

# SPD-20 SERVICE NOTES

## TOTAL PERCUSSION PAD

*First Edition*  
**Issued by RJA**

### SPECIFICATIONS

SPD-20 :TOTAL PERCUSSION PAD

- PADS  
Built-in Pads : 8  
External Pads(Optional) : 3 (4)
- Maximum Polyphony  
14 Voices
- Instruments  
700 Voices
- Memory  
Patches : 99  
Patch Chain : 8
- Effect  
Reverb  
Delay  
Chorus  
Franger
- Display  
7-segment LED x3
- Connectors  
Output Jacks (L[Mono], R)  
  
Phone Jack (Stereo)  
Trigger Input Jacks (Dual):3  
  
HH CTRL/TRIG 4 Jack (Dual)  
  
MIDI Connectors (IN, OUT)  
Foot SW Jack(Dual)

\*Trigger inputs 1 and 2 accept rim shots from the PD-7,PD-9 and PD-120 while inputs 3 and 4 accept rim shots from the PD-7 and PD-9.

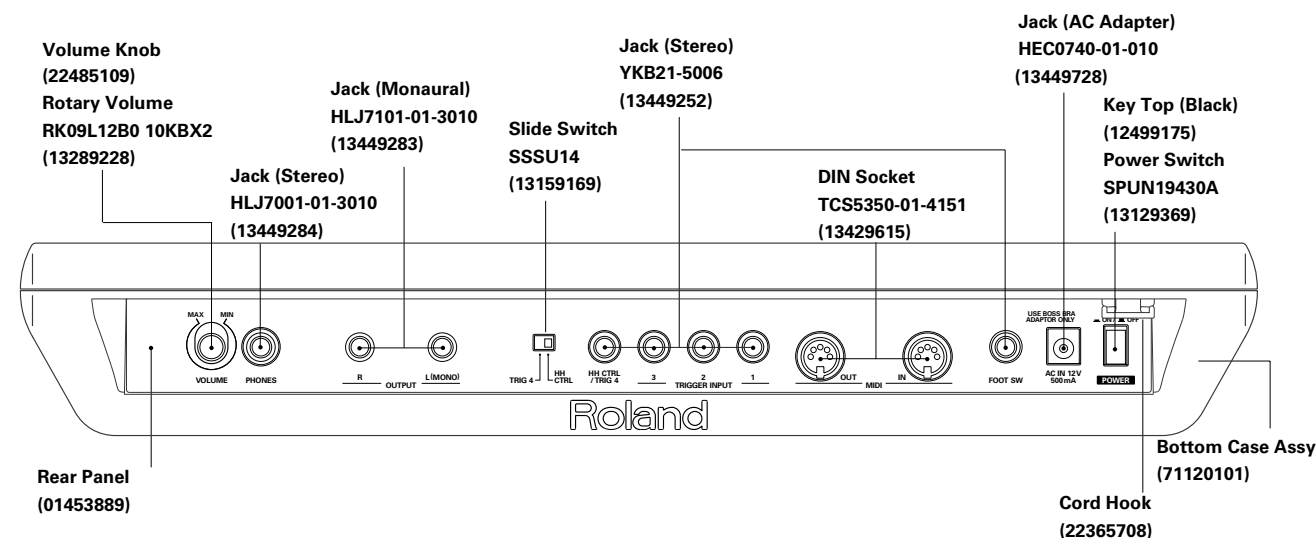
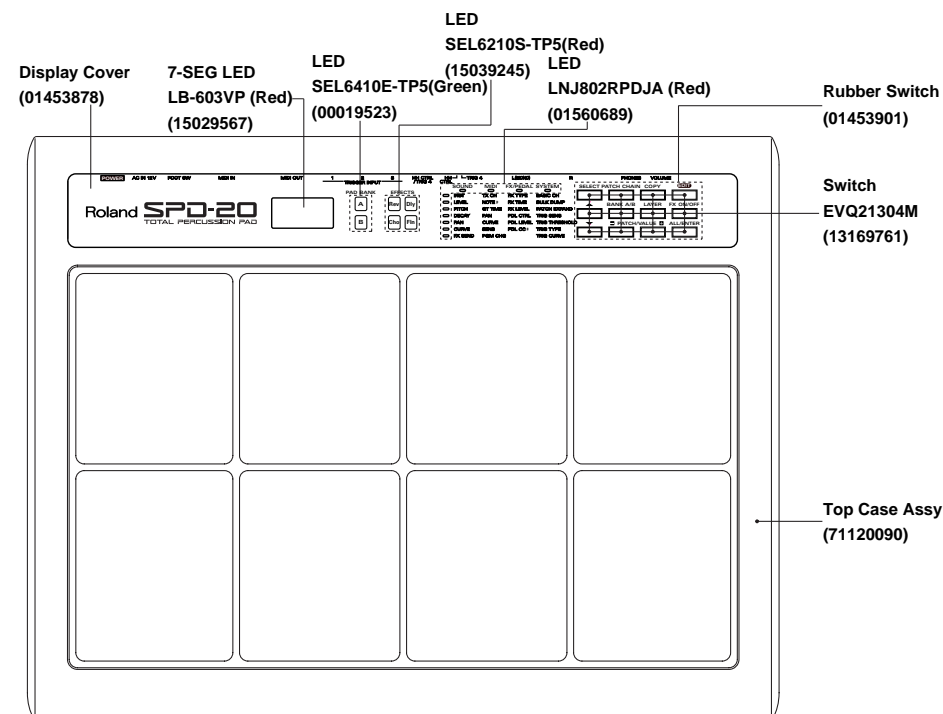
- Power Supply  
AC 12V:AC Adaptor
- Current Draw  
420mA
- Dimensions  
17-3/4(W) x 13-13/16(D) x 2-13/16(H) inches
- Weight  
2.8 Kg / 6 lbs 3 oz(excepting AC adaptor)
- Accessories  
Owner's Manual  
ENGLISH :(# 71121112)  
JAPANESE :(# 71120089)  
AC Adaptor (BOSS BRA Series)  
100V :(# 12449621)  
117V :(# 12449622)  
230V :(# 01341356)  
240V :(# 12449625)  
  
Slit Tape :(#01564589)
- Options :  
Pads (PD-120, PD-100, PD-9, PD-7, PD-5)  
  
Kick Trigger Unit (KD-7)  
  
Hi-Hat Control Pedal (FD-7)  
  
Footswitch (BOSS FS-5U)  
Footswitch Cable (BOSS PCS-31)  
  
Pedal Switch (DP-2/6)  
All-purpose Clamp Set (APC-33)

\*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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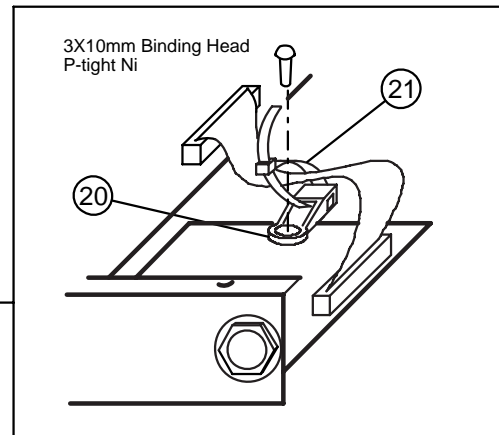
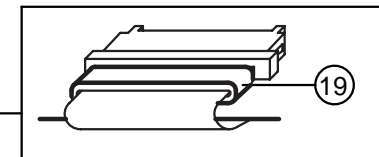
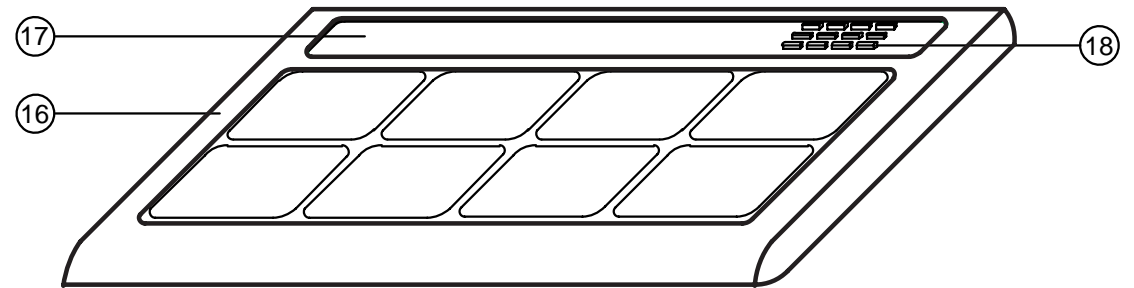
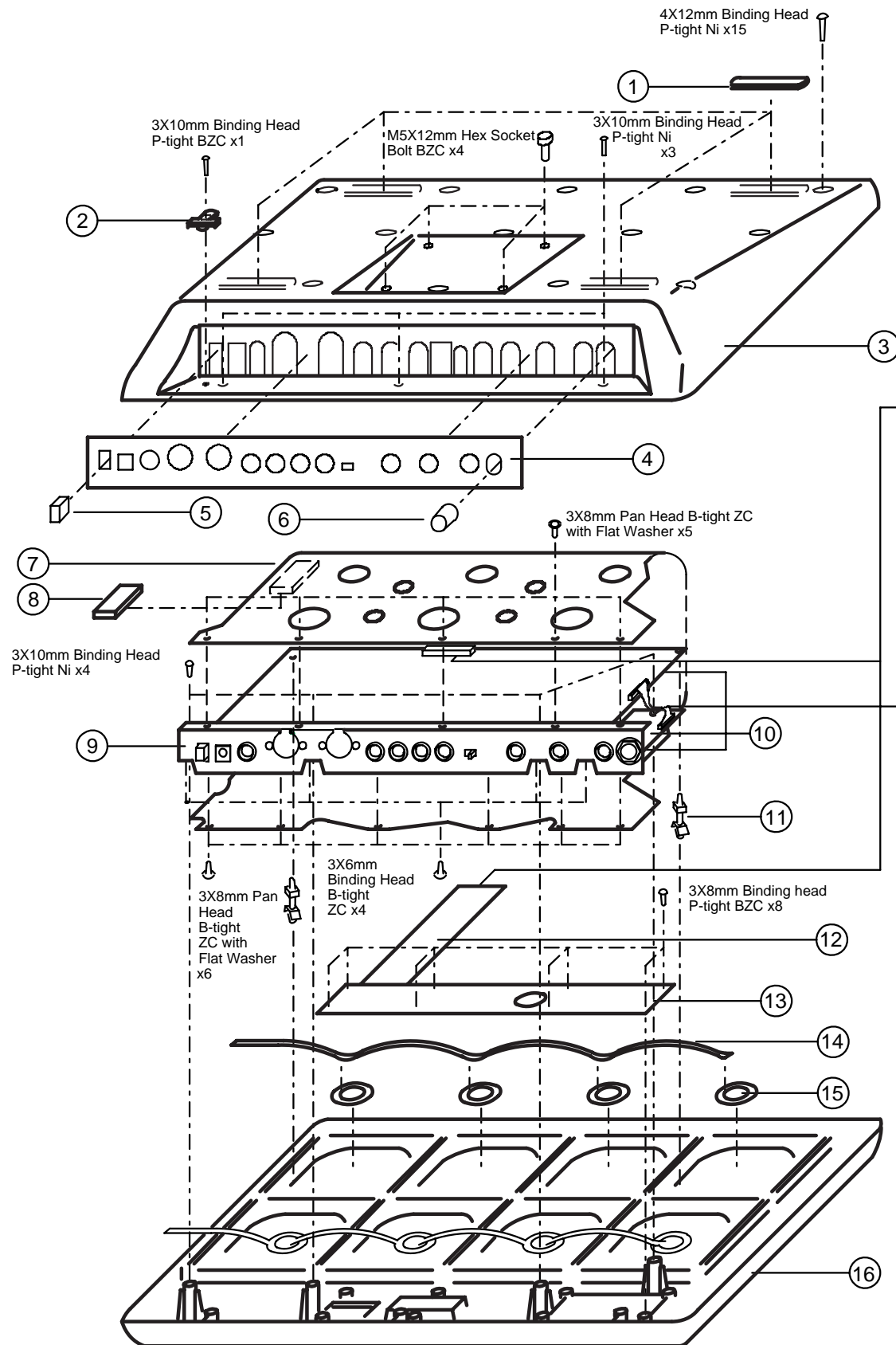
### LOCATION OF CONTROLS



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**EXPLODED VIEW**



- ① 22355152 Rubber Foot x 4
- ② 22365708 Cord Hook
- ③ 71120101 Bottom Case Assy
- NOTE : Replacement Bottom Case Assy includes the following parts.
- ① Rubber Foot
- ② Cord Hook
- ④ Rear Panel
- ④ 01453889 Rear Panel
- ⑤ 12499175 Key Top (Black)
- ⑥ 22485109 HP-5600 Knob
- ⑦ 22255385 Shield Sheet
- ⑧ 22265595 Shield Cushion
- ⑨ 22205874 Rear Holder
- ⑩ 71120156 Main Board Assy
- ⑪ 12199573 PCB Holder x 2
- ⑫ 01560656 FUJI CARD 30 x 190 x A6.0 BB-P1.25-HBL15-S

- ⑬ 71120145 Panel Board Assy
- ⑭ 01455789 Sensor Flexible x 2
- ⑮ 25295208 ø27 Sensor Tape ø18 x 8
- ⑯ 71120090 Top Case Assy

Note: Replacement Top Case Assy consists of the following 5 parts. We don't supply Top Case, Playing Plate and Cushion separately.

- \*\*\*\*\* Top Case
- \*\*\*\*\* Playing Plate
- \*\*\*\*\* Cushion
- ⑰ 01453878 Display Cover
- ⑱ 01453901 Rubber Switch
- ⑲ 12449471 Ferrite Core
- ⑳ 40016545 Tie Holder SKM-1
- ㉑ 40016512 Insulok Tie T-18S(80mm)

# PARTS LIST

### SAFETY PRECAUTIONS: \*2

The parts marked  $\Delta$  have safety-related characteristics. Use only listed parts for replacement.

### CONSIDERATIONS ON PARTS ORDERING

When ordering any parts listed in the parts list, please specify the following items in the order sheet.

QTY	PART NUMBER	DESCRIPTION	MODEL NUMBER
Ex. 10	22575241	Sharp Key	C-20/50
15	2247017300	Knob (orange)	DAC-15D

Failure to completely fill the above items with correct number and description will result in delayed or even undelivered replacement.

NOTE1: The parts marked # are new. (initial parts)  
NOTE2: The parts marked ! have safety-related characteristics. Use only listed parts for replacement

MB → MAIN BOARD ASSY  
PB → PANEL BOARD ASSY  
VB → VOLUME BOARD ASSY

### CASING

#	71120090	Top Case Assy Note: Replacement Top Case Assy consists of the following 5 parts. We don't supply Top Case, Playing Plate and Cushion separately.		
	*****	Top Case		
	*****	Playing Plate		
	*****	Cushion		
#	01453878	Display Cover		
#	01453901	Rubber Switch		
#	71120101	Bottom Case Assy Note: Replacement Bottom Case Assy consists of the following 6 parts.		
	*****	Bottom Case		
	01453889	Rear Panel		
	22355152	Foot		
	22365708	PAD-80 Cord Hook		
	40011323	3*10mm Binding Head P-tight BZC		
	40019190	M5*12mm Hex Socket Bolt BZC		

### CHASSIS

	22205874	Rear Holder		
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### KNOB, BUTTON

#	01453901	Rubber Switch		
	12499175	Key Top for SDDWA(Black)		
	22485109	HP-5600 knob		

### SWITCH

	13129369	SPUN19430A	Power Switch	SW2 on MB
	13159169	SSSU14	Slide Switch	SW1 on MB
	13169761	EVQ21304M	Tact Switch	SW301 to 312

### JACK, SOCKET

	13429543	100-032-001	IC Socket 32P	IC10 on MB
	13449284	HLJ7001-01-3010	Jack(Stereo)	JK401 on VB
	13449283	HLJ7101-01-3010	Jack(Monoral)	JK1,2 on MB
	13449252	YKB21-5006	Jack(Stereo)	JK3 to 6, 9 on MB
	13449728	HEC0740-01-010	AC Adaptor Jack	JK10 on MB
	13429615	TCS5350-01-4151	MIDI Conector	JK7,8 on MB

### DISPLAY UNIT

	15029567	LB 603VP	7-seg LED	D301 on PB
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### PCB ASSY

#E	71120156	Main Board Assy NOTE1: Replacement Main Board Assy includes the Rear Holder. NOTE2: Replacement Main Board Assy does not include the Lithium Battery. Because Lithium Battery does not use for the back-up of factory presets.		
	12569249S0	Lithium Battery		CR2032

#	71120167	Volume Board Assy		
#	71120145	Panel Board Assy		

### IC

	15199776	h8/510 HD6415108F10	CPU	IC12 on MB
	00781723	M27C2001-10F1	2M EPROM(BLANK)	IC10 on MB
	17048914	M27C2001-10F1	2M EPROM(PROGRAMMED)	IC10 on MB
	15239229	TC6116AF(GP4)	Custom IC	IC6 on MB
#	01562756	LHMNOPW2	64M MASK ROM(for Sound)	IC1 on MB
	01122412	TC551001B(C)-70L	SRAM	IC8 on MB
	01125112	TC55257DFL-70L(EL)	SRAM	IC3 on MB
	15289125	PC410	Photo-Coupler	IC17 on MB
	15289709	M51954BFP SOP	Reset IC	IC22 on MB
	15289714	uPD63200GS	D/A Converter	IC7 on MB1
	15189261	M5218AFP	Op. amp	IC4,18,21,23,24,26,29,30 on MB
	15289106	M5238FP	Op. amp	IC19 on MB
	15289109	M5216FP	Op. amp	IC5 on MB
	15259883	TC7S00F TE85L	Single 2-input NAND Gate	IC9 on MB
	15249104	TC7S04F TE85L	Single Inverter	IC11,20 on MB
	15249121	TC7W04F TE12L	Single Inverter	IC14 on MB, IC301 on PB
	15259738T0	TC74HC138AF(EL)	3 to 8 Demultiplexer	IC302 on PB
	15259740T0	TC74HC139AF(EL)	Dual 2 to 4 Demultiplexers	IC303 on PB
	15259864T0	TC74HC4052F-T2	Dual 4-channel Analog Multiplexer	IC15,16 on MB
	15259711T0	TC74HC14F-T2	Hex Schmitt Trigger Inverters	IC13 on MB
#	15259742T0	TC74HC148AF(EL)	8 to 3 Priority Encoder	IC2 on MB
	15199291	BA9700A	Switching Regulator	IC29 on MB
	15199231	uPC78L05J-T	Regulator	IC27 on MB
	15199233	uPC79L05J-T	Regulator	IC25 on MB

### TRANSISTOR

	15319101	2SC2412KR T146	NPN	Q23 to 27,29 to36, 38 to 42 on MB
	15309101	2SA1037KR PNP		Q1,2,28 on MB
	15329507	DTA114EK T146	D-TR	Q9 to 22 on MB
	15329514	DTC343TK T146	D-TR	Q3,6,7,8 on MB
	15329105	2SK304V TE85L	N-ch FET	Q4,5 on MB
	15329516	DTC114EK T146	PNP	Q301,302,303 on PB
	15309605	2SB1184R F5 TR	D-TR	Q37 on MB

### DIODE

	15339138	DCC010-TB		DA1,3,5,6,7,9 to 22 on MB
	15339139	DCF010-TL		DA4,8 on MB
	15339140	DCG010-TL		DA2 on MB
	15339141	DSD010-TB		D1,2,3,7 to 10,13,14 on MB D319 to 330 on PB
	15039169	DSK10C-ET1		D4,5,11,12 on MB
	00237712	RD5.6M-T1B B3		D6 on MB
#	01561301	1GWJ42 TPB2	LED(red)	D15 on MB
#	01560689	LNJ802RPQJA	LED(red)	
	15039245	SEL6210S TP5	LED(green)	
	00019523	SEL6410E TP5	LED(green)	

### RESISTOR

	15399953	1W MCR100-220J	1W22Ω	R12,34 on MB
	15399931	MNR34J5ABJ221	R-ARRAY	RA7,8 on MB
	15399932	MNR34J5ABJ101	R-ARRAY	RA1 to 5 on MB
	15399965	RCE9A103JAG7A	R-ARRAY	R6 on MB

### POTENTIOMETER

	13289228	RK09L12B0 10KB *2	Rotary Volume	VR401
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### CAPACITOR

	00674423	ECA0JM102B	1000uF/6.3V	C151
	13639698	ECEA0JKS101B	100uF/16V	C3,4,6,7,29 to 33,42,68,72,102,110,115,121,130,140
	13639150M0	ECEA0CKS100B	10uF/16V	C1,2,4,5,25,26,27,28,128
	13669261M0	ECEA1HKS010B	1uF/50V	C98,143
	13649710	25MV470HC+T	470uF/25V	C119,139
	13549260M0	ECQ-B1H27JF3	2700pF/50V	C15,16
	13549284	ECQ-B1H561JF3	560pF/50V	C17,18
	13559360	ECQ-B181JF3	180pF/100V	C13,14

### POTENTIOMETER, TRIMMER

	13299206	ENVD8AA03B24		VR1 on MB
	01013556	RK09L1140 10KB		VR4-7,14-17 on PB
#	01342545	RK09L1140 10KB with click		VE3,13 on PB
	01013545	RK09K12D0 10KBX2		VR2 on PB
#	01343301	RS25111A6 10KB L=15	25mm slide	VR9-12 on PB
#	01343312	RS25111C6 10KB L=15	25mm clicked	VR8 on PB
#	01342134	EWA NKE C10 B14	30mm slide	VR18-25 on PB

### CAPACITOR

	00236545	AMZV0050J224 0200		C120,127 on MB
	00239601	AMZV0050J104 0200		C117,121,124,203,328,C333,335 on MB
#	00239434	AMZV0050J182 0200		C128,144,152,160,170,C330 on MB
	00239490	AMZV0050J103 0200		C7 on PB
#	00236301	AMZV0050J222 0200		C123,135,147,156,165,C174 on MB
#	00239534	AMZV0050J223 0200		C122,129 on MB
#	00239578	AMZV0050J473 0200		C118,125,205 on MB
	00236378	AMZV0050J822 0200		C202 on MB

### INDUCTOR, COIL, FILTER

	12449396	BLM31A601SPT		L3 on MB
	00907856	BLM21A601SPT		L1,2,4 to 28
	00342556	ELC08D054 L29 on MB		
	12449471	SSC-45-8-F Ferrite Core		

### CRYSTAL, RESONATOR

	00894023	MA-406 20.000MHz		X2 on MB
#	01453945	SG8002DC 23.2MHz		X1 on MB

### CONNECTOR

	13429281	SLEM30R-2		CN2 on MB, CN301 on PB
#	01560678	SLD5R-1		CN3, 4 on MB
	13369929	53253-0710		CN401 on VB

### WIRING, CABLE

	23505664	Wiring Harness A		CN1 on MB
#	01560656	FUJI CARD 30*190-A6.0 BB-P1.25-HBL15-S		FlatCable(30P)

### BATTERY

	12569249S0	CR2032 220MAH 30M		BT1 on MB
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### SENSOR

#	71120112	SENSOR ASSY NOTE: Replacement Sensor Assy consists of the following 2 parts.		
#	*****	SPD-20 Sensor Flexible		
	25295208	ø27 Sesor Tape ø18(*4)		

### SCREWS

	40011245	4*12mm Binding Head P-tight NI		
	40011234	3*10mm Binding Head P-tight NI		
	40011312	3*8mm Binding Head P-tight BZC		
	40011034	3*8mm Pan Head B-tight ZC with Flat Washer		
	40011056	3*6mm Binding Head B-tight ZC		
	40011323	3*10mm Binding Head P-tight BZC		
	40019190	M5*12mm Hex Socket Bolt BZC		
	40016601	Nylon Ribet NRP-355		

### PACKING CASE

#	01453890	PACKING CASE		
	22645349	PAD L		
	22645350	PAD R		

### MISCELLANEOUS

	12569420	Lithium Battery Holder		for CR2032
	13429281	Connector SLEM30R-2		Flat Cable Holder(30P)
	12199573	PCB Holder KGLS-8S		
	22255385	Shield Sheet		
	22175352	Leaf Spring		
	40016512	Inshlok Tie T18S 80mm		
	40016545	Tie Holder SKM-1		
	22265595	Shield Cushion		

### ACCESSORIES(STANDARD)

	12449621	BRA-100	AC Adaptor(100V)	
	12449622	BRA-120	AC Adaptor(120V)	
	01341356	BRA-230	AC Adaptor(230V)	
	12449625	BRA-240A	AC Adaptor(240V)	
#	71121112	Owner's Manual English		
#	71120089	Owner's Manual Japanese		
#	01564589	Slit Tape	Adhesive Tape White W3MM	



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

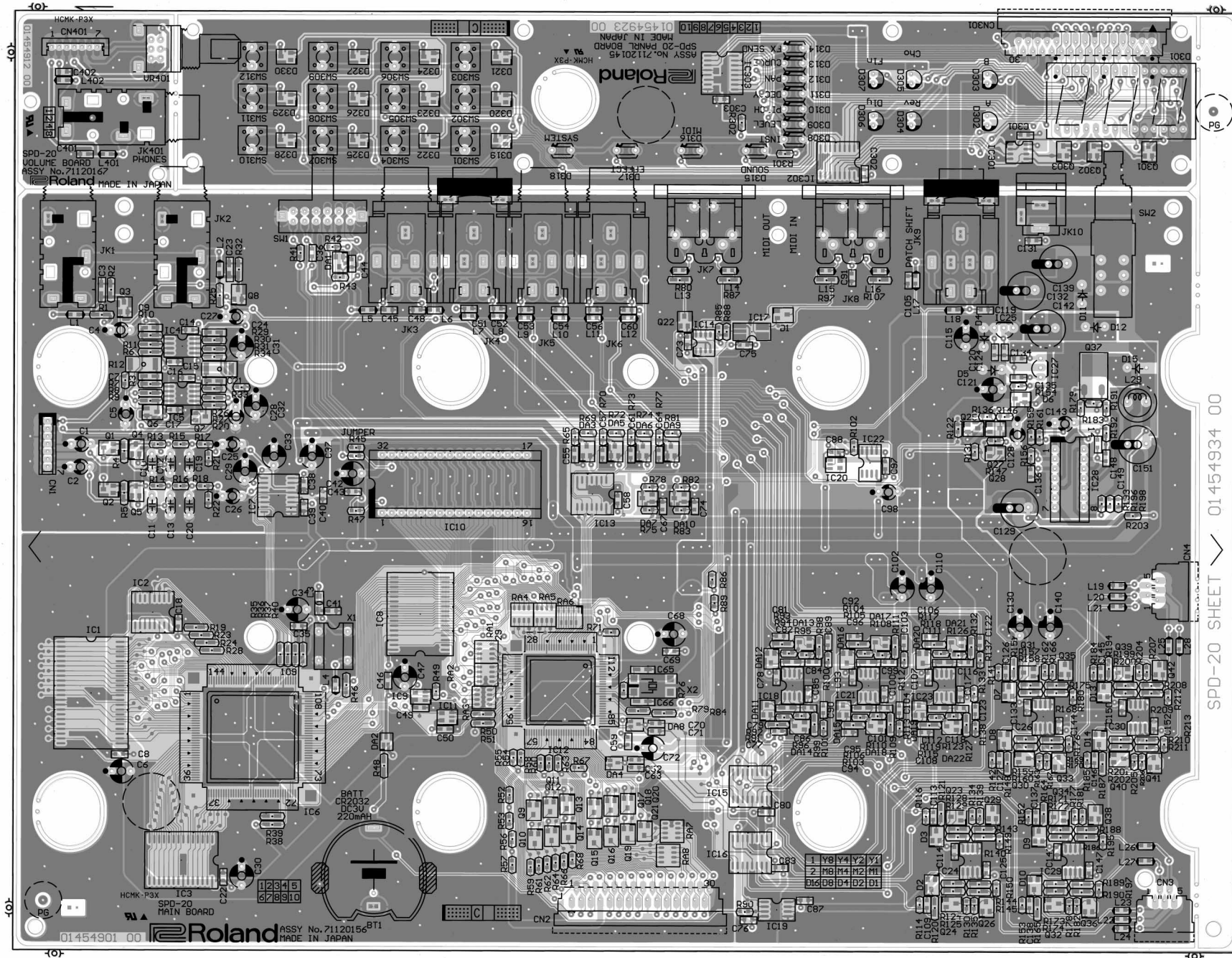
A CIRCUIT BOARD

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VOLUME BOARD ASS'Y  
ASSY 71120167



MAIN BOARD ASS'Y  
ASSY 71120156



PANEL BOARD ASS'Y  
ASSY 71120145



For Nordic Countries

**Apparatus containing Lithium batteries**

**CAUTION!**

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacture. Discard used batteries according to the manufacturer's instructions.

**ADVARSEL!**

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

**ADVARSEL!**

Lithiumbatteri - Eksplosionsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

**WARNING!**

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparatillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

**VAROITUS!**

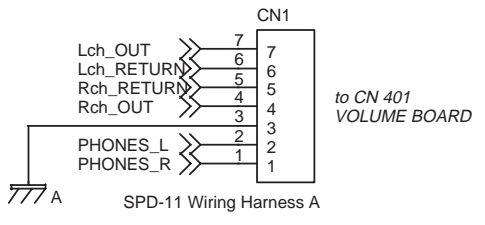
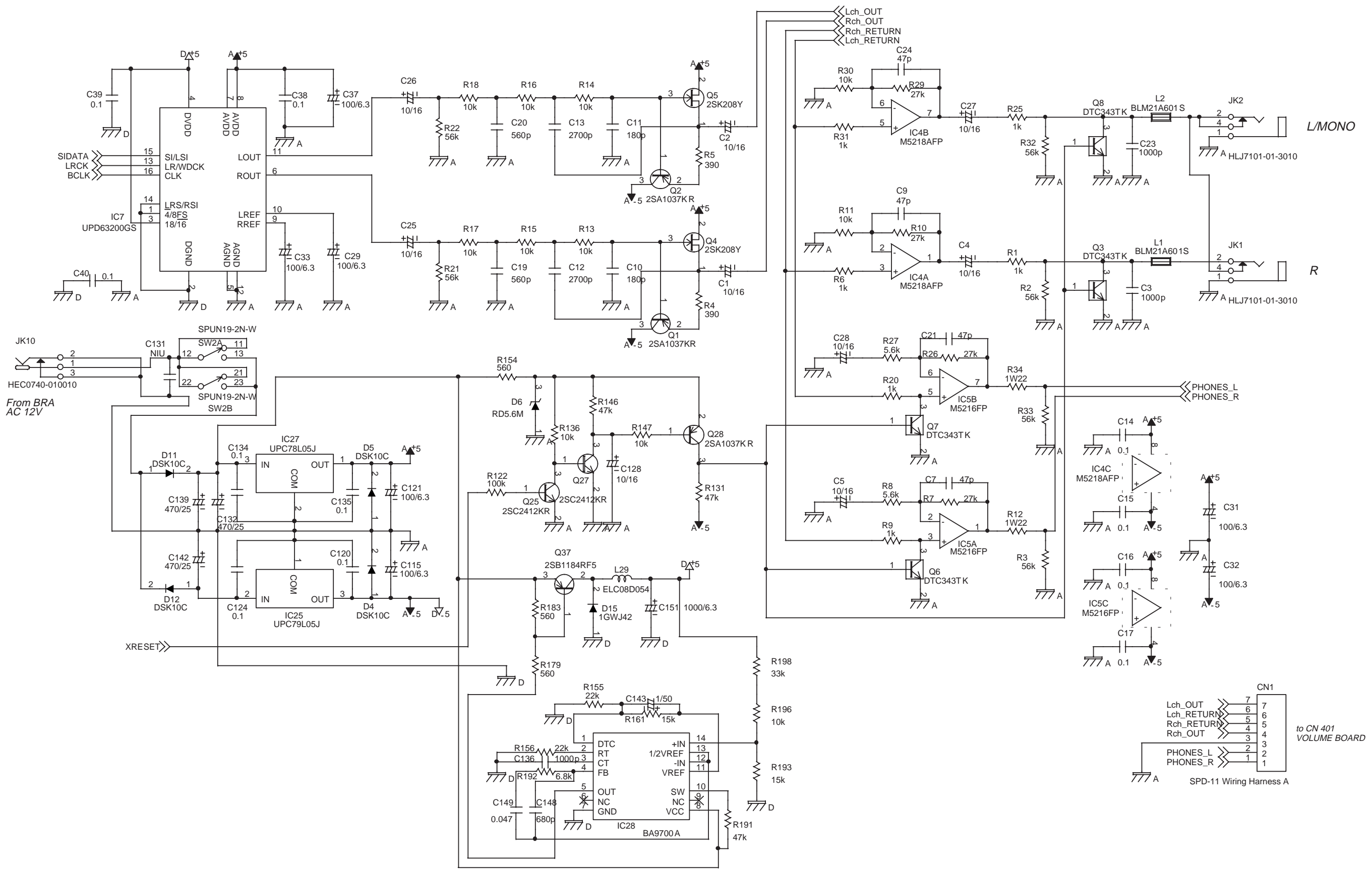
Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

SPD-20 SHEET 01454934 00

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# A CIRCUIT DIAGRAM

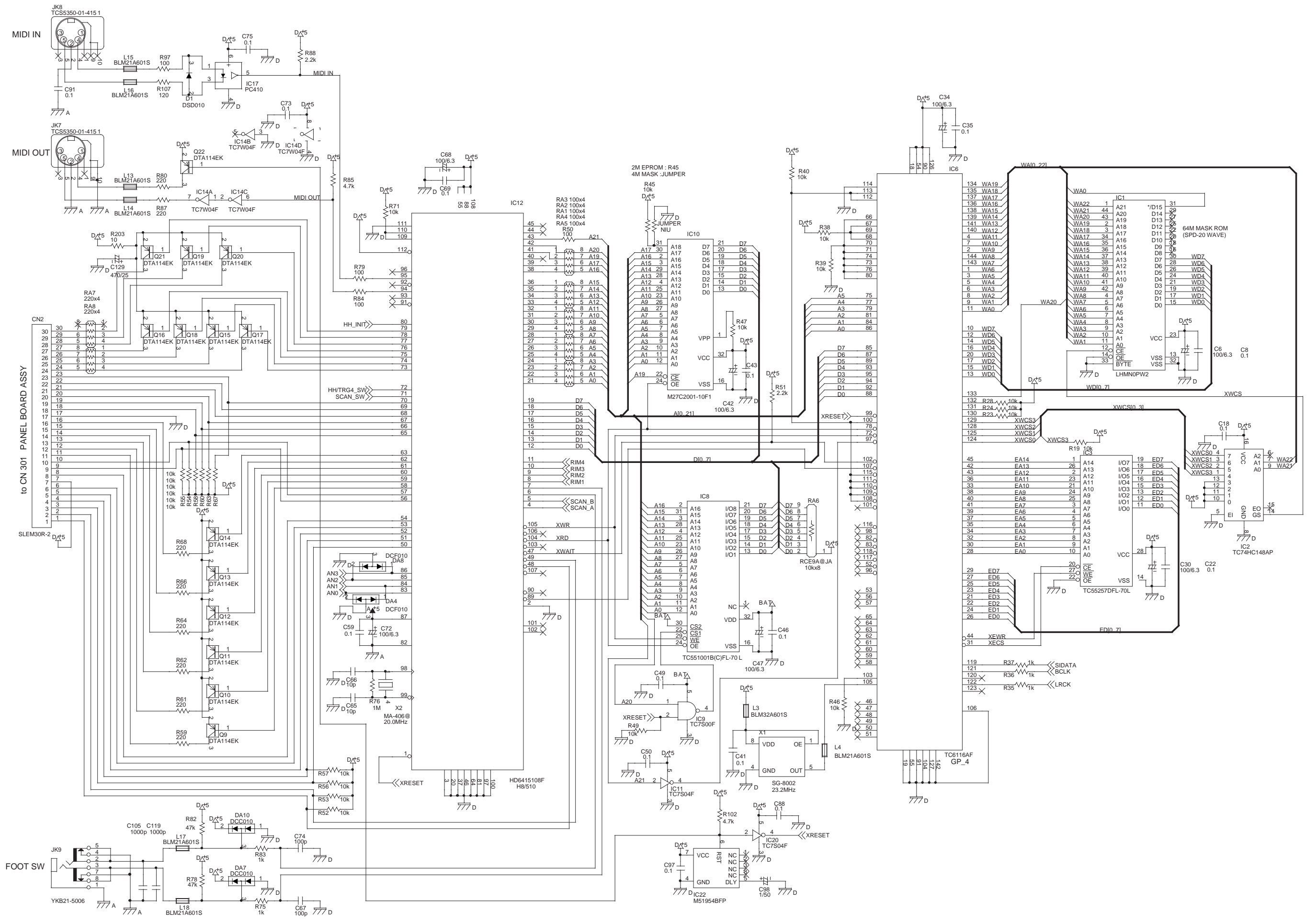
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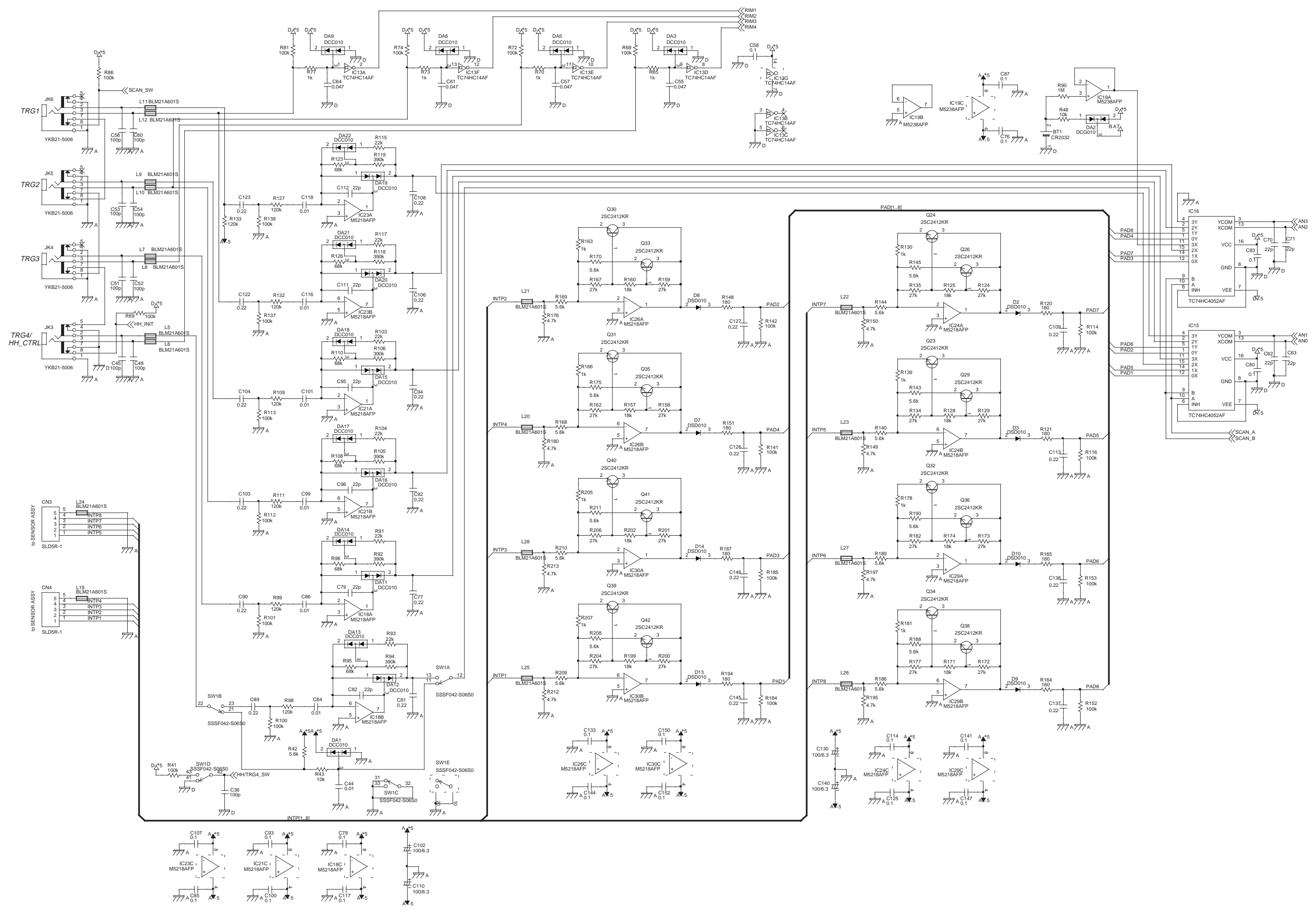
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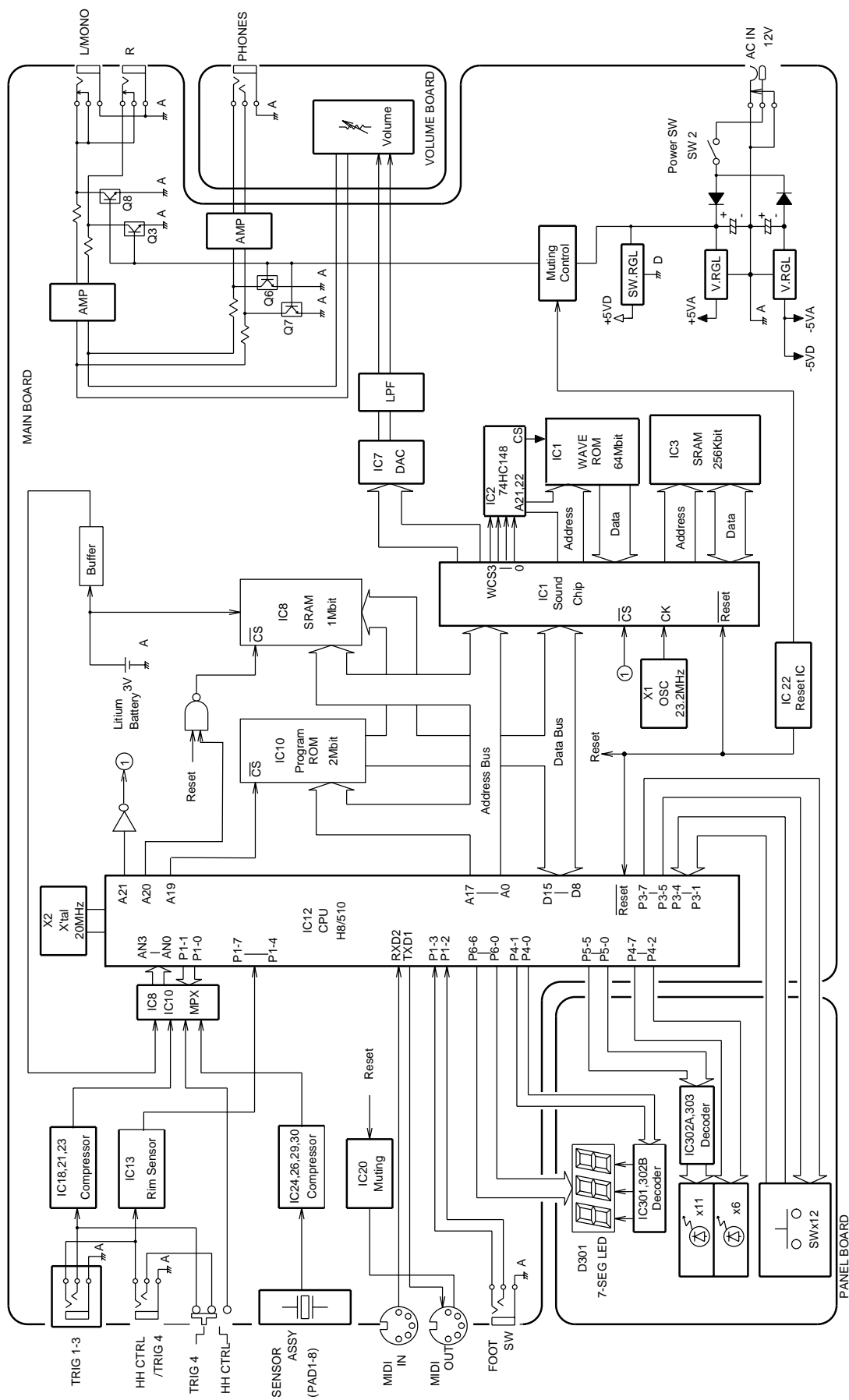
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1 2 3 4 5 6 7 8 9 10 11 12 13 14

**A BLOCK DIAGRAM**



**LOADING THE FACTORY PRESET DATA**

Perform this procedure after repairs or the like to restore the RAM to its factory preset status. This procedure will delete all data currently written to RAM and replace them with the factory preset data.

1. Turn ON the power while pressing both the [▼] and [ALL/ENTER] keys at the same time. The following display appears.



2. Press the [ALL/ENTER] key to execute initialization. If initialization is unnecessary, press a key other than the [ALL/ENTER] key.

**DATA SAVE AND LOAD**

To save the data stored in the RAM of the SPD-20 on an external device or to load the external data onto the RAM of the SPD-20, use the exclusive MIDI message. The following explains how to transmit and receive the data.

**NOTE:** In some devices, the MIDI channel number and the Device ID number can be set independently, and will not necessarily be the same. When transferring bulk data with another device, refer to the operating manual for that device.

**<How to transmit (Bulk Dump) >**

Here's how to transmit the memory data of the SPD-20.

Make connections between [MIDI OUT] of the transmitter and [MIDI IN] of the receiver.

1. Set the Device ID number (=Basic Channel) on Which Exclusive data will be sent.

- ① In edit mode, press [SELECT] to select SYSTEM.
- ② Use [▲], [▼] to select BASIC CH.
- ③ Use [▲PATCH/VALUE▼] to specify the channel (1~16).
- ④ Press [EDIT] to return to play mode.

2. Use [▲], [▼] to select the SYSTEM parameter BULK DUMP.



3. Use [▲PATCH/VALUE▼] to select the patch data you wish to transmit (ALL/1 ~ 99). If ALL is selected, all Patch data, Patch Chain data, and system parameter data will be transmitted at once.

4. Set the receiving MIDI device so that it will be able to receive Exclusive messages.

5. Press [ALL/ENTER] and data transmission will begin.

<The time required of transmitting data>  
 All patch data .....about 65 sec  
 One patch data .....about a sec



If you wish stop the operation during transmission, press [EDIT].

6. If you wish to transmit other Patch data, repeat steps 3 ~ 5.

7. Press [EDIT] to return to play mode.

**<How to receive (Bulk Load)>**

Here's how to receive Patch data that was stored in another SPD-20 or in a sequencer.

Make connections between [MIDI IN] of the transmitter and [MIDI OUT] of the receiver.

**NOTE:** When data is received, the previous settings will be lost.

1. Make sure that the MIDI channel of the transmitting device matches the Basic channel of the receiving SPD-20.

(refer to "How to transmit"-1)

If you transfer Exclusive data from another SPD-20, set the basic channels on both units match.

If you receive the Exclusive data that was stored in a sequencer, set the basic channel to match the same number which was set when you saved data in the sequencer.

2. Press [EDIT] to enter edit mode.

3. Transmit the Exclusive data from the other MIDI device. When reception begins the following display will appear.



4. Press [EDIT] to return to play mode.

\* Exclusive data transmission can require a significant amount of time, so allow a reasonable time for these operations. Data cannot be transmitted while incoming Bulk data is being processed, nor can data be received while Bulk data is being transmitted.

If Bulk data (Exclusive data) is received during Patch Chain play mode, the SPD-20 will return to normal play mode when reception ends.

**IDENTIFYING THE VERSION NUMBER**

The ROM version can be checked on the "Version check" in "Test Mode".

However, it can also be checked with the following procedure.

1. Turn ON the power supply while pressing both the [SELECT] and [EDIT] keys at the same time. The following will be displayed on the 7-segment LED.

The displayed ROM version number is for the EP-ROM (IC10 on CPU Board).



1.00 .....version number

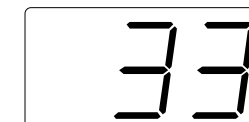
2. Press any key to the normal mode.

**CHECKING BATTERY VOLTAGE**

Use this procedure to check the voltage of the lithium battery.

1. Holding down [▲] and [FX ON/OFF] keys simultaneously, turn on power.

The LED display will show the status of the lithium battery.



The readings of 3.3 volts is a proof of a good battery condition.

If the readings is below 2.2V, the battery needs an exchange.

**NOTE:** The battery is also monitored during operation and causes the error message if it goes below 2.2V. (Refer to "ERROR MESSAGES" section.)

2. To return to the operation mode, press any key.

## TEST MODE

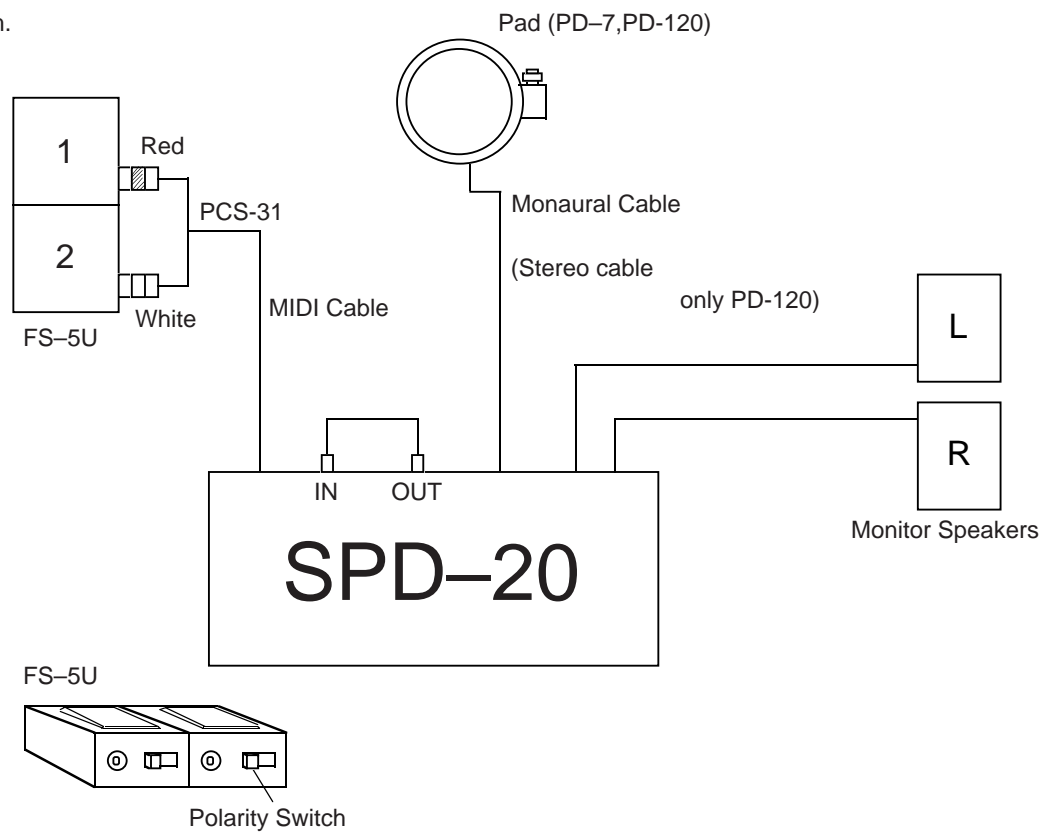
### < CAUTION >

The user data will be erased once the unit enters the test mode.  
Be sure to save the user data before accessing the test mode. Refer to "DATA SAVE AND LOAD" section.

### ●Tools and materials

- Monitor speakers
- MIDI cable
- Foot switches (FS-5U) x 2
- Connection cable (PCS-31)
- Pad (PD-7,PD-120)
- Monaural cable
- Hi-Hat control pedal (FD-7)
- Stereo cable

Make connections as shown in following diagram.



### ●Entering test mode

While pressing [ALL/ENTER] and [EDIT] keys simultaneously, turn power on. The 7-seg LED will display as follows.

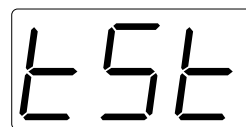


fig. 1

Press [ALL/ENTER] key, RAM,SOUND ROM, LITHIUM BATTERY check by automatic operation, and the display shows as folloes:



fig. 2

This display is "TEST MENU".

If not all tests succeeded, the display shows as follows.

RAM NG:



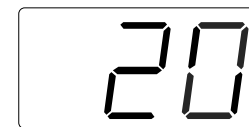
fig. 3

WAVE ROM NG:



fig. 4

BATTERY NG:



2.0V

fig. 5

(The test mode is stoped.)

### ●Exiting test mode

Press [ALL/ENTER] key while in the test menu of the test mode.The following display will ppear and it will blink. After that SPD-20 exit the Test mode automatically.

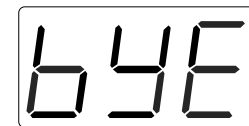


fig. 6

### ●Test procedure

#### 1.Version check

Press [SELECT] key, the 7-seg LED will display the version number.



fig.7 (1.00.....Version number)

Press [SELECT] key the display returns to the test menu.

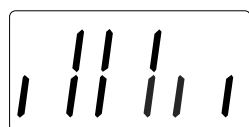


fig. 8

During the subsequent tests, the number of segments being its is decremented by after returning to the menu screen from a test.

2.LED check

Press [PATCH CHAIN] key to start the LED test. Verify that all LED turn on, one at a time. When all the segments have turned on, press [PATCH CHAIN] key.

3.SW check

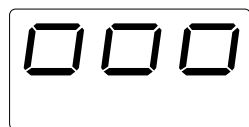


fig. 9

Press [COPY] key and the display changes as follows: Press 12 keys on the right hand of the front panel one by one. Segments of the LED will be turned off, one at a time for a key pressed. When all keys are pressed, the 7-seg LED will show YES

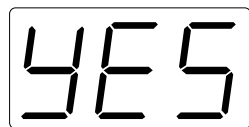


fig. 10

and then return to the menu.

4.FOOT SW check

Connect FOOT SW socket to the foot switch via the cable PCS-31.



fig. 11

Press [EDIT] key and the 7-seg LED will show: Depress the pedals on the foot switch, one at a time.

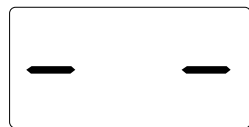


fig. 12

As follows if the pressed pedal is good: Then the 7-seg LED will show YES before returning to the menu.

5.MIDI check

Connect the MIDI IN to MIDI OUT using the MIDI cable. Press [▲] key to start the MIDI circuit test.

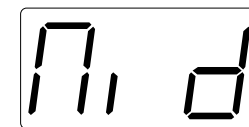


fig. 13

When the MIDI circuitry is good, the 7-seg LED shows YES and returns to the menu.

6.TRIGGER INPUT check

Set TRIG4/HH CTRL selector switch on the rear panel to TRIG4 position.

\*TRIGGER CIRCUIT check

Hit head of PD-7 one by one and listen to the speakers. Verify all jacks are correctly localized(panning).

	SOUND NAME	PAN
TRIG1	Kick	hard left
TRIG2	Snare	hard right
TRIG3	Darbuk	hard left
TRIG4	Cymbal	hard right

\*RIM CIRCUIT check

Press [BANK A/B] key. The 7-seg LED will change as follows:

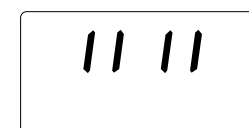


fig. 14

A monaural cable into TRIG1 ~ 4 jacks one by one. As follows if this check is good:

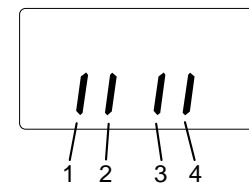


fig. 15

Now the 7-seg LED should show YES and return to the menu.

7.RIM A/D check

Press [LAYER] key. The 7-seg LED will change as follows:

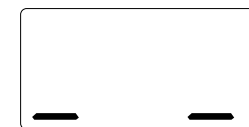


fig. 16



Connect TRIG1 jack to the PD-120 via the stereo cable.  
Hit rim of the PD-120, the 7-seg LED will change as follows:

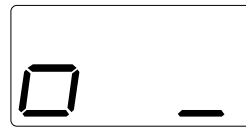


fig. 17

Connect TRIG2 jack to the PD-120 via the stereo cable.  
Hit rim of the PD-120, the 7-seg LED will change as follows:

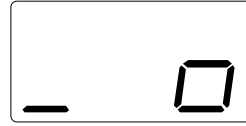


fig. 18

Press [LAYER] key the display returns to the test menu.

8.Hi-HAT CONTROL check

Connect the Hi-Hat control pedal(FD-7) to SPD-20 HH CTRL/TRIG4 socket via the monaural cable.

\*Set HH CTRL/TRIG4 switch to HH CTRL.

Press [FX ON/OFF] key. The 7-seg LED will change as follows:

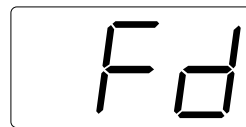


fig. 19

After entering the test mode, depress the control pedal.  
The 7-seg will first read a value X(fluctuating) and should read 0 at a maximum pressure.

Press [FX ON/OFF] key the display returns to the test menu.

9.CROSSTALK check

Press [▼] key. The 7-seg LED will change as follows:

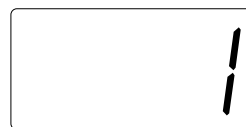


fig. 20

The displayed number represents a pad. The [- PATCH/VALUE+] keys scroll pads 1 through 8.  
Hit the pad being displayed. No output sound means the circuitry is good.  
If the pad causes crosstalk sound, the display will indicate:

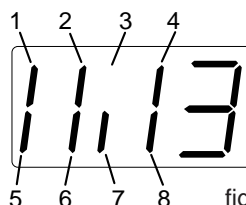


fig. 21

(The number of pad being checked on this display.)

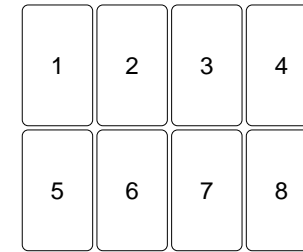


fig. 22

Unlit segments indicate non-crosstalk pads and one being checked.

After completion of the test, press[▼] key and the display return to the test menu.

10.VELOCITY check

Press [-PATCH/VALUE] key. The 7-seg LED will change as follows:

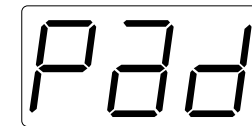


fig. 23

Press the head of the 8 pads on the SPD-20 and observe the velocity readings on the LED display. The highest readings should be 127.

After completion of the test, press[-PATCH/VALUE] key and the display return to the test menu.

After completion of all tests, press [ALL/ENTER] key and the 7-seg LED returns to the operation mode after displaying message shown in (fig.5).

## ERROR MESSAGES

If a problem occurs during operation, an error message will be displayed.

Check which error message is displayed, and take the appropriate action as described in this section.

### Act SENS Err

- The MIDI cable connecting another MIDI device to the SPD-20 is not connected correctly or may be broken.
  - Check the MIDI cable and the connections with the other device.

### Load Err

- Bulk Data loading was not successful.
  - Try loading once again.
  - \* Press any button on the front panel and previous display will reappear.

### SERIAL Err

- MIDI data was received incorrectly.
  - \* Press any button on the front panel and previous display will reappear.

### BUFFER FULL

- Too much MIDI data was received from another MIDI device.
  - Reduce the amount of MIDI data transmitted by the other device.
  - Or, retransmit the data after an interval to reduce the amount of MIDI data transmitted in a short time.
  - \* Press any button on the front panel and previous display will reappear.

### ANALOG TEST Err

- The memory data inside the SPD-20 has been lost.
  - Press any button on the front panel. All data will be initialized, and the normal display will reappear.
  - \* If this happens, all the data in the SPD-20 will be reset to the factory preset settings.

### ANALOG TEST Err

- This indicates that there is an irregularity in the voltage of the pad detection circuit.
  - IC15,IC16 or peripheral circuits may be at fault .
  - \* Press any button on the front panel and previous display will reappear.

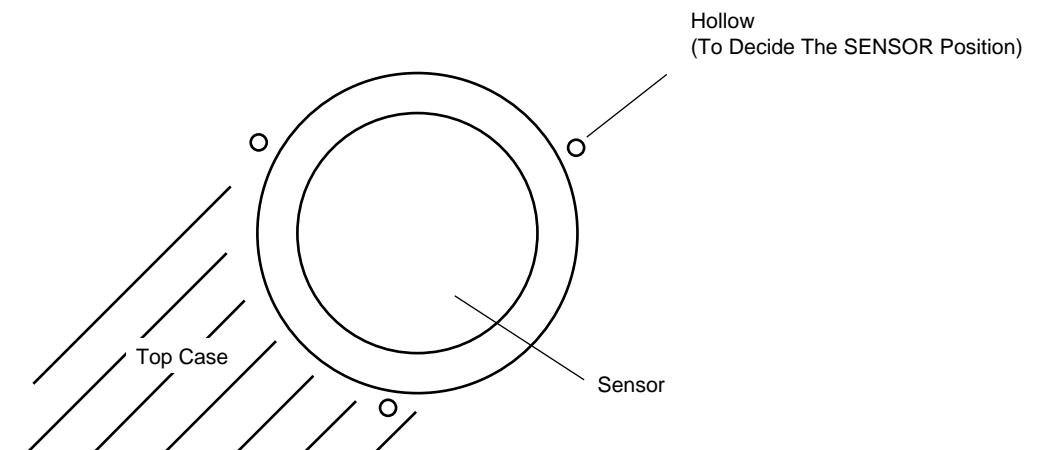
**NOTE:** Sometimes this error message will appear if you strike a pad while turning on the power. In this event, turn the power on once again.

### BATTERY LO

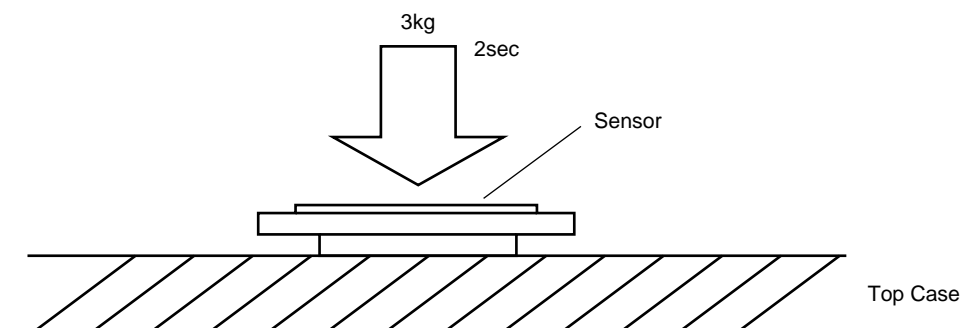
- The memory backup battery inside the SPD-20 has run down.
  - Have the battery replaced.
  - \* Press any button on the front panel and previous display will reappear.

## How to exchange the Sensor and the Sensor Assy

1. Refer to the following for sticking positions of Sensor Assys.



2. Press the Sensor Assy to an approximately 3-Kg load for 2 seconds after sticking of the sensor assy.



## ADJUSTMENT

### ■ Preventing mistriggering of two pads tapped simultaneously

When you tap two internal pads simultaneously they may positively trigger the sound. If this is the case, follow the steps described below.

This information is not found in the Owner's manual.

1. Holding **BANK A/B** and **LAYER**, turn on the power switch.  
The display will read **70** which is the factory setting.
2. This value is the "crosstalk cancel" level set for the internal pads.

Change this value to 50 by pressing **PATCH/VALUE** **[+]** or **[-]**. Decreasing this value minimizes the chance of missing sound but increases the chance of cross talk. \*1 The reverse holds true.

\*1 Crosstalk: A tap of a pad will cause a different pad to trigger its sound source.

A pad on the SPD-20 tends to cause crosstalk when it is not tapped at the center.

Note: With the crosstalk cancel set at 50, strong tapping of a pad at outer portion (from 2 cm from periphery) will cause a crosstalk. Ask the user how he plays the pads and adjust the cancel level in the range of 60 to 70.

CAUTION: Pads are disabled during setting sequence of the crosstalk cancel level.

3. Turn off power.

The setting is memorized and will be made effective as you turn on the SPD-20 next time.

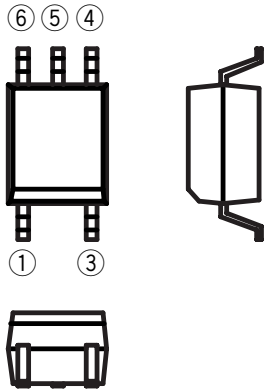
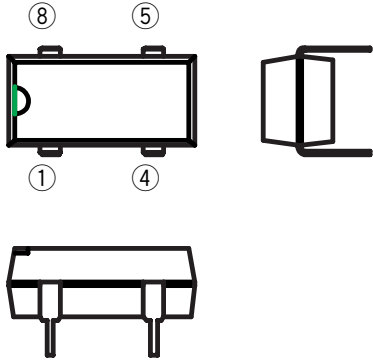
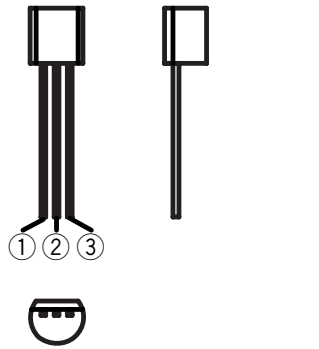
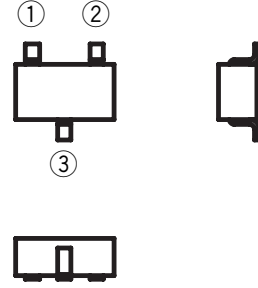
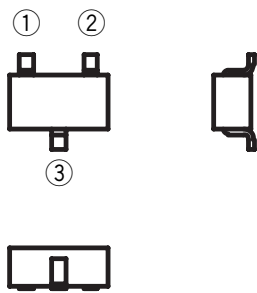
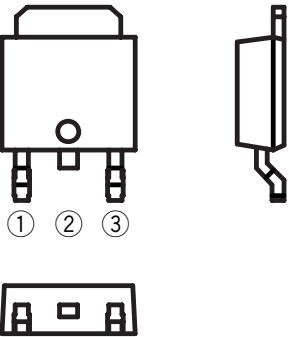
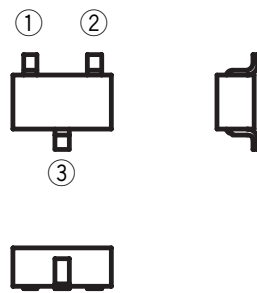
Remarks: Mistriggering is more likely to occur as two pads are tapped at the same time and with uneven forces (or out of the center of the pad).  
To reduce mistriggering: Tap pads at the center with same force; or not at the same time.

To set the crosstalk cancel level of the pads connected to the TRIGGER INPUT of the SPD-20, refer to p.53 of the Owner's manual.



IC DATA

MB ---> Main Board Assy (pcb 22935470 1/3)  
 PB ---> Panel Board Assy (pcb 22935470 2/3)

<p>Photo Coupler(IC17 on MB)                  PC-410                  (15289125)</p> <p>① Anode                  ③ Cathode                  ④ GND                  ⑤ V0                  ⑥ VCC</p> 	<p>Oscillator(X1 on MB)                  SG-8002                  (01453945)</p> <p>① 0E                  ④ GND                  ⑤ OUT                  ⑧ VDD</p> 	<p>+5V Voltage Regulator(IC27 on MB)  <math>\mu</math>PC78L05J                  (15199231)                  -5V Voltage Regulator(IC25 on MB)  <math>\mu</math>PC79L05J                  (15199233)</p> <p><math>\mu</math>PC78L05J                  ① OUT                  ② GND                  ③ IN</p> <p><math>\mu</math>PC79L05J                  ① GND                  ② IN                  ③ OUT</p> 	<p>Transistor(Q9 to 22 on MB)                  DTA114EK (15329507)                  Transistor(Q301,302,303 on PB)                  DTC114EK (15329516)                  Transistor(Q3, 6, 7, 8 on CB)                  DTC343TK (15329514)</p> <p>① Emitter                  ② Base                  ③ Collector</p> 
<p>Transistor(Q1, 2, 28 on MB)                  2SA1037KR                  (15309101)</p> <p>① Emitter                  ② Base                  ③ Collector</p> 	<p>Transistor(Q37 on MB)                  2SB1184R F5                  (15309605)</p> <p>① Base                  ② Collector                  ③ Emitter</p> 	<p>Transistor(Q23 to 27, Q29 to 36                  Q38 to 42 on MB)                  2SC2412KR                  (15319101)</p> <p>① Emitter                  ② Base                  ③ Collector</p> 	<p>FET(Q4, 5 on MB)                  2SK208Y                  (15329105)</p> <p>① Drain                  ② Source                  ③ Gate</p> 