPOLAR OP AMP)	IC1 on PB, IC2,IC3,IC5,IC6 on JB	5
#	02458090	TC4066BFT(EL)	IC (CMOS)	IC1 on JB	1
	15259118	TC4W66F(Te12L)	IC (CMOS)	IC4 on JB	1
	15259884	TC7S08F(Te85L)	IC (CMOS)	IC8 on CB	1
	01906156	S-8520E33MC-BJS-T2	IC (DC-DC REGULATOR)	IC7 on JB	1
	02455056	S-80930ALMP-DAT-T2	IC (RESET)	IC7 on CB	1
TRANSISTOR					
	15319107	2SC4116-GR(Te85R)	TRANSISTOR	Q1,Q2 on PB, Q2 on JB	3
	15329103T0	2SK880-GR(Te85R)	FET TRANSISTOR	Q1,Q11 on JB	2
#	02562867	IRF7606	TRANSISTOR	Q10 on JB	1

15329521	RN1307(Te85R)	TRANSISTOR	Q1,Q2 on CB, Q3-Q7,Q12 on JB	8
15329533	RN2307(Te85R)	TRANSISTOR	Q3-Q10 on CB	8

DIODE					
#	15339119T0	1SS352(TPH3)	SWITCHING DIODE	D1 on CB, D1-D8 on PB, D11,D12 on JB	11
	01019534	1SS355 TE-17	SWITCHING DIODE	D9 on JB	1
	F5339137	SS14 VF=0.45V	DIODE	D3,D7 on JB	2
	02562878	02DZ5,1-Y(TPH3)	ZENER DIODE	D9 on PB	1
	15339120T0	1SS302(Te85R)	DIODE ARRAY	DA1-DA6 on JB	6
	15029342	GL3ED8	LED (RED/GREEN)	LED9 on PB	1
	F5029126	L-113GD8	POWER LED	LED17 on PB	1
	F5029117	L-312LRD	LED (RED)	LED4,LED12,LED14,LED15 on PB	4
	F5029124	L-34GDSL	LED (GREEN)	LED2,LED10 on PB	2
	1502928100	L-34HDSL	LED (RED)	LED3,LED5-LED8,LED11, LED13,LED16 on PB	8
	F5029125	L-34YDSL	LED (YELLOW)	LED1 on PB	1

RESISTOR					
#	F5399910	0 OHM	CHIP RESISTOR (3216TYPE)	C3 on JB	1
	15399301	0 OHM	CHIP RESISTOR (1608TYPE)	C25,R45 on JB	2
#	F5419716	CRN3410J3	CHIP RESISTOR	RA2,RA7 on CB	2
#	F5419715	CRN34680J	CHIP RESISTOR	RA1,RA3-RA6,RA8-RA12 on CB	10
	00566867	RPC05T 100 J	CHIP RESISTOR (1608TYPE)	R16 on CB	1
	00567023	RPC05T 101 J	CHIP RESISTOR (1608TYPE)	R7,R9,R10,R15,R17,R18, R22,R23,R30 on CB	9
	00567156	RPC05T 102 J	CHIP RESISTOR (1608TYPE)	R6 on PB R46,R60,R62 on JB	4
	00567289	RPC05T 103 J	CHIP RESISTOR (1608TYPE)	R3,R5,R11,R12,R21,R27,R28,R29 on CB, R2 on PB, R1,R3,R11,R12,R15,R21, R27,R42,R48,R50 on JB	19
	00567412	RPC05T 104 J	CHIP RESISTOR (1608TYPE)	R3 on PB, R6,R13,R14,R47 on JB	5
	00567556	RPC05T 105 J	CHIP RESISTOR (1608TYPE)	R5,R7 on PB, R2,R51 on JB	5
	00567167	RPC05T 122 J	CHIP RESISTOR (1608TYPE)	R1 on PB	1
	00567290	RPC05T 123 J	CHIP RESISTOR (1608TYPE)	R1 on CB, R31 on JB	2
	00566890	RPC05T 150 J	CHIP RESISTOR (1608TYPE)	R20 on CB	1
	00567178	RPC05T 152 J	CHIP RESISTOR (1608TYPE)	R24 on CB	1
	00567301	RPC05T 153 J	CHIP RESISTOR (1608TYPE)	R2 on CB, R33,R58 on JB	3
	00567067	RPC05T 221 J	CHIP RESISTOR (1608TYPE)	R6,R14 on CB	2
	00567323	RPC05T 223 J	CHIP RESISTOR (1608TYPE)	R23,R26,R54,R56 on JB	4
	00567334	RPC05T 273 J	CHIP RESISTOR (1608TYPE)	R8 on PB	1
	00567089	RPC05T 331 J	CHIP RESISTOR (1608TYPE)	R4 on PB	1
	00567367	RPC05T 393 J	CHIP RESISTOR (1608TYPE)	R40 on JB	1
	00566967	RPC05T 470 J	CHIP RESISTOR (1608TYPE)	R26 on CB	1
	00567245	RPC05T 472 J	CHIP RESISTOR (1608TYPE)	R8,R52 on JB	2
	00567378	RPC05T 473 J	CHIP RESISTOR (1608TYPE)	R9,R10 on PB, R4,R5,R9,R10,R16-R20, R22,R24,R25,R28,R29,R30, R37,R39,R53,R55,R57 on JB	22
	00567501	RPC05T 474 J	CHIP RESISTOR (1608TYPE)	R59,R61 on JB	2
	00567389	RPC05T 563 J	CHIP RESISTOR (1608TYPE)	R4 on CB, R34,R35,R38,R41 on JB	5
	00566990	RPC05T 680 J	CHIP RESISTOR (1608TYPE)	R8,R13 on CB	2
	00567390	RPC05T 683 J	CHIP RESISTOR (1608TYPE)	R36 on JB	1
	00567401	RPC05T 823 J	CHIP RESISTOR (1608TYPE)	R7 on JB	1

POTENTIOMETER					
#	F3279805	RD901-40-125F-AF5-00D	POT. W/0 CLICK 250KA	VR4,VR5 on PB	2
	F3279802	RD901-40-125F-B54-00D	POT. W/0 CLICK 50KB	VR1,VR3 on PB	2
	F3279803	RD901-40-125F-B54-11D	POT. W/11 CLICKS 50KB	VR2 on PB	1

CAPACITOR					
#	F5359345	0.027U	CHIP CAPACITOR (1608TYPE)	C6 on JB	1
	F5367504	100/6.3V	CHIP CAPACITOR	C1,C3,C4,C24,C42,C46 on CB	6
	F5369601	1/50V	CHIP CAPACITOR	C1,C2 on PB, C2,C5,C18,C39 on JB	6
	01674167	ECUV1H100DCV	CHIP CAPACITOR (1608TYPE)	C15,C39,C40 on CB, C19,C33 on JB	5
	01674278	ECUV1H470JCV	CHIP CAPACITOR (1608TYPE)	C34,C35 on CB	2
	01674334	ECUV1H101JCV	CHIP CAPACITOR (1608TYPE)	C7,C12,C17,C36,C37 on JB	5
	01674423	ECUV1H471JCV	CHIP CAPACITOR (1608TYPE)	C30,C31 on JB	2
	01674567	ECJ1VB1H562K	CHIP CAPACITOR (1608TYPE)	C13,C44 on CB, C14 on JB	3
	01674612	ECJ1VB1E103K	CHIP CAPACITOR (1608TYPE)	C4,C8,C32 on JB	3
	01674701	ECJ1VF1E104Z 0.1UF/16VK	CHIP CAPACITOR (1608TYPE)	C5-C12,C14,C16,C19,C21,C22, C23,C25,C26,C27,C29,C31,C33, C36,C37,C38,C41,C43,C47 on CB, C3 on PB, C11,C28,C38 on JB	30
	F5367503	47/6.3V	CHIP CAPACITOR	C26 on JB	1

F5367542	10/16V	CHIP CAPACITOR	C2,C20,C28,C30,C32 on CB.		#	F2259117	SHIELD SHEET		1
F5367546	100/16V	CHIP CAPACITOR	C4-C9 on PB. C24,C34,C35 on JB	14	#	G2177104	SPRING		2
02341489	ECPU1C474MA5	MYLAR CAPACITOR(SUBMICRON)	C18 on CB. C23,C29,C40 on JB	4					
			C10 on PB. C1,C9,C10 on JB	4					
INDUCTOR, COIL, FILTER									
F2449209	SLF7032T-151MR37-2(150UH)	COIL	L16 on JB	1					
F2449210	SLF7032T-4R7M1R7-2(4.7UH)	COIL	L15 on JB	1					
02563478	NFM4516P13C204F	EMI FILTER	C21 on JB	1					
12449381	SBT-0460TF	EMI FILTER	L14 on JB	1					
#	12449386	SBT-0180W	EMI FILTER	FL1 on JB	1				
	00903167	N2012Z601T02	FERRITE-BEAD (CHIP)	L1-L7 on CB. L1-L10,L12,L13 on JB	19				
CRYSTAL, RESONATOR									
	01899745	AT-41CD2 6.4MHZ	CRYSTAL	X3 on CB	1				
	00901912	MA-406 24.576MHZ TE24	CRYSTAL	X2 on CB	1				
CONNECTOR									
	F3439160	53015-0210 2P P=2MM	CONNECTOR	CN6 on JB	1				
#	F3439165	A2001WR2-10P	CONNECTOR	CN3 on CB	1				
#	F3439166	A2001WR2-11P	CONNECTOR	CN2 on CB	1				
#	F3439167	A2001WR2-14P	CONNECTOR	CN1 on CB	1				
#	F3439164	A2001WR2-8P	CONNECTOR	CN1 on JB	1				
WIRING, CABLE									
	G3477146	3P L=40x5x5 MM P=2MM	RIBBON CABLE	CN3 on JB to CN4 on JB	1				
#	G3487222	WIRING 8P		CN3 on PB to CN1 on JB	1				
#	G3487221	WIRING 10P		CN1 on PB to CN3 on CB	1				
#	G3487220	WIRING 11P		CN2 on PB to CN2 on CB	1				
#	G3487219	WIRING 14P		CN2 on JB to CN1 on CB	1				
	G3487163	WIRING BATTERY	L=80MM 2P		1				
SCREWS									
	H5019430	SCREW 2.6x5	BINDING HEAD TAPTITE P FEZC		2				
	H5019110	SCREW 3x6	PAN HEAD TAPTITE-2 FEZC		12				
	H5029325	SCREW 3x6	PAN HEAD TAPTITE-2 BZC		5				
	H5019115	SCREW 3x8	PAN HEAD TAPTITE-2 BZC		2				
	H5029850	SCREW M4x6	HEXAGON SOCKET BUTTON HEAD FENI		4				
	H5029852	SCREW 4M3	HEXAGON SOCKET BUTTON HEAD FEBZC		2				
	40123545	JACK NUT M9x11x2	NI		5				
	40016467	JACK WASHER M9.2x14x0.5	FENI		5				
	H5039521	VR ACCESSORY NUT M7			5				
	H5039413	NYLON WASHER M4.1x7.5x0.5	BLACK		2				
	H5039414	NYLON WASHER M5.1x9.5x0.5	BLACK		2				
	40011923	WASHER M9.1x13	INTERNAL TOOTH		2				
	H5039324	MINI JACK NUT M6	FENI		1				
PACKING									
#	G2567114	CD PACKAGE			1				
	G2607212	PACKING CASE LOWER			1				
#	G2627136	PACKING CASE UPPER			1				
	H2679505	POLYETHYLENE BAG	220x340x0.03		1				
	G2237614	REAR PAD			1				
	G2237613	SIDE PAD			1				
MISCELLANEOUS									
	G2257130	BATTERY INSULATING SHEET			1				
	G2177309	BATTERY TERMINAL(-)			1				
	G2177308	BATTERY TERMINAL(+)			1				
	G2177307	BATTERY TERMINAL(+/-)			1				
	G2357111	CUSHION R			2				
	G2257131	INSULATING SHEET BOTTOM			1				
	G2257129	INSULATING SHEET CENTER			1				
	F2539803	LABEL CAUTION	FCC/CE/C-TICK/EMC		1				
	02123845	LEAF A			2				
	G2197126	LED GUIDE			1				
	H2369427	LED SPACER	H=8MM		8				
#	G2197502	MINI JACK HOLDER			1				
	G2357115	PEDAL FOOT	M8		2				
	2215770201	PEDAL GUIDE BUSH			2				
#	G2537848	QUICK MANUAL LABEL			1				
#	F2259116	SHIELD COVER			1				

TEST MODE

Test items

1. FLASH ROM check
2. Version number check
3. Switch and LED check
4. LEVEL volume check
5. GUIDE volume check
6. DA check
7. Output check
8. INST volume check
9. MIC volume check
10. MUTE check
11. AUX IN (NORMAL) check
12. AUX IN (FLAT AMP SIMULATE) check
13. AUX IN (CENTER CANCEL) check
14. AUX IN (L ch) check
15. CN2 solder spot check
16. Noise check
17. Battery operation check
 - Note : Test items 7.to15. also include a PHRASE SELECT volume check.

Items required for tests

- Oscillators x 2
- Oscilloscope
- Noise meter
- Monitor amp
- FS-5U x 2
- 1k ohm stereo short plug
- 150 ohm short plug
- 47k ohm short plug
- J-5
- Stereo mini <-> monaural phone conversion cable

Entering test mode

- Set all volumes to minimum.
- While holding down the left pedal (REC/PLAY/OVERDUB) and right pedal (STOP/TAP TEMPO), connect the adaptor to the ADAPTOR JACK to turn on the power.
- When only the POWER LED is lit, within two seconds press the left pedal and then the right pedal.
- You will enter Test mode, and all LEDs other than "PEAK" will either light or blink.
 - Note : A FLASH ROM check is automatically performed when you enter Test mode. The state of the LEDs when you enter Test mode will depend on the result of this test. For details refer to the following item "1. FLASH check."
 - For details on how to skip directly to a desired test item, refer to "Skipping directly to the desired test," following the explanations of each test item.

Explanation of each test item

1. FLASH ROM check

- Enter Test mode.
- The FLASH ROM check will be performed when you enter Test mode.
- If there are no problems, all LEDs other than "PEAK" will light.

If there is a problem, the state of the LEDs will indicate the problem as follows.

"OVERDUB" (yellow) blinking : MAKER ID error
 "PLAY" (green) blinking : DEVICE ID error
 "REC" (red) blinking : BUSY error

Note : If a problem was found, operation will stop and it will not be possible to proceed to the next step. Turn off the power to exit Test mode.

If there are any unlit LEDs regardless of whether or not there was a problem, it is possible that the LED is faulty or soldered incorrectly. (With the exception of "PEAK.")

2. Version number check

- Press the right pedal.
- The internal ROM version number and the external FLASH ROM version number will be indicated by the LEDs.

Internal ROM version number display

This is indicated by the four LEDs: "FLAT AMP SIMULATE", "CENTER CANCEL", "NORMAL", and "INST & MIC."

"FLAT AMP SIMULATE" only lit : Ver1.00

"CENTER CANCEL" only lit : Ver1.01

"NORMAL" only lit : Ver1.02

"INST & MIC" only lit : Ver1.03

External FLASH ROM version number display

This is indicated by the following seven LEDs: "REVERSE", "TAP TEMPO", "WRITE", "EXIT", "AUTO START", "MEMORY FULL", and "LOOP QUANTIZE."

"REVERSE" only lit : Ver1.00

"TAP TEMPO" only lit : Ver1.01

"WRITE" only lit : Ver1.02

"EXIT" only lit : Ver1.03

"AUTO START" only lit : Ver1.04

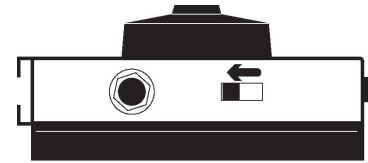
"MEMORY FULL" only lit : Ver1.05

"LOOP QUANTIZE" only lit : Ver1.06

- After verifying the version, press the right pedal.
- All LEDs other than "PEAK" will light.

3. Switches and LED check

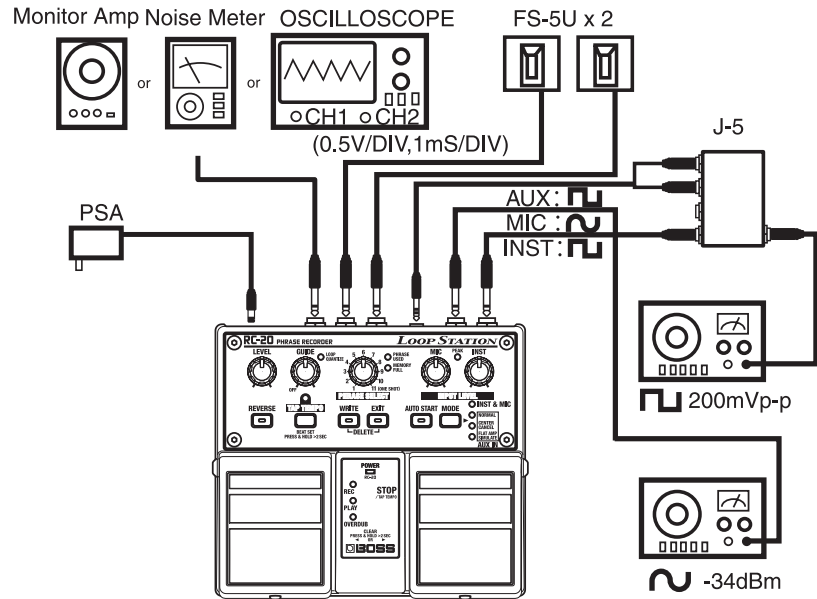
- Connect two FS-5U units to the PHRASE SHIFT jack and REVERSE jack.
- Set the FS-5U polarity switches to the position shown in the diagram.



- Press the REVERSE switch.
- Verify that "REVERSE", "PLAY", "OVERDUB", and "PHRASE USED" go dark, and that "TAP TEMPO" changes from orange to red.
- Press the TAP TEMPO switch, and verify that "TAP TEMPO" goes dark.
- Press the WRITE switch, and verify that "WRITE" goes dark.
- Press the EXIT switch, and verify that goes dark "EXIT."
- Press the AUTO START switch, and verify that "AUTO START" goes dark.
- Press the MODE switch, and verify that "INST & MIC", "NORMAL", "CENTER CANCEL", and "FLAT AMP SIMULATE" go dark.
- Press the FS-5U that is connected to the PHRASE SHIFT jack, and verify that "MEMORY FULL" goes dark.
- Press the FS-5U that is connected to the REVERSE jack, and verify that all LEDs other than "PEAK" light.

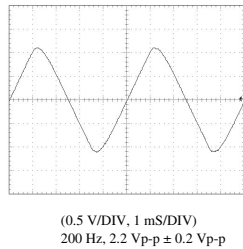
4. LEVEL volume check

- Connect your waveform measurement equipment as shown in the diagram below. Connect your oscilloscope to OUTPUT.



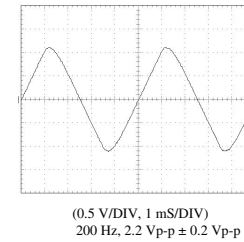
Input INST : 200Hz, square wave, 200 mVp-p
 MIC : 200 Hz, sine wave, -34 dBm
 AUX IN : 200 Hz, square wave, 200 mVp-p, STEREO

- Move the LEVEL volume to approximately the center position, and then back to the minimum position.
- Move the LEVEL volume from 'minimum' to 'maximum', and verify that the waveform increases smoothly. At this time, the MODE LEDs will light consecutively from "FLAT AMP SIMULATE," following the waveform.
- With the LEVEL volume at maximum, verify that the output waveform is the same as shown in the diagram.



5. GUIDE volume check

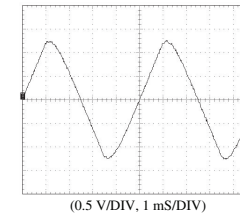
- Move the GUIDE volume to approximately the center position, and then back to the minimum.
- Move the GUIDE volume from 'minimum' to 'maximum,' and verify that the waveform increases smoothly. At this time, the MODE LEDs will change successively from "FLAT AMP SIMULATE," following the waveform.
- With the GUIDE volume at maximum, verify that the output waveform is the same as shown in the diagram.



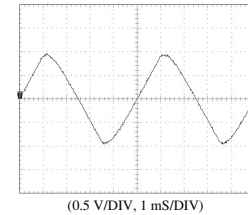
6. DA check

- Once again check the output waveform at the point that "5. GUIDE volume check" is completed, to check the DC leakage and level. In the following cases, the result is NG.

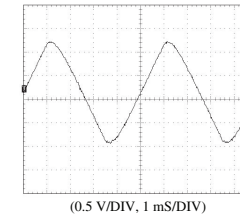
Excessive level NG



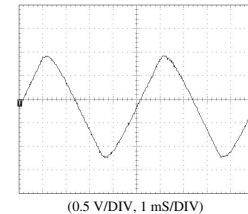
Insufficient level NG



+DC NG

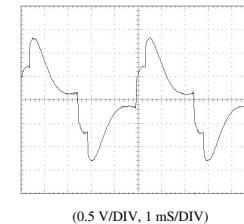


-DC NG



7. Output check

- Set the INST volume and MIC volume to 'maximum.'
- Set the PHRASE SELECT volume to the '2' position.
- Verify that "OVERDUB" and "REVERSE" are lit.
- Verify that the output waveform is as shown in the diagram.

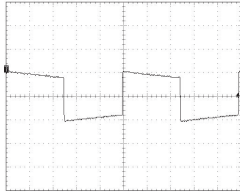


Note : The waveform will change slightly depending on the inaccuracy of the input function.

8. INST volume check

- Set the PHRASE SELECT volume to the '3' position.
- Verify that "REVERSE" is dark and "TAP TEMPO" is lit red.

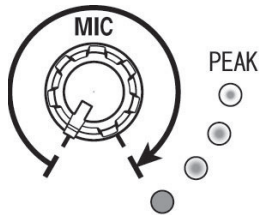
- Set the INST volume to 'minimum,' and slowly move it to 'maximum.'
- Verify that the waveform increases smoothly.
- Verify that that when the INST volume is at maximum, the waveform is the same as shown in the diagram.



(0.5 V/DIV, 1 mS/DIV)
1.2 Vp-p ± 0.2 Vp-p

9. MIC volume check

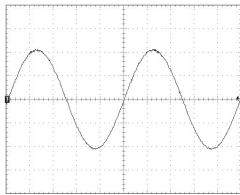
- Set the PHRASE SELECT volume to the '4' position.
- Verify that "TAP TEMPO" changes from red to green.
- Set the MIC volume to minimum, and gradually move it to maximum.
- Verify that the waveform increases smoothly.
- Verify that "PEAK" lights as shown in the diagram.



(The start illuminating of the LED indication.)

(The LED indication will stay illuminated.)

- Verify that when MIC volume is at maximum, the waveform is the same as shown in the diagram.

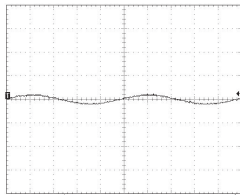


(0.5V/DIV, 1mS/DIV)

- Connect a noise meter to OUTPUT, and verify that the reading is in the range of -1.0 dBm +/- 1.5 dBm.

10.MUTE check

- Set the PHRASE SELECT volume to the '5' position.
- Verify that "TAP TEMPO" is dark and "LOOP QUANTIZE" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.

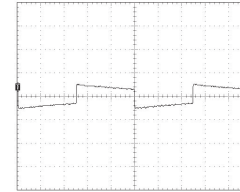


(0.5V/DIV, 1mS/DIV)

- Connect a noise meter to OUTPUT, and verify that the reading is in the range of -22.0 dBm +/- 1.5 dBm.

11.AUX IN (NORMAL) check

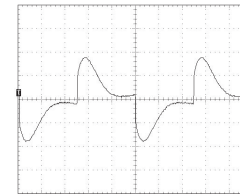
- Set the PHRASE SELECT volume to the '6' position.
- Verify that "LOOP QUANTIZE" is dark and "PHRASE USED" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.



(0.5V/DIV, 1mS/DIV)
0.6Vp-p ± 0.1Vp-p

12.AUX IN (FLAT AMP SIMULATE) check

- Set the PHRASE SELECT volume to the '7' position.
- Verify that "PHRASE USED" is dark and "INST & MIC" is lit.
- Verify that the output waveform is the same as the waveform shown in the diagram.



(0.5V/DIV, 1mS/DIV)
2.0Vp-p ± 0.2Vp-p

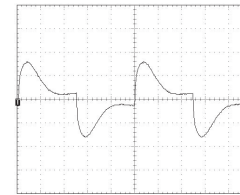
- Press the FS-5U that is connected to the REVERSE jack, and verify that the waveform does not decrease.

13.AUX IN (CENTER CANCEL) check

- Set the PHRASE SELECT volume to the '8' position.
- Verify that "INST & MIC" is dark and "NORMAL" is lit.
- Verify that there is no longer an output waveform.
- Note : If the waveform remains, it is possible that the CENTER CANCEL section is NG, or that there is a spot of solder on the connector.

14.AUX IN (L ch) check

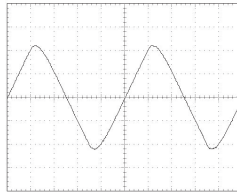
- Set the PHRASE SELECT volume to the '9' position.
- Verify that "NORMAL" is dark and "CENTER CANCEL" is lit.
- Input only the L channel to AUX IN.
- Verify that the output waveform is the same as the waveform shown in the diagram.
- Note : Verify that when compared with the output waveform of "12. AUX IN (FLAT AMP SIMULATE) check," the phase is inverted.



(0.5V/DIV, 1mS/DIV)
1.8Vp-p ± 0.2Vp-p

15. CN2 solder spot check

- Set the PHRASE SELECT volume to the '10' position.
- Verify that "CENTER CANCEL" is dark and "FLAT AMP SIMULATE" is lit.
- Verify that there is no longer an output waveform.
Note : If the waveform remains, it is possible that there is a spot of solder between pins 1-2 or 2-3 of CN2.
- Set the PHRASE SELECT volume to the '11' position.
- Verify that all LEDs are lit except for "PEAK."
- Verify that the output waveform is the same waveform as shown in the diagram.



(0.5V/DIV, 1ms/DIV)
200Hz, 2.2Vp-p ± 0.2Vp-p

16. Noise check

- Set the PHRASE SELECT volume to the '2' position.
- Connect a 47k ohm short plug to the INST jack, a 150k ohm short plug to the MIC jack, and a 1 k ohm stereo short plug to the AUX IN jack.
- Connect a monitor amp to OUTPUT.
- Set the INST volume and MIC volume to the maximum.
- Drop the unit from a height of 10 cm, and verify that no abnormal noise is output.
- Turn the INST volume and MIC volume, and verify that no abnormal noise is output.
- With the INST volume and MIC volume at the maximum positions, measure the residual noise, and verify that it is less than -78 dBm (IHF-A).

17. Battery operation check

- Put the battery in the battery compartment and insert the plug into the INPUT jack.
- Check that power is turned on.
- Check that the unit is operating normally.

Note : Always check the battery after repairing or servicing the product.

Skipping directly to the desired test

- Enter Test mode.
- The FLASH ROM check will occur automatically, and if there is no problem, all LEDs other than "PEAK" will light.
- Follow the procedure described in the section for the test you want to perform.
Note : In order to perform "5. GUIDE volume check," you must first perform "4. LEVEL volume check."
Note : Even if it is not immediately after entering Test mode, you can select the desired test item in the same way whenever all LEDs other than "PEAK" are lit.

Exiting Test mode

- Disconnect the plug from the ADAPTOR jack to turn off the power.

Cautions

After repairing or servicing the product, you must check all test items.

SERIAL DUMP AND UPDATE PROCEDURE

The following data can be transmitted and received between two RC-20 units without using any other devices.

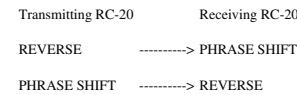
1. Program

- The operating program is stored in CPU ROM, but some processing can be altered by applying patches.
This corresponds to such patch data.
- 2. Guide sound
- 3. Phrases (1 - 11)

Procedure

1. Connect the transmitting RC-20 and the receiving RC-20 as follows.

Connect the REVERSE jack and PHRASE SHIFT jack respectively.



2. Start up the transmitting RC-20 in Dump mode.

- 1) While holding down the [TAP TEMPO] and [AUTO START] buttons, turn on the power of the transmitting RC-20.
- 2) [EXIT] and the [FLAT AMP SIMULATE] and [REC] [PLAY] [OVERDUB] indicators will light.

3. Start up the receiving RC-20 in Update mode.

- 1) Turn the [LEVEL] knob and [GUIDE] knob all the way to the left.
- 2) Set the [PHRASE SELECT] knob to 1.
- 3) While holding down the [REVERSE] and [MODE] buttons, turn on the power of the receiving RC-20.
- 4) Within three seconds of turning on the power, press the [REVERSE] button and then the [MODE] button.
[WRITE] and the [FLAT AMP SIMULATE] and [REC] [PLAY] [OVERDUB] indicators will light.

* In Dump mode the [EXIT] indicator will light, but in Update mode the [WRITE] indicator will light.

4. Select the data that you want to send from the transmitting RC-20

- 1) Press the [TAP TEMPO] button to select the data that you want to send.
[TAP TEMPO] indicator
Dark : Program, Guide sound, All phrases
Green : Specified phrase
Red : Guide sound
Orange : Program

- 2) If the [TAP TEMPO] indicator is green, use the [PHRASE SELECT] knob to select the phrase that will be transmitted.

5. Transmit the data from the transmitting RC-20.

Transmission will begin when you press the left pedal of the transmitting RC-20.

When the [MODE] indicators of both the transmitting RC-20 and the receiving RC-20 stop at "FLAT AMP SIMULATE," transmission/reception has been completed.

* With the factory settings, transmitting the program, guide sound, and all phrases will require approximately 15 minutes.

Note : Never turn off the power until transmission/reception has been completed.

State of the transmitting RC-20

"FLAT AMP SIMULATE" Waiting to transmit

- * The RC-20 will briefly be in this state between data items.
- * Since the guide sound data is divided into two parts, the RC-20 will briefly be in this state even when transmitting only the guide sound data.

"CENTER CANCEL" Now transmitting
"NORMAL" No data for transmission

State of the receiving RC-20

"FLAT AMP SIMULATE" Waiting for reception

- * The RC-20 will briefly be in this state between data items.
- * Since the guide sound data is divided into two parts, the RC-20 will briefly be in this state even when receiving only the guide sound data.

"CENTER CANCEL" Now receiving
"NORMAL" Error

- * An error will also occur if memory becomes full.

6. Repeat steps 4. -- 5. as necessary.

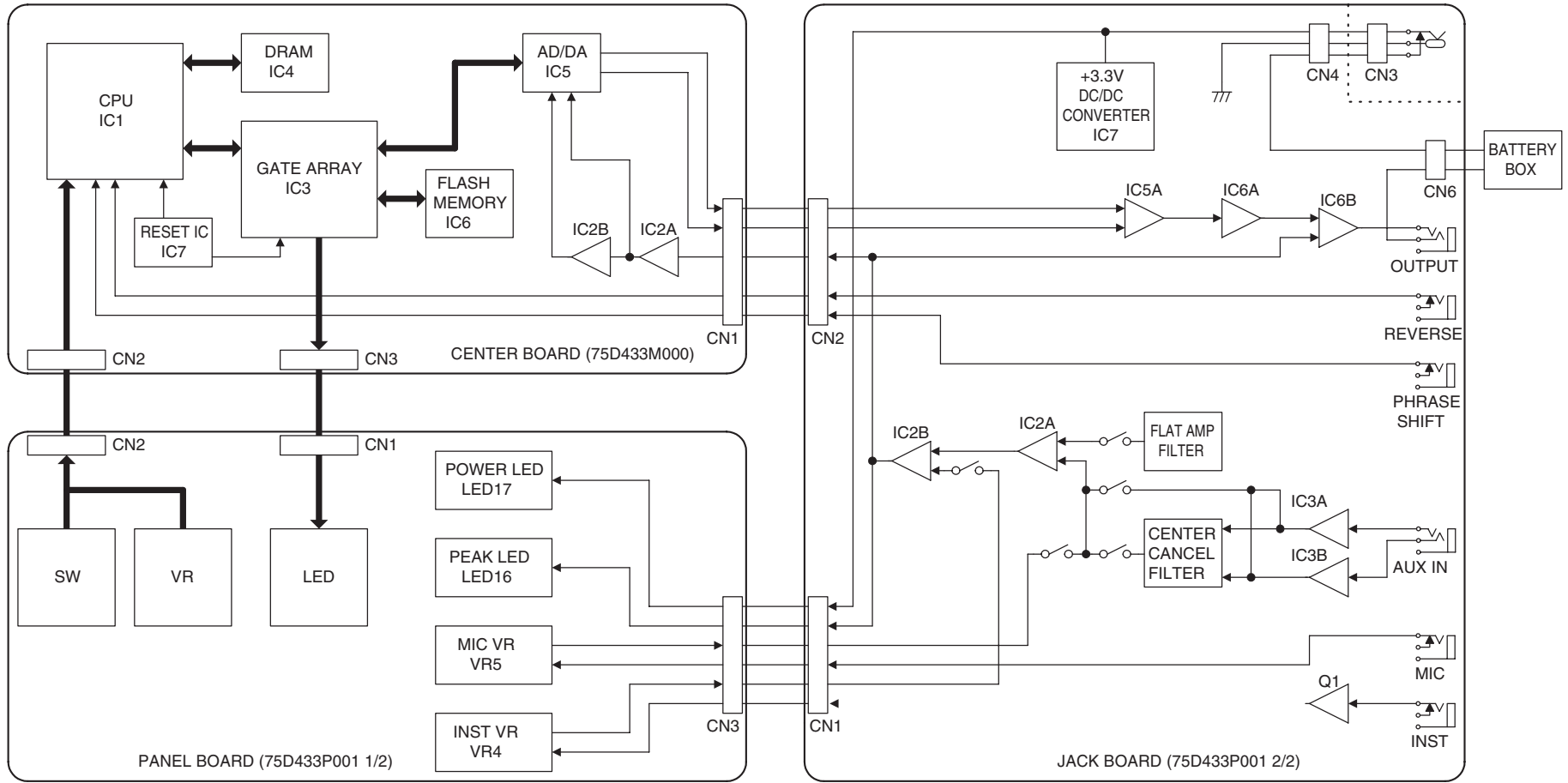
7. Turn off the power when you are finished.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A BLOCK DIAGRAM

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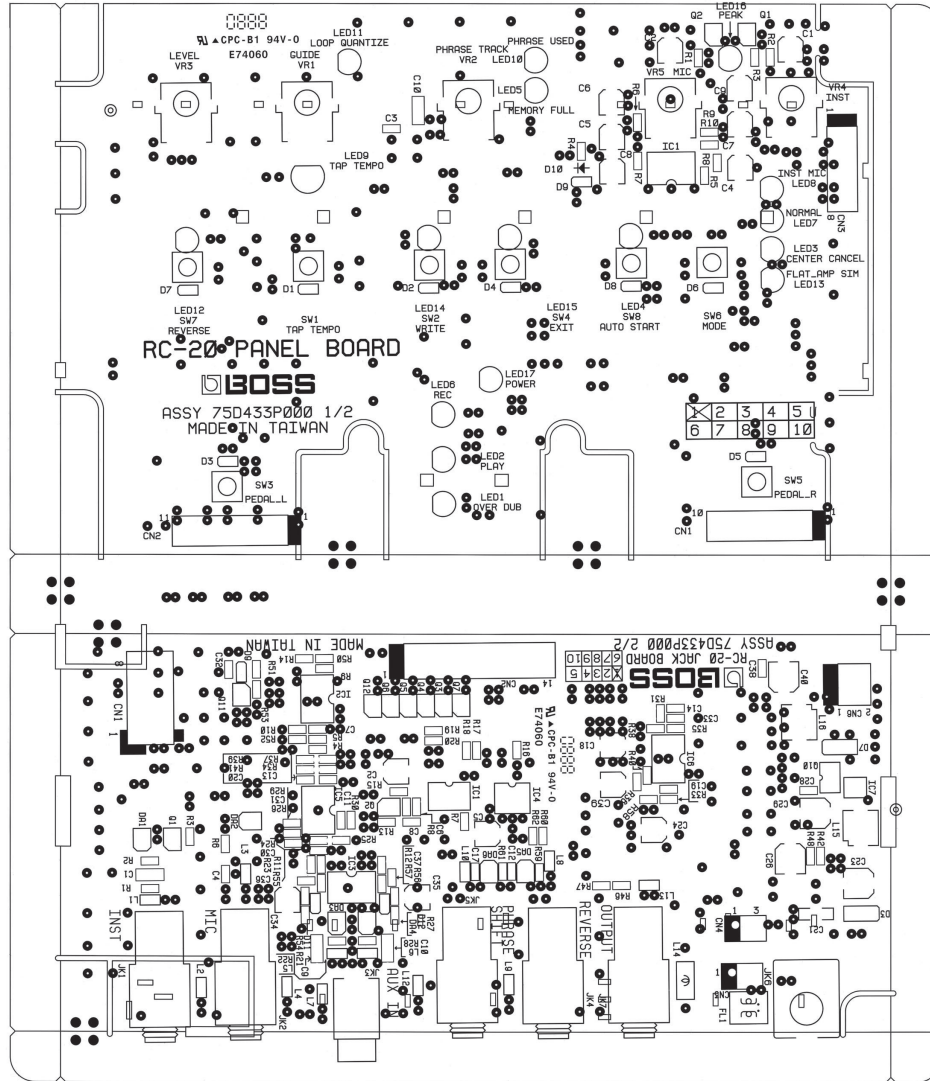
RC-20 Block Diagram



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (PANEL, JACK)

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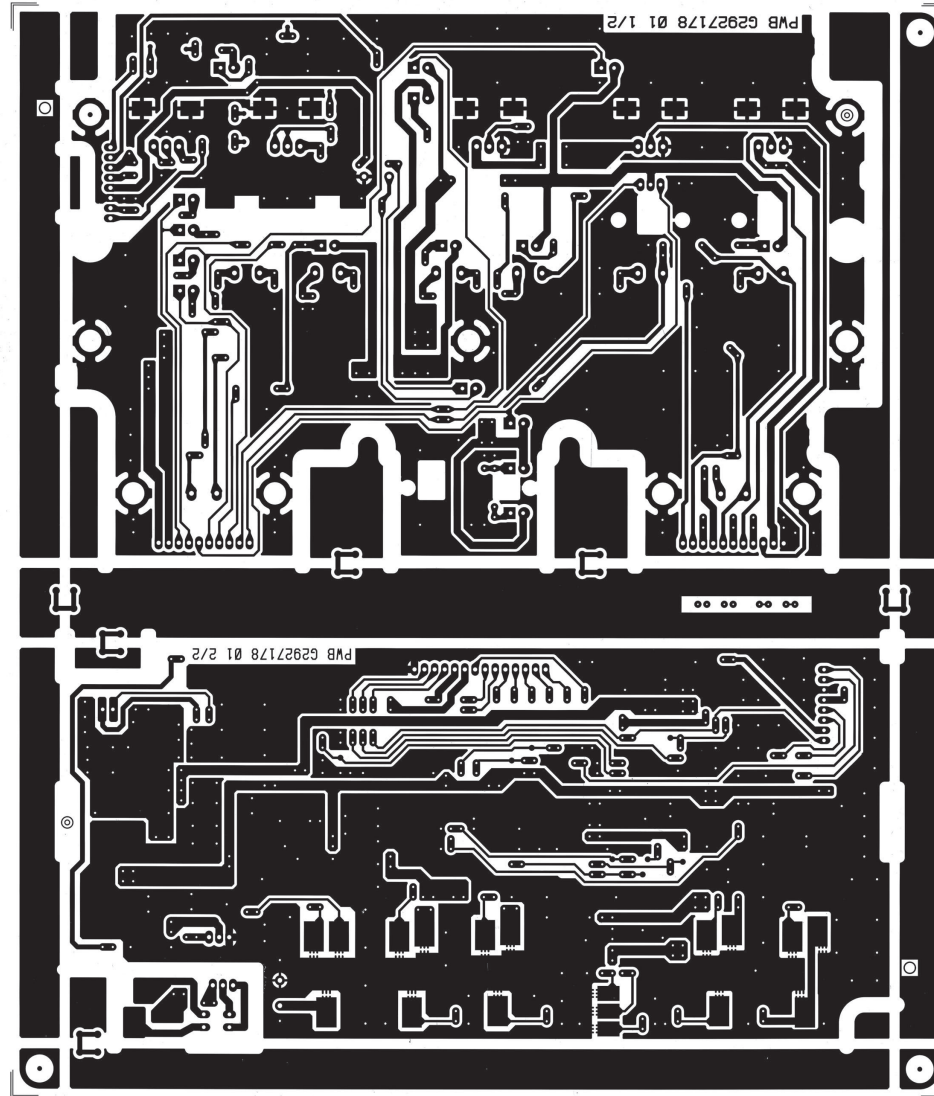


View from component side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT BOARD (PANEL, JACK)

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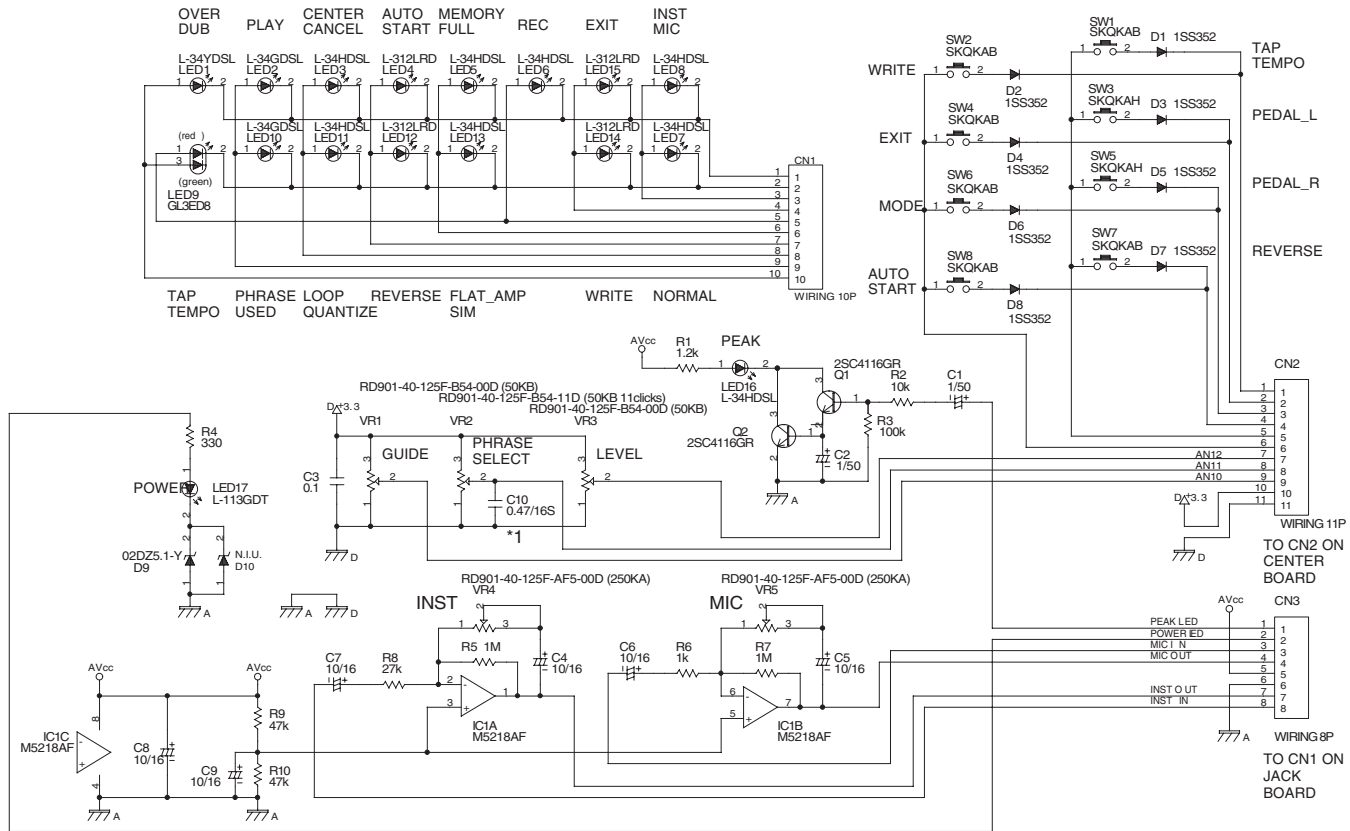


View from foil side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (PANEL)

B
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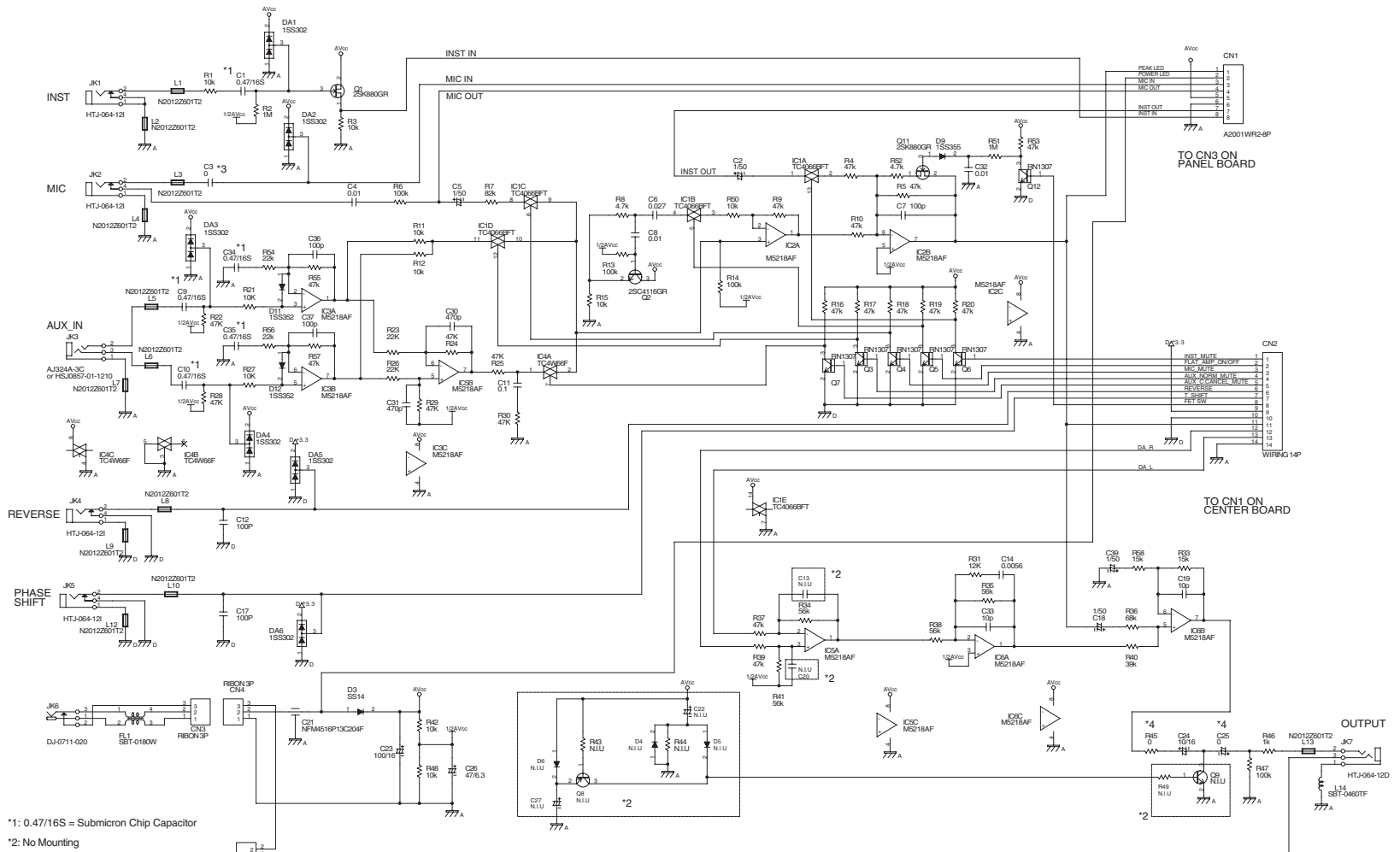
*1: 0.47/16S = Submicron Chip Capacitor

PANEL BOARD ASSY
75D433P000 1/2 *1LOT-16LOT
75D433P001 1/2 *17LOT-

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

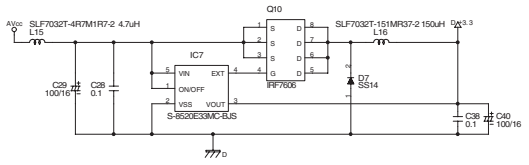
A CIRCUIT DIAGRAM (JACK 1-16 LOT)

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- *1: 0.47/16S = Submicron Chip Capacitor
- *2: No Mounting
- *3: Jumper Wire: 1 LOT
0 ohm(3216 Type): 2 LOT - 16 LOT
- *4: 0 ohm(1608 Type): 1 LOT - 16 LOT

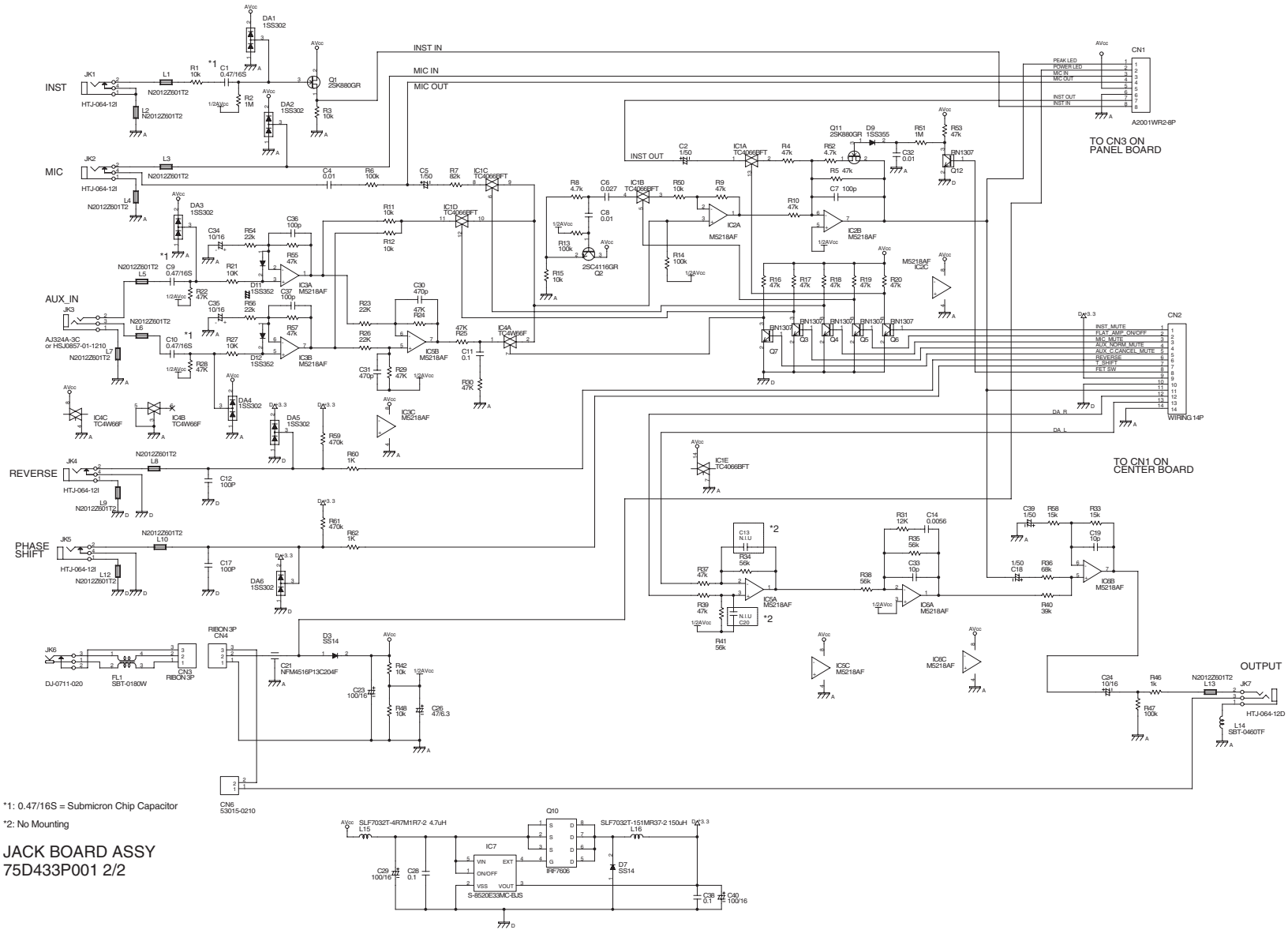
JACK BOARD ASSY
75D433P000 2/2



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (JACK 17 LOT up)

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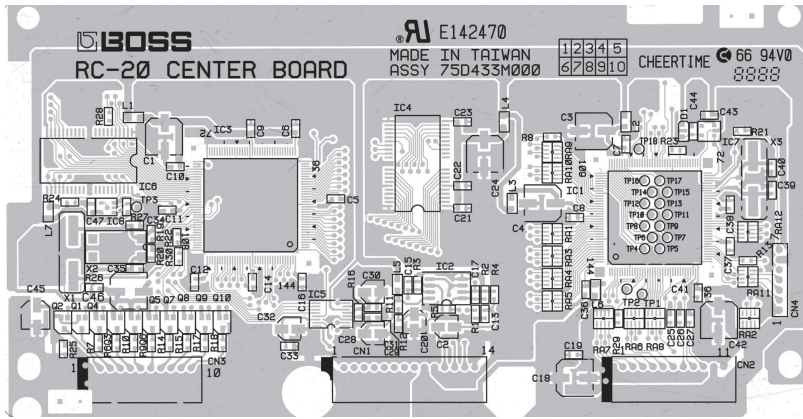
*1: 0.47/16S = Submicron Chip Capacitor
 *2: No Mounting

JACK BOARD ASSY
75D433P001 2/2

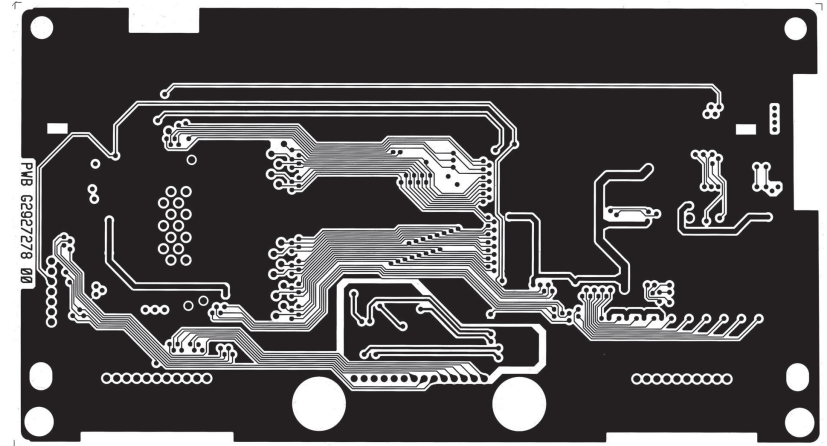
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A **CIRCUIT BOARD (CENTER)**

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View from component side

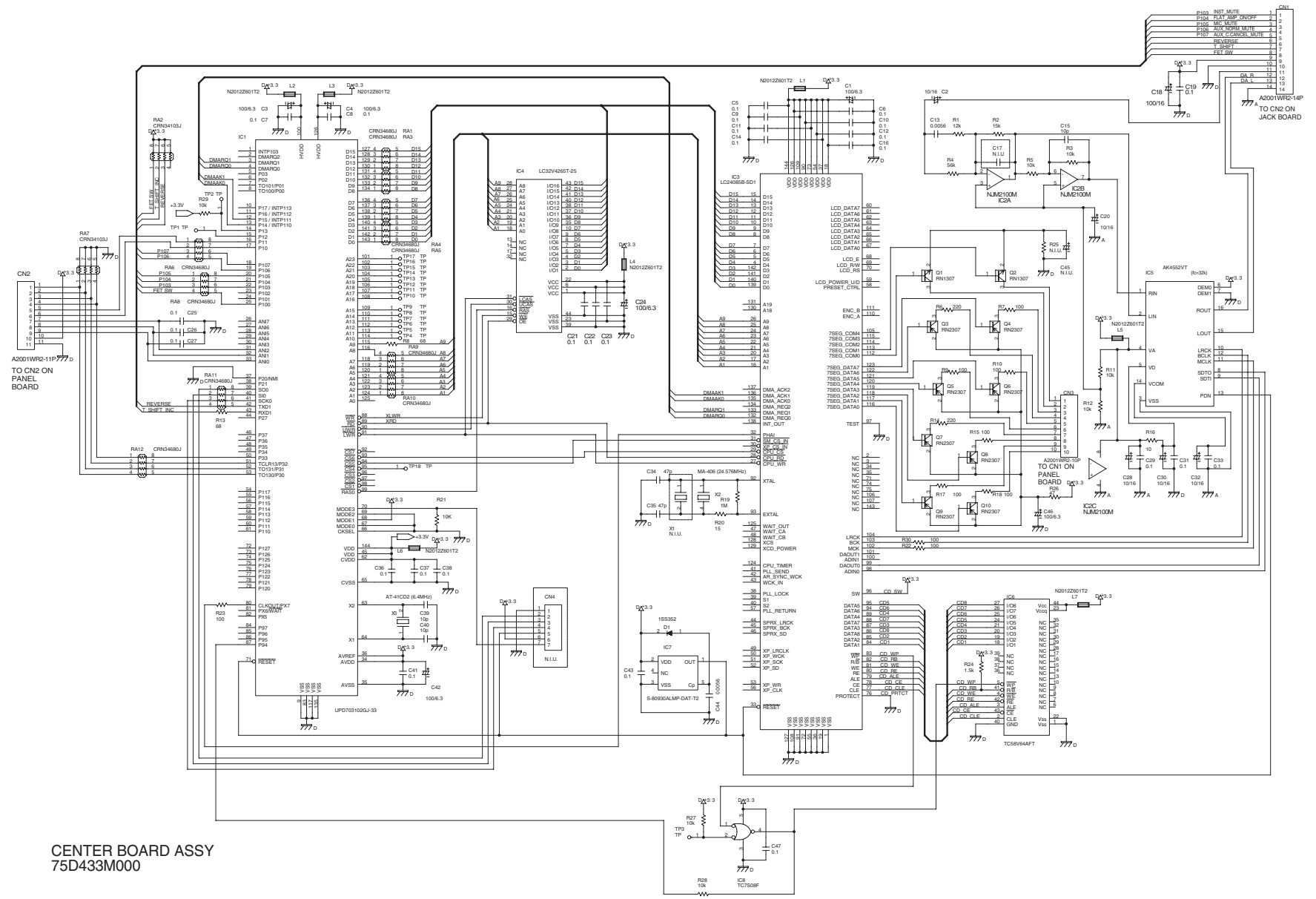


View from foil side

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

A CIRCUIT DIAGRAM (CENTER)

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CENTER BOARD ASSY
75D433M00