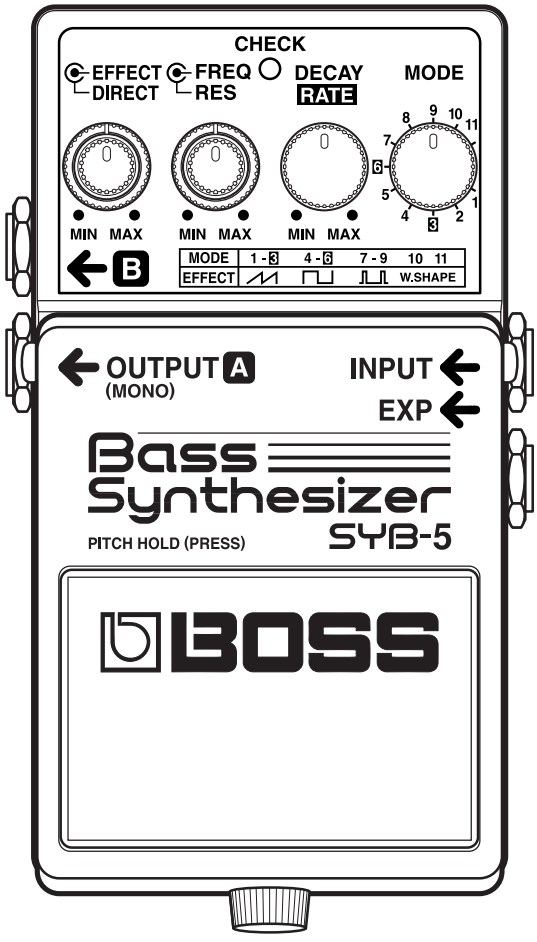
SYB-5 Bass Synthesizer

SERVICE NOTES
Issued by RJA



Roland

17058286E0

Printed in Japan (0500) (TP)

CAUTIONARY NOTES

PART LIST

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

SPECIFICATIONS

SYB-5: Bass Synthesizer

Nominal Input Level

-20 dBu

Input Impedance

1 Mohm

Nominal Output Level

-20 dBu

Output Impedance

1 kohm

Recommended Load Impedance

10 kohm or greater

Residual Noise

-96 dBu (IHF-A, Typ.); All knobs at center position

Controls

Pedal switch, EFFECT knob, DIRECT knob, FREQ knob, RES knob, DECAY/RATE knob, MODE knob

Indicators

CHECK indicator (Serves also as battery check indicator)

Connectors

INPUT jack, OUTPUT A (MONO) jack, OUTPUT B jack, EXP jack, AC adaptor jack (DC 9 V)

Power Supply

DC 9 V: Dry battery/9 V type (6F22 (carbon), 6LR61 (alkaline)), AC Adaptor (PSA-series: optional)

Current Draw

50 mA (DC 9 V)

* *Expected battery life under continuous use:*

Carbon: 2 hours, Alkaline: 6 hours

These figures will vary depending on the actual conditions of use.

Dimensions

73 (W) x 129 (D) x 59 (H) mm

2-7/8 (W) x 5-1/8 (D) x 2-3/8 (H) inches

Weight

440 g /1 lb (including battery)

Accessories

Owner's Manual ENGLISH:(#G6017385)

JAPANESE:(#G6017386)

Mode Label:(#G2507107)

Leaflet ("USING THE UNIT SAFELY," "IMPORTANT NOTES," and "Information"):(##********)

Dry battery/9 V type (6LR61):(#********)

* *The battery that was supplied with the unit is for temporary use-intended primarily for testing its operation. We also suggest replacing this with an alkaline dry cell.*

Options

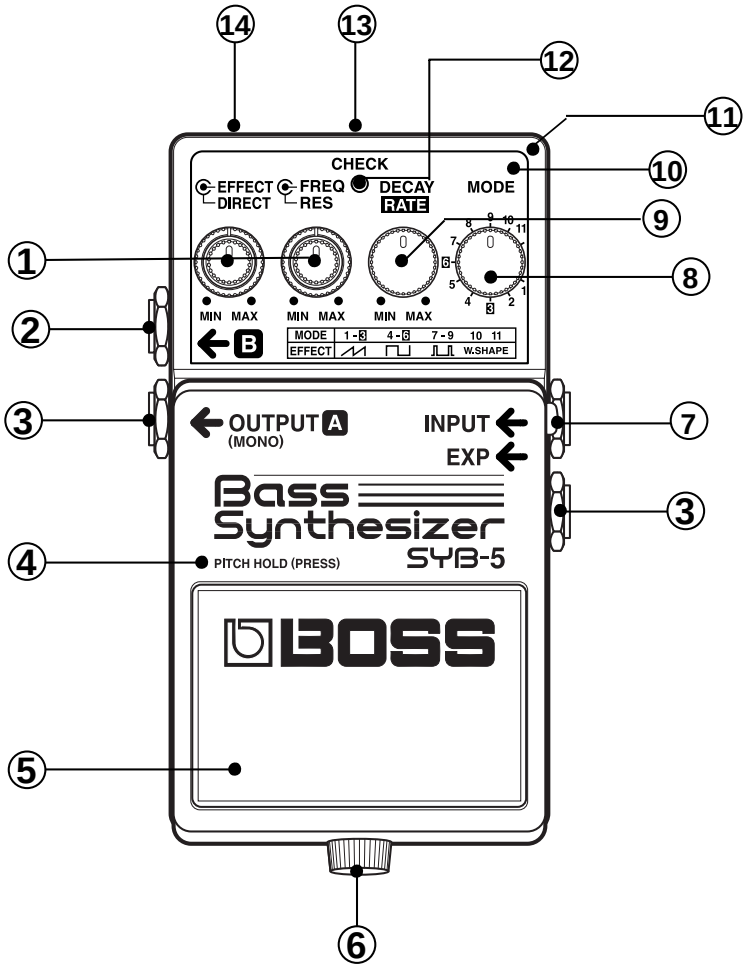
AC Adaptor (PSA-series)

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.*

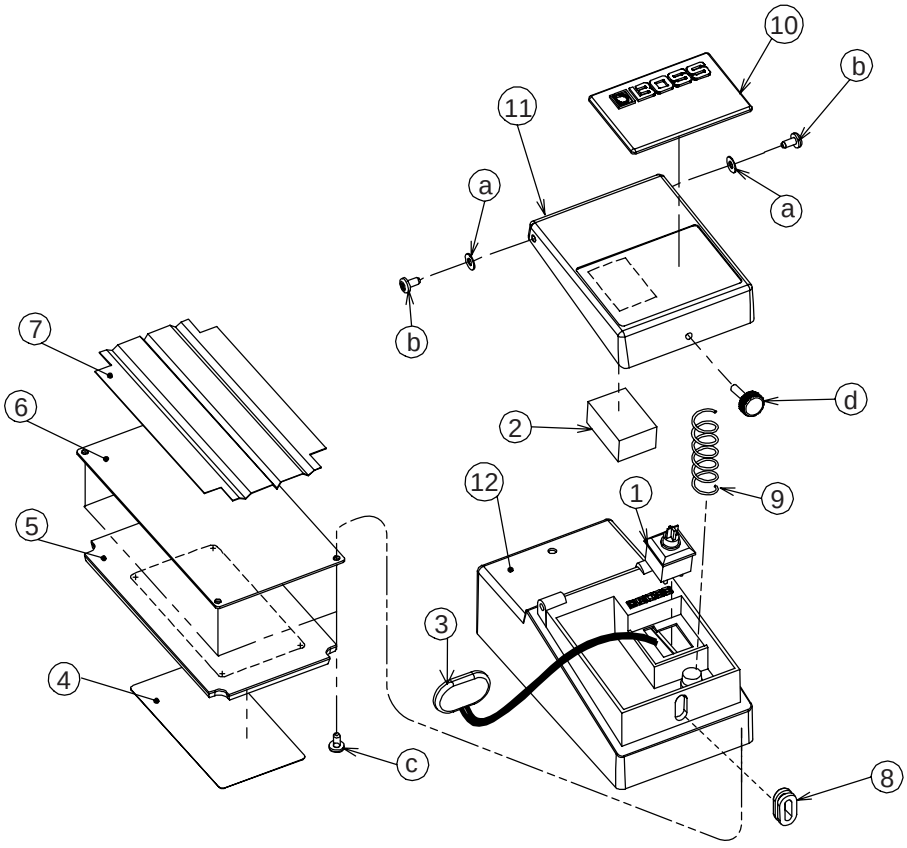
LOCATION OF CONTROLS



LOCATION OF CONTROLS PARTS LIST

NO	PART CODE	CATEGORY	PART NAME	DESCRIPTION	Q'TY
1	22480220	KNOB,BUTTON	P R-KNOB (INTERNAL)	(SS) BF BLK/LCG	
	22480221	KNOB,BUTTON	P O-KNOB (EXTERNAL)	(OUTER) S BLK/LCG	
	F327985401	POTENTIOMETER	POTENTIOMETER	RD912D-20-20FWH-B54-6009	
2	13449150MF	JACK,EXT TERMINAL	PHONE JACK (STEREO)	HTJ-064-12D	
	H5039510	SCREWS	NUT M9X12X2	FENI	
	H5039112	SCREWS	WASHER M9		
3	13449140MF	JACK,EXT TERMINAL	JACK (STEREO)	HTJ-064-14D	
	H5039510	SCREWS	NUT M9X12X2	FENI	
	H5039112	SCREWS	WASHER M9		
4	75E192T000	CASING	PEDAL		
5	2235730400	CASING	FOOT BASE (PEDAL MAT)	235-304	
6	H5029820	SCREWS	SCREW M3X10	THUMB SCREW	
7	13449104MF	JACK,EXT TERMINAL	JACK	HTJ-064-13D	
	H5039510	SCREWS	NUT M9X12X2	FENI	
	H5039112	SCREWS	WASHER M9		
8	22480260	KNOB,BUTTON	P R-KNOB	MF BLK/LCG	
	F3229160	POTENTIOMETER	POTENTIOMETER	RD901-20-15FP-B50K-0D 11CLICK	
9	22480260	KNOB,BUTTON	P R-KNOB	MF BLK/LCG	
	F3279852	POTENTIOMETER	POTENTIOMETER	RD901-20-15FW-B54-006	
10	G2217187	CASING	PANEL		
11	75E193C000	CASING	CASE		
12	1502928100	DIODE	LED (RED)	L-34HDSL	
13	13449717	JACK,EXT TERMINAL	ADAPTOR JACK	HEC2392-01-150	
14	2253753801	MISCELLANEOUS	PSA CAUTION	253-538	

EXPLODED VIEW



EXPLODED VIEW PARTS LIST

[PART]

NO	PART CODE	PART NAME	DESCRIPTION
1	13129710	SWITCH(PUSH)	JM-0404
2	2226733300	CUSHION	
3	F3419102	BATTERY CONNECTOR	
4	G253751603	BOTTOM CAUTION PSA	FCC/CE/C-TICK/EMC GRY
5	2235730500	BOTTOM BASE	
6	2202785100	BOTTOM COVER	
7	G2167301	INSULATION SPACER	
8	2215770201	PEDAL GUIDE BUSH	
9	2217710900	COIL SPRING	
10	2235730400	FOOT BASE(PEDAL MAT)	
11	75E192T000	PEDAL	
12	75E193C000	CASE	

[SCREW]

NO	PART CODE	PART NAME	DESCRIPTION	Q'TY
a	H5039401	NYLON WASHER M3X6X0.5		2
b	H501941301	SCREW M3X10	BINDING MACHINE FEBC	2
c	H5029325	SCREW M3X6	PAN HEAD TAPTITE B1 FEBC	4
d	H5029820	SCREW M3X10	THUMB SCREW	1

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)

CASING

#	75E192T000	PEDAL			1
#	G2217187	PANEL			1
#	75E193C000	CASE			1
	2235730500	BOTTOM BASE	235-305		1
	2235730400	FOOT BASE (PEDAL MAT)	235-304		1
	2202785100	BOTTOM COVER	202-851		1

KNOB,BUTTON

	22480260	P R-KNOB	MF BLK/LCG		2
	22480220	P R-KNOB (INTERNAL)	(SS) BF BLK/LCG		2
	22480221	P O-KNOB (EXTERNAL)	(OUTER) S BLK/LCG		2

SWITCH

	13129710	SWITCH (PUSH)	JM-0404	SW1	1

JACK,EXT TERMINAL

	13449140MF	JACK (STEREO)	HTJ-064-14D	JK5,JK7	2
	13449104MF	JACK	HTJ-064-13D	JK6	1
	13449150MF	JACK (STEREO)	HTJ-064-12D	JK2	1
	13449717	ADAPTOR JACK	HEC2392-01-150	JK1	1

PWB ASSY

#	75E193O000	OUT JACK ASSY	OUTPUT A (MONO)		1
#	75E193M000	MAIN BOARD ASSY			1
	703433L000	LED BOARD ASSY			1
#	75E193I000	IN JACK ASSY	INPUT+EXP		1

IC

#	F5179186	IC (CPU)	UPD780034AGK-B20-9ET V1.00	IC5	1
	02565501	IC (DSP)	TC220CCA0AF-B01(MR3)	IC7	1
	F5179125	IC (DC-DC)	S-8520E33MC-BJS-T2	IC6	1
	02897778	IC (RESET)	S-80130ALMC-JAP-T2	IC9	1
	F5289101	IC (OP.AMP)	NJM2100M 8P SOP	IC2	1
	15189261	IC (BIPOLAR OP AMP)	M5218AFP-600E	IC1,IC3,IC4	3
	02451434	IC (AD/DA)	AK4552VT	IC8	1

TRANSISTOR

	15329103	FET	2SK880GR-TE85R	Q3	1
	F5329530	FET	2SK879Y	Q4,Q5,Q6,Q7	4
	F5329502	FET	2SJ190	Q15	1
	15319107	TRANSISTOR	2SC4116-GR(TE85R)	Q1,Q8,Q9,Q10,Q11,Q12	6
	15309104	TRANSISTOR	2SA1586-GR(TE85R)	Q13	1

DIODE

	F5339137	DIODE	SS14 VF=0.45V	D1,D3	2
	1502928100	LED (RED)	L-34HDSL	LED1	1
	F5339201	DIODE	GS1G	D2	1
	15339119	DIODE	1SS-352	D4,D5,D6,D7	4

RESISTOR

	F5399160	MTL.FILM RESISTOR	56K J	R9,R25,R29,R44,R45,R48,R49,R52,R53,R56, R57,R63	12
	F5399106	MTL.FILM RESISTOR	47 J	R78	1
	F5399298	MTL.FILM RESISTOR	4.7 J	R100	1
	F5399156	MTL.FILM RESISTOR	33K J	R64	1

RESISTOR

	F5399154	MTL.FILM RESISTOR	27K J	R89	1
	F5399152	MTL.FILM RESISTOR	22K J	R7,R8,R10,R15,R16,R24,R28,R31,R32,R36,R37,R38,R42,R61,R62,R65	16
#	F5399190	MTL.FILM RESISTOR	220K J	R71	1
	F5399130	MTL.FILM RESISTOR	2.2K J	R1	1
	F5399200	MTL.FILM RESISTOR	1M J	R13,R26,R30,R35,R41,R43,R47,R51,R55,R79	10
	F5399128	MTL.FILM RESISTOR	1K J	R34,R40,R67,R74,R88	5
	F5399147	MTL.FILM RESISTOR	15K J	R11,R23,R27	3
	F5429386	MTL.FILM RESISTOR	150K F (1608TYPE)	R19	1
	F5429365	MTL.FILM RESISTOR	10K OHM F RANK (1%)	R91	1
	F5399140	MTL.FILM RESISTOR	10K J	R2,R3,R12,R14,R20,R21,R70,R72,R76,R90,R92	11
	F5399170	MTL.FILM RESISTOR	100K J	R33,R39,R46,R50,R54,R58,R73,R77	8
	F5399104	MTL.FILM RESISTOR	10 J	R22	1
#	F5399129	MTL.FILM RESISTOR	1.5K J	R69	1
	F5399101	MTL.FILM RESISTOR	0 J	R86	1

POTENTIOMETER

#	F327985401	POTENTIOMETER	RD912D-20-20FWH-B54-6009	VR1,VR2	2
	F3279852	POTENTIOMETER	RD901-20-15FW-B54-006	VR3	1
#	F3229160	POTENTIOMETER	RD901-20-15FP-B50K-0D 11CLICK	VR4	1

CAPACITOR

	F5359800	CHIP CAPACITOR (1608 TYPE)	GRM39F104Z25PT	C2,C20,C24,C26,C28,C31,C47-C59,C61,C65-C69,C74,C75,C77,C79	29
	F5359704	CHIP CAPACITOR (1608 TYPE)	GRM39CH220J50PT	C62,C63,C72	3
	F5359370	CHIP CAPACITOR (1608 TYPE)	GRM39CH180J50PT	C73	1
	F5359817	CHIP CAPACITOR	GRM39B683K50PT 0.068 K	C71	1
	F5359740	CHIP CAPACITOR (1608 TYPE)	GRM39B222K50PT	C11,C34,C38	3
	F5359732	CHIP CAPACITOR (1608 TYPE)	GRM39B102J50PT	C78	1
	01906178	MYLAR CAPACITOR	ECPU1C104MA5(SUBMICRON)	C13	1
	F5359725	CHIP CAPACITOR	ECJ1VC1H151J 150P J	C12,C35,C39,C42,C45	5
	F3629680	CHEMICAL CAPACITOR	47/16V	C3,C5,C27,C60	4
	F3629700	CHEMICAL CAPACITOR	10U/16V (H=7MM)	C14,C21,C22,C25,C33,C36,C37,C40,C43	9
	13629550KM	CHEMICAL CAPACITOR	100/16V	C1,C4,C46,C76	4
	F3629705	CHEMICAL CAPACITOR	10/16V SV P=1.5 4X5	C10,C19,C41,C44,C80,C81	6
	F3629695TS	CHEMICAL CAPACITOR	1/50V	C23	1

INDUCTOR,COIL,FILTER

	F2449210	SMD COIL	SLF7032T-4R7M1R7-2(4.7UH)	L2	1
	F2449209	COIL	SLF7032T-151MR29-2(150UH)	L3	1
	F5409131	EMI	QT04-60	L1	1

CRYSTAL,RESONATOR

	F5299114	CRYSTAL	HC-49SM 5MHZ	X1	1
	F5299307	CRYSTAL	HC-49SM 11.2896MHZ	X2	1

WIRING, CABLE

	G3487433	8P P=2.0MM L=100MM	FLAT CABLE	CN2,CN5	1

SCREWS

	H5039112	WASHER M9			4
	H5039205	WASHER 12.5X9.5X0.5/0.9	INTERNAL TOOTH FENI		4
	H5039521	VR ACCESSORY NUT M7			4
	H5029820	SCREW M3X10	THUMB SCREW		1
	H5029325	SCREW 3X6	PAN HEAD TAPTITE-2 BC		5
	H501941301	SCREW 3X10MM	BINDING MACHINE FEBC		2
	H5039401	NYLON WASHER 3X6X0.5			2
	H5039510	NUT M9X12X2	FENI		4
	H5039104	JACK WASHER M9.2X14X1.6	AL		1
	22137709	JACK SPACER M9.6X14X1.0			1

PACKING

#	G2607115	PACKING CASE			1
	G2627738	INNER BOX			1

MISCELLANEOUS

	2253753801	PSA CAUTION	253-538		1
	H2369402	POLYCA PIPE M3X6X6			1
	2215770201	PEDAL GUIDE BUSH	215-702		1
	H5319102	INSULOK TIE	80M/M T-18S		2
	G2167301	INSULATION SPACER			1
#	G2257314	INSULATING SHEET			1

MISCELLANEOUS

	22257257	EARTH TERMINAL		ET1,ET2	2
	2226733300	CUSHION	226-333		1
	2217710900	COIL SPRING	217-109		1
	G253751603	BOTTOM CAUTION PSA	FCC/CE/C-TICK/EMC GRY		1
	F3419102	BATTERY CONNECTOR	(006P)		1

ACCESSORIES (Standard)

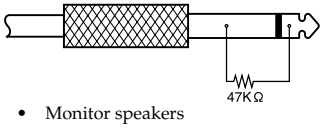
#	G6017385	OWNER'S MANUAL	ENGLISH		1
#	G6017386	OWNER'S MANUAL	JAPANESE		1
#	G2507107	MODE SEAL			1

TEST MODE

Required Items

Tools Required

- Oscillator
- Oscilloscope
- Noise meter
- 47k OHM short plug (#17041375)



- Monitor speakers
- Expression pedal (Roland EV-5)

Test Categories

1. DSP, CPU Check
2. EFFECT Volume Check
3. DIRECT Volume Check
4. FREQ Volume Check
5. RES Volume Check
6. DECAY/RATE Volume Check
7. Expression Pedal (EV-5) Insertion Check
8. Expression Pedal (EV-5) Volume Check
9. AF/AD Check
10. DAC, JACK Switch Check
11. DSP THRU Maximum Output Check
12. DSP MUTE Check
13. ANALOG BYPASS Maximum Output Check
14. ANALOG MUTE Check
15. ANALOG NOISE Check
16. MODE Volume Check
17. Battery Check
18. Noise Check

Entering Test Mode

- Turn all volume controls down completely (to minimum). Set MODE to 1.
- Hold down the pedal and connect the DC plug to the adapter jack.
- When CHECK lights up, release the pedal.
- The CHECK light goes off for approximately two seconds, then lights again, indicating that the unit has entered test mode.

* *The unit will not switch to test mode unless all volume controls are turned completely down. Furthermore, the unit will not enter test mode if, due to faulty volume controls or other causes, the minimum value is not detected for all volume controls.*

* *The unit enters Test mode even without an expression pedal (EV-5) connected to the EXP jack.*

* *If CHECK does not light, if may be due to a faulty LED. Switch the pedal on and off in Normal mode to confirm that CHECK lights and goes off. If CHECK flashes, refer to "1. DSP, CPU Check" in "Tests."*

* *For instructions on skipping tests in order to perform only a particular test item, refer to "Instructions for Skipping Tests."*

Exiting Test Mode

- The pedal may be pressed to exit Test mode.

* *"17. Battery Check" and "18. Noise Check" are not Test mode items, but are performed in Normal mode.*

Instructions for Skipping Tests

- Follow the instructions in "Entering Test Mode" and switch to Test mode.
- When the pedal is released, the unit automatically runs "1. DSP, CPU Check"; if no error is detected, CHECK lights up.
- Use the MODE control to select the desired test category.

MODE 1: EFFECT, DIRECT, FREQ, RES, DECAY/RATE Volume Check
MODE 2: Expression Pedal (EV-5) Insertion Check
MODE 3: Expression Pedal (EV-5) Volume Check
MODE 4: AF/AD Check
MODE 5: DAC, JACK Switch Check
MODE 6: DSP THRU Maximum Output Check
MODE 7: DSP MUTE Check
MODE 8: ANALOG BYPASS Maximum Output Check
MODE 9: ANALOG MUTE Check
MODE 10: ANALOG NOISE Check
MODE 11: MODE Volume Check

* *The volume checks can be run only in the following sequence: EFFECT->DIRECT->FREQ->RES->DECAY/RATE.*

* *To run "17. Battery Check" and "18. Noise Check," turn on the power without entering Test mode items, and instead perform these in Normal mode.*

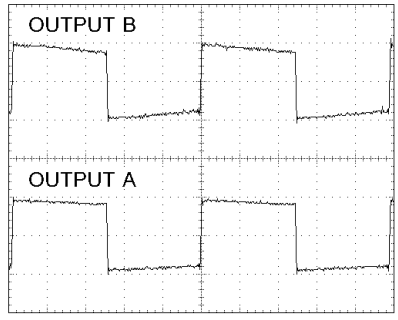
Precautionary Note

Be sure to confirm all test categories following repair of adjustments to the instrument.

Tests

1. DSP, CPU Check

- Refer to "Entering Test Mode" and switch to Test mode.
- A check of the DSP and CPU is performed automatically while the CHECK light is off. If no problem is detected, CHECK lights up and the unit enters Test mode; CHECK flashes if an error has occurred.
- Connect the oscillator to INPUT, input a rectangular wave (200 Hz, 100 mVp-p), and check the waveform output with the oscilloscope from both OUTPUT A(MONO) and OUTPUT B. Confirm that the waveform output is the same 200 Hz, 100 mVp-p waveform shown in the figure (DSP THRU).



50mV/DIV, 1mS/DIV

- If CHECK lights up, the process automatically advances to the next step.

* *If CHECK flashes, it may be due to a fault surrounding the DSP or CPU, faulty soldering, or other such problem. Disconnect the DC plug from the adapter jack and turn off the power.*

2. EFFECT Volume Check

- Rotate the knob in the clockwise direction from minimum to center, then to maximum; CHECK should change from lit to off to lit.
- When the maximum is detected, CHECK lights up, and then the process advances to the DIRECT Volume Check.

3. DIRECT Volume Check

- Rotate the knob in the clockwise direction from minimum to center, then to maximum; CHECK should change from lit to off to lit.
- When the maximum is detected, CHECK lights up, and then the process

advances to the FREQ Volume Check.

* *The DIRECT Volume Check and EFFECT Volume maximum value are detected simultaneously. The DIRECT Volume Check is not run unless the EFFECT Volume maximum is detected.*

4. FREQ Volume Check

- Rotate the knob in the clockwise direction from minimum to center, then to maximum; CHECK should change from lit to off to lit.
- When the maximum is detected, CHECK lights up, and then the process advances to the RES Volume Check.

* *The FREQ Volume Check and DIRECT Volume maximum value are detected simultaneously. The FREQ Volume Check is not run unless the DIRECT Volume maximum is detected.*

5. RES Volume Check

- Rotate the knob in the clockwise direction from minimum to center, then to maximum; CHECK should change from lit to off to lit.
- When the maximum is detected, CHECK lights up, and then the process advances to the DECAY/RATE Volume Check.

* *The RES Volume Check and FREQ Volume maximum value are detected simultaneously. The RES Volume Check is not run unless the FREQ Volume maximum is detected.*

6. DECAY/RATE Volume Check

- Rotate the knob in the clockwise direction from minimum to center, then to maximum; CHECK should change from lit to off to lit.

* *The DECAY/RATE Volume Check and RES Volume maximum value are detected simultaneously. The DECAY/RATE Volume Check is not run unless the RES Volume maximum is detected.*

7. Expression Pedal (EV-5) Insertion Check

- Confirm that the MODE control is set to 2.
- With nothing connected to the EXP jack, confirm that CHECK is unlit.
- Connect the EV-5 to the EXP jack. Confirm that CHECK lights up.

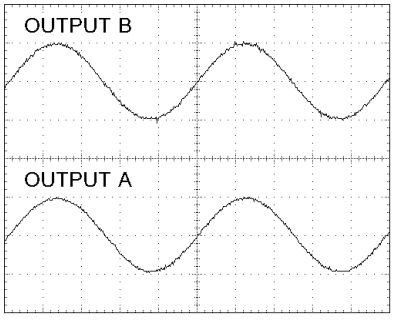
8. Expression Pedal (EV-5) Volume Check

- Confirm that the MODE control is set to 3.
- Set the EV-5 pedal so that it is fully raised (minimum setting). Confirm that CHECK lights up.
- Depress the EV-5 pedal so that it is completely pressed down (maximum setting). Confirm that CHECK lights up. CHECK should be off with the pedal between the minimum and maximum positions.
- Unplug the cable from the EXP jack to disconnect the EV-5. Confirm that CHECK lights up.

* *Perform this check with the MINIMUM VOLUME on the side of the EV-5 set to 0.*

9. AF/AD Check

- Confirm that the MODE control is set to 4. CHECK goes out.
- Use the oscillator to input a sine wave at 200 Hz, -25 dBm (FLAT) to INPUT.
- Check the waveform output with the oscilloscope from both OUTPUT A(MONO) and OUTPUT B. Confirm that the waveform is the same as that shown in the figure and that there is no distortion.

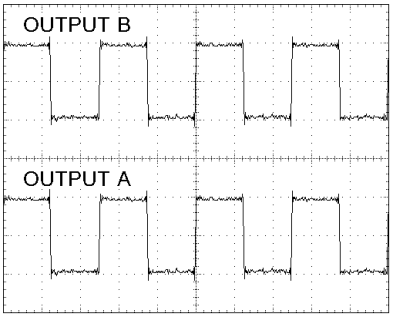


50mV/DIV, 1mS/DIV

- Check the waveform output with the noise meter from both OUTPUT A(MONO) and OUTPUT B. Confirm that each waveform output is and between -28.5 dBm and -25.5 dBm(FLAT).

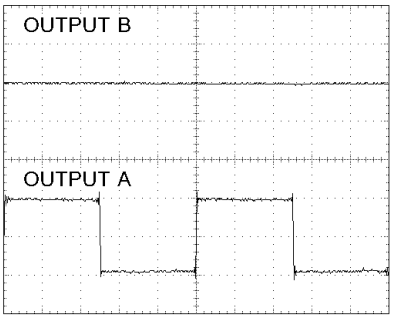
10. DAC, JACK Switch Check

- Confirm that the MODE control is set to 5. CHECK lights up.
- Connect plugs to both the OUTPUT A(MONO) and OUTPUT B jacks, and check the waveform output from both jacks with the oscilloscope. Confirm that the waveform output from each is a 400-Hz rectangular wave, with the waveform the same as that shown in the figure.



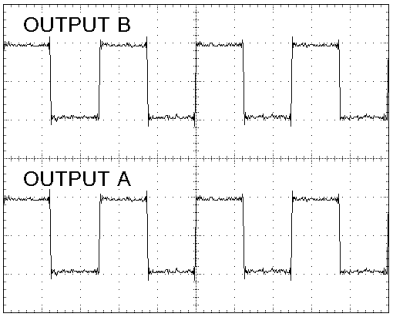
50mV/DIV, 1mS/DIV

- Disconnect the plug connected to the OUTPUT B jack.
- Confirm that the waveform output from OUTPUT A(MONO) is a 200-Hz rectangular wave, and that the waveform is the same as that shown in the figure.



50mV/DIV, 1mS/DIV

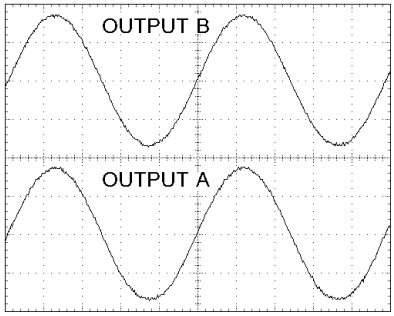
- Connect the plug to the OUTPUT B jack.
- Confirm that the waveform output from both OUTPUT A(MONO) and OUTPUT B is a 400-Hz rectangular wave, with the waveform the same as that shown in the figure.



50mV/DIV, 1mS/DIV

11. DSP THRU MAXIMUM Output Check

- Confirm that the MODE control is set to 6. CHECK goes out.
- Use the oscillator to input a sine wave at 200 Hz, +5 dBm (FLAT) to INPUT.
- Check the waveform output from both OUTPUT A(MONO) and OUTPUT B with the oscilloscope. Confirm that the waveform is the same as that shown in the figure and that there is no distortion.

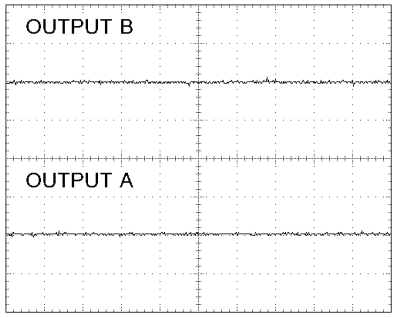


1V/DIV, 1mS/DIV

- Check the output level from both OUTPUT A(MONO) and OUTPUT B with the noise meter. Confirm that each is between +3 dBm and +6 dBm(FLAT).

12. DSP MUTE Check

- Confirm that the MODE control is set to 7. CHECK lights up.
- Use the oscillator to input a sine wave at 200 Hz, +5 dBm (FLAT) to INPUT.
- Check the waveform output from both OUTPUT A(MONO) and OUTPUT B with the oscilloscope. Confirm that the waveform is the same as that shown in the figure.

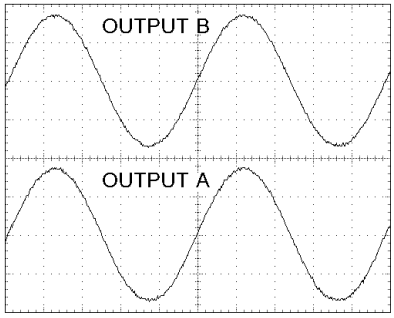


1V/DIV, 1mS/DIV

- Check the output level from both OUTPUT A(MONO) and OUTPUT B with the noise meter. Confirm that each waveform output is at or below -71 dBm(FLAT).

13. ANALOG BYPASS Maximum Output Check

- Confirm that the MODE control is set to 8. CHECK goes out.
- Use the oscillator to input a sine wave at 200 Hz, +5 dBm (FLAT) to INPUT.
- Check the waveform output from both OUTPUT A(MONO) and OUTPUT B with the oscilloscope. Confirm that the waveform is the same as that shown in the figure and that there is no distortion.

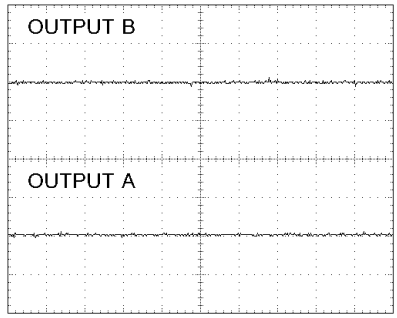


1V/DIV, 1mS/DIV

- Check the output level from both OUTPUT A(MONO) and OUTPUT B with the noise meter. Confirm that each is between +3 dBm and +6 dBm(FLAT).

14. ANALOG MUTE Check

- Confirm that the MODE control is set to 9. CHECK lights up.
- Use the oscillator to input a sine wave at 200 Hz, +5 dBm (FLAT) to INPUT.
- Check the waveform output from both OUTPUT A(MONO) and OUTPUT B with the oscilloscope. Confirm that the waveform is the same as that shown in the figure and that there is no distortion.



1V/DIV, 1mS/DIV

- Check the output level from both OUTPUT A(MONO) and OUTPUT B with the noise meter. Confirm that each waveform output is at or below -74 dBm(FLAT).

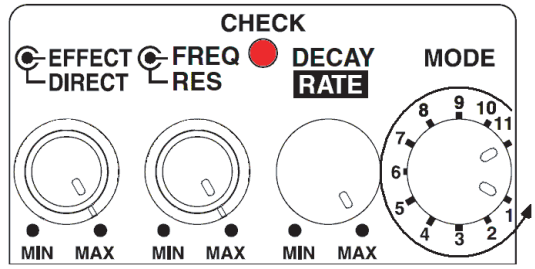
15. ANALOG NOISE Check

- Confirm that the MODE control is set to 10. CHECK goes out.
- Connect the 47 kΩ short plug to the INPUT jack.
- Check the output level from both OUTPUT A(MONO) and OUTPUT B with the noise meter. Confirm that output from each is at or below -98 dBm(IHF-A).

16. MODE Volume Check

- Confirm that the MODE control is set to 11. CHECK lights up.
- Confirm that the EV-5 is not connected to the EXP jack.

Slowly rotate the MODE control as shown in the figure, one click at a time, and confirm that CHECK lights up and goes off as described below.



MODE 11: ON
MODE 10: OFF
MODE 9: ON
MODE 8: OFF
MODE 7: ON
MODE 6: OFF
MODE 5: ON
MODE 4: OFF
MODE 3: ON
MODE 2: OFF
MODE 1: ON

* *If checking the MODE volume only, without performing all of the tests, rotate the control in the reverse sequence of that described above (i.e., MODE 1 -> MODE 11) and confirm that CHECK behaves as described.*

17. Battery Check

- Press the pedal and confirm that CHECK lights up (so that the effects are switched on).
- Confirm that a plug is connected to INPUT.
- Disconnect the DC plug from the adapter jack.
- Confirm that CHECK is lit.

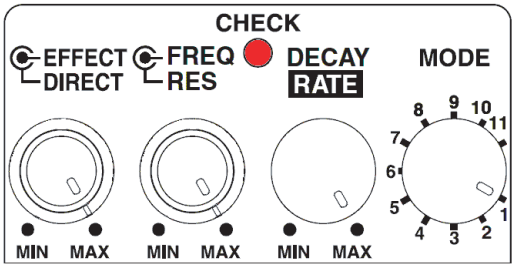
* *If CHECK is dimmer than when used with the adapter, it indicates that the batteries are going dead.*

18. Noise Check

- Connect the DC plug to the adapter jack.

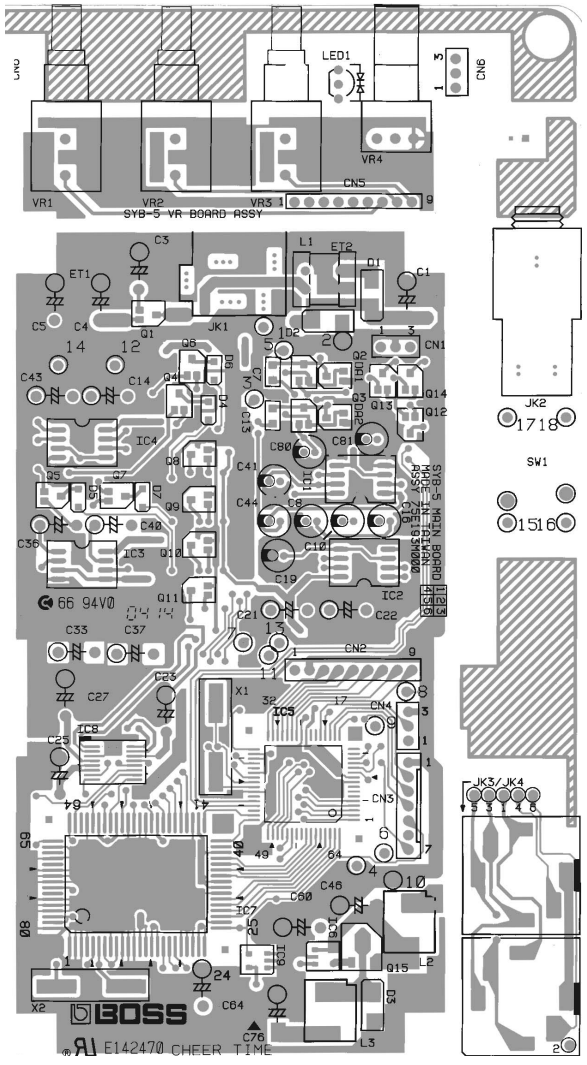
* *As this check places a drain on the batteries, use the adapter when performing this check.*

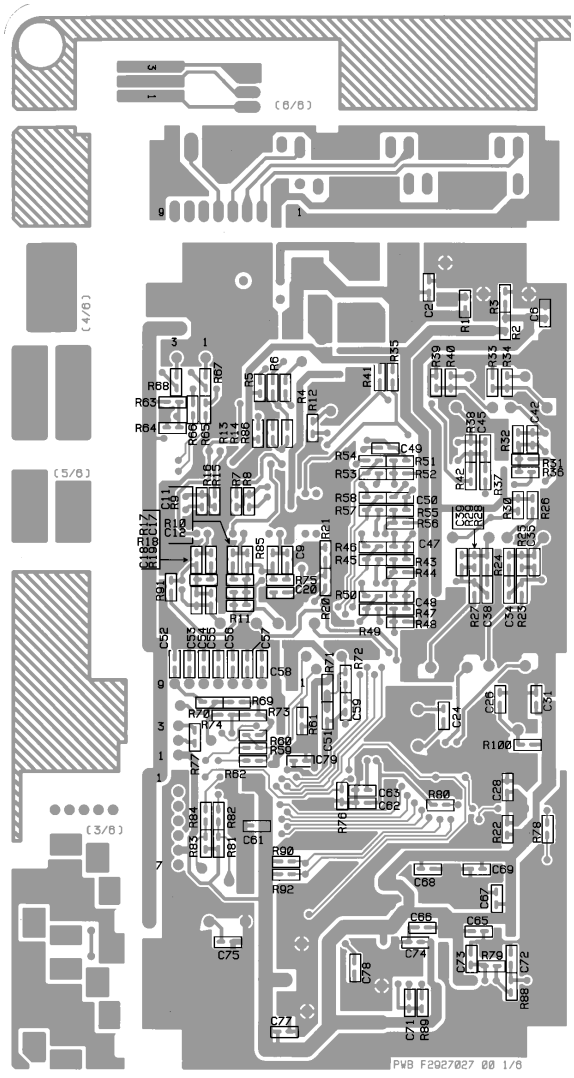
- Confirm that CHECK is lit and that the effects are on.
- Set the volume controls as shown in the figure.



- Connect the 47 kΩ short plug to the INPUT jack.
- Connect plugs to both the OUTPUT A(MONO) and OUTPUT B jacks and check the residual noise from both jacks with the noise meter. Confirm that both are at or below -92 dBm(IHF-A).
- Connect the monitor speakers to the OUTPUT A(MONO) and OUTPUT B jacks.
- Press the pedal to switch the effects on and off, and confirm that no switching noise is produced.
- Press the pedal so that the effects are on, and rotate each of the knobs, confirming that no abnormal sounds are produced.
- Set the EFFECT volume to MIN and the DIRECT volume to MAX so that only the direct sound is output.
- Shock-test the unit by dropping it from a height of 10 cm twice. Confirm that no unusual noise is output from OUTPUT B.
- Disconnect the plug form the OUTPUT B jack.
- Shock-test the unit by dropping it from a height of 10 cm twice. Confirm that no unusual noise is output from OUTPUT A(MONO).
- Switch the pedal between ON and OFF, and confirm that no switching noise is produced.

CIRCUIT BOARD





CIRCUIT DIAGRAM