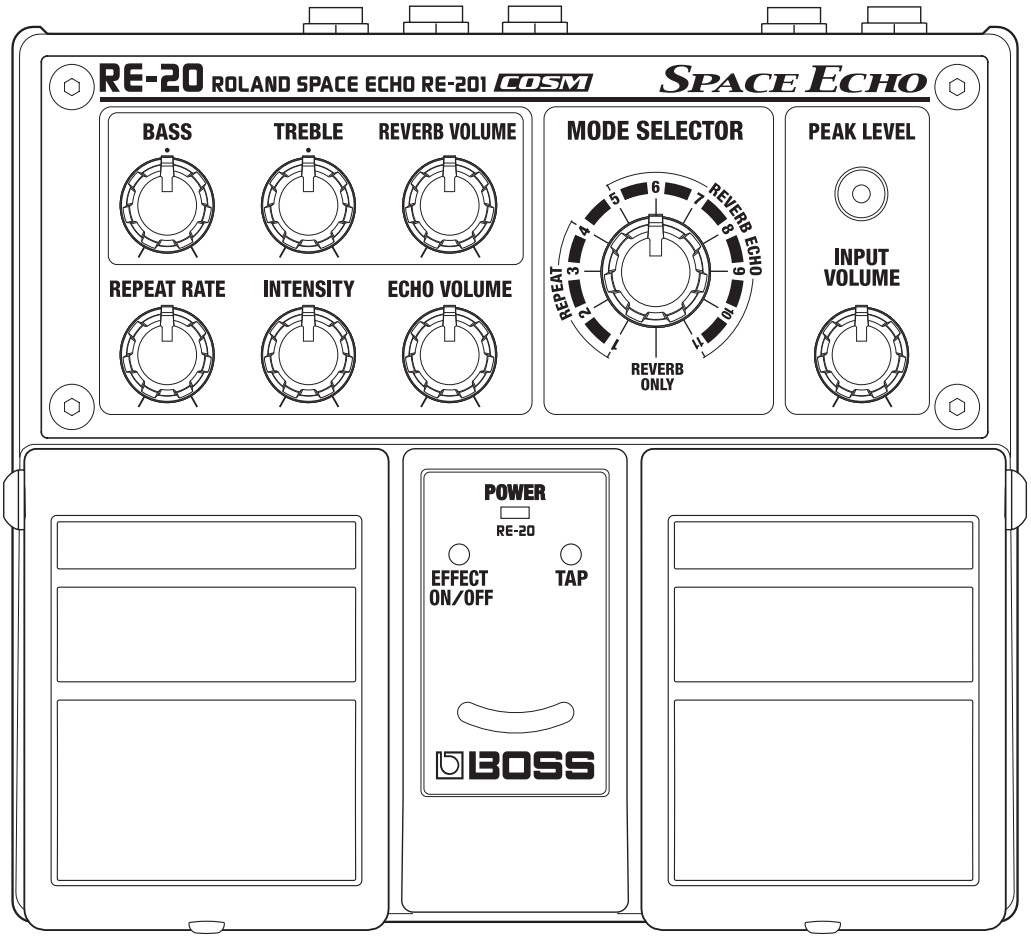
BOSS
RE-20 COSM
ROLAND SPACE ECHO RE-201

SERVICE NOTES
Issued by RJA

Table of Contents

Revice Infomation

July, 18, 2008 Part Name Corrected (p. 7, p. 13)



Roland
17058511E0
Printed in Japan (0370) (SC-MZ)

Cautionary Notes

Before beginning the procedure, please read through this document. The matters described may differ according to the model.

No User Data

This product cannot save user data. Backing up user data during servicing is not required.

Parts List

A component whose part code is ******* cannot be supplied as a service part because one of the following reasons applies.

- Because it is supplied as an assembled part (under a different part code).
- Because a number of circuit boards are grouped together and supplied as a single circuit board (under a different part code).
- Because supply is prohibited due to copyright restrictions.
- Because reissuance is restricted.
- Because the part is made to order (at current market price).

Circuit Diagram

In the circuit diagram, "NIU" is an abbreviation for "NOT IN USE." The circuit board and circuit-board diagram show silk-screened indications, but no components are mounted.

Main Specifications

RE-20 (40370): Space Echo

●Controls

- EFFECT ON/OFF pedal
- TAP pedal
- BASS knob
- TREBLE knob
- REVERB VOLUME knob
- REPEAT RATE knob
- INTENSITY knob
- ECHO VOLUME knob
- MODE SELECTOR knob
- INPUT VOLUME knob
- DIRECT switch

●Indicators

- POWER indicator (serves also as battery check indicator)
- PEAK LEVEL indicator
- EFFECT ON/OFF indicator
- TAP indicator

●Connectors

- INPUT jacks A/MONO, B (1/4 inch phone type)
- OUTPUT jacks A/MONO, B (1/4 inch phone type)
- EXP PEDAL jack (1/4 inch TRS phone type)
- DC IN jack (DC 9 V)

●Nominal Input Level

-20 dBu (INPUT VOLUME knob: center), max +4 dBu

●Input Impedance

1 MΩ

●Nominal Output Level

-20 dBu

●Output Impedance

1 kΩ

●Recommended Load Impedance

10 kΩ or greater

●Power Supply

DC 9 V: Dry battery LR6/R6 (AA) type x 6, AC Adaptor (PSA series)

●Current Draw

75 mA (9 V max.)
Expected battery life under continuous use:
Carbon: 9 hours
Alkaline: 32 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 11 oz (including batteries)

●Accessories

- Owner's Manual (English) (#G6027121R1)
- Leaflet ("USING THE UNIT SAFELY," "IMPORTANT NOTES," and "Information") (#G6017303R3)
- Dry battery R6 (AA) type (carbon) x 6 (#*******)

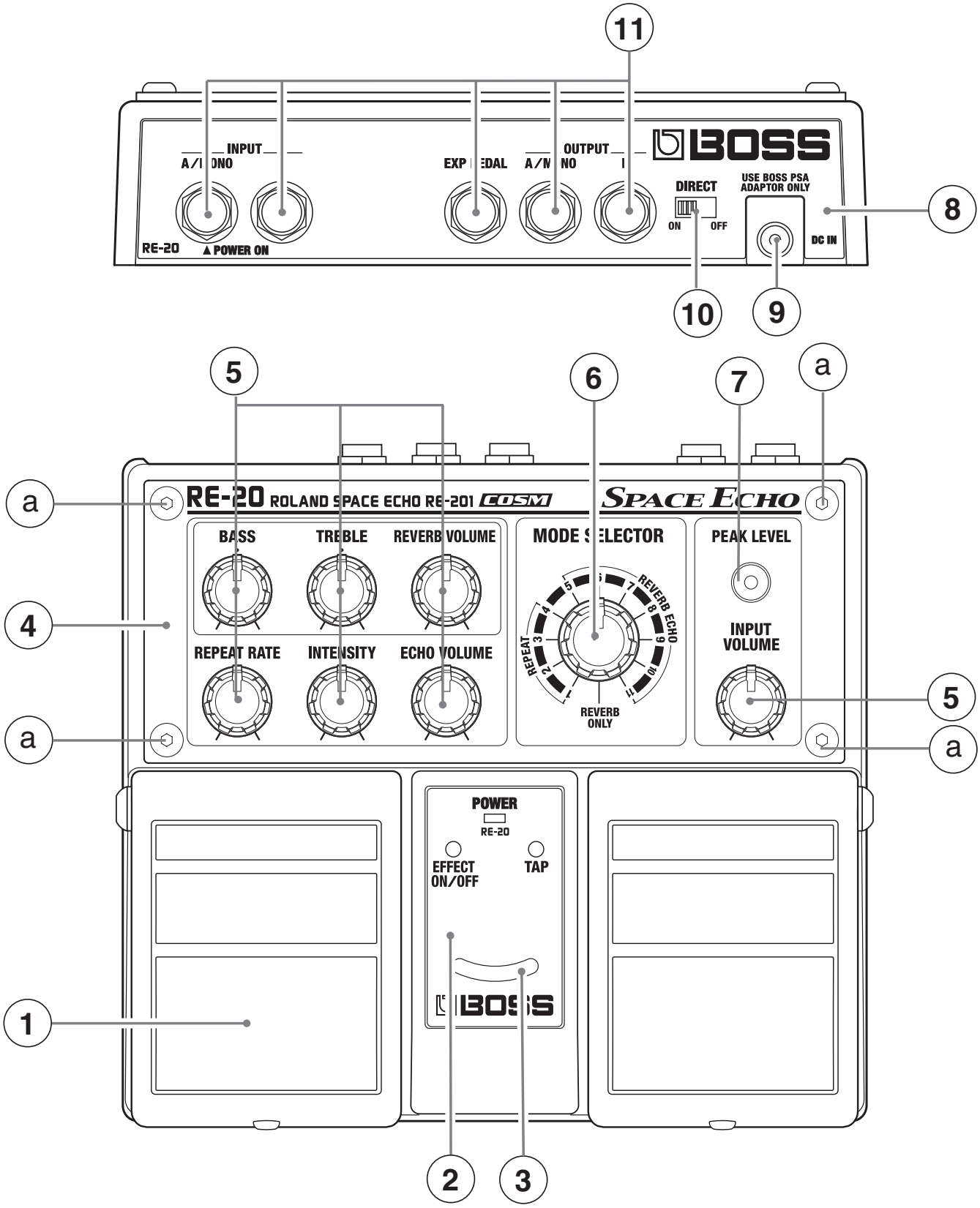
●Options

- Owner's Manual (Japanese) (#G6017467R0)
- AC Adaptor (PSA series)
- Expression pedal (Roland EV-5)

* *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.*

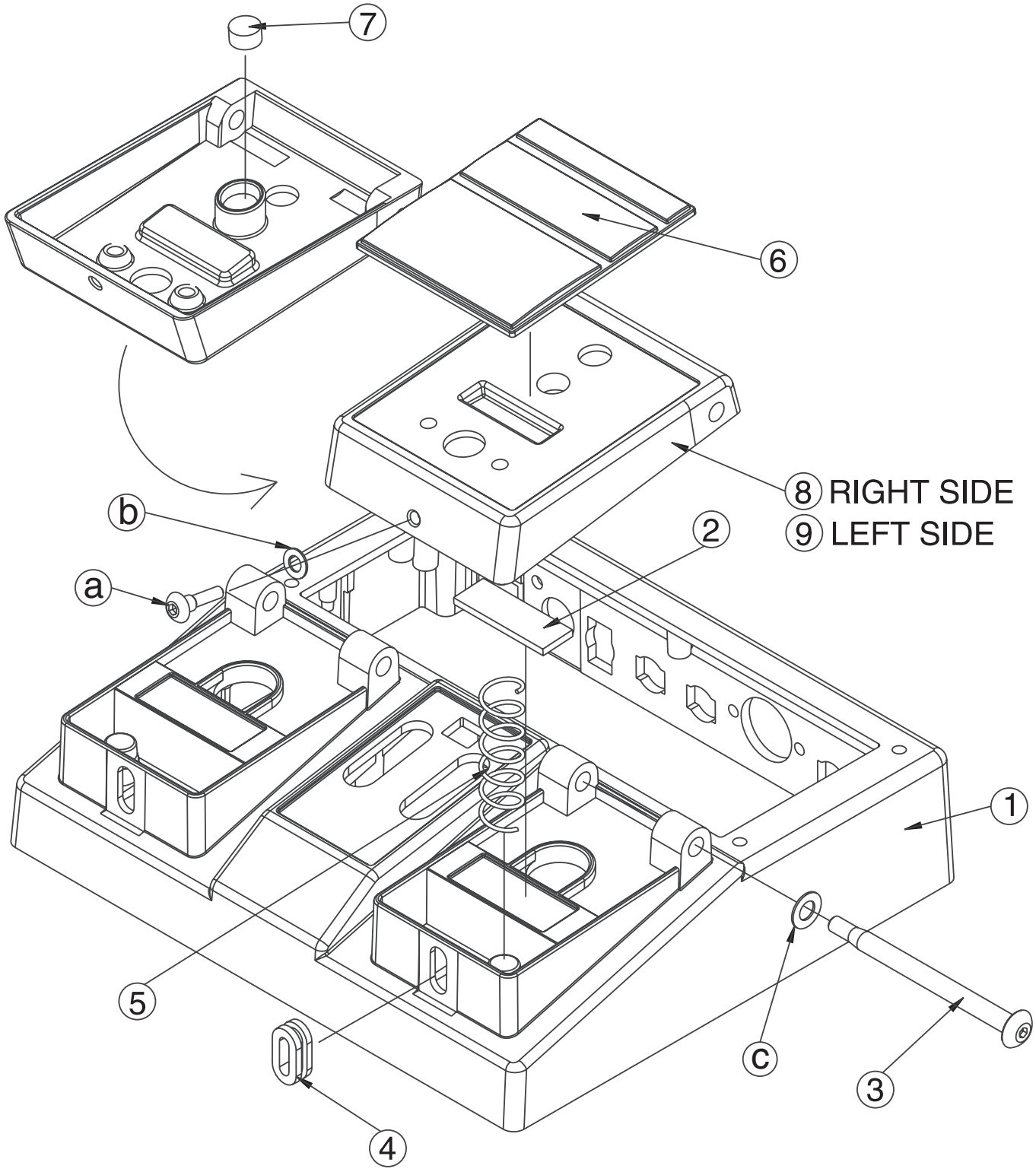
Location of Controls



Location of Controls Parts List

No.	Part Code	Part Name	Description	Q'ty
1	G2357116R0	PEDAL PLATE	62X53	2
2	G2217784R0	LED PANEL		1
3	G2147896R0	LED COVER		1
4	G2217785R0	PANEL		1
5	75D522N0R0	MINIMUM VR KNOB		7
6	G2477521R0	R-KNOB		1
7	G2207420R0	LED ESCUTION		1
8	G2127314R0	REAR PANEL		1
9	F3449415R0	ADAPTOR JACK	KM02009BB	1
10	F3159104R0	SLIDE SWITCH	SS037-P222BHH-PE9	1
11	F3449707R0	STEREO JACK	HTJ-064-12DS	5
a	H5029855R0	SCREW M4X8	HEXAGON BUTTON HEAD FE NI	4

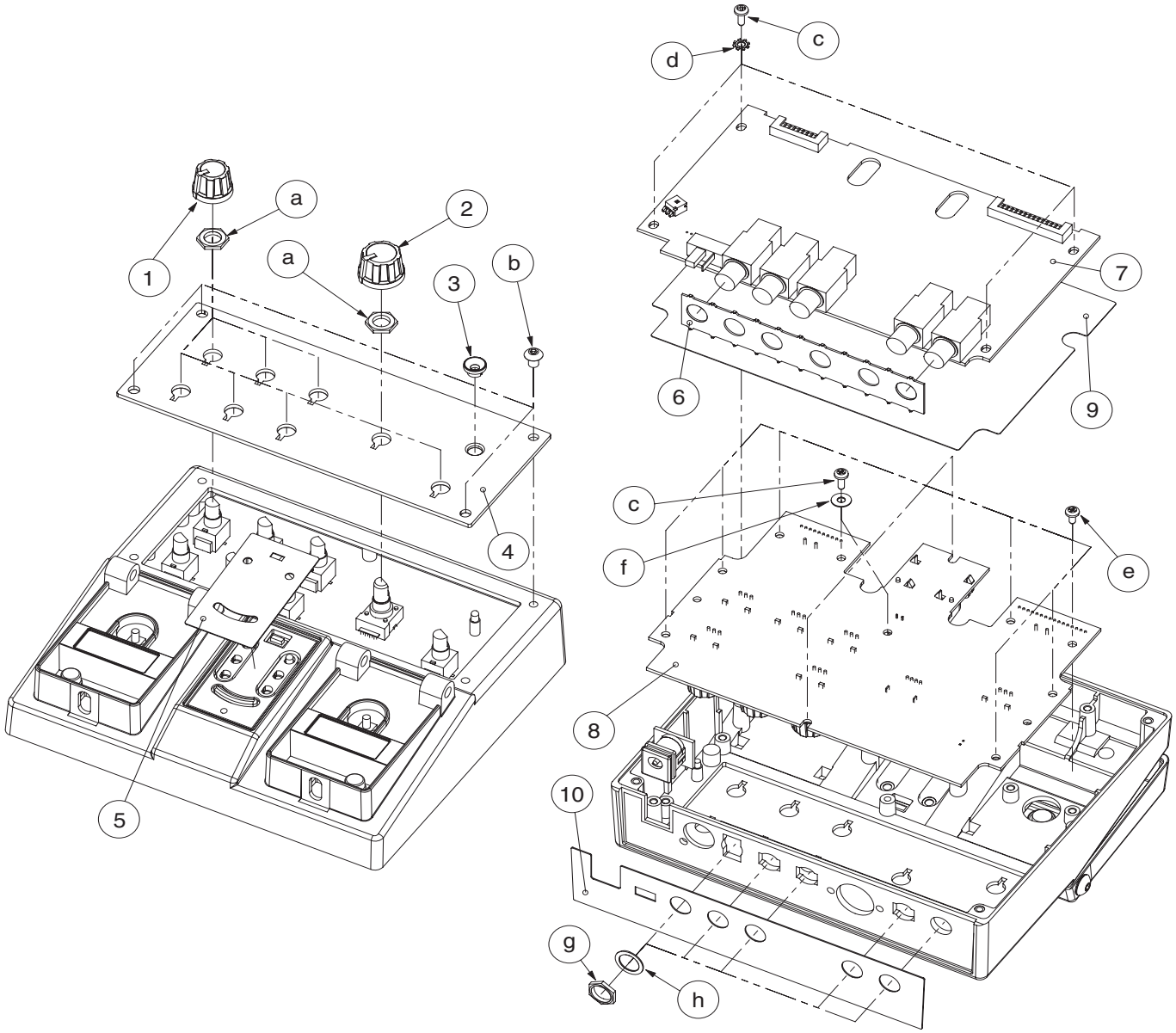
Exploded View (1)



Exploded View (1) Parts List

No.	Part Code	Part Name	Description	Q'ty
1	75E282C0R0	CASE		1
2	G2357111R0	CUSHION R		2
3	H5029851R0	PEDAL SHAFT		2
4	22157702R0	PEDAL GUIDE BUSH		2
5	22177109R0	COIL SPRING		2
6	G2357116R0	PEDAL PLATE	62X53	2
7	G2357115R0	PEDAL FOOT	M8	2
8	75E282R0R0	PEDAL R		1
9	75E282L0R0	PEDAL L		1
a	H5029852R0	SCREW 4M3 FEBZC	HEXAGON SOCKET BUTTON HEAD	2
b	H5039413	NYLON WASHER M4.1X7.5X0.5	~~M4.1X7.5X0.5 BZC~~ BLACK	2
c	H5039414R0	NYLON WASHER	M5.1x9.5x0.5 ~~BZC~~ BLACK	2

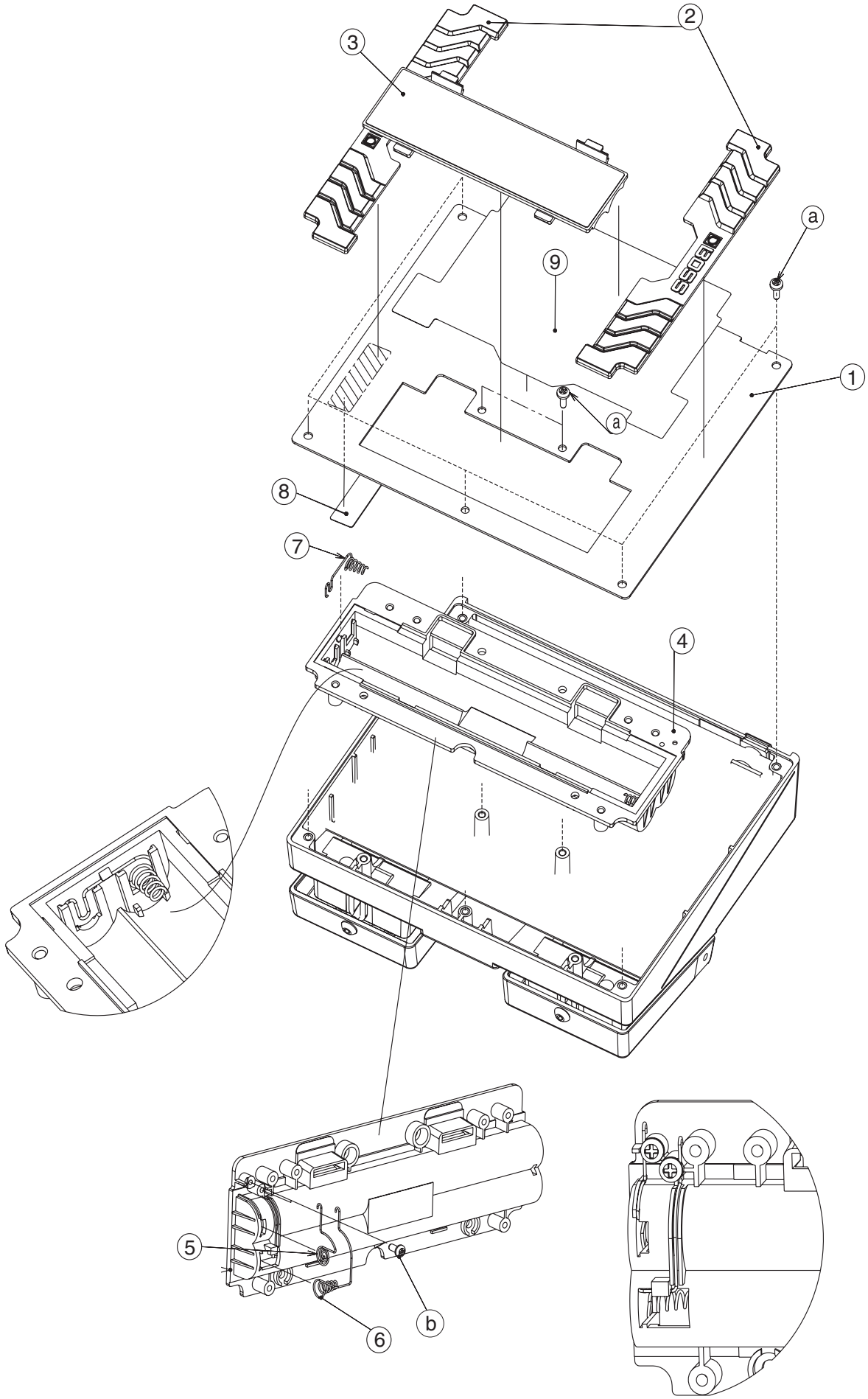
Exploded View (2)



Exploded View (2) Parts List

No.	Part Code	Part Name	Description	Q'ty
1	75D522N0R0	MINIMUM VR KNOB		7
2	G2477521R0	R-KNOB		1
3	G2207420R0	LED ESCUTION		1
4	G2217785R0	PANEL		1
5	G2217784R0	LED PANEL		1
6	G2147807R0	JACK HOLDER		1
	75E283S0R0	PANEL+JACK BOARD ASSY		1
		NOTE: 'PANEL+JACK BOARD ASSY' includes the following parts.		
7	*******	JACK BOARD ASSY		1
8	*******	PANEL BOARD ASSY		1
9	G2257129R0	INSULATING SHEET		1
10	G2127314R0	REAR PANEL		1
a	H5039521R0	NUT M7		8
b	H5029855R0	SCREW M4X8	HEXAGON BUTTON HEAD FE NI	4
c	H5019116R0	SCREW M3X8	PAN HEAD TAPPING-B1 ZC	6
d	H5039219R0	WASHER M3X6	TOOTH WASHER M3	4
e	H5019110R0	SCREW M3X6	PAN TAPPING B1 ZC	9
f	H5039111R0	WASHER	D8D3T0.5 ZC	2
g	H5039510R0	NUT M9X12X2T NI		5
h	H5039158R0	WASHER M9X14X0.5T NI		5

Exploded View (3)



Exploded View (3) Parts List

No.	Part Code	Part Name	Description	Q'ty
1	75D422E0R0	BOTTOM COVER		1
2	G2357118R0	BOTTOM FOOT		2
3	G2017621R0	BATTERY COVER		1
4	G2017620R0	BATTERY CASE		1
5	G2177308R0	BATTERY TERMINAL (+)		1
6	G2177309R1	BATTERY TERMINAL (-)		1
7	G2177307R1	BATTERY TERMINAL (+-)		1
8	G2257130R0	BATTERY INSULATING SHEET		1
9	G2547131R0	BOTTOM COVER LABEL		1
a	H5019115R0	SCREW M3X8	PAN TAPPING B1 BZC	7
b	H5019430	SCREW M2.6X5	BINDING HEAD TAPTITE FE ZC	2

Parts List

SAFETY PRECAUTIONS:
The parts marked ⚠ have safety-related characteristics. Use only listed parts for replacement.

Due to one or more of the following reasons, parts with parts code ******** cannot be supplied as service parts.

- Part supplied only as a component in a complete assembly
- Copyright does not permit the part to be supplied
- Part is sold commercially

NOTE: The parts marked # are new. (initial parts) The description "Q'TY" means a necessary number of the parts per one product.

CASING					
	G2017620R0	BATTERY CASE			1
	75D422E0R0	BOTTOM COVER			1
#	75E282C0R0	CASE			1
CHASSIS					
	G2357116R0	PEDAL PLATE	62X53		2
#	G2147807R0	JACK HOLDER			1
#	G2207420R0	LED ESCUTION			1
#	G2217784R0	LED PANEL			1
#	G2217785R0	PANEL			1
	G2147896R0	LED COVER			1
#	75E282L0R0	PEDAL L			1
#	75E282R0R0	PEDAL R			1
#	G2127314R0	REAR PANEL			1
KNOB, BUTTON					
	75D522N0R0	MINIMUM VR KNOB			7
#	G2477521R0	R-KNOB			1
SWITCH					
#	F3159104R0	SLIDE SWITCH	SS037-P222BHH-PE9	SW1 on Jack	1
#	13129778	SWITCH	SKQKAH	SW2,SW3 on Panel	2
JACK, EXT TERMINAL					
#	F3449415R0	JACK	KM02009BB	JK5 on Jack	1
	F3449707R0	LINE OUT JACK	HTJ-064-12DS	JK1,JK2,JK3,JK4,JK6 on Jack	5
PWB ASSY					
#	75E283S0R0	PANEL+JACK BOARD ASSY			1
		NOTE: 'PANEL+JACK BOARD ASSY' includes the following parts.			
#	********	JACK BOARD ASSY			1
#	********	PANEL BOARD ASSY			1
IC					
	04010990	IC (CUSTOM)	UPD800402GJ-211-UEN-A(ESC)	IC10 on Jack	1
	F5259710R0	IC (LOGIC)	TC7W04FK	IC8 on Jack	1
#	01672623	IC	TC74HC4053AFT	IC16 on Panel	1
#	03784434	IC(OP AMP)	NJM2100V	IC3 on Jack	1
#	04345889	IC(OP AMP)	NJM14558M	IC2,IC4 on Jack, IC15 on Panel	3
#	03018301	IC(SDRAM)	K4S641632K-UC75000	IC11 on Jack	1
#	04231223	IC(EEPROM)	HN58X24512FPIEZ	IC9 on Jack	1
	03562245	IC (EEPROM)	HN58X2402SFPI	IC7 on Jack	1
	F5289709R0	IC (RESEST)	BD45301G	IC13 on Jack	1
	02451434	IC (AD/DA)	AK4552VT	IC5 on Jack	1
#	04565334	SWITCHING REGULATOR	BD9730KV	IC12 on Jack	1
TRANSISTOR					
#	15329521	TRANSISTOR	RN1307	Q8,Q9,Q10,Q11 on Jack	4
DIODE					
#	F5229814R0	LED	L-964ID(RED)	LED1 on Panel	1
#	F5029126R0	LED	L-113GDT-F01(GREEN)	LED2 on Panel	1
	15029281	LED (RED)	GL-3PR8	LED3, LED4 on Panel	2
	F5029162R0	LED(CHIP)	19-21SURC/S530-A2/TR8	LED10,LED11,LED12,LED13,LED14 on Panel	5

POTENTIOMETER

#	F3229194R0	POTENTIOMETER	RV112FF-40B1-125F-0B20K-1H57	VR3 on Panel	1
	F3229167R1	POTENTIOMETER	RD902F-40-125F-A250K-00DL5	VR2 on Panel	1
	F3279802R0	9M/M POTENTIOMETER	RD901F-40-125F-B54-00D	VR4,VR5,VR6,VR9 on Panel	4
#	F3279819R0	POTENTIOMETER	RD901-40-125F-B54-0CD	VR7,VR8 on Panel	2

CAPACITOR

#	F5369547R0	CAPACITOR	RV2-25V470MU-R 47/25	C193,C195,C197 on Panel	3
#	02345101	CAPACITOR	RV2-16V100MU-R 10/16	C199,C201,C202,C203,C209 on Panel	5

INDUCTOR, COIL, FILTER

	F5409131R0	COIL	WQT04-60	FL1 on Jack	1
	F5409148R0	SMD COIL	ELL6SH151	L6,L13 on Jack	2

CRYSTAL, RESONATOR

	F5299525R0	CRYSTAL	HC49SMÄ@16.9344MHZ	X1 on Jack	1

FUSE, FUSE HOLDER

#	03344734	FUSE	MINISMDC075F	R92 on Jack	1

CONNECTOR

#	F3439161R0	CONNECTER	A2001WR2-16P (HORIZON)	CN1 on Jack	1
#	F3439165R0	CONNECTER	A2001WR2-10P (HORIZON)	CN7 on Jack	1
#	04567012	BATTERY CONNECTOR	53015-0210	CN2 on Jack	1

WIRING, CABLE

#	G3477165R0	FLAT CABLE	3P-70X6X6 P=2.0		1
#	G3489223R0	WIRING	16P L=40MM P=2MM		1
#	F3467050R0	WIRING	10P L=40MM P=2MM		1
#	G3487163R0	WIRING BATTERY	L=80MM 2P		1

SCREWS

#	H5039219R0	WASHER	TOOTH WASHER M3		4
	H5019110R0	SCREW 3X6	PAN TAPPING B1 ZC		9
	H5019115R0	SCREW 3X8	PAN TAPPING B1 BZC		7
	H5019116R0	SCREW 3X8	PAN HEAD TAPPING-B1 ZC		6
#	H5039414R0	NYLON WASHER	M5.1X9.5X0.5 ~~BZC~~ BLACK		2
	H5039413	NYLON WASHER M4.1X7.5X0.5	~~M4.1X7.5X0.5 BZC~~ BLACK		2
#	H5029852R0	SCREW 4M3 FEBZC	HEXAGON SOCKET BUTTON HEAD		2
#	H5029855R0	SCREW M4X8	HEXAGON BUTTON HEAD FE NI		4
#	H5039111R0	WASHER	D8D3T0.5 ZC		2
#	H5039413	NYLON WASHER M4.1X7.5X0.5	BLACK		2
	H5019430	SCREW M2.6X5	BINDING HEAD TAPTITE P FEZC		2
	H5039521R0	NUT M7			8
	H5039510R0	NUT M9X12X2T NI			5
	H5029851R0	PEDAL SHAFT			2
	H5039158R0	WASHER M9X14X0.5T NI			5

PACKING

#	G2237614R0	PACKING PAD	SIDE PAD		1
#	G2237613R0	PACKING PAD	REAR PAD		1
#	G2607212R0	PACKING CASE	LOWER		1
#	G2627790R0	PACKING CASE	ENGLISH/JAPANESE		1

MISCELLANEOUS

#	G2199521R0	LED SPACER	H=8.0 LEDS-8		1
#	G2257129R0	INSULATING SHEET	CENTER		1
#	G2547131R0	LABEL	BOTTOM COVER LABEL		1
#	G2197126R0	LED SPACER	(LED GUIDE)		1
	G2257130R0	BATTERY INSULATING SHEET			1
	G2357118R0	BOTTOM FOOT			2
	22177109R0	COIL SPRING			2
	G2357111R0	CUSHION R			2
#	G2357115R0	PEDAL FOOT			2
	22157702R0	PEDAL GUIDE BUSH			2
#	G2177309R1	BATTERY TERMINAL	(-)		1
#	G2177307R1	BATTERY TERMINAL	(+/-)		1
	G2017621R0	BATTERY COVER			1
	G2177308R0	BATTERY TERMINAL(+)			1

ACCESSORIES (Standard)

	G6017303R3	LEAFLET	JAPANESE/ENGLISH	1
#	G6017467R0	OWNER'S MANUAL	JAPANESE	1
#	G6027121R1	OWNER'S MANUAL	ENGLISH	1

Verifying the Version Number

1. Connect an AC adapter (PSA series).
2. Adjust the MODE SELECTOR control to REVERB ONLY, and turn all other controls all the way counterclockwise (minimum).
3. Set the **DIRECT** switch to **OFF**.
   Depressing the left and right pedals and inserting a plug into the INPUT A/MONO jack makes the power come on and the PEAK LED light up.
   After approximately 2 seconds, the PEAK LED goes dark.
4. Release the left and right pedals, then within 5 seconds, depress first the left pedal, then the right pedal.
   The PEAK LED lights up.
   After approximately 2 seconds, the LED goes dark.

   * *DSP, SDRAM, and EEPROM checks are performed during the foregoing interval. If a problem is found in the DSP, SDRAM, EEPROM, or the like, the LED may not go dark.*

   Immediately after this goes dark, the version is indicated by the illumination pattern of the EFFECT ON/OFF and TAP LEDs.

LED operating state	Version number
TAP LED only illuminated	Version 1.00
EFFECT ON/OFF LED only illuminated	Version 1.01
TAP and EFFECT ON/OFF LEDs both illuminated	Version 1.02

* *After the version display, pressing the right pedal transfers execution to the Test mode.*

Factory Reset

The RE-20 has no factory-reset feature.

System Update

On the RE-20, performing a system update is not possible.
If an update is required, replace with an updated circuit board.
(Updating can be performed only at the factory.)

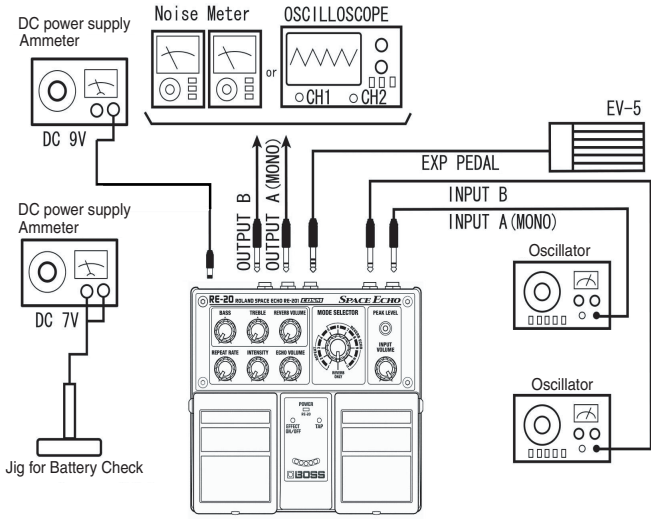
Test Mode

Items Required

- Noise meter x 1
- Oscilloscope x 1
- PSA adapter (or 9 V DC power supply) x 1
- Oscillators x 2
- Powered monitor x 1
- EXP pedal x 1
- 47 Ω short plugs x 2

Entering the Test Mode

1. Refer to the figure below and connect the measuring equipment to a connector other than the INPUT A/MONO jack.



2. Set the **DIRECT** switch to **OFF**.
3. Depressing the left and right pedals and inserting a plug into the INPUT A/MONO jack makes the PEAK LED light up.
   After approximately 2 seconds, the PEAK LED goes dark.
4. Release the left and right pedals, then within 5 seconds, depress first the left pedal, then the right pedal.
   The PEAK LED lights up.
   After approximately 2 seconds, the LED goes dark.

   * *DSP, SDRAM, and EEPROM checks are performed during the foregoing interval. If a problem is found in the DSP, SDRAM, EEPROM, or the like, the LED may not go dark.*

   Immediately after this goes dark, the version number is indicated by the illumination pattern of the EFFECT ON/OFF and TAP LEDs.

LED operating state	Version number
TAP LED only illuminated	Version 1.00
EFFECT ON/OFF LED only illuminated	Version 1.01
TAP and EFFECT ON/OFF LEDs both illuminated	Version 1.02

* *After checking the version, pressing the right pedal advances execution to the Test Mode.*

Quitting the Test Mode

Detach the plug inserted into the INPUT A/MONO jack and switch off the power.

Skipping

Adjusting the MODE SELECTOR control to the setting shown below and entering the Test mode executes a DSP test, then starts execution of the respective test items.

(The SDRAM and EEPROM tests are performed only when the unit is switched on with REVERB ONLY activated.)

Mode	Test
MODE 1	VR (potentiometer) test
MODE 2	12-click test
MODE 3	EXP pedal test
MODE 4	DIRECT switch test
MODE 5	ANALOG BYPASS waveform test
MODE 6	D/A output waveform test
MODE 7	DSP throughput waveform test

Test Items

Details of the Test Items

1. Version Check

1. Set the **DIRECT** switch to **OFF**, then connect an AC adapter.
2. Adjust the MODE SELECTOR control to REVERB ONLY, and turn all other controls all the way counterclockwise (minimum).
3. Depressing the left and right pedals and inserting a plug into the INPUT A/MONO jack makes the PEAK LED light up.
4. After approximately **2** seconds, the PEAK LED goes dark.
5. Release the left and right pedals, then within **5** seconds, depress first the left pedal, then the right pedal.
6. The PEAK LED lights up.
7. After approximately **2** seconds, the LED goes dark.

* *DSP, SDRAM, and EEPROM checks are performed during the foregoing interval. If a problem is found in the DSP, SDRAM, EEPROM, or the like, the LED may not go dark.*

8. After the PEAK LED goes dark, the version is indicated by the illumination pattern of the EFFECT ON/OFF and TAP LEDs.

LED operating state	Version number
TAP LED only illuminated	Version 1.00
EFFECT ON/OFF LED only illuminated	Version 1.01
TAP and EFFECT ON/OFF LEDs both illuminated	Version 1.02

9. After checking the version, pressing the right pedal advances execution to the next item.

2. LED Illumination Check/Measurement of Current Consumption

All LEDs are illuminated.

1. Check whether all LEDs light up and verify their brightness.
   - POWER
   - EFFECT ON/OFF
   - TAP
   - Virtual Tape Display (total 5)
   - PEAK LEVEL
2. Measure current consumption. (Rating: 102 [mA] or less)
3. Press the right pedal to proceed to the next test.

3. Volume Check

All LEDs are dark.

1. Turn the BASS control in the sequence described below.
   MIN position -> 9 o'clock position -> MIN position -> 9 o'clock position -> 12 o'clock position -> 3 o'clock position -> MAX position (All Virtual Tape Display LEDs light up.)

   * *In the interval from MIN to MAX, the Virtual Tape Display LEDs light up in sequence.*

   * *For controls that click when turned (BASS and TREBLE), the EFFECT ON/OFF and TAP LEDs light up simultaneously when the control is at the 12 o'clock position.*
2. In the same way as for the BASS control, test the other five controls in the sequence shown below.

   * *Test in this sequence: TREBLE -> REVERB VOLUME -> REPEAT RATE -> INTENSITY -> ECHO VOLUME.*
3. When checking of the six controls has ended, return all the controls to the MIN position.
4. Next, carry out testing of MODE SELECTOR.

5. Starting at the **REVERB ONLY** position, slowly turn clockwise, one click at a time, to make one full turn (i.e., returning to the "REVERB ONLY" position).

* *To conduct the testing correctly, first set MODE SELECTOR at the **1** position. Next, turn MODE SELECTOR to the **REVERB ONLY** position, then execute the test.*

- The LEDs light up in the sequence shown below as the MODE SELECTOR control is being turned.

MODE SELECTOR position	LED illumination status
REVERB ONLY	EFFECT ON/OFF illuminated and TAP illuminated
1	EFFECT ON/OFF illuminated One LED of the Virtual Tape Display illuminated
2	EFFECT ON/OFF illuminated Two LEDs of the Virtual Tape Display illuminated
3	EFFECT ON/OFF illuminated Three LEDs of the Virtual Tape Display illuminated
4	EFFECT ON/OFF illuminated Four LEDs of the Virtual Tape Display illuminated
5	EFFECT ON/OFF illuminated Five LEDs of the Virtual Tape Display illuminated
6	EFFECT ON/OFF illuminated Five LEDs of the Virtual Tape Display illuminated
7	TAP illuminated One LED of the Virtual Tape Display illuminated
8	TAP illuminated Two LEDs of the Virtual Tape Display illuminated
9	TAP illuminated Three LEDs of the Virtual Tape Display illuminated
10	TAP illuminated Four LEDs of the Virtual Tape Display illuminated
11	TAP illuminated Five LEDs of the Virtual Tape Display illuminated
Return to REVERB ONLY	EFFECT ON/OFF illuminated and TAP illuminated

6. Turn MODE SELECTOR in the direction opposite that of step **5** (i.e., turn it counterclockwise).
Starting at the **REVERB ONLY** position, slowly turn counterclockwise, one click at a time, to make one full turn (i.e., returning to the **REVERB ONLY** position).

- The LEDs light up in the sequence shown below as the MODE SELECTOR control is being turned.

MODE SELECTOR position	LED illumination status
REVERB ONLY	EFFECT ON/OFF illuminated and TAP illuminated
11	TAP illuminated Five LEDs of the Virtual Tape Display illuminated
10	TAP illuminated Four LEDs of the Virtual Tape Display illuminated
9	TAP illuminated Three LEDs of the Virtual Tape Display illuminated
8	TAP illuminated Two LEDs of the Virtual Tape Display illuminated
7	TAP illuminated One LED of the Virtual Tape Display illuminated
6	EFFECT ON/OFF illuminated and TAP illuminated Five LEDs of the Virtual Tape Display illuminated
5	EFFECT ON/OFF illuminated Five LEDs of the Virtual Tape Display illuminated
4	EFFECT ON/OFF illuminated Four LEDs of the Virtual Tape Display illuminated
3	EFFECT ON/OFF illuminated Three LEDs of the Virtual Tape Display illuminated
2	EFFECT ON/OFF illuminated Two LEDs of the Virtual Tape Display illuminated
1	EFFECT ON/OFF illuminated One LED of the Virtual Tape Display illuminated
Return to REVERB ONLY	EFFECT ON/OFF illuminated and TAP illuminated

7. If the volume check ends normally, execution automatically advances to the next test.

* *The leftmost Virtual Tape Display LED flashes for **1** second, then remains steadily illuminated.*

4. EXP Pedal Check

1. Set the MIN volume on the EV-5 to **0**.

2. Depress the heel end of the EV-5 pedal.

3. Connect the EV-5 to the "EXP PEDAL" jack.

4. Slowly depress the toe end of the EV-5 pedal.

5. Verify that the "Virtual Tape Display" LEDs smoothly light up successively.
If all **Virtual Tape Display** LEDs light up and EXP (expression) pedal verification ends normally, execution automatically advances to the next test. (The **EFFECT ON/OFF** LED flashes for **1** second, then remains steadily illuminated.)

* *Detach the EV-5 from the RE-20's **EXP PEDAL** jack.*

5. DIRECT Type Selector Switch Check

Verify that the DIRECT switch on the back of the unit is functioning correctly.

- DIRECT type switch: OFF
  EFFECT ON/OFF only illuminated

1. Switch the DIRECT type switch to **ON**.
Verify that only the **TAP** LED lights up.

2. Switch the DIRECT type switch to **OFF**.
Verify that only the **EFFECT ON/OFF** LED lights up.

3. Switch the DIRECT type switch to **ON**.
Verify that only the **TAP** LED lights up.
If the check of the DIRECT type selector switch ends normally, execution automatically advances to the next test.

* *After the **TAP** LED goes dark, the rightmost Virtual Tape Display LED remains steadily illuminated.*

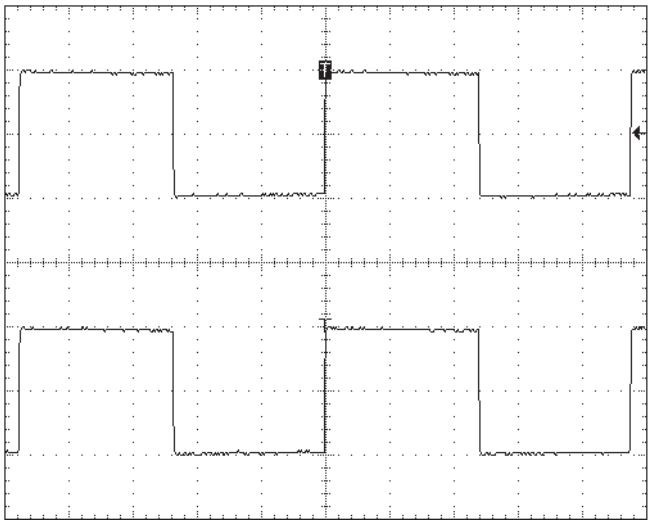
6. ANALOG BYPASS Waveform Check

1. Input a signal to only INPUT A (MONO).

- INPUT A (MONO): Rectangular wave -- 200 Hz, 500 mVp-p
- INPUT B: No connection
- OUTPUT A (MONO): Oscilloscope channel 1
- OUTPUT B: Oscilloscope channel 2

2. Adjust INPUT VOLUME to the maximum setting.

3. Verify that the waveform shown below is output.



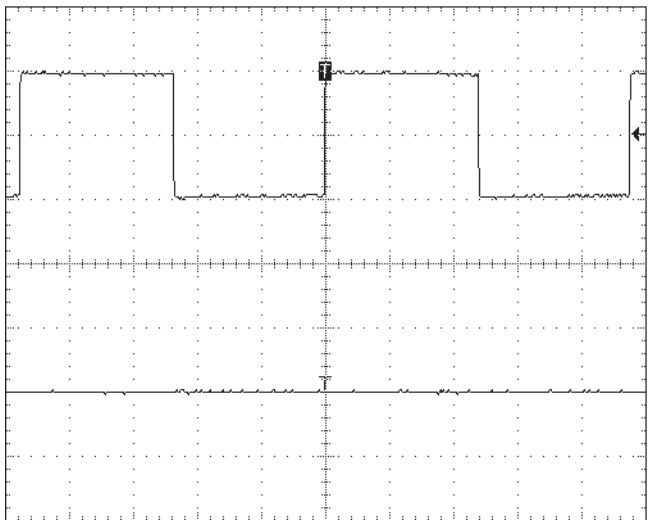
500 mV/DIV,1 ms/DIV

* *Thereafter, make the settings for OUTPUT A (MONO): channel 1 and OUTPUT B: channel 2, and for the waveform image, set the upper section to channel 1 and the lower section to channel 2.*

4. Input the signal to INPUT A (MONO) and insert a 47 kΩ short plug into INPUT B.

- INPUT A (MONO): Rectangular wave -- 200 Hz, 500 mVp-p
- INPUT B: 47 kΩ short plug

5. Verify that the waveform shown below is output.

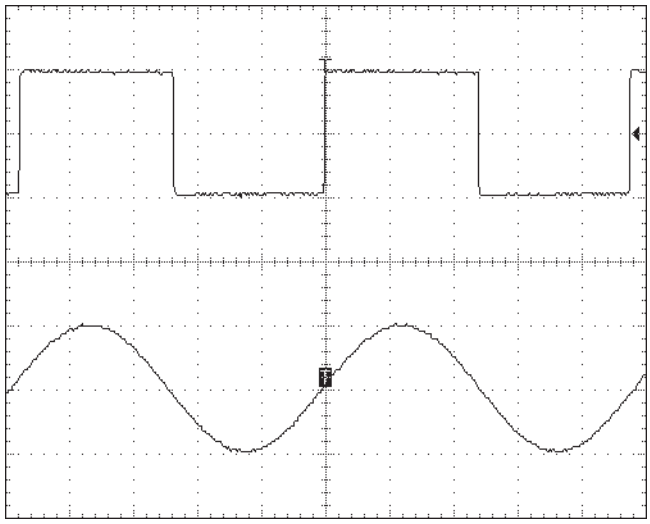


500 mV/DIV, 1 ms/DIV

6. Input the signal to both INPUT A (MONO) and INPUT B.

- INPUT A (MONO): Rectangular wave 200 Hz, 500 mVp-p
- INPUT B: Sine wave 200 Hz, 500 mVp-p

7. Verify that the waveform shown below is output.



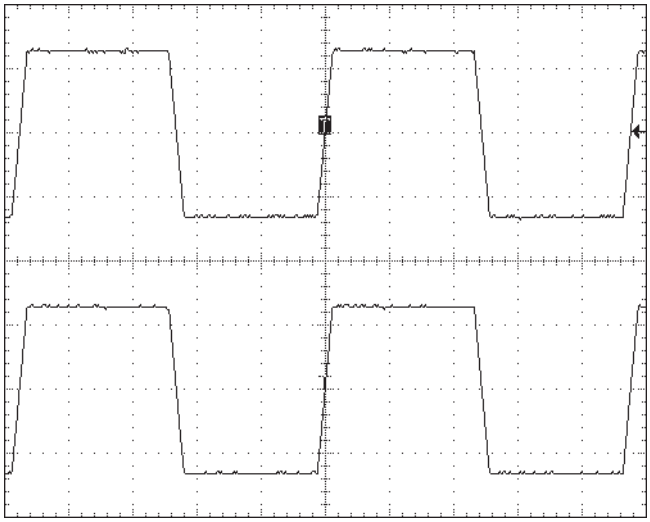
500 mV/DIV, 1 ms/DIV

7. Analog Maximum-amplitude Waveform Check

1. Input the signal to both INPUT A (MONO) and INPUT B.

- INPUT A (MONO): Sine wave 200 Hz, 5 Vp-p
- INPUT B: Sine wave 200 Hz, 5 Vp-p

2. Verify that the waveform shown below is output.



2 V/DIV, 1 ms/DIV

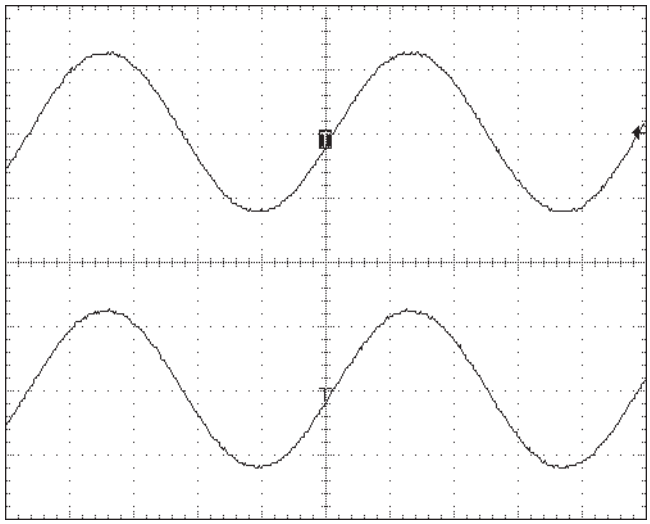
3. Turn the INPUT VOLUME control toward MIN, and adjust it to a position where clipping disappears (a position somewhere between 10 and 12 o'clock).

* *Turn the control further toward MIN and verify that the waveform disappears.*

* *At the same time, verify that the touch of the control is free from problems and that the waveform changes smoothly.*

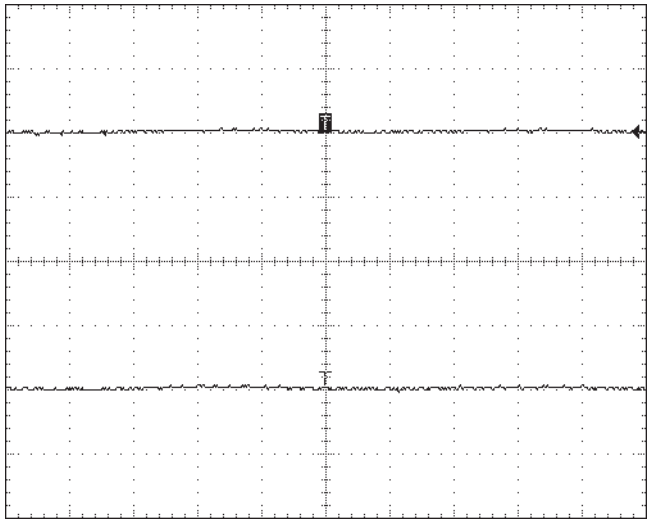
4. Verify that the waveform shown below is output.

* *Position where clipping disappears*



2 V/DIV, 1 ms/DIV

* *When INPUT VOLUME is set at the MIN position*



2 V/DIV, 1 ms/DIV

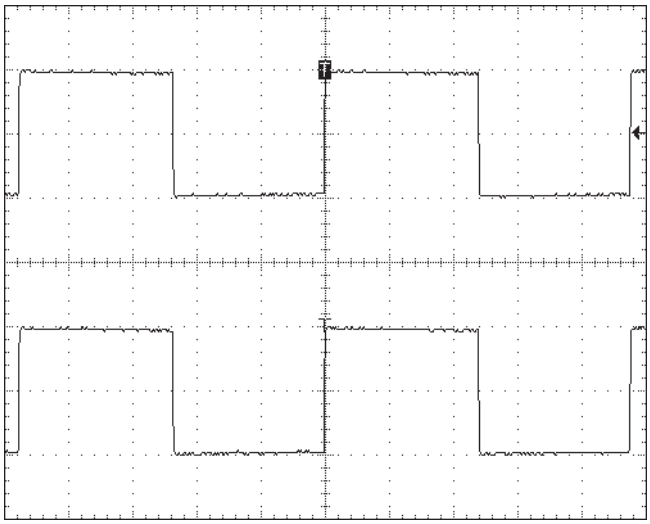
8. Analog Bypass-path FET Switch Operation Check

1. Input the signal to both INPUT A (MONO) and INPUT B.

- INPUT A (MONO): Rectangular wave 200 Hz, 500 mVp-p
- INPUT B: Rectangular wave 200 Hz, 500 mVp-p

2. Adjust INPUT VOLUME to MAX.

3. Verify that the waveform shown below is output.

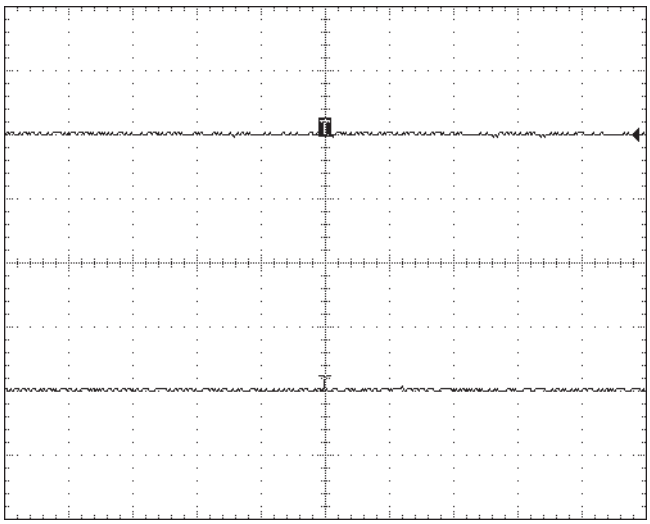


500 mV/DIV, 1 ms/DIV

4. Depressing the right pedal makes the output waveforms from both OUTPUT A (MONO) and B disappear.

* *The rightmost and center Virtual Tape Display LEDs light up.*

5. Verify that the waveform shown below is output.



500 mV/DIV,1 ms/DIV

6. After verification, advance to the next test.

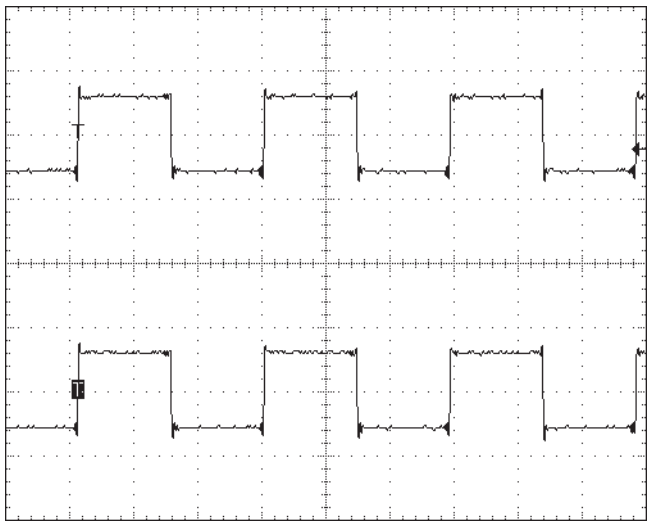
9. D/A Output Waveform Check

Press the right pedal to perform the D/A output waveform check.

* *The leftmost Virtual Tape Display LED remains steadily illuminated.*

1. Verify the output from OUTPUT A (MONO) and OUTPUT B.

2. Verify that the waveform shown below is output.

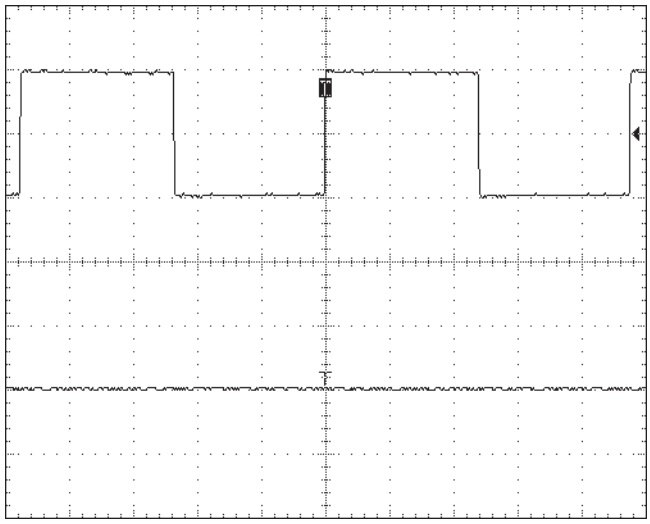


500 mV/DIV, 1 ms/DIV

3. Detach the plug from OUTPUT B.

4. Adjust INPUT VOLUME to MAX.

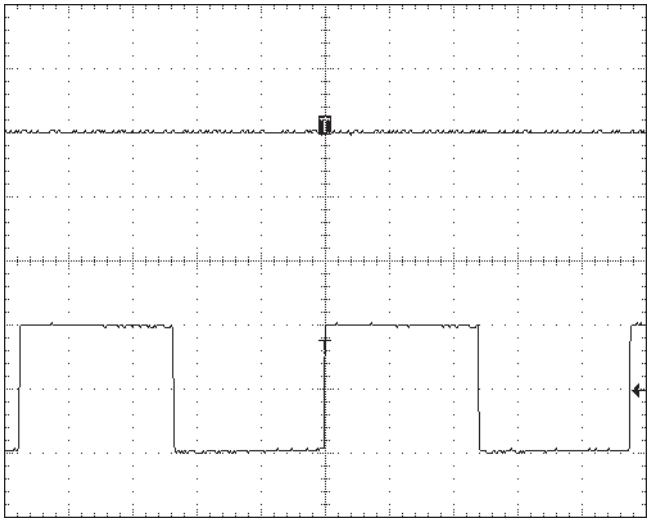
5. Verify that the waveform shown below is output.



500 mV/DIV, 1 ms/DIV

6. Detach the plug from OUTPUT A (MONO) and connect the plug to OUTPUT B.

7. Verify that the waveform shown below is output.



500 mV/DIV, 1 ms/DIV

8. After verification, again insert the plug into OUTPUT A (MONO), and advance to the next test.

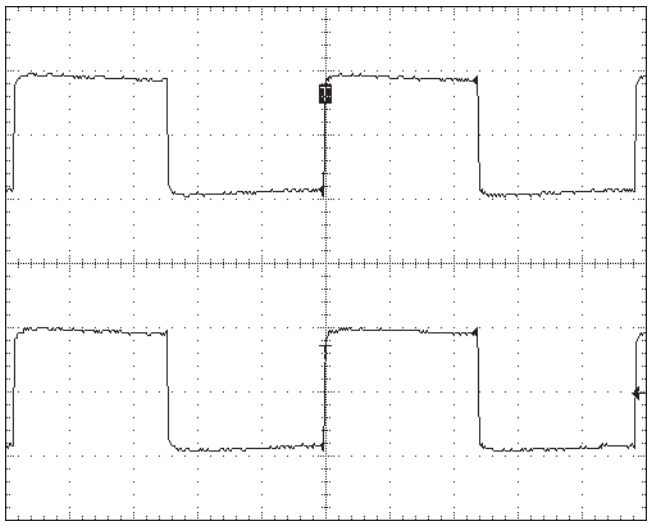
10. DSP Throughput Waveform Check

Press the right pedal to perform the DSP throughput (output) waveform check.

* *The leftmost and center Virtual Tape Display LEDs light up.*

1. Verify the output waveforms from OUTPUT A (MONO) and OUTPUT B.

2. Verify that the waveform shown below is output.

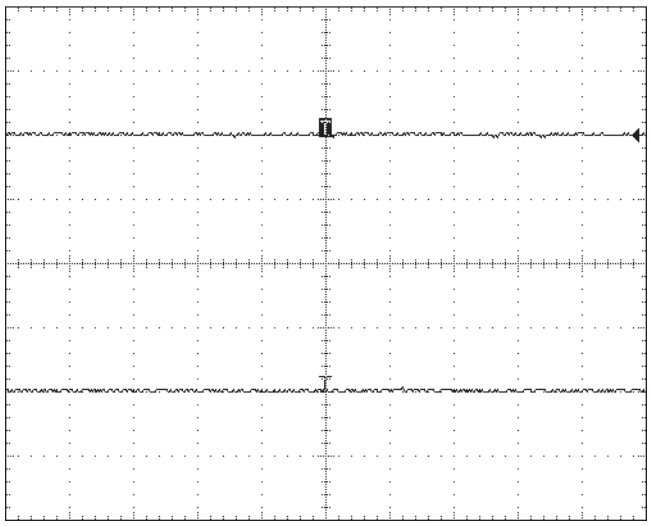


500 mV/DIV, 1 ms/DIV

3. Turn the INPUT VOLUME control (MAX -> MIN -> MAX) and verify the output waveform.

* *Verify that the waveform changes smoothly.*

4. Verify that when the control is set at MIN, the waveform shown below is output.



500 mV/DIV, 1 ms/DIV

5. After verification, detach all plugs except for the one inserted into INPUT A (MONO).

6. Detach the plug inserted into the INPUT jack and switch off the power.

11. Residual Noise Test

1. Set the potentiometers at the positions described below.

- All except MODE SELECTOR and INPUT VOLUME: MAX position
- MODE SELECTOR: **REVERB ONLY** position
- INPUT VOLUME: MIN position
- DIRECT switch: **ON** position

2. Connect 47 kΩ short plugs to both INPUT A (MONO) and INPUT B.

3. Depressing the left and right pedals and inserting a plug into the INPUT A/MONO jack makes the PEAK LED light up.

4. After approximately **2** seconds, the PEAK LED goes dark.

5. Release the left and right pedals, then within **5** seconds, depress first the left pedal, then the right pedal to enable residual noise testing.

* *Entering the residual noise test makes the three rightmost **Virtual Tape Display** LEDs light up.*

* *The analog bypass signal is output.*

6. Adjust the INPUT VOLUME control to the MAX position.

7. Measure the output level at OUTPUT A (MONO) and OUTPUT B.
Passing value: -94 dBm or less (JIS A)

8. Depress the right pedal. (The three leftmost "Virtual Tape Display" LEDs light up.)

* *The DSP throughput signal is output.*

9. Measure the output level at OUTPUT A (MONO) and OUTPUT B.
Passing value: -91 dBm or less (JIS A)

10. Depress the right pedal once to enter the normal mode.

11. Continue by executing the next noise test.

12. Audible Noise Check

From this section and after, inspection is carried out in the normal performance mode.

1. Connect 47 kΩ short plugs to both INPUT A (MONO) and INPUT B.

2. Adjust the INPUT VOLUME control to the MIN position.

3. Connect the output from OUTPUT A (MONO) and OUTPUT B to a powered monitor.

4. Adjust INPUT VOLUME to the MAX position and verify that audio is silent.

5. Apply impact to the RE-20 unit and verify that no abnormal noise occurs.

6. Turn the INPUT VOLUME control from the MIN position to MAX, and verify that no abnormal noise occurs.

7. Adjust the INPUT VOLUME control to the MIN position, then detach all plugs and switch off the power.

13. Battery Operation Check

1. Detach the connected AC adapter.

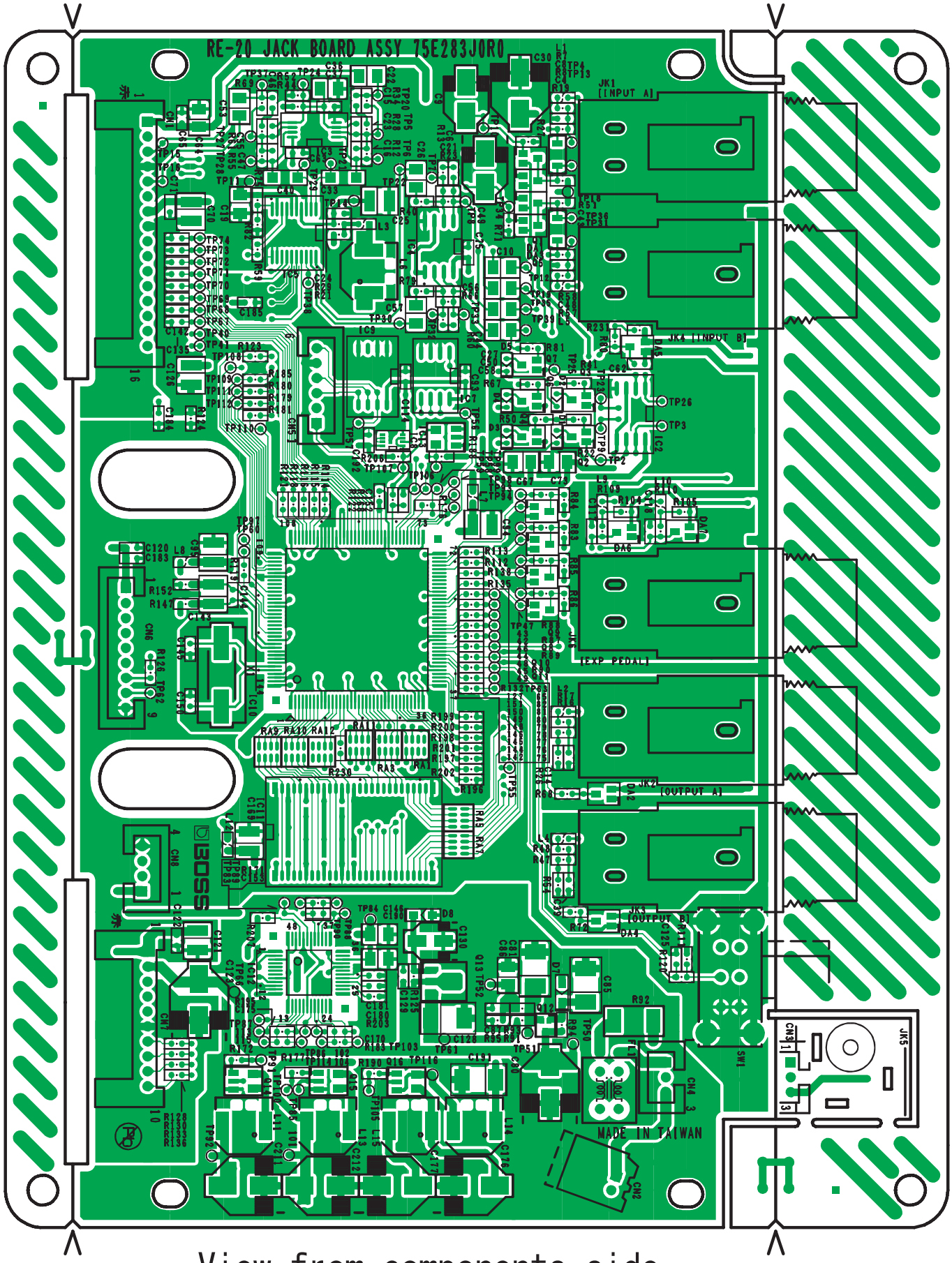
2. After inserting batteries into the battery compartment, insert a plug into INPUT A (MONO) and switch on the power.
Verify that the **PEAK LEVEL** LED lights up.

3. If normal operation can be verified, the test results are considered to be OK (passed).

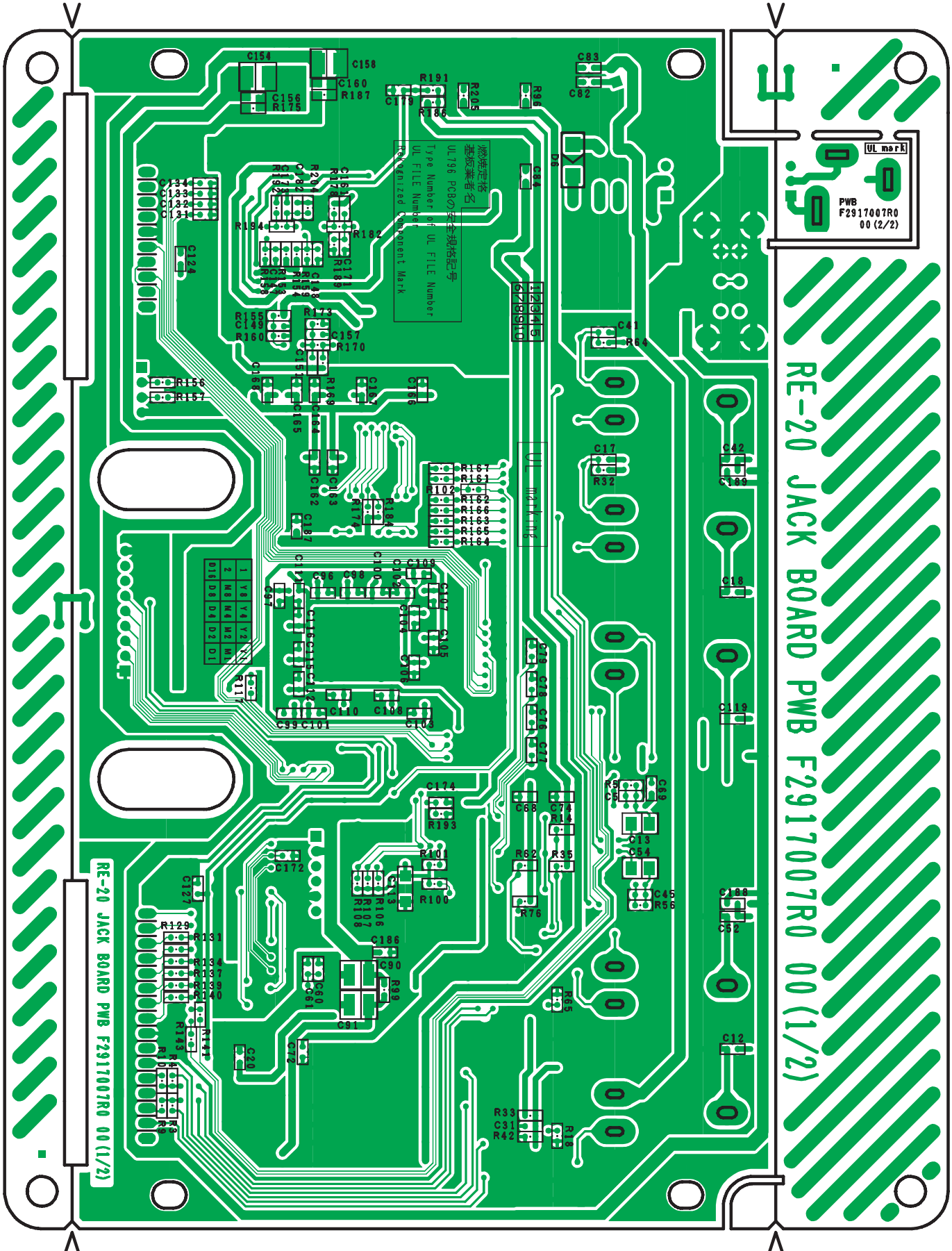
* *If the **PEAK LEVEL** LED is dark, check the battery voltage.*

This completes the testing.

Circuit Board (Jack Board)

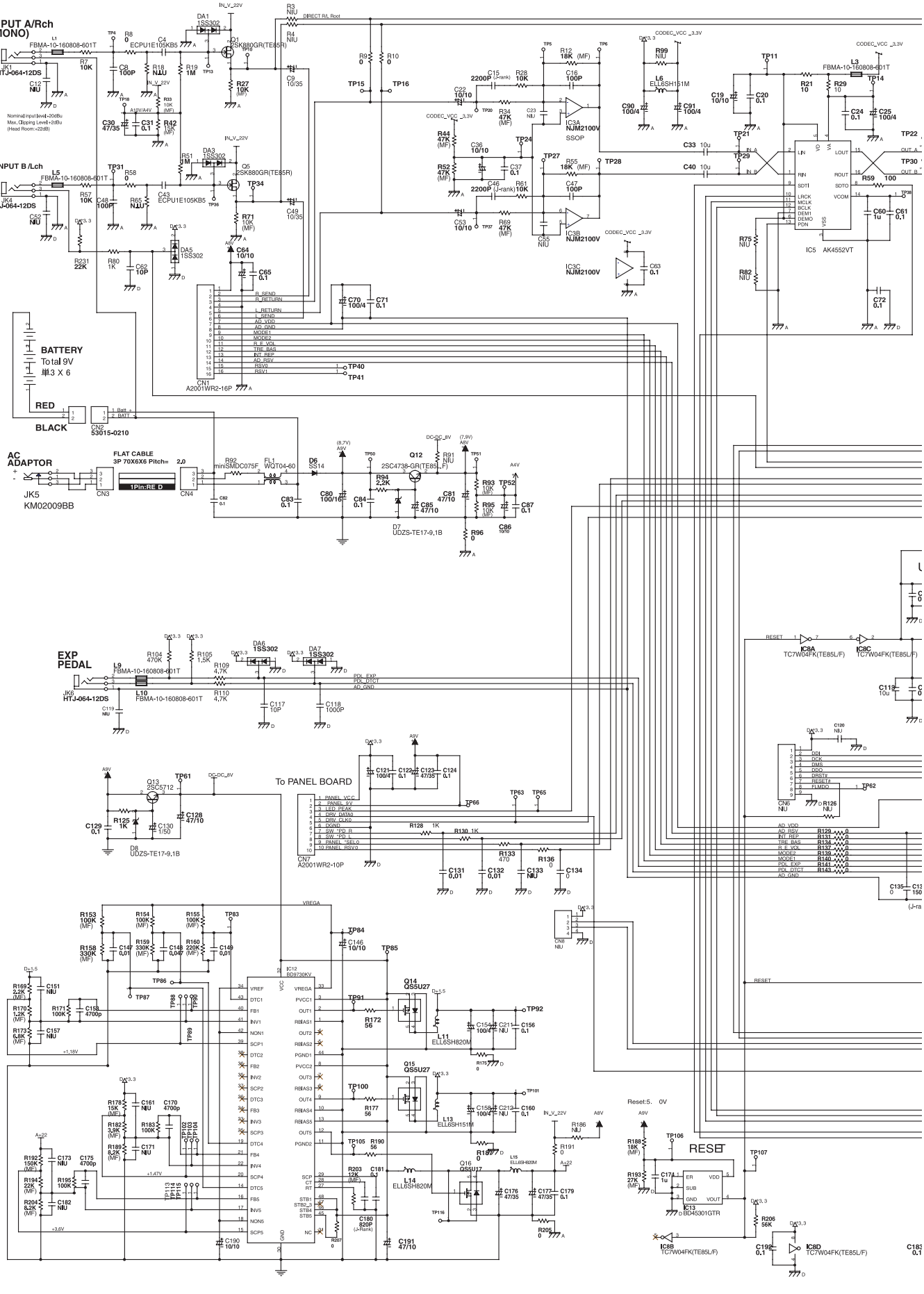


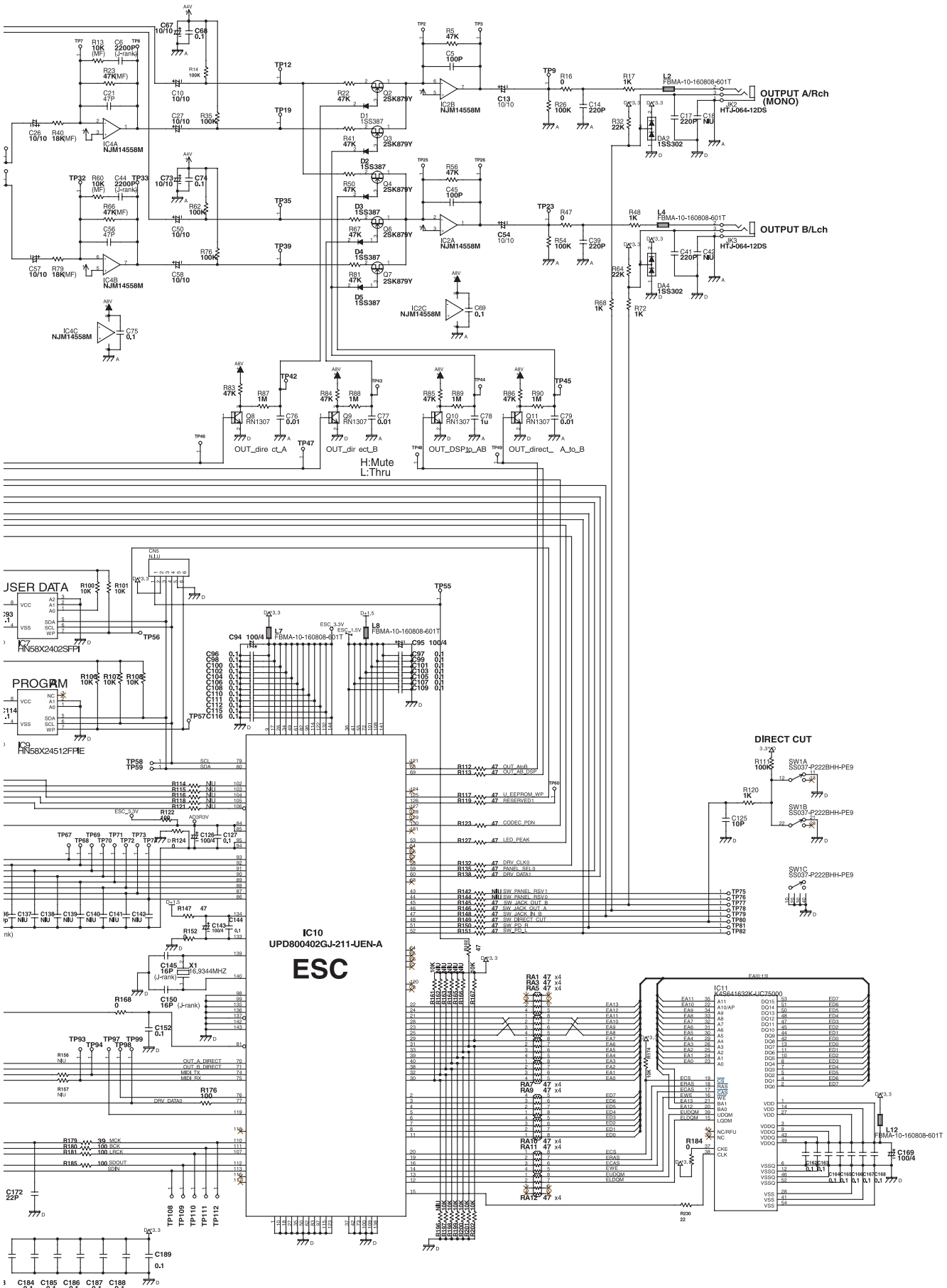
View from components side



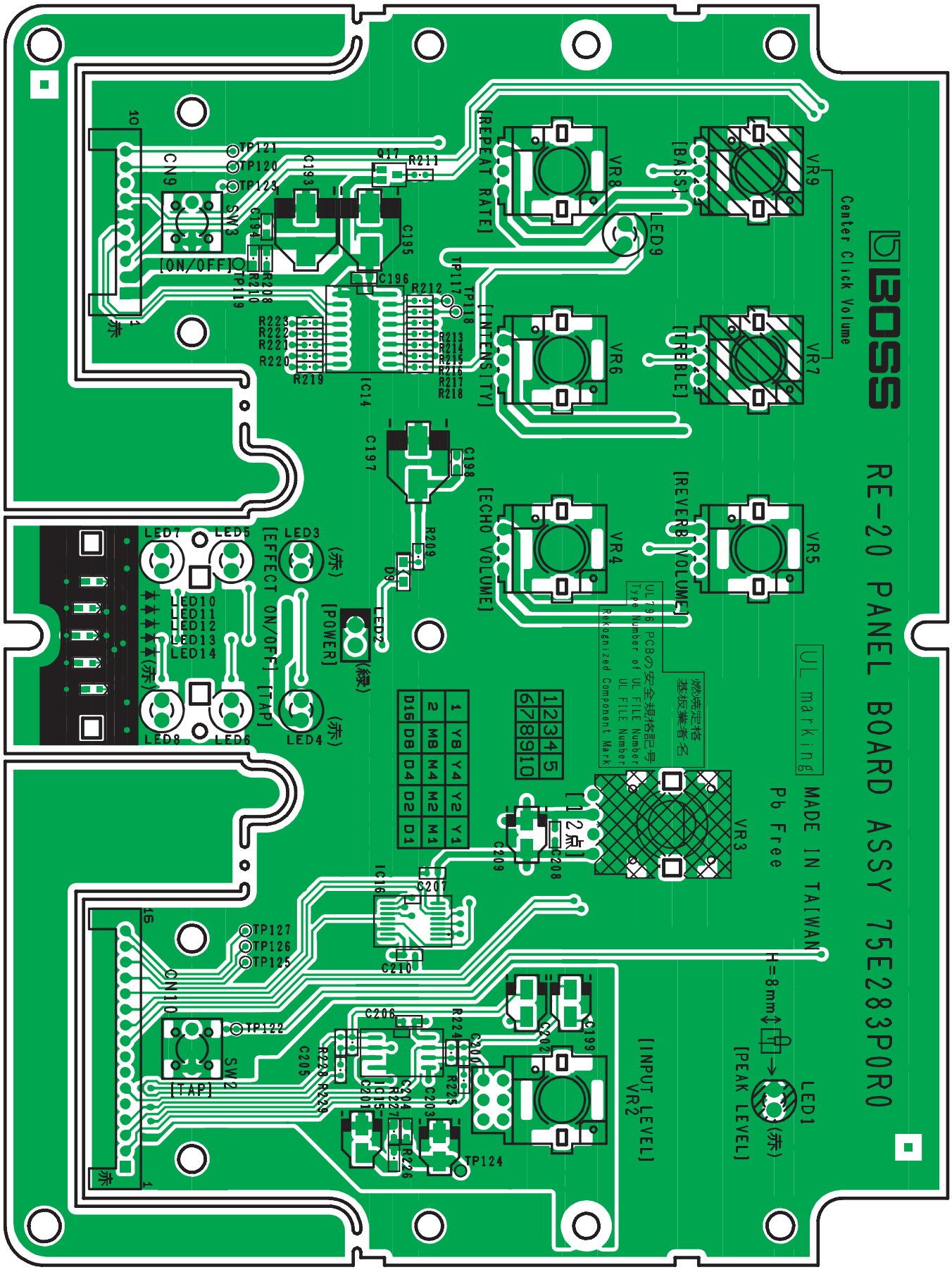
View from foil side

Circuit Diagram (Jack Board)

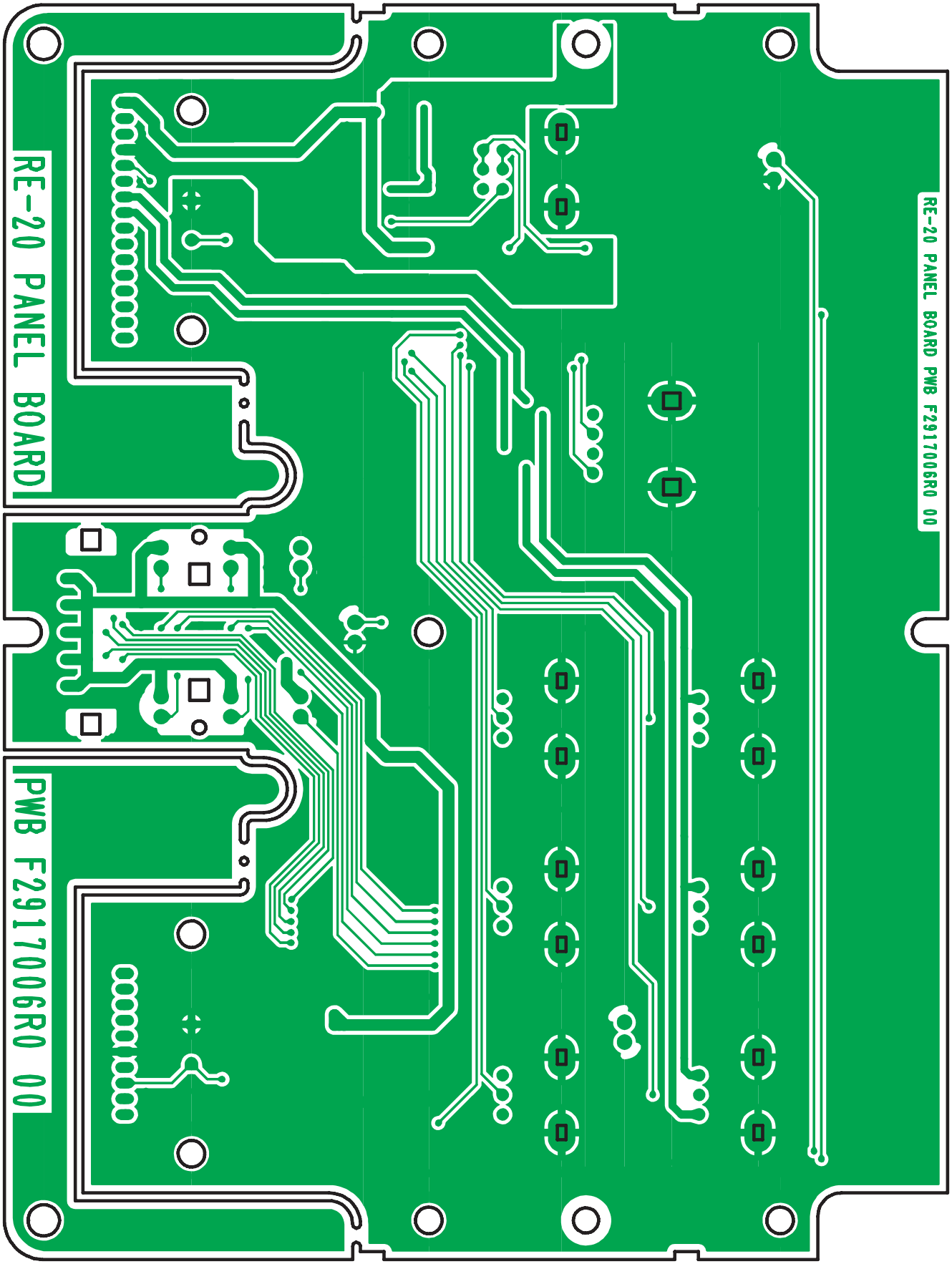



OUTPUT A/Rch (MONO)
OUTPUT B/Lch
H:Mute
L:Thru
OUT_dire ct_A
OUT_dir ect_B
OUT_DSP to_AB
OUT_direct_ A_to_B
DIRECT CUT
IC10
UPD800402GJ-211-UEN-A
ESC
IC11
K4S641632K-UC75000

Circuit Board (Panel Board)

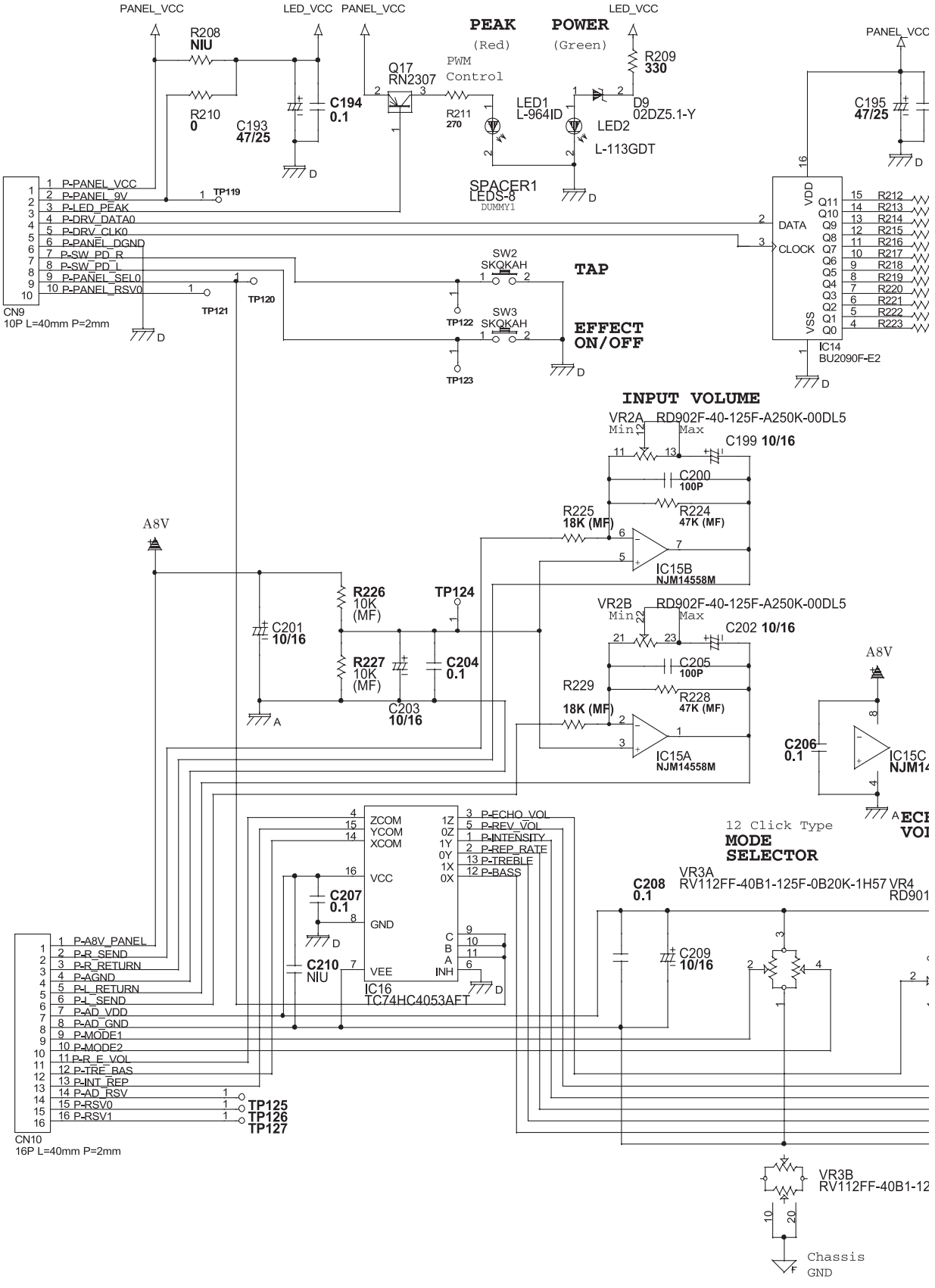


View from components side

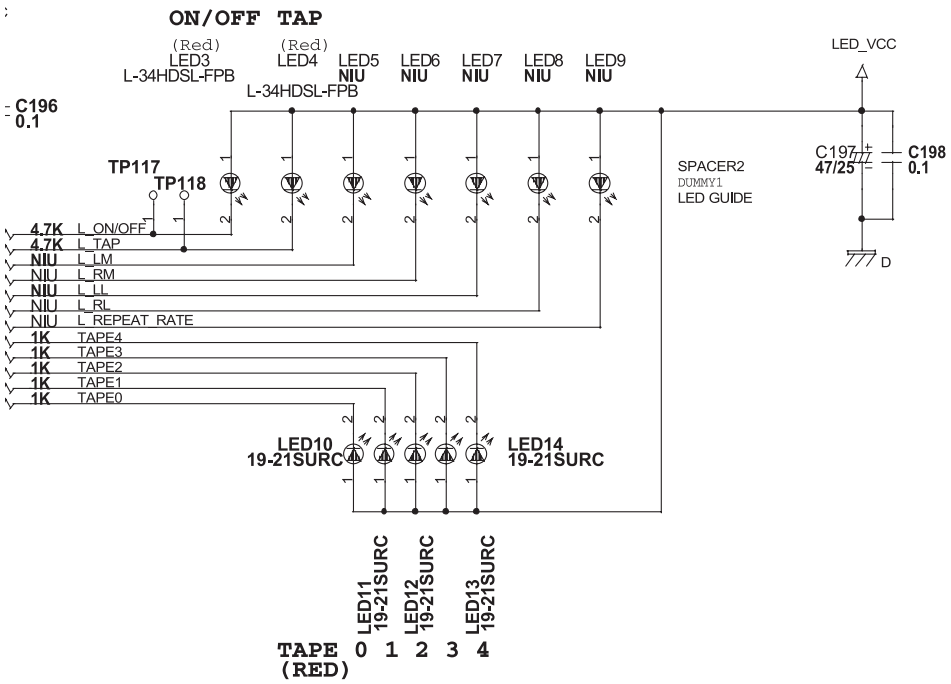


View from foil side

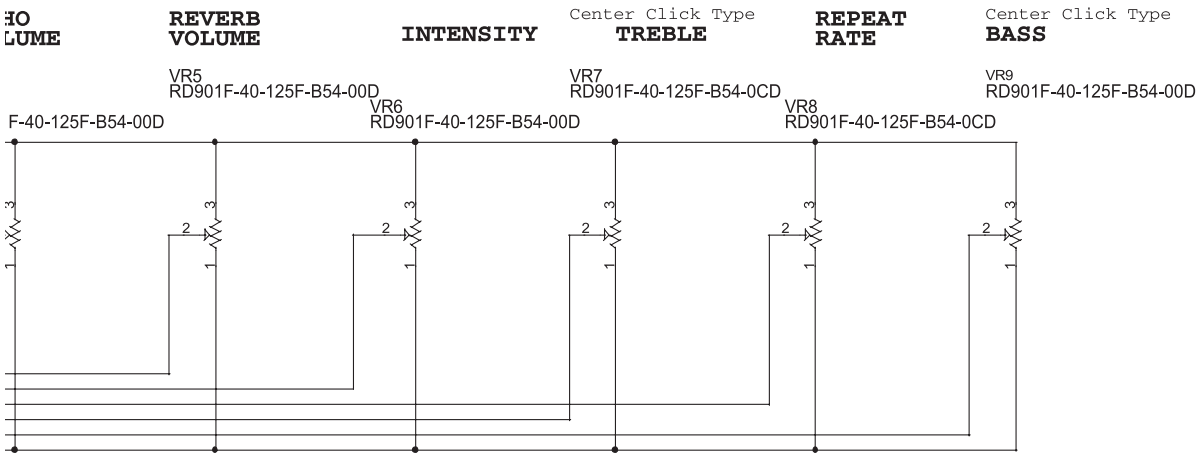
Circuit Diagram (Panel Board)



Connect the mounting leads for all potentiometers (frame ground) to



4558M



25F-0B20K-1H57

chassis ground (screw holes).

MEMO