PORTATONE

EZ-150

SERVICE MANUAL



CONTENTS

SPECIFICATIONS 3
PANEL LAYOUT 4
BLOCK DIAGRAM 5
CIRCUIT BOARD LAYOUT & WIRING 6
DISASSEMBLY PROCEDURE 7
LSI PIN DESCRIPTION 10
IC BLOCK DIAGRAM 12
CIRCUIT BOARDS 13
TEST PROGRAM 16
MIDI IMPLEMENTATION CHART 18
OVERALL CIRCUIT DIAGRAM
PARTS LIST

PK 001707

YAMAHA
HAMAMATSU, JAPAN

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IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING : Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT : This presentation or sale of this manual to any individual or firm does not constitute authorization certification, recognition of any applicable technical capabilities, or establish a principal-agent relationship of any form.

The data provided is belived to be accurate and applicable to the unit(s) indicated on the cover. The research engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING : Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground bus in the unit (heavy gauge black wires connect to this bus.)

IMPORTANT : Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (Where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

■ WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specification equal to those originally installed.

SPECIFICATIONS

Keyboard
61 standard-size keys (C1 - C6) with light guide

Display
LED display

Setup
STANDBY/ON
MASTER VOLUME : MINI-MAX

Panel controls
Overall, SONG, VOICE, STYLE, DEMO, POTABLE GRAND, DJ, METRONOME, Dict., L, R, TEMPO/TAP, numeric keypad (0 - 9, +, –)

Voices
100 panel voices (max. polyphony: 16)

Effects
Dual (Included in Voice),
Harmony/Echo (Included in Voice),
Split (Included in Voice),
Sustain

Style
100 styles

Fingering: Multi Fingering

Sections: Intro, Main A, B, Ending, Ritardando, Fill

Overall controls
Light On/Off, Multi Pad, Grade, Talking, Transpose, Tuning, Accompaniment Volume, Song Volume, Metronome Volume

Style controls
ACMP On/Off, Sync-Start, Start/Stop, Intro/Ending/rit., Main A, B (Auto Fill)

Song controls
Start/Stop, Pause, A-B Repeat, Fast Forward, Rewind, Melody Voice Change

One Touch Setting
1/style, 1/song

Multi Pads
4 pads x 10 banks

Yamaha Education Suite
Dictionary, Lesson 1-4

Preset songs
100 songs

Amplifier
2.0W + 2.0W

MIDI
IN/OUT

Auxiliary jacks
PHONES/OUTPUT, DC IN 12V, MIDI IN/OUT, SUSTAIN

Speakers
12cm x 2

Power consumption
9W
(when using PA-3C power adaptor)

Power supply
Adaptor: Yamaha PA-3C or PA-3B AC power adaptor
Batteries: Six “D” size, R20P(LR20) or equivalent batteries

Dimensions
931 x 349 x 128 mm
(36-2/3" x 13-3/4" x 5-1/16")

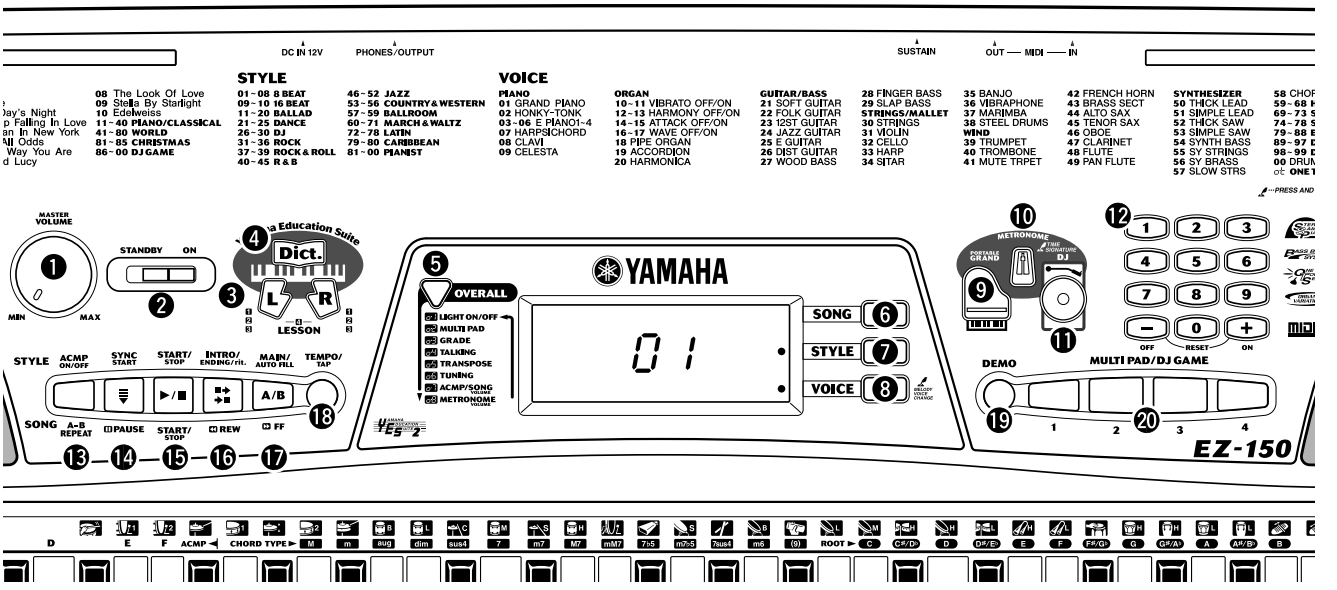
Weight
4.7kg (10 lbs., 6 oz.)

Supplied accessories
Music Rest, Owner’s Manual, Song Book

Optional accessories
Headphones: HPE-150
AC power adaptor: PA-3C or PA-3B
Keyboard stand: L-2L, L-2C

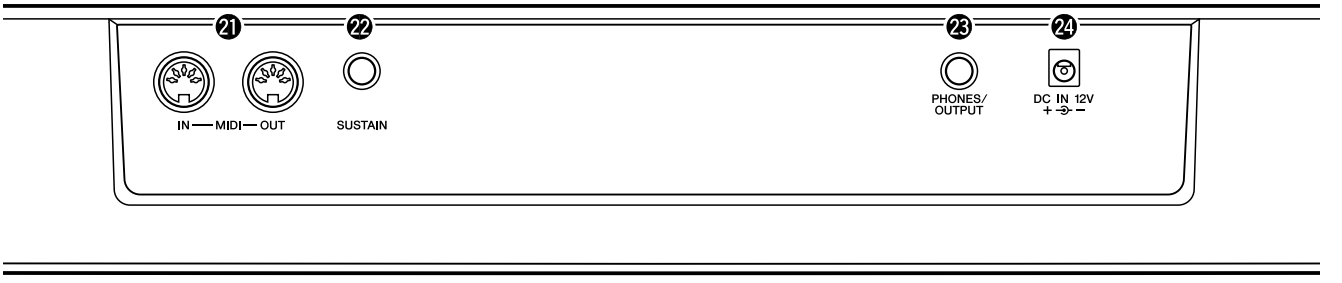
PANEL LAYOUT

• Front Panel

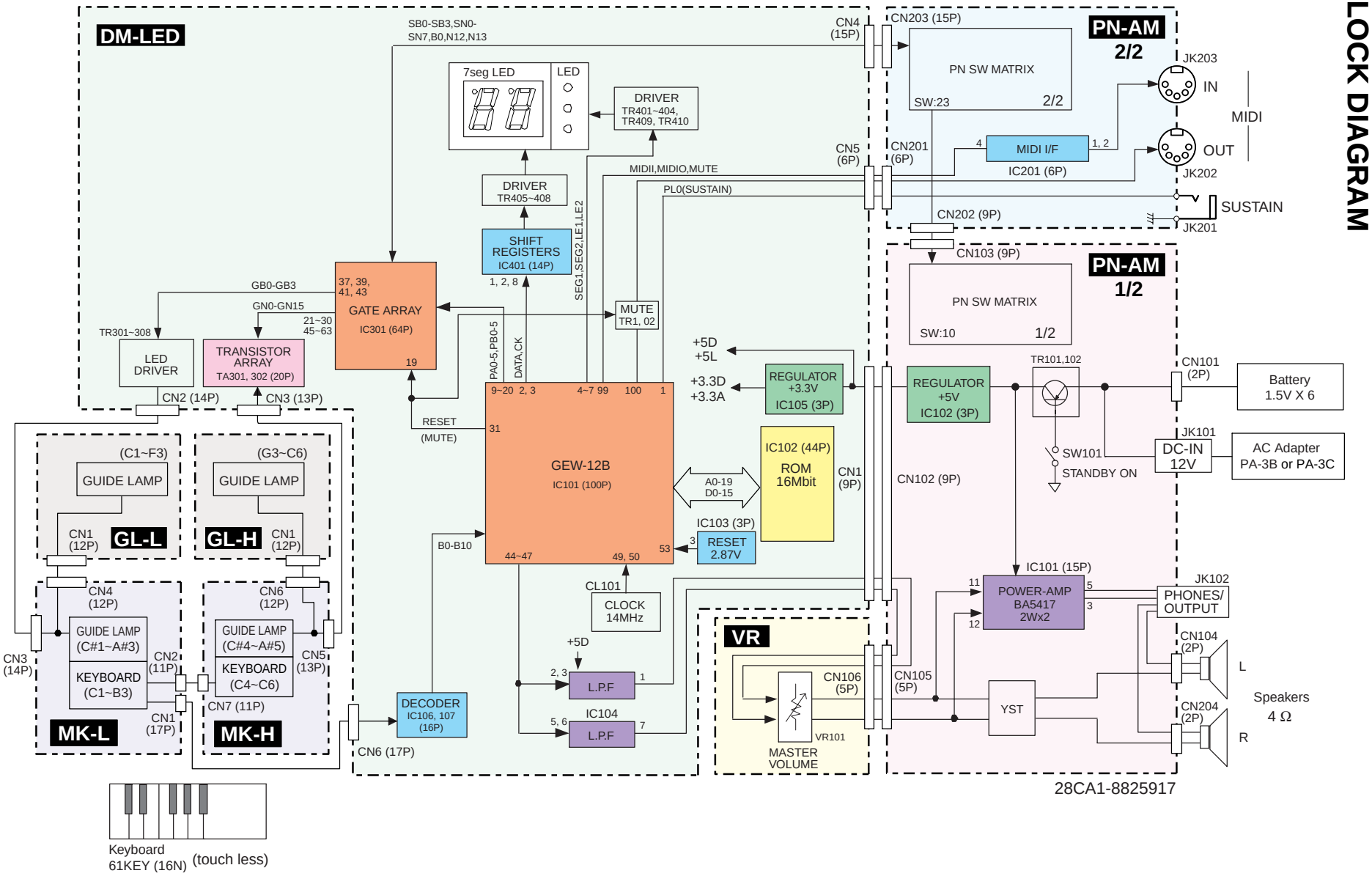


❶ [MASTER VOLUME] dial
❷ Power switch ([STANDBY/ON])
❸ LESSON [L] (Left) and [R] (Right) buttons
❹ [Dict.] (DICTIONARY) button
❺ [OVERALL] button
❻ [SONG] button
❼ [STYLE] button
❽ [VOICE] button
❾ [PORTABLE GRAND] button
❿ [METRONOME] button
⓫ [DJ] button
⓬ Numeric keypad, [+/ON] and [–/OFF] buttons
⓭ [ACCOMPANIMENT ON/OFF] ([A-B REPEAT]) button
⓮ [SYNC START] ([❚❚ PAUSE]) button
⓯ [START/STOP] button
⓰ [INTRO/ENDING/rit.] ([◀◀ REW]) button
⓱ [MAIN/AUTO FILL] ([▶▶ FF]) button
⓲ [TEMPO/TAP] button
⓳ [DEMO] button
⓴ [MULTI PAD/DJ GAME] buttons

• Rear Panel

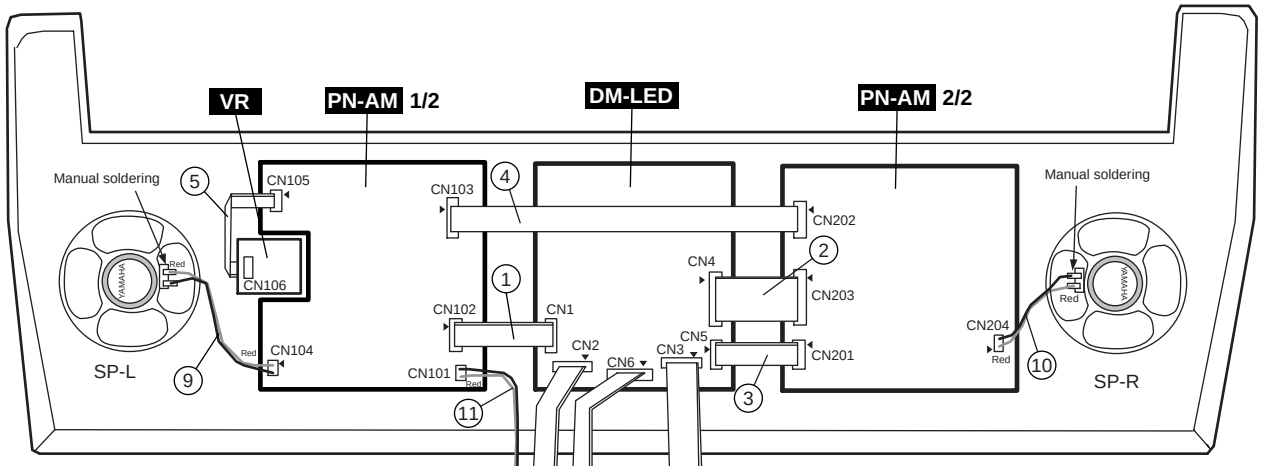


㉑ MIDI IN, OUT terminals
㉒ SUSTAIN jack
㉓ PHONES/OUTPUT jack
㉔ DC IN 12V jack

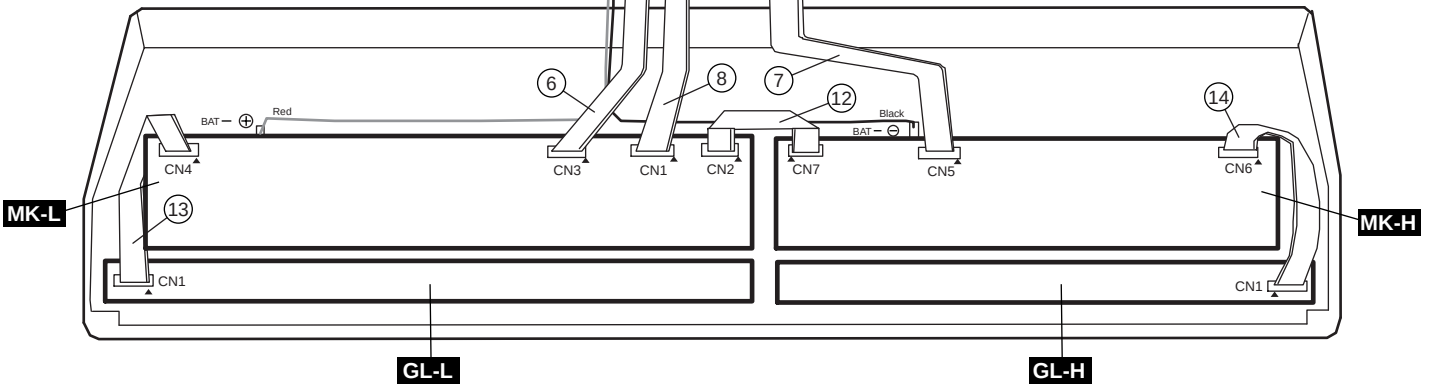

DM-LED
SB0-SB3,SN0-
SN7,B0,N12,N13
CN4
(15P)
7seg LED
LED
DRIVER
TR401~404,
TR409, TR410
DRIVER
TR405~408
SHIFT
REGISTERS
IC401 (14P)
1, 2, 8
SEG1,SEG2,LE1,LE2
MIDII,MIDIO,MUTE
PL0(SUSTAIN)
CN5
(6P)
GB0-GB3
GN0-GN15
37, 39,
41, 43
GATE ARRAY
IC301 (64P)
19
21~30
45~63
MUTE
TR1, 02
TR301~308
LED
DRIVER
TRANSISTOR
ARRAY
TA301, 302 (20P)
PA0-5,PB0-5
DATA,CK
CN2 (14P)
CN3 (13P)
RESET
(MUTE)
31
9~20 2, 3
4~7 99
100
1
GEW-12B
IC101 (100P)
44~47
49, 50
53
B0-B10
+5D
+5L
+3.3D
+3.3A
REGULATOR
+3.3V
IC105 (3P)
A0-19
D0-15
IC102 (44P)
ROM
16Mbit
CN1
(9P)
IC103 (3P)
RESET
2.87V
CL101
CLOCK
14MHz
+5D
2, 3
L.P.F
1
IC104
5, 6
L.P.F
7
DECODER
IC106, 107
(16P)
CN6 (17P)
(C1~F3)
GUIDE LAMP
CN1
(12P)
GL-L
(G3~C6)
GUIDE LAMP
CN1
(12P)
GL-H
CN4
(12P)
GUIDE LAMP
(C#1~A#3)
KEYBOARD
(C1~B3)
CN2
(11P)
CN1
(17P)
MK-L
CN6
(12P)
GUIDE LAMP
(C#4~A#5)
KEYBOARD
(C4~C6)
CN5
(13P)
CN7 (11P)
MK-H
CN3
(14P)
VR
CN106
(5P)
VR101
MASTER
VOLUME
CN105
(5P)
CN203 (15P)
PN SW MATRIX
SW:23
2/2
PN-AM
2/2
JK203
IN
MIDI
OUT
JK202
CN201
(6P)
4
MIDI I/F
1, 2
IC201 (6P)
CN202 (9P)
SUSTAIN
JK201
CN103 (9P)
PN SW MATRIX
SW:10
1/2
PN-AM
1/2
REGULATOR
+5V
IC102 (3P)
TR101,102
CN101
(2P)
Battery
1.5V X 6
SW101
STANDBY ON
JK101
DC-IN
12V
AC Adapter
PA-3B or PA-3C
CN102 (9P)
IC101 (15P)
POWER-AMP
BA5417
2Wx2
11
12
5
3
JK102
PHONES/
OUTPUT
CN104
(2P)
L
Speakers
4 Ω
CN204
(2P)
R
YST
28CA1-8825917
Keyboard
61KEY (16N) (touch less)

CIRCUIT BOARD LAYOUT & WIRING

● Upper case side



● Lower case side



Loca-tion	Part No.	Part Name	SOURSE	DESTINATION
①	(WA81360)	DM-PN1 WIRE 9P	DMLED-CN1	PNAM-CN102
②	(WA81370)	DM-PN2 WIRE 15P	DMLED-CN4	PNAM-CN203
③	(WA81380)	DM-PN3 WIRE 6P	DMLED-CN5	PNAM-CN201
④	(WA81390)	PN1-PN2 WIRE 9P	PNAM-CN103	PNAM-CN202
⑤	(WA81400)	PN-VR WIRE 5P	PNAM-CN105	VR-CN106
⑥	(WA83180)	DM-MKL WIRE HARNESS 14P	DMLED-CN2	MK-L - CN3
⑦	(WA83190)	DM-MKH WIRE HARNESS 13P	DMLED-CN3	MK-H - CN5

Loca-tion	Part No.	Part Name	SOURSE	DESTINATION
⑧	(WA83200)	DM-MK WIRE HARNESS 17P	DMLED-CN6	MK-L - CN1
⑨	(V719660)	SP WIRE HARNESS 2P	PNAM-CN104	SP - L
⑩	(V719660)	SP WIRE HARNESS 2P	PNAM-CN204	SP - R
⑪	(V718670)	CONNECTOR ASSEMBLY 2P	PNAM-CN101	BTT- ⊕ BTT- ⊖
⑫	(WA47880)	CONNECTOR ASSEMBLY	MK-L - CN2	MK-H - CN7
⑬	(V775730)	GL WIRE HARNESS	MK-L - CN4	GL-L - CN1
⑭	(V775730)	GL WIRE HARNESS	MK-H- CN6	GL-H - CN1

DISASSEMBLY PROCEDURE

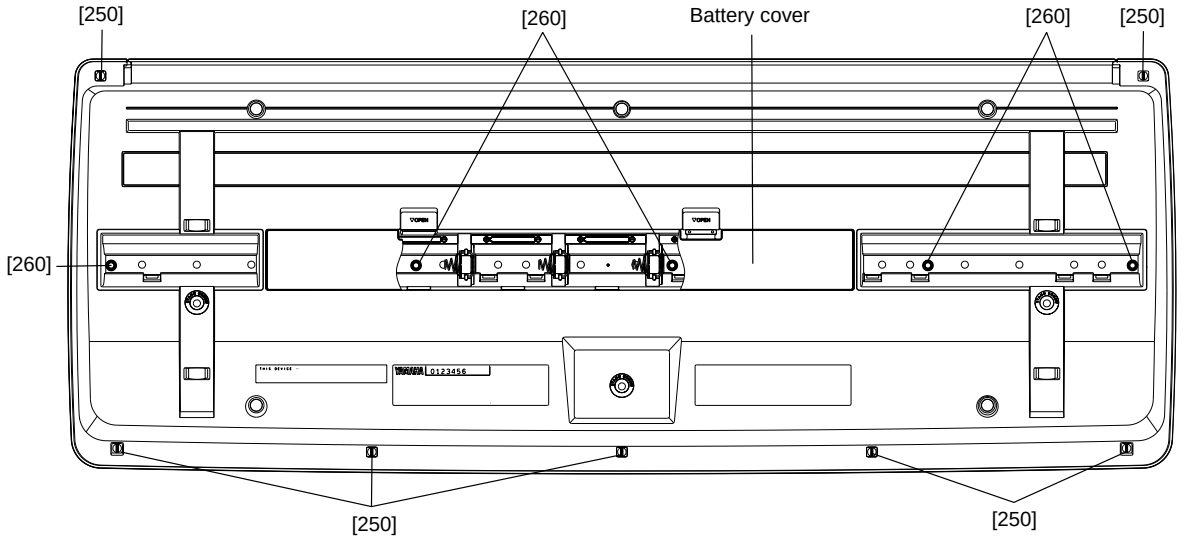
Caution: Be sure to attach the removed filament tape just as it was before removal.

1. Lower Case Assembly

(Time required: About 2 minutes)

1-1. Remove the battery cover. (Fig. 1)

1-2. Remove the seven (7) screws marked [250] and the five (5) screws marked [260]. Then, remove the lower case assembly. (Fig. 1)



[250]: Bind Head Tapping Screw-B 3.0X12 MFZN2Y (VE683000)
[260]: Bind Head Tapping Screw-B 3.0X30 MFZN2Y (V7213700)

Fig .1

2. Removing the Spring Terminal (+), (-) and Spring Terminal

A. Spring Terminal (+) and (-)

2-1. Remove the Lower case assembly. (See procedure 1.)

2-2. Remove the battery harness soldered to the spring terminal (+) and (-). (Fig. 2)

2-3. Remove the hooks (two at each place) and pull out the spring terminal (+) and (-). (Fig.2-1)(Fig.2-2)

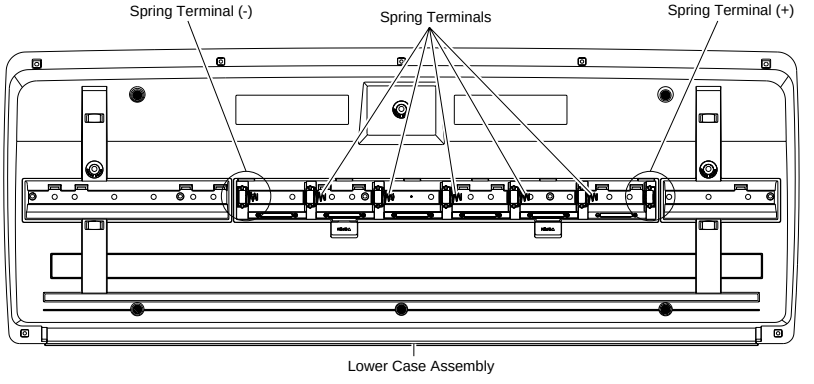


Fig .2

B. Spring Terminal

2-1. Remove the Lower case assembly. (See procedure 1.)

2-2. Remove spring terminal hooks (two at each place) and pull out the spring terminal. (Fig. 2-2)

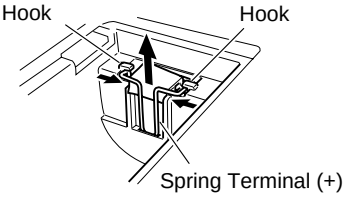


Fig .2-1

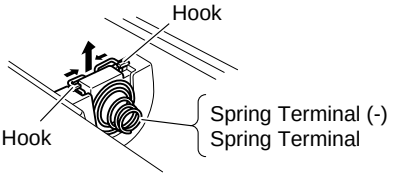


Fig .2-2

3. PN-AM (1/2, 2/2) Circuit Board

(Time required: About 4 minutes each)

3-1. Remove the lower case assembly. (See procedure 1.)

3-2. **PN-AM 1/2 Circuit Boards**

3-2-1. Remove the twelve (12) screws marked [240A]. Then, remove the PN-AM 1/2 circuit board. (Fig. 4)

3-3. **PN-AM 2/2 Circuit Board**

3-3-1. Remove the eight (8) screws marked [240B]. Then, remove the PN-AM 2/2 circuit board. (Fig. 4)

4. VR Circuit Board

(Time required: About 3 minutes)

4-1. Remove the lower case assembly. (See procedure 1.)
4-2. Remove the volume knob. (Fig. 3)
4-3. Remove the three (3) screws marked [240C]. Then, remove the VR circuit board.(Fig. 4)

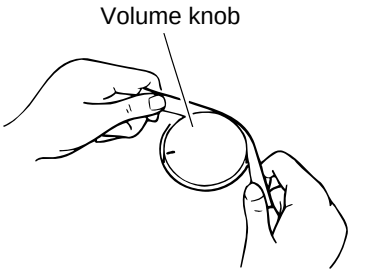
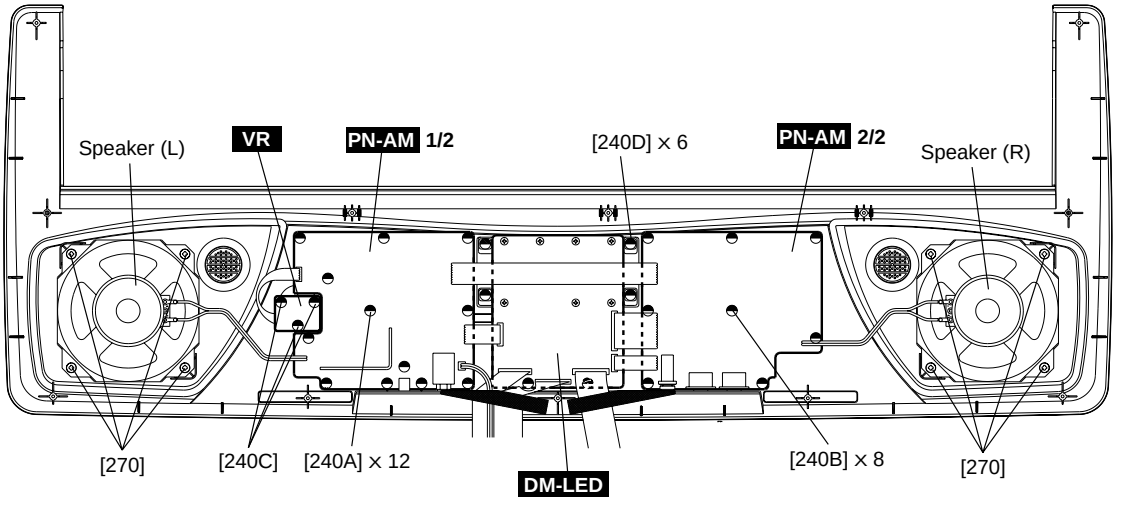


Fig .3



[240]: Bind Head Tapping Screw-B 3.0X8 MFZN2Y (EP600250)
[270]: Bind Head tapping Screw-B 4.0X8 MFZN2Y (EP640410)

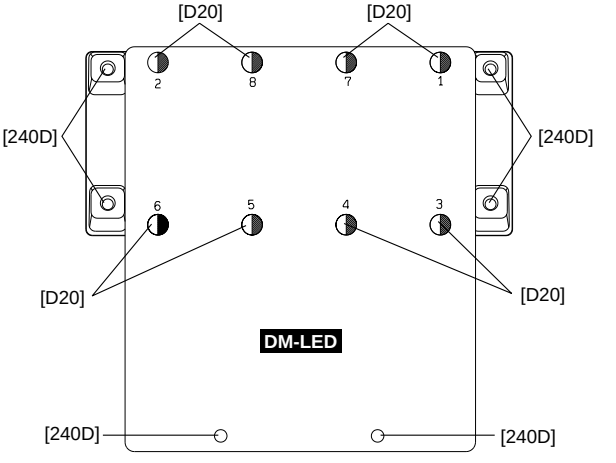
Fig .4

5. DM-LED Circuit Board and LED Unit

(Time required: About 5 minutes)

5-1. Remove the lower case assembly. (See procedure 1.)
5-2. Remove the six (6) screws marked [240D]. Then, remove the DM-LED circuit board with the LED unit. (Figs. 4 and 5)
5-3. Remove the eight (8) screws marked [D20]. Then, remove the LED unit from the DM-LED circuit board. (Fig. 5)

✻When you install the LED unit on the DM-LED circuit board, tighten the screws from No.1 to No. 8 in order with reference to Fig. 6.



[240]: Bind Head Tapping Screw-B 3.0X8 MFZN2Y (EP600250)
[D20]: Bind Head Tapping Screw-P 3.0X8 MFZN2Y (EP600280)

Fig .5

6. Speakers (Time required: About 3 minutes)

6-1. Remove the lower case assembly. (See procedure 1.)
6-2. Remove the four (4) screws marked [270] from each speaker. Then, remove the speakers. (Fig. 4)

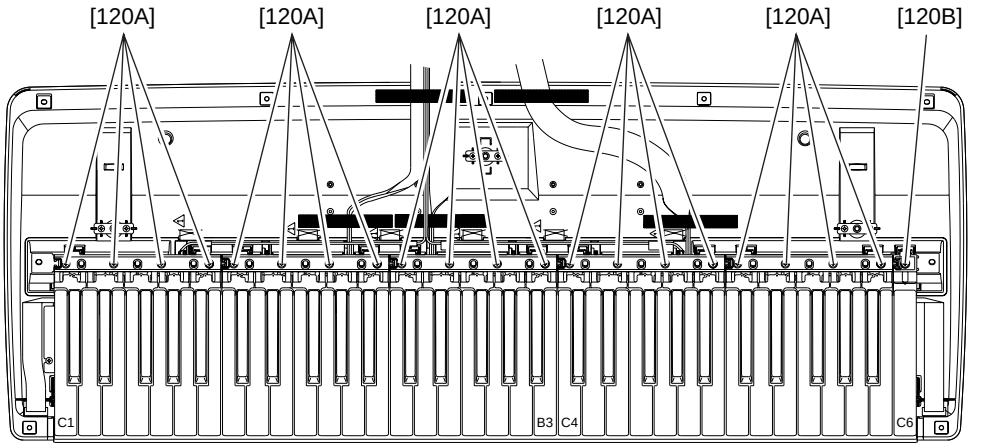
✻Each of the right and left speakers can be removed in the same way.

7. Keyboard Assembly

7-1. Remove the lower case assembly. (See procedure 1.)
7-2. The black and white keys are arranged as a set of one octave unit from the left side. There are 5 sets in total. Remove the four (4) screws marked [120A]. Then, remove the keyboard assembly. (Fig. 7) At this time, note that there are two (2) hooks behind the black keys. (Photo.1)

Push the hooks in and slightly lift. Slide the keyboard assembly towards you to unhook it, and then, lift it.

7-3. To remove the C6 white key, remove the screw marked [120B], push the hook in behind the key, slightly lift it, slide it towards you to unhook, and then lift it. (Fig. 6)



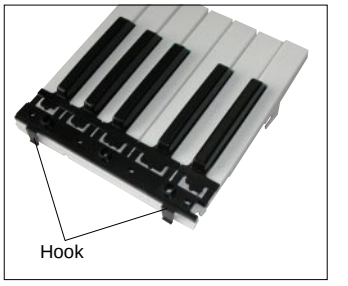


Photo. 1

[120]: Bind Head Tapping Screw-P 3.0X20 MFZN2Y (VT069800)

Fig .6

8. MK-L and MK-H Circuit Boards

(Time required: About 6 minutes)

8-1. Remove the lower case assembly. (See procedure 1.)

8-2. **MK-L (C1 - B3) Circuit Board**

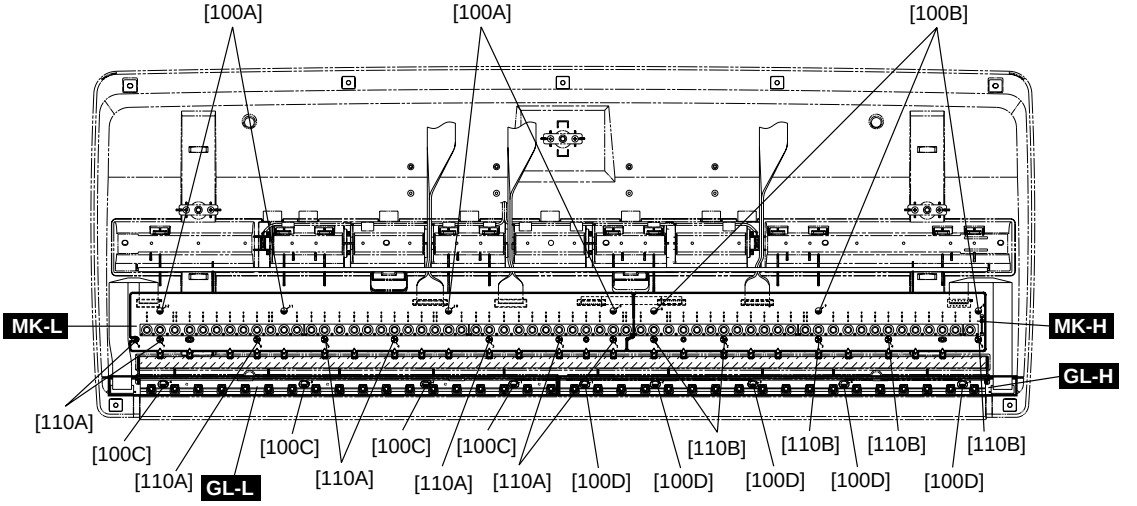
8-2-1. Remove the C1 - B3 keyboard assemblies. (See procedure 7.)

8-2-2. Remove the four (4) screws marked [100A] and the eight (8) screws marked [110A]. Then, remove the MK-L circuit board. (Fig. 7)

8-3. **MK-H (C4 - C6) Circuit Board**

8-3-1. Remove the C4 - C6 keyboard assemblies. (See procedure 7.)

8-3-2. Remove the three (3) screws marked [100B] and the five (5) screws marked [110B]. Then remove the MK-H circuit board. (Fig. 7)



[100]: Bind Head Tapping Screw-B 3.0X8 MFZN2Y (EP600250)
[110]: Bind Head Tapping Screw-P SP 3.0X12 MFZNBL (VZ313100)

Fig .7

9. GL-L and GL-H Units

(Time required: 30 minutes)

9-1. Remove the lower case assembly. (See procedure 1.)

9-2. **GL-L**

9-2-1. Remove the C1 - B3 keyboard assemblies. (See procedure 7.)

9-2-2. Remove the four (4) screws marked [100C]. Then, remove the GL-L unit. (Fig. 7)

9-3. **GL-H**

9-3-1. Remove the C4 - C6 keyboard assemblies. (See procedure 7.)

9-3-2. Remove the five (5) screws marked [100D]. Then, remove the GL-H unit. (Fig. 7)

10. Rubber Contact

10-1. Remove the Lower case assembly. (See procedure 1.)
10-2. Remove the keyboard assembly corresponding to the rubber contact to remove. (See procedure 7.)
10-3. Remove the rubber contact. (Photo 2.)

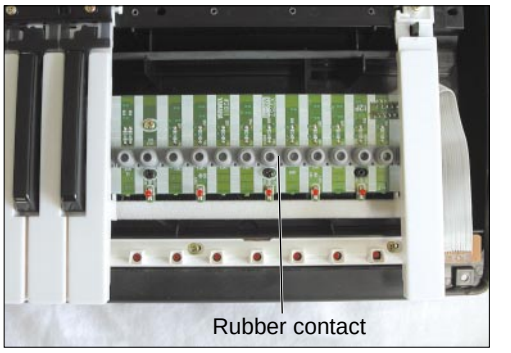


Photo. 2

LSI PIN DESCRIPTION

- **D402117Q** (XW159A00) **GATE ARRAY** DM-LED: IC301

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	DB0	I/O	Two way input/output (Powered)	33	SB1	O	Output
2	DB1	I/O		34	SB2	O	
3	DB2	I/O		35	SB3	O	
4	DB3	I/O		36	VSS11		GND
5	VSS4		GND	37	GB0	O	Output (Open drain)
6	DB4	I/O	Two way input/output (Powered)	38	VSS12		GND
7	DB5	I/O		39	GB1	O	Output (Open drain)
8	DB6	I/O		40	VSS13		GND
9	DB7	I/O		41	GB2	O	Output (Open drain)
10	VSS0		GND	42	VSS2		GND
11	WRH	I	CMOS input (Schmitt trigger, Non-inverted)	43	GB3	O	Output (Open drain)
12	VSS5		GND	44	VSS14		GND
13	WRL	I	CMOS input (Schmitt trigger, Non-inverted)	45	GN0	O	Output
14	VSS6		GND	46	GN1	O	
15	WRB	I	CMOS input (Schmitt trigger, Non-inverted)	47	GN2	O	
16	VSS7		GND	48	GN3	O	
17	RDN	I	CMOS input (Schmitt trigger, Non-inverted)	49	GN4	O	
18	VSS8		GND	50	GN5	O	
19	RESET	I	CMOS input (Schmitt trigger, Non-inverted)	51	VSS15		GND
20	VSS9		GND	52	GN6	O	Output
21	SN0	I	CMOS input (Standard, Non-inverted)	53	GN7	O	
22	SN1	I		54	GN8	O	
23	SN2	I		55	GN9	O	
24	SN3	I		56	GN10	O	
25	VSS1		GND	57	VSS3		GND
26	VDD0		Power supply	58	VDD1		Power supply
27	SN4	I	CMOS input (Standard, Non-inverted)	59	GN11	O	Output
28	SN5	I		60	GN12	O	
29	SN6	I		61	GN13	O	
30	SN7	I		62	GN14	O	
31	VSS10		GND	63	GN15	O	
32	SB0	O	Output	64	VSS16		GND

● **YMW728B-F** (XV762A00) **GEW12** (AWM Tone Generator) DM-LED: IC101

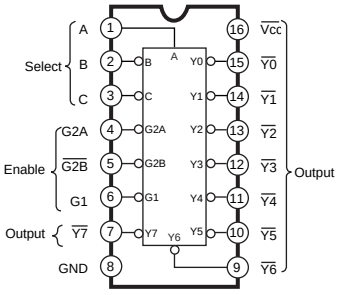
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	PL0	I/O	Port L	51	DAC_Vdd		Power supply
2	PL1	I/O		52	SYI	I	Synch. signal
3	PL2	I/O		53	ICN	I	Inicial Clear
4	PL3	I/O		54	Vss		Ground
5	PL4	I/O		55	MA19	O	Memory address bus
6	PL5	I/O		56	MA18	O	
7	PL6	I/O		57	MA8	O	
8	Vdd		Power supply	58	Vdd		Power supply
9	PA0	I/O	Port A	59	MA17	O	Memory address bus
10	PA1	I/O		60	MA9	O	
11	PA2	I/O		61	MA7	O	
12	PA3	I/O		62	MA10	O	
13	PA4	I/O		63	MA6	O	
14	PA5	I/O		64	MA11	O	
15	PB0	I/O	Port B	65	Vss		Ground
16	PB1	I/O		66	MA5	O	Memory address bus
17	PB2	I/O		67	MA12	O	
18	PB3	I/O		68	MA4	O	
19	PB4	I/O		69	MA13	O	
20	PB5	I/O		70	MA3	O	
21	Vss		Ground	71	MA14	O	
22	PC0	I/O	Port C	72	Vdd		Power supply
23	PC1	I/O		73	MA2	O	Memory address bus
24	PC2	I/O		74	MA15	O	
25	PC3	I/O		75	MA1	O	
26	PC4	I/O		76	MA16	O	
27	PC5	I/O		77	MA0	O	
28	PD0	I/O	Port D	78	MA20	O	
29	PD1	I/O		79	Vss		Ground
30	PD2	I/O		80	ROMLOEN	O	OEN pin
31	PD3	I/O		81	MD15	I/O	Memory data Input / output
32	PD4	I/O		82	MD0	I/O	
33	PD5	I/O		83	MD7	I/O	
34	Vdd		Power supply	84	MD8	I/O	
35	PE0	I/O	Port E	85	MD14	I/O	
36	PE1	I/O		86	MD1	I/O	
37	PE2	I/O		87	MD6	I/O	
38	PE3	I/O		88	MD9	I/O	
39	PE4	I/O		89	Vdd		Power supply
40	PE5	I/O		90	MD13	I/O	Memory data Input / output
41	TESTE	I	Test Mode E	91	MD2	I/O	
42	TESTD	I	Test Mode D	92	MD5	I/O	
43	Vss		Ground	93	MD10	I/O	
44	DACLMM	O	1bit DAC Output L (-)	94	MD12	I/O	
45	DACLPP	O	1bit DAC Output L (+)	95	MD3	I/O	
46	DACRPP	O	1bit DAC Output R (+)	96	MD4	I/O	
47	DACRMM	O	1bit DAC Output R (-)	97	MD11	I/O	
48	DAC_Vss		Ground	98	Vss		Ground
49	X_O	O	Crystal quarts Output	99	MIDII	I	MIDI Input
50	X_I	I	Crystal quarts Input	100	MIDIO	O	MIDI Output

IC BLOCK DIAGRAM

- **SN74LV138ANSR** (IS013810)
- **74LVX138SJ** (X4245A00)

3 to 8 Demultiplexer

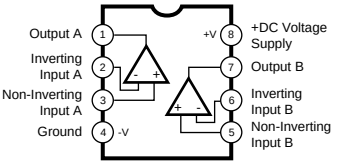
DM-LED: IC106, 107



- **µPC4572G2** (XF634A00)

Dual Operational Amplifier

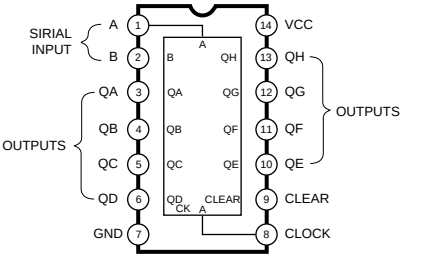
DM-LED: IC104



- **SN74LV164ANSR** (IS016410)

8-Bit Shift Register

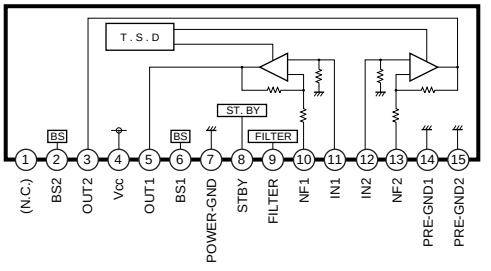
DM-LED: IC401



- **BA5417** (XV771A00)

Power Amplifier

PN-AM: IC101



■ CIRCUIT BOARDS

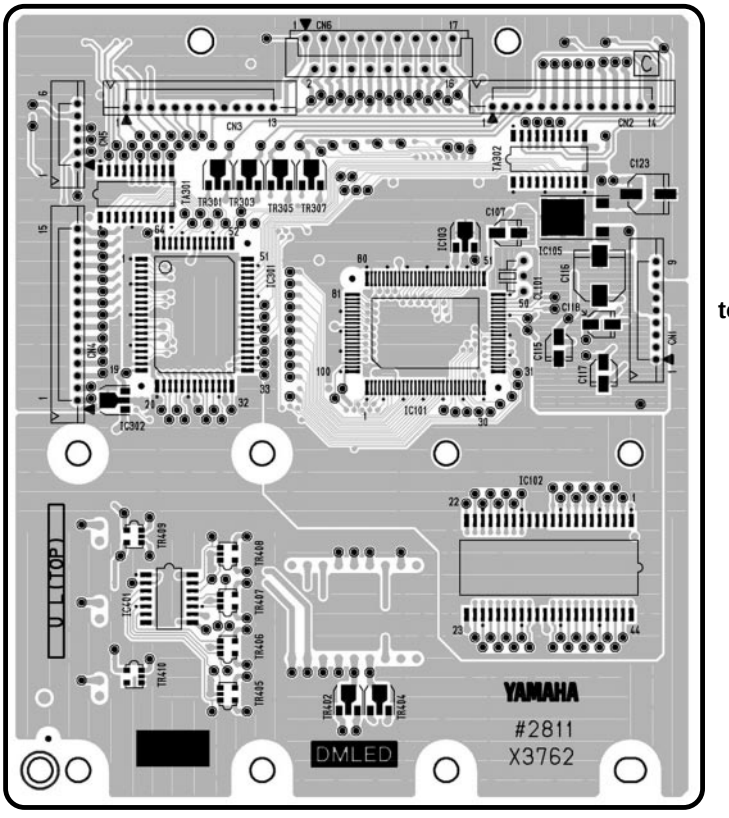
● DM-LED Circuit Board (X3762C0)

to MK-H-CN5 to MK-L-CN1 to MK-L-CN3

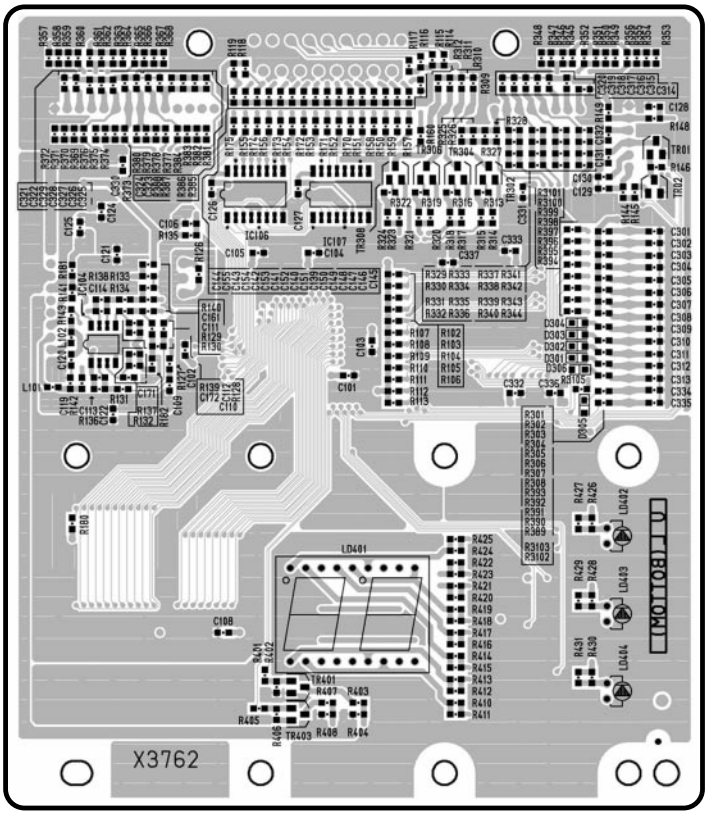
to PN-AM 2/2 -CN201

to PN-AM 2/2 -CN203

to PN-AM 1/2 -CN102



Component side

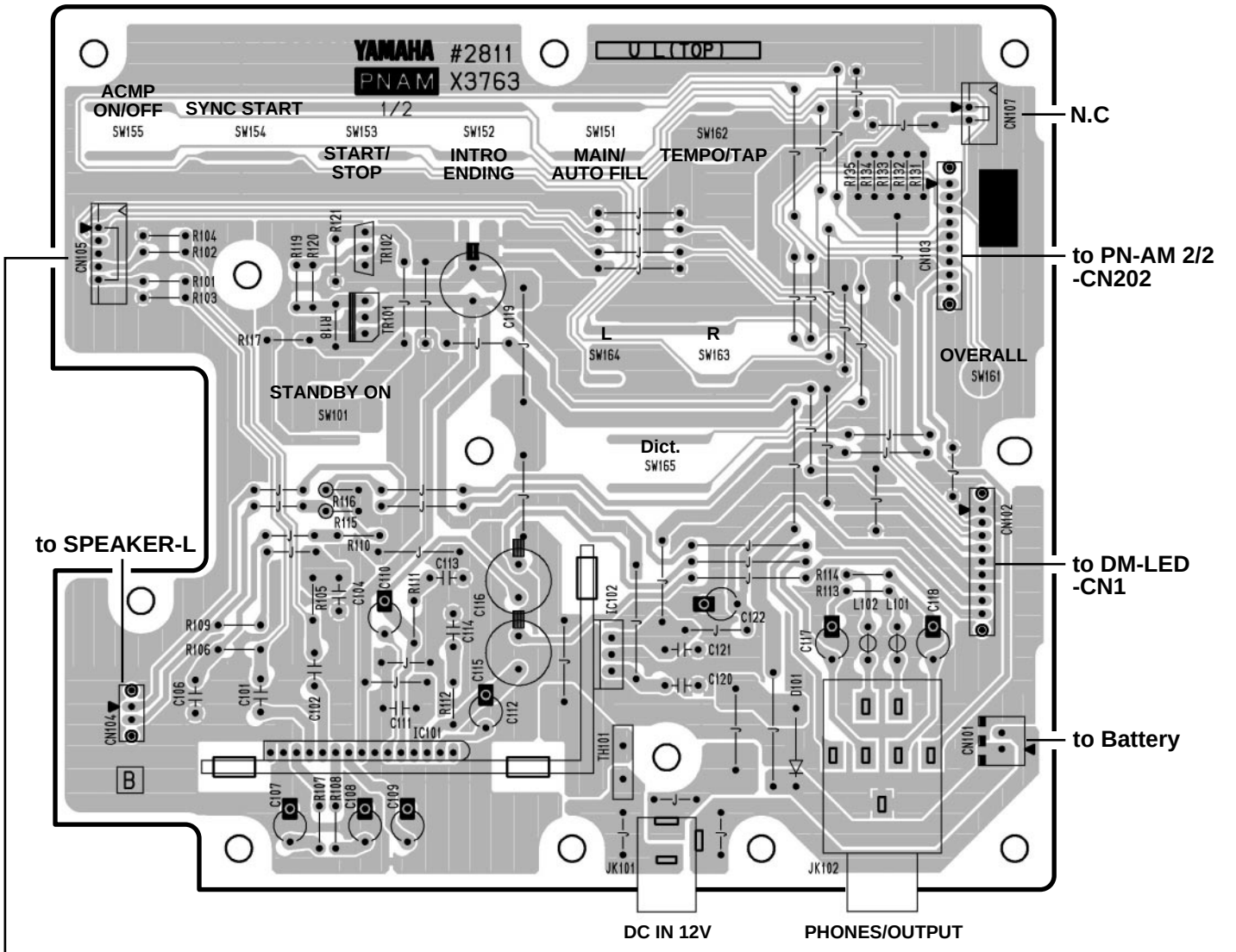


Pattern side

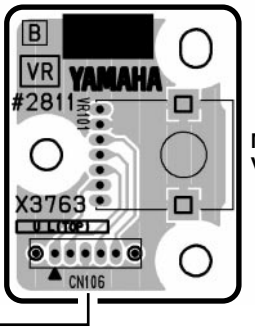
2NA-WA45440 ⚠2

Note : See parts list for details of circuit board conponent parts.

● PN-AM 1/2 Circuit Board (X3763B0)

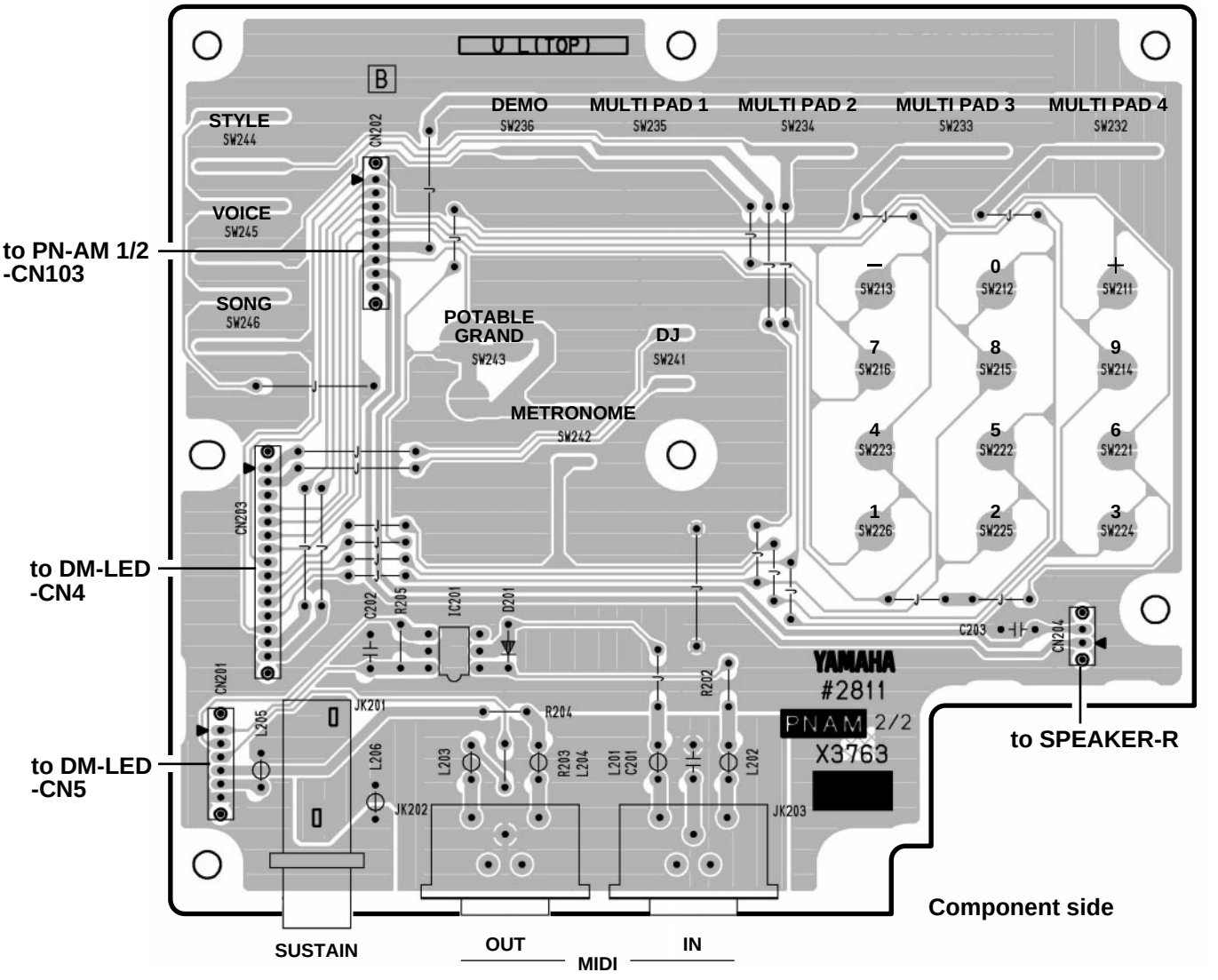


● VR Circuit Board (X3763B0)



PN-AM1/2, VR: 2NA-WA45460 ⚠1

● **PN-AM 2/2 Circuit Board** (X3763B0)



2NA-WA45460 ⚠1

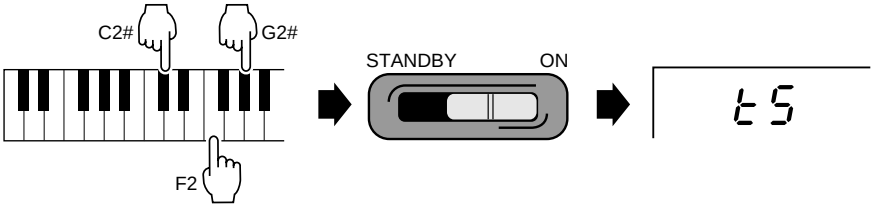
TEST PROGRAM

A. PREPARATION

1) Use PA-3C (or PA-31) AC adaptor.
2) Set the volume to any level unless otherwise specified.
3) Measuring instruments: a frequency counter and a level meter (with JIS-C filter)
   Note: Connect 33Ω load resistance to the [PHONES/OUTPUT] jack.
4) Foot switch (FC4 or FC5), MIDI cable

B. HOW TO START THE TEST PROGRAM

While pressing the C2#, F2, and G2# keys, turn on the power switch.



C. OPERATING INSTRUCTIONS OF THE TEST PROGRAM

1) When the test program is started, “tS” appears on the LED.
2) Select the test program number by pressing the [-/OFF] or [+/ON] button on the numeric keypad.
3) Press the [START/STOP] button to start the testing.

● When the test result is OK, press the [START/STOP] button to return to the test item number. Press the [-/OFF] or [+/ON] button on the numeric keypad to proceed to the next test.
When the test result is OK and the [START/STOP] button is pressed to return to the test item number, a dot (.) is added adjacent to the first character of the test item number.

● When the test result is NG, press the leftmost white key to return to the test item number. Turn off the power switch to finish the test program.

D. TEST PROGRAM LIST

Test No.	LED (initial)	Test Functions and Judgment Criteria
1	01	Displays the ROM version. The ROM (program) version is displayed on the LED.
2	02	Checks the ROM connected to the CPU bus. The test result appears on the LED. Check that the LED displays "PS".
3	03	Checks the RAM built in the CPU. The test result appears on the LED. Check that the LED displays "PS".
11	11	Automatically executes the scaling of the keyboard (Sine waves are output in turn from C2 to D#3). Check the sound by hearing for abnormal sound or noise. Check the lighting of LED corresponding to each of the keys.
13	13	Connect the frequency counter to the headphone jack. (L or R) Produces a signal (at 440.0Hz ± 1.76Hz). Check that the correct signal is produced.
14	14	Connect the level meter (with the JIS-C filter) to the right and left headphone jacks. (33Ω load) Set the [MASTER VOLUME] to the maximum and check the output level. (1kHz) PHONES L: -60.0dBm or less PHONES R: -24.5dBm ± 2dB
15	15	Connect the level meter (with the JIS-C filter) to the right and left headphone jacks. (33Ω load) Set the [MASTER VOLUME] to the maximum and check the output level. (1kHz) PHONES L:-24.5dBm ± 2dB PHONES R: -60.0dBm or less
19	19	Connect the level meter (with the JIS-C filter) to the right and left headphone jacks. (33Ω load) Set the [MASTER VOLUME] to the maximum and check the noise of the D/A converter. PHONES L/R: -78.0dBm or less
20	20	Checks the switches on the panel. Press the switches displayed on the LED as instructed. When the switch is pressed, a pre-assigned note is output. (See table 1.) When all the switches are pressed, the check result appears on the LED, and then, check that the LED displays "PS". (To stop this check before reaching its end, press the [START/STOP] button to return to the selection screen.)

21	21	All panel LED lighting check. Check that all the LEDs on the panel are lit up.
25	25	Check that all the LEDs on the keyboard are lit up. The LEDs from C1 to B1 (both white and black keys) on the keyboard are lit up. Check that the LED on each octave is lit up in the following order when you press the highest (rightmost) white key C6 on the keyboard. [LED between C2 and B2, LED between C3 and B3, LED between C4 and B4, LED between C5 and B5, and LED of C6]
26	26	Check that all the LEDs of the white keys are lit up. The LEDs of the white keys from C1 to B1 are lit up. Check that all the LEDs of the white keys are lit up in the following order when you press the highest (rightmost) white key C6 on the keyboard. [LEDs from C2 to B2, LEDs from C3 to B3, LEDs from C4 to B4, LEDs from C5 to B5, and LED of C6] Check the LEDs for the difference in brightness.
27	27	Check that all the LEDs of the black keys are lit up. The LEDs of the black keys from C1# to A1# are lit up. Check that all the LEDs of the black keys are lit up in the following order when you press the highest (rightmost) white key on the keyboard, C6. [LEDs from C2# to A2#, LEDs from C3# to A3#, LEDs from C4# to A4#, LEDs from C5# to A5#] Check the LEDs for the difference in brightness.
31	31	Connect the foot switch (FC-4 or FC-5) to the [SUSTAIN] jack. Check the output of C3 note when the pedal is depressed and C4 note when the pedal is released.
37	37	Connect the [MIDI IN] jack and the [MIDI OUT] jack with a MIDI cable, and then, start the test. Check that C4 note is output and the LED displays "PS".
41	41	Checks all the ROMs connected to the CPU bus. The test result is displayed on the LED about 20 seconds later. Check that the LED displays "PS".
42	42	Checks the RAM built in the CPU. (GEW12) The test result is displayed on the LED about 20 seconds later. Check that the LED displays "PS".
48	48	Exits from the test program and returns to the play mode.

NOTE: Time is required to complete the checks performed in the test No. 41 and 42.

TABLE 1

ORDER	Switch Name	LED	NOTE
1	Dict.	dI	C3
2	Lesson L	LL	C#3
3	LessonR	Lr	D3
4	Overall	oA	D#3
5	SONG	So	E3
6	STYLE	St	F3
7	VOICE	vo	F#3
8	PORTABLE GRAND	GP	G3
9	METRONOME	bt	G#3
10	DJ	dJ	A3
11	Tenkey 1	t1	A#3
12	Tenkey 2	t2	B3
13	Tenkey 3	t3	C4
14	Tenkey 4	t4	C#4
15	Tenkey 5	t5	D4
16	Tenkey 6	t6	D#4
17	Tenkey 7	t7	E4

ORDER	Switch Name	LED	NOTE
18	Tenkey 8	t8	F4
19	Tenkey 9	t9	F#4
20	Tenkey -	t-	G4
21	Tenkey 0	t0	G#4
22	Tenkey +	PL	A4
23	ACMP	Ac	A#4
24	SYNC START	Sy	B4
25	START/STOP	St	C5
26	INTRO	It	C#5
27	MAIN	Ab	D5
28	TEMPO	tP	D#5
29	DEMO	dE	E5
30	MULTI PAD 1	P1	F5
31	MULTI PAD 2	P2	F#5
32	MULTI PAD 3	P3	G5
33	MULTI PAD 4	P4	G#5

YAMAHA [EZ-150] Date:4-MAR-2003
Model EZ-150 MIDI Implementation Chart Version : 1.0

Function...		Transmitted	Recognized	Remarks
Basic	Default	1 - 7,10	1 - 7,10	
Channel	Changed	x	x	
Mode	Default	3	3	
	Messages	x	x	
	Altered	**********	x	
Note Number	: True voice	0 - 127 **********	0 - 127 0 - 127	
Velocity	Note ON	o 9nH,v=1-127 *1	o 9nH,v=1-127	
	Note OFF	x 9nH,v=0	x 9nH,v=0 or 8nH	
After	Key's	x	x	
Touch	Ch's	x	x	
Pitch Bend		x	x	
Control Change	0,32	o *2	o *2	Bank Select LSB,MSB
	7	o	o	Volume
	10	o	o	Pan
	6,38	x	x	Data Entry
	64	o	o	Sustain
	71-74	x	x	
	84	o	o	Portamento Cntrl
	91,93,94	x	x	
	96-97	x	x	RPN Inc,Dec
	98,99	x	x	NRPN LSB,MSB
	100-101	x	x	RPN LSB,MSB
Prog Change	: True #	o 0 - 127 *3 **********	o 0 - 127 *3 *3	
System Exclusive		o *4	o *4	
Common	: Song Pos.	x	x	
	: Song Sel.	x	x	
	: Tune	x	x	
System Real Time	: Clock	x	x	
	: Commands	x	x	
Aux	:All Sound OFF	x	x	
	:Reset All Cntrls	x	x	
	:Local ON/OFF	x	x	
	:All Notes OFF	x	x	
Mes- sages	:Active Sense	o	o	
	:Reset	x	x	

Mode 1 : OMNI ON , POLY Mode 2 : OMNI ON ,MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF,MONO x : No

NOTE:

**1 Playing the keyboard does not produce any changes in velocity data; the transmitted velocity value is fixed. The velocity value generated by playing the key is predetermined for each voice and may differ depending on the selected voice.*

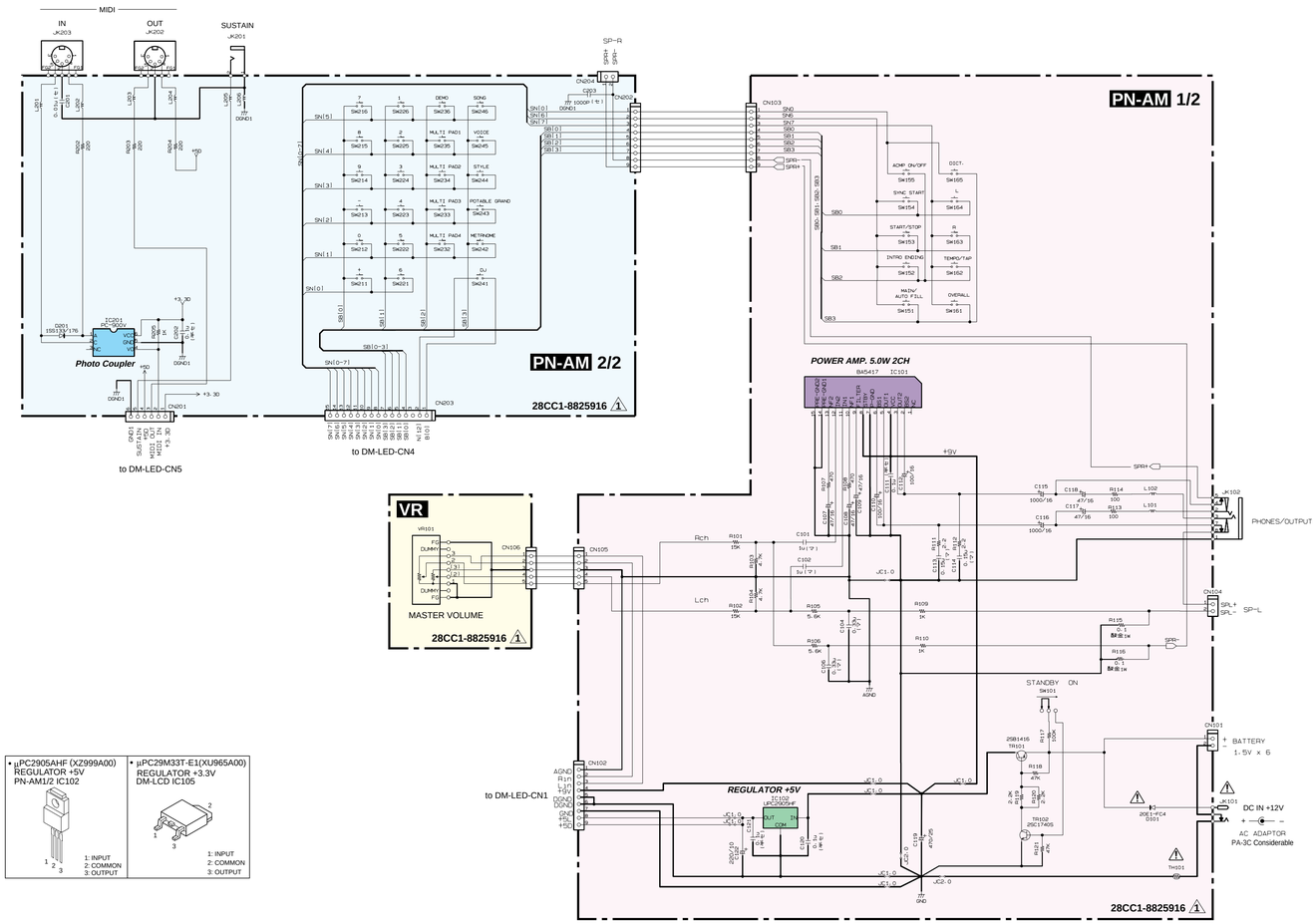
**2 MSB can be used to change the voice for the Melody or Rhythm.*
MSB=00H :Melody Voice
MSB=7FH : Rhythm Voice
LSB: Refer to Voice list.

**3 For program change values, refer to the voice list.*
Program change and other like channel messages received will not affect the EZ-150 panel settings or what is being played on the keyboard.

**4 < GM System on > F0H,7EH,7FH, 09H, 01H, F7H All data is restored to the default values.*

**5 MIDI does not function (transmit/receive) in the Song mode.*

■OVERALL CIRCUIT DIAGRAM 1/2 (PN-AM 1/2, PN-AM 2/2, VR)



- μPC2905AHF (XZ999A00)
  REGULATOR +5V
  PN-AM1/2 IC102

1: INPUT
2: COMMON
3: OUTPUT

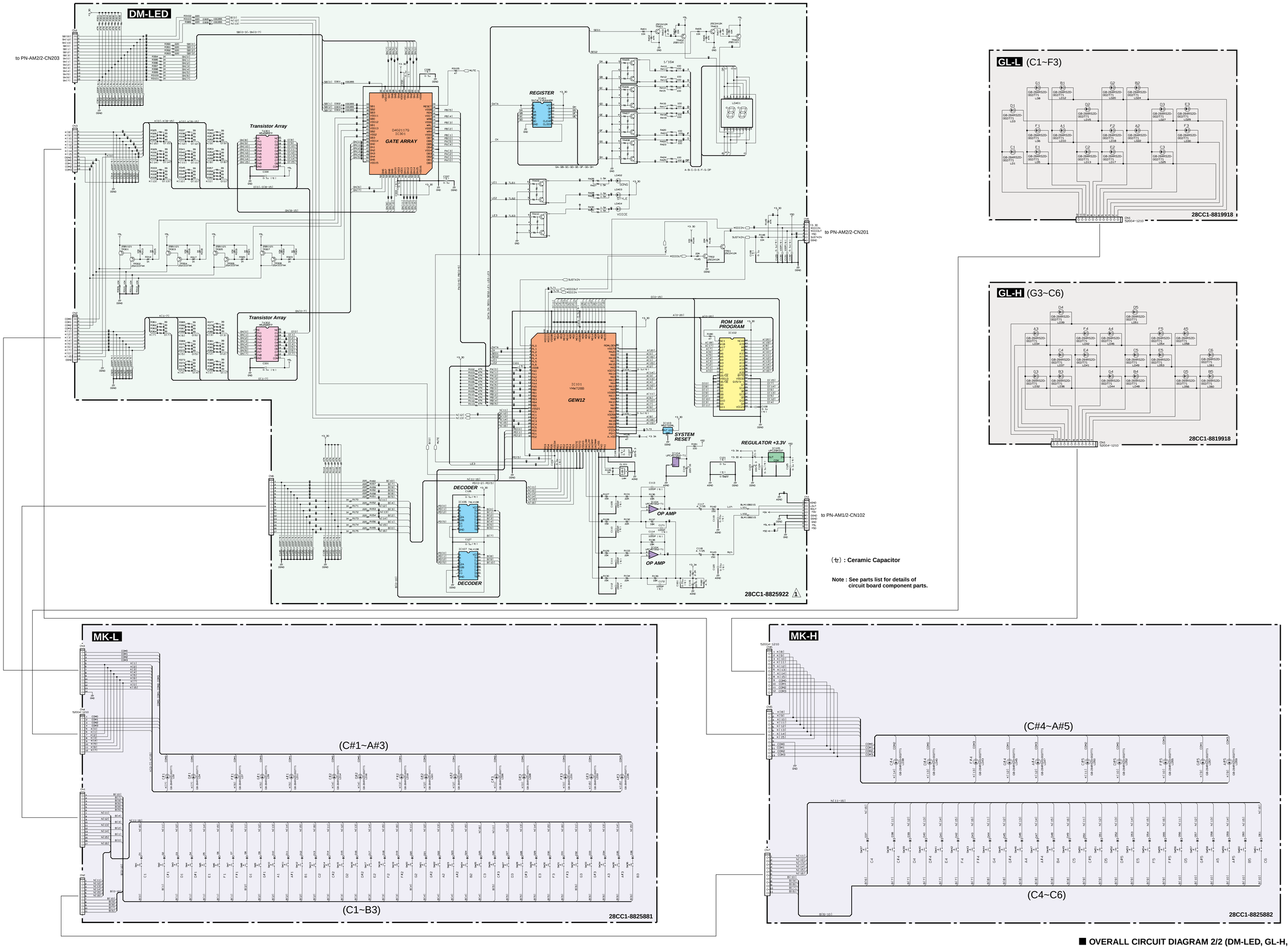
- μPC29M33T-E1(XU965A00)
  REGULATOR +3.3V
  DM-LCD IC105

1: INPUT
2: COMMON
3: OUTPUT

酸金 : Metal Oxide Film Resistor
〈マ〉: Mylar Capacitor
〈セ〉: Ceramic Capacitor
(半セ) : Semiconductive Ceramic Capacitor

Note : See parts list for details of circuit board component parts.

■ OVERALL CIRCUIT DIAGRAM 2/2 (DM-LED, GL-H, GL-L, MK-H, MK-L)



(セ) : Ceramic Capacitor

Note : See parts list for details of circuit board component parts.

■ OVERALL CIRCUIT DIAGRAM 2/2 (DM-LED, GL-H, GL-L, MK-H, MK-L)

PORTATONE

EZ-150

PARTS LIST

CONTENTS

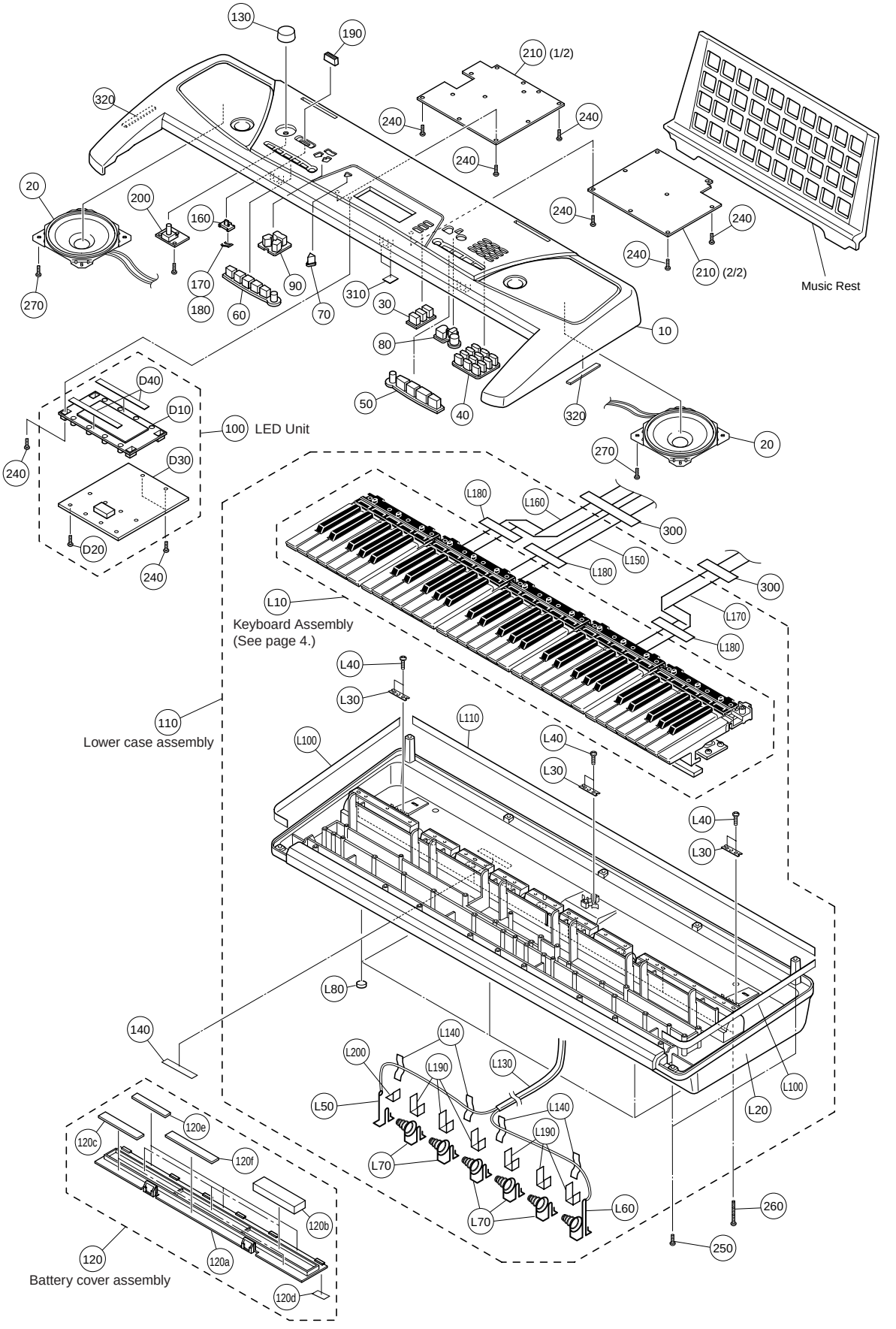
OVERALL ASSEMBLY 2
KEYBOARD ASSEMBLY 4
ELECTRICAL PARTS 5

WARNING

Components having special characteristics are marked ⚠ and must be replaced with parts having specification equal to those originally installed.

- The numbers “QTY” show quantities for each unit.
- The parts with “--” in “PART NO.” are not available as spare parts.
- This mark “ } ” in the REMARKS column means these parts are interchangeable.
- The second letter of the shaded ( ) part number is O, not zero.
- The second letter of the shaded ( ) part number is I, not one.

OVERALL ASSEMBLY

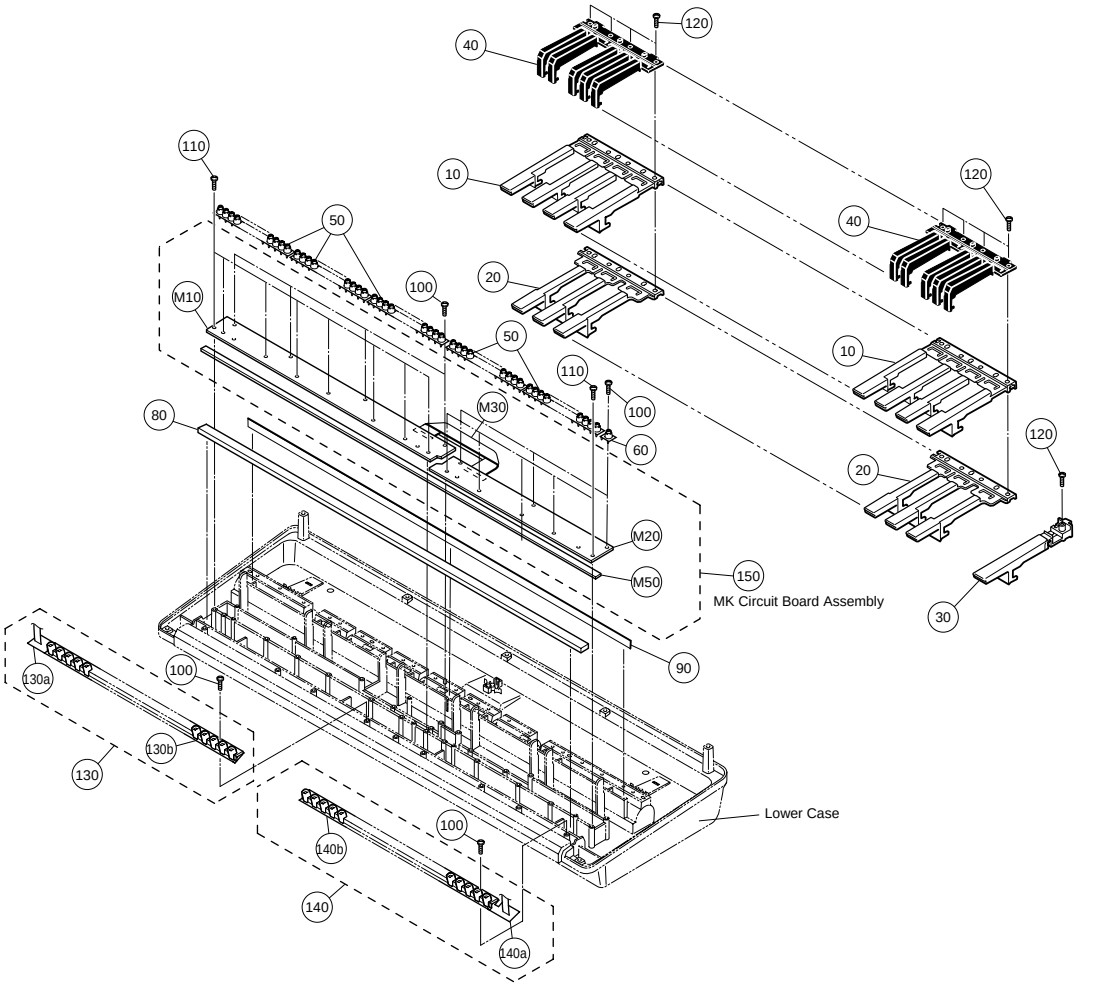


	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
		--	OVERALL ASSEMBLY			EZ-150 (WA06630)		
*	10	WA081600	Upper Case					
	20	X3804A00	Speaker	12.0cm 4ohm 3W			2	
	30	V7031700	Panel Switch	x3 DOME BLACK		SONG,STYLE,VOICE		01
	40	V7202300	Panel Switch	x12 DOME WHITE		0-9,OFF/-,ON/+		03
	50	V7032100	Panel Switch	x5 DOME OR/BL		DEMO,MULTI PAD/DJ GAME1-4		02
	60	V7032200	Panel Switch	x6 DOME BLACK		ACMP ON/OFF,SYNC START, START/STOP,INTRO/ENDING/ rit.,MAIN/AUTO FILL, TEMPO/TAP		02
	70	V7032300	Panel Switch	x1 DOME BLACK		OVERALL		01
	80	V7916700	Panel Switch	x3 DOME BLACK		METRONOME,PORTABLE GRAND, DJ		01
	90	V7032500	Panel Switch	x3 DOME WH/OR		Dict.,LESSON L,LESSON R		01
	100	--	LED Unit			(WA08430)		
	110	--	Lower Case Assembly			(WA59800)		
	120	V9259700	Battery Cover Assembly	PT				03
	120a	--	Battery Cover Black			(V704220)		
	120b	--	Battery Cushion White			(V710060)	3	
	120c	--	Cushion	PE		(V796870)	2	
	120d	--	Nonwoven Fabric Cloth	15X3X0.5		(V925980)	6	
	120e	--	Cushion	PE 55X8X1		(WA10190)	3	
	120f	--	Cushion	PE 100X12X2		(WA21920)		
	130	VU432400	Knob Black			MASTER VOLUME		01
	140	--	Label	FE		(WA07790)		
	160	VF073800	Slider	LC				01
	170	BB005650	Brush	YCUT-MEH				02
	180	VA010200	Grease	G-902, 1kg				40
	190	VV490600	Slide Knob Black			STANDBY/ON		03
*	200	WA843900	Circuit Board	VR				
*	210	WA843800	Circuit Board	PNAM (1/2,2/2)				
	240	EP600250	Bind Head Tapping Screw-B	3.0X8 MFZN2Y			29	01
	250	VE683000	Bind Head Tapping Screw-B	3.0X12 MFZN2Y			7	01
	260	V7213700	Bind Head Tapping Screw-B	3.0X30 MFZN2Y			5	
	270	EP640410	Bind Head Tapping Screw-B	4.0X8 MFZN2Y			8	01
	300	--	Adhesive Tape	12X90		(V591240)	4	
	310	--	Nonwoven Fabric Cloth	14X6X0.5		(V789860)	6	
	320	--	Cushion	PE 80X12X1		(V796870)	2	
		--	LED Unit			(WA08430)		
*	D10	WA084400	LED Panel	TYPE-A				
	D20	EP600280	Bind Head Tapping Screw-P	3.0X8 MFZN2Y		8	01	
*	D30	WA454500	Circuit Board	DMLED				
	D40	--	Nonwoven Fabric Cloth	0.5X95X8		(V706870)	2	
		--	Lower Case Assembly			(WA59800)		
	L10	--	Keyboard Assembly	16N C61 LIGHTS		(WA44050)		
*	L20	WA081200	Lower Case					
	L30	VI104400	Holder	CH			3	
	L40	EP600250	Bind Head Tapping Screw-B	3.0X8 MFZN2Y			6	01
	L50	V7060500	Spring Terminal	(+)				01
	L60	V7060700	Spring Terminal	(-)				01
	L70	V7060200	Spring Terminal	(+/-)			5	01
	L80	CB043750	Foot Black	T1.6			5	01
	L100	--	Cushion	PE 360X15X1.0		(V642100)	2	
	L110	--	Cushion	PE 885X15X1.0		(V642110)		
	L130	--	Connector Assembly	BATTERY XH 2P		(V718670)		
	L140	VA126100	Adhesive Tape	12X50			4	03
	L150	--	Connector Assembly	DM-MK 17P P=2.0		(WA83200)		
	L160	--	Connector Assembly	DM-MKL 14P P=2.0		(WA83180)		
	L170	--	Connector Assembly	DM-MKH 13P P=2.0		(WA83190)		
	L180	--	Adhesive Tape	12X90		(V591240)	3	
	L190	--	Nonwoven Fabric Cloth	40X13X0.5		(V771130)	6	
	L200	--	Nonwoven Fabric Cloth	13X13X0.5		(V771140)		
			ACCESSORY					
		V2115000	Music Rest					06

*: New Parts

RANK: Japan only

KEYBOARD ASSEMBLY



REF NO.	PART NO.	DESCRIPTION			REMARKS		QTY	RANK
	--	KEYBOARD ASSEMBLY	16N C61 LIGHTS		EZ-150	(WA44050)		
10	**V9808100**	White Keys	16N CEGB LIGHTS UV				5	02
10	--	White Keys	16N CEGB LIGHTS UV			(WB12510)	5	
20	**V9808200**	White Keys	16N DFA LIGHTS UV				5	02
20	--	White Keys	16N DFA LIGHTS UV			(WB12540)	5	
30	**V9808300**	White Key	16N C' LIGHTS UV		C6			01
40	**V7760000**	Black Key	16N LIGHTS				5	03
50	**VZ271800**	Rubber Contact	16N-1M OCT 1M				5	05
60	**VZ271900**	Rubber Contact	16N-1M C' 1M		C6			04
80	**VZ303000**	Felt L	16N					02
90	**V7100100**	Rubber Support	16N					03
100	**EP600250**	Bind Head Tapping Screw-B	3.0X8 MFZN2Y				16	01
110	**VZ313100**	Bind Head Tapping Screw-P	SP 3.0X12 MFZNBL				13	01
120	**VT069800**	Bind Head Tapping Screw-P	3.0X20 MFZN2				21	01
130	--	GL-L Unit GB	16N LIGHTS			(WB06690)		
* 130a	**WB070100**	Circuit Board	GL-L					
130b	**V7838400**	Lamp Cover L Unit	16N LIGHTS					04
140	--	GL-H Unit GB	16N LIGHTS			(WB06700)		
* 140a	**WB070300**	Circuit Board	GL-H					
140b	**V7838500**	Lamp Cover H Unit	16N LIGHTS					04
150	--	MK Circuit Board Assembly	16N C61 LIGHTS			(WA44040)		
	--	MK Circuit Board Assembly	16N C61 LIGHTS			(WA44040)		
* M10	**WA440100**	Circuit Board	MK-L					
* M20	**WA440300**	Circuit Board	MK-H					
M30	--	Connector Assembly	MK 16N-1M-C61			(WA47880)		
M50	**VZ302900**	Felt U	16N					02

*: New Parts

RANK: Japan only

■ ELECTRICAL PARTS

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
			ELECTRICAL PARTS			EZ-150		
*		**WA454500**	Circuit Board	DMLED		(WA45440)(X3762C0)		
*		**WB070300**	Circuit Board	GL-H		(WB07040)(X0231E0)		
*		**WB070100**	Circuit Board	GL-L		(WB07020)(X0230F0)		
*		**WA440300**	Circuit Board	MK-H		(WA44020)(X3757B0)		
*		**WA440100**	Circuit Board	MK-L		(WA44000)(X3756C0)		
*		**WA843800**	Circuit Board	PNAM (1/2,2/2)		(WA45460)(X3763B0)		
*		**WA843900**	Circuit Board	VR		(WA45460)(X3763B0)		
*		**WA454500**	Circuit Board	DMLED		(WA45440)(X3762C0)		
	C0101	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	-0106	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0107	**UF017220**	Electrolytic Cap. (chip)	22 6.3V				01
	C0108	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0109	**US063150**	Ceramic Capacitor-B (chip)	1500P 50V K				01
	-0112	**US063150**	Ceramic Capacitor-B (chip)	1500P 50V K				01
	C0113	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0114	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0115	**UF017220**	Electrolytic Cap. (chip)	22 6.3V				01
	C0116	**UF118220**	Electrolytic Cap. (chip)	220 6.3V UUR0J2				01
	C0117	**UF046470**	Electrolytic Cap. (chip)	4.7 25V				01
	C0118	**UF046470**	Electrolytic Cap. (chip)	4.7 25V				01
	C0119	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0120	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0121	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0122	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
*	C0123	**WB516000**	Electrolytic Cap. (chip)	100 6.3V LOW Z				
	C0124	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	-0129	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0130	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0131	**US062100**	Ceramic Capacitor-SL(chip)	100P 50V J				01
	C0132	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0139	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	-0155	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	C0161	**US064100**	Ceramic Capacitor-B (chip)	0.0100 50V K				01
	C0171	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0172	**US063100**	Ceramic Capacitor-B (chip)	1000P 50V K				01
	C0301	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	-0329	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	C0330	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	-0333	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0334	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	C0335	**US062220**	Ceramic Capacitor-SL(chip)	220P 50V J				01
	C0336	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	C0337	**US135100**	Ceramic Capacitor-F (chip)	0.1000 16V Z				01
	CL101	**V2905100**	Ceramic Resonator	14M CSTLA14M0X35-B				01
	CN001	**VK025300**	Wire Trap	52147 9P TE				01
	CN002	**VK025800**	Wire Trap	52147 14P TE				01
	CN003	**VK025700**	Wire Trap	52147 13P TE				01
	CN004	**VF667600**	Wire Trap	52147 15P TE				01
	CN005	**VF728300**	Wire Trap	52147 6P TE				01
	CN006	**VG924500**	Wire Trap	52328 17P TE				02
	D0301	**VT332900**	Diode	1SS355 TE-17				01
	-0306	**VT332900**	Diode	1SS355 TE-17				01
	IC101	**XV762A00**	IC	YMW728B-F		GEW12		08
*	IC102	**X3953100**	IC	16M PROGRAM				
	IC103	**XZ625A00**	IC	M62722ML		SYSTEM RESET		01
	IC104	**XF634A00**	IC	UPC4572G2-T1		OP AMP		02
	IC105	**XU965A00**	IC	UPC29M33T-E1		REGULATOR +3.3V		03
	IC106	**IS013810**	IC	SN74LV138ANSR		DECODER		01
*	IC106	**X4245A00**	IC	74LVX138SJ				
	IC107	**IS013810**	IC	SN74LV138ANSR		DECODER		01
*	IC107	**X4245A00**	IC	74LVX138SJ				
	IC301	**XW159A00**	IC	D402117Q		GATE ARRAY		05
	IC401	**IS016410**	IC	SN74LV164ANSR		REGISTER		02
	L0101	**V3063400**	Chip Inductance	BLM18BD601SN1D				01
	L0102	**V3063400**	Chip Inductance	BLM18BD601SN1D				01
*	LD401	**WA815500**	LED Display	2HSR31410B10 7SEG.				
	LD402	**V6091200**	LED Red	SLI-343URT32		SONG		01
*	LD402	**WA815700**	LED Red	HFR803014P-50-00				

✻: New Parts

RANK: Japan only

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	LD403	**V6091200**	LED Red	SLI-343URT32		STYLE		01
*	LD403	**WA815700**	LED Red	HFR803014P-50-00				
	LD404	**V6091200**	LED Red	SLI-343URT32		VOICE		01
*	LD404	**WA815700**	LED Red	HFR803014P-50-00				
	R0102	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	-0119	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	R0126	**RD359100**	Carbon Resistor (chip)	1.0M 63M J				01
	R0127	**RD357150**	Carbon Resistor (chip)	15.0K 63M J				01
	-0130	**RD357150**	Carbon Resistor (chip)	15.0K 63M J				01
	R0131	**RD357220**	Carbon Resistor (chip)	22.0K 63M J				01
	-0134	**RD357220**	Carbon Resistor (chip)	22.0K 63M J				01
	R0135	**RD354470**	Carbon Resistor (chip)	47.0 63M J				01
	R0136	**RD357180**	Carbon Resistor (chip)	18.0K 63M J				01
	-0139	**RD357180**	Carbon Resistor (chip)	18.0K 63M J				01
	R0140	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
	R0142	**RD355150**	Carbon Resistor (chip)	150.0 63M J				01
	R0143	**RD355150**	Carbon Resistor (chip)	150.0 63M J				01
	R0144	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0145	**RD357220**	Carbon Resistor (chip)	22.0K 63M J				01
	R0146	**RD357220**	Carbon Resistor (chip)	22.0K 63M J				01
	R0148	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0149	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	R0150	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	-0160	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	R0170	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	-0175	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0180	**RD354470**	Carbon Resistor (chip)	47.0 63M J				01
	R0181	**RD355100**	Carbon Resistor (chip)	100.0 63M J				01
	R0182	**RD356470**	Carbon Resistor (chip)	4.7K 63M J				01
	R0301	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	-0308	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	R0309	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	-0313	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0314	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0315	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0316	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0317	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0318	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0319	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0320	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0321	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0322	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0323	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0324	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0325	**RD354560**	Carbon Resistor (chip)	56.0 63M J				01
	-0388	**RD354560**	Carbon Resistor (chip)	56.0 63M J				01
	R0389	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	-0393	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	R0394	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	-0399	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R0401	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0402	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	R0403	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
	R0404	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0405	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0406	**RD357470**	Carbon Resistor (chip)	47.0K 63M J				01
	R0407	**RD356220**	Carbon Resistor (chip)	2.2K 63M J				01
	R0408	**RD357100**	Carbon Resistor (chip)	10.0K 63M J				01
	R0410	**RD355270**	Carbon Resistor (chip)	270.0 63M J				01
	-0425	**RD355270**	Carbon Resistor (chip)	270.0 63M J				01
	R0426	**RD356150**	Carbon Resistor (chip)	1.5K 63M J				01
	-0431	**RD356150**	Carbon Resistor (chip)	1.5K 63M J				01
	R3100	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R3101	**RD356100**	Carbon Resistor (chip)	1.0K 63M J				01
	R3102	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	R3103	**RD355220**	Carbon Resistor (chip)	220.0 63M J				01
	R3105	**RD354470**	Carbon Resistor (chip)	47.0 63M J				01
	TA301	**V6795400**	Transistor Array	M54585FP				03
	TA302	**V6795400**	Transistor Array	M54585FP				03
	TR001	**VV556400**	Transistor	2SC2412K Q,R,S				01

*: New Parts

RANK: Japan only

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	TR001	**V4767500**	Transistor	2SD601A-(TX) Q,R,S				01
	TR002	**VV556400**	Transistor	2SC2412K Q,R,S				01
	TR002	**V4767500**	Transistor	2SD601A-(TX) Q,R,S				01
	TR301	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR302	**VV556500**	Transistor	2SA1037AK Q,R,S				01
	TR302	**V8819500**	Transistor	2SA1235A E,F				
	TR303	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR304	**VV556500**	Transistor	2SA1037AK Q,R,S				01
	TR304	**V8819500**	Transistor	2SA1235A E,F				
	TR305	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR306	**VV556500**	Transistor	2SA1037AK Q,R,S				01
	TR306	**V8819500**	Transistor	2SA1235A E,F				
	TR307	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR308	**VV556500**	Transistor	2SA1037AK Q,R,S				01
	TR308	**V8819500**	Transistor	2SA1235A E,F				
	TR401	**VV556400**	Transistor	2SC2412K Q,R,S				01
	TR401	**V4767500**	Transistor	2SD601A-(TX) Q,R,S				01
	TR402	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR403	**VV556400**	Transistor	2SC2412K Q,R,S				01
	TR403	**V4767500**	Transistor	2SD601A-(TX) Q,R,S				01
	TR404	**VQ987100**	Transistor	2SB1121 S,T,U				01
	TR405	**V5005800**	Digital Transistor	FMG11A T148				01
	-410	**V5005800**	Digital Transistor	FMG11A T148				01
*		**WB070300**	Circuit Board	GL-H		(WB07040)(X0231E0)		
	CN1	**--**	Connector Assembly	GL		(V775730)		
*	LD32	**WB221900**	LED Red	GB-284RS2D-002/T71		G3		
*	LD34	**WB221900**	LED Red	GB-284RS2D-002/T71		A3		
*	LD36	**WB221900**	LED Red	GB-284RS2D-002/T71		B3		
*	LD37	**WB221900**	LED Red	GB-284RS2D-002/T71		C4		
*	LD39	**WB221900**	LED Red	GB-284RS2D-002/T71		D4		
*	LD41	**WB221900**	LED Red	GB-284RS2D-002/T71		E4		
*	LD42	**WB221900**	LED Red	GB-284RS2D-002/T71		F4		
*	LD44	**WB221900**	LED Red	GB-284RS2D-002/T71		G4		
*	LD46	**WB221900**	LED Red	GB-284RS2D-002/T71		A4		
*	LD48	**WB221900**	LED Red	GB-284RS2D-002/T71		B4		
*	LD49	**WB221900**	LED Red	GB-284RS2D-002/T71		C5		
*	LD51	**WB221900**	LED Red	GB-284RS2D-002/T71		D5		
*	LD53	**WB221900**	LED Red	GB-284RS2D-002/T71		E5		
*	LD54	**WB221900**	LED Red	GB-284RS2D-002/T71		F5		
*	LD56	**WB221900**	LED Red	GB-284RS2D-002/T71		G5		
*	LD58	**WB221900**	LED Red	GB-284RS2D-002/T71		A5		
*	LD60	**WB221900**	LED Red	GB-284RS2D-002/T71		B5		
*	LD61	**WB221900**	LED Red	GB-284RS2D-002/T71		C6		
*		**WB070100**	Circuit Board	GL-L		(WB07020)(X0230F0)		
		--	Jumper Wire	0.55		(VA07890)		
	CN1	**--**	Connector Assembly	GL		(V775730)		
*	LD1	**WB221900**	LED Red	GB-284RS2D-002/T71		C1		
*	LD3	**WB221900**	LED Red	GB-284RS2D-002/T71		D1		
*	LD5	**WB221900**	LED Red	GB-284RS2D-002/T71		E1		
*	LD6	**WB221900**	LED Red	GB-284RS2D-002/T71		F1		
*	LD8	**WB221900**	LED Red	GB-284RS2D-002/T71		G1		
*	LD10	**WB221900**	LED Red	GB-284RS2D-002/T71		A1		
*	LD12	**WB221900**	LED Red	GB-284RS2D-002/T71		B1		
*	LD13	**WB221900**	LED Red	GB-284RS2D-002/T71		C2		
*	LD15	**WB221900**	LED Red	GB-284RS2D-002/T71		D2		
*	LD17	**WB221900**	LED Red	GB-284RS2D-002/T71		E2		
*	LD18	**WB221900**	LED Red	GB-284RS2D-002/T71		F2		
*	LD20	**WB221900**	LED Red	GB-284RS2D-002/T71		G2		
*	LD22	**WB221900**	LED Red	GB-284RS2D-002/T71		A2		
*	LD24	**WB221900**	LED Red	GB-284RS2D-002/T71		B2		
*	LD25	**WB221900**	LED Red	GB-284RS2D-002/T71		C3		
*	LD27	**WB221900**	LED Red	GB-284RS2D-002/T71		D3		
*	LD29	**WB221900**	LED Red	GB-284RS2D-002/T71		E3		
*	LD30	**WB221900**	LED Red	GB-284RS2D-002/T71		F3		
*		**WA440300**	Circuit Board	MK-H		(WA44020)(X3757B0)		
	010	**--**	Masking Tape	W=15		(VQ29160)		
	CN05	**VK025500**	Wire Trap	52147 11P TE				01

✻: New Parts

RANK: Japan only

	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	CN06	**VK025700**	Wire Trap	52147 13P TE				01
	CN07	**VE851300**	Wire Trap	52004 12P TE				
	D37	**VV437800**	Diode	1N4148(DO-34)				01
	-61	**VV437800**	Diode	1N4148(DO-34)				01
*	LD38	**WB221900**	LED Red	GB-284RS2D-002/T71		C#4		
*	LD40	**WB221900**	LED Red	GB-284RS2D-002/T71		D#4		
*	LD43	**WB221900**	LED Red	GB-284RS2D-002/T71		F#4		
*	LD45	**WB221900**	LED Red	GB-284RS2D-002/T71		G#4		
*	LD47	**WB221900**	LED Red	GB-284RS2D-002/T71		A#4		
*	LD50	**WB221900**	LED Red	GB-284RS2D-002/T71		C#5		
*	LD52	**WB221900**	LED Red	GB-284RS2D-002/T71		D#5		
*	LD55	**WB221900**	LED Red	GB-284RS2D-002/T71		F#5		
*	LD57	**WB221900**	LED Red	GB-284RS2D-002/T71		G#5		
*	LD59	**WB221900**	LED Red	GB-284RS2D-002/T71		A#5		
*		**WA440100**	Circuit Board	MK-L		(WA44000)(X3756C0)		
	010	**--**	Masking Tape	W=15		(VQ29160)		
	CN01	**VG924500**	Wire Trap	52328 17P TE				02
	CN02	**VK025500**	Wire Trap	52147 11P TE				01
	CN03	**VK025800**	Wire Trap	52147 14P TE				01
	CN04	**VE851300**	Wire Trap	52004 12P TE				
	D01	**VV437800**	Diode	1N4148(DO-34)				01
	-36	**VV437800**	Diode	1N4148(DO-34)				01
*	LD02	**WB221900**	LED Red	GB-284RS2D-002/T71		C#1		
*	LD04	**WB221900**	LED Red	GB-284RS2D-002/T71		D#1		
*	LD07	**WB221900**	LED Red	GB-284RS2D-002/T71		F#1		
*	LD09	**WB221900**	LED Red	GB-284RS2D-002/T71		G#1		
*	LD11	**WB221900**	LED Red	GB-284RS2D-002/T71		A#1		
*	LD14	**WB221900**	LED Red	GB-284RS2D-002/T71		C#2		
*	LD16	**WB221900**	LED Red	GB-284RS2D-002/T71		D#2		
*	LD19	**WB221900**	LED Red	GB-284RS2D-002/T71		F#2		
*	LD21	**WB221900**	LED Red	GB-284RS2D-002/T71		G#2		
*	LD23	**WB221900**	LED Red	GB-284RS2D-002/T71		A#2		
*	LD26	**WB221900**	LED Red	GB-284RS2D-002/T71		C#3		
*	LD28	**WB221900**	LED Red	GB-284RS2D-002/T71		D#3		
*	LD31	**WB221900**	LED Red	GB-284RS2D-002/T71		F#3		
*	LD33	**WB221900**	LED Red	GB-284RS2D-002/T71		G#3		
*	LD35	**WB221900**	LED Red	GB-284RS2D-002/T71		A#3		
*		**WA843800**	Circuit Board	PNAM (1/2,2/2)		(WA45460)(X3763B0)		
*		**WA843900**	Circuit Board	VR		(WA45460)(X3763B0)		
		EP600190	Bind Head Tapping Screw-B	3.0X8 MFZN2BL			2	01
		--	Silicon Grease	G-746		(0412125)		
		--	Jumper Wire	0.55		(VA07890)		
	C0101	**VE327200**	Monolithic Mylar Capacitor	1.0 50V J				02
	C0101	**VU838100**	Monolithic Mylar Capacitor	1.0000 50V J				
	C0102	**VE327200**	Monolithic Mylar Capacitor	1.0 50V J				02
	C0102	**VU838100**	Monolithic Mylar Capacitor	1.0000 50V J				
	C0104	**VE326600**	Monolithic Mylar Capacitor	0.33 50V J				01
	C0104	**VR169000**	Monolithic Mylar Capacitor	ECQ-V1H334JL3				01
	C0106	**VE326600**	Monolithic Mylar Capacitor	0.33 50V J				01
	C0106	**VR169000**	Monolithic Mylar Capacitor	ECQ-V1H334JL3				01
	C0107	**UR837470**	Electrolytic Cap.	47.00 16.0V				01
	-0109	**UR837470**	Electrolytic Cap.	47.00 16.0V				01
	C0110	**UR838100**	Electrolytic Cap.	100.00 16.0V				01
	C0111	**VC694800**	Semiconductive Cera. Cap.	0.1000 25V Z				01
	C0112	**UR838100**	Electrolytic Cap.	100.00 16.0V				01
	C0113	**VE326200**	Monolithic Mylar Capacitor	0.15 50V J				
	C0113	**VR168500**	Monolithic Mylar Capacitor	ECQ-V1H154JL3				01
	C0114	**VE326200**	Monolithic Mylar Capacitor	0.15 50V J				
	C0114	**VR168500**	Monolithic Mylar Capacitor	ECQ-V1H154JL3				01
	C0115	**UR839100**	Electrolytic Cap.	1000 16.0V				01
	C0116	**UR839100**	Electrolytic Cap.	1000 16.0V				01
	C0117	**UR837470**	Electrolytic Cap.	47.00 16.0V				01
	C0118	**UR837470**	Electrolytic Cap.	47.00 16.0V				01
	C0119	**UR848470**	Electrolytic Cap.	470.00 25.0V				01
	C0120	**VC694800**	Semiconductive Cera. Cap.	0.1000 25V Z				01
	C0121	**VC694800**	Semiconductive Cera. Cap.	0.1000 25V Z				01
	C0122	**UR828220**	Electrolytic Cap.	220.00 10.0V				01
	C0201	**FG644100**	Ceramic Capacitor-F	0.0100 50V Z				01

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	REF NO.	PART NO.	DESCRIPTION			REMARKS	QTY	RANK
	C0202	**VC694800**	Semiconductive Cera. Cap.	0.1000 25V Z				01
	C0203	**VS880600**	Ceramic Capacitor-B	1000P 50V K				01
	CN101	**LB918020**	Base Post Connector	XH 2P TE				01
	CN102	**VI878700**	Cable Holder	51048 9P TE				01
	CN103	**VI878700**	Cable Holder	51048 9P TE				01
	CN104	**VI878000**	Cable Holder	51048 2P TE				01
	CN105	**VK024900**	Wire Trap	52147 5P TE				01
	CN106	**VI878300**	Cable Holder	51048 5P TE				01
	CN201	**VI878400**	Cable Holder	51048 6P TE				01
	CN202	**VI878700**	Cable Holder	51048 9P TE				01
	CN203	**VI879300**	Cable Holder	51048 15P TE				01
	CN204	**VI878000**	Cable Holder	51048 2P TE				01
⚠	D0101	**VV731400**	Diode	2A02M				01
⚠	D0101	**VY717100**	Diode	LT2A02-E				01
	D0201	**VB941200**	Diode	1SS133,1SS176				01
	HS001	**--**	Heat Sink			(V561400)		
	IC101	**XV771A00**	IC	BA5417		POWER AMP. 5.0W 2CH		03
	IC102	**XZ999A00**	IC	UPC2905HF		REGULATOR +5V		03
*	IC201	**WA645200**	Photo Coupler	PC-900V0NSZX				
⚠	JK101	**V6557600**	Connector	HTJ-020-05AZ		DC IN 12V		04
	JK102	**LB101870**	Phone Jack	JACK YKB21-5006		PHONES/OUTPUT		03
	JK201	**VC687500**	Phone Jack Black	JACK YKB21-5014		SUSTAIN		01
	JK202	**VJ107200**	DIN Connector	JACK 5P YKF51-5050		MIDI OUT		01
	JK202	**VZ085800**	DIN Connector	5P HDC-052S-01				01
	JK203	**VJ107200**	DIN Connector	JACK 5P YKF51-5050		MIDI IN		01
	JK203	**VZ085800**	DIN Connector	5P HDC-052S-01				01
	L0101	**VB835000**	Coil	FL5R200QNT 20uH				01
	L0102	**VB835000**	Coil	FL5R200QNT 20uH				01
	L0201	**VB835000**	Coil	FL5R200QNT 20uH				01
	-0206	**VB835000**	Coil	FL5R200QNT 20uH				01
	R0101	**HF757150**	Carbon Resistor	15.0K 1/4 J				01
	R0102	**HF757150**	Carbon Resistor	15.0K 1/4 J				01
	R0103	**HF756470**	Carbon Resistor	4.7K 1/4 J				01
	R0104	**HF756470**	Carbon Resistor	4.7K 1/4 J				01
	R0105	**HF756560**	Carbon Resistor	5.6K 1/4 J				01
	R0106	**HF756560**	Carbon Resistor	5.6K 1/4 J				01
	R0107	**HF755470**	Carbon Resistor	470.0 1/4 J				01
	R0108	**HF755470**	Carbon Resistor	470.0 1/4 J				01
	R0109	**HF756100**	Carbon Resistor	1.0K 1/4 J				01
	R0110	**HF756100**	Carbon Resistor	1.0K 1/4 J				01
	R0111	**HF753220**	Carbon Resistor	2.2 1/4 J				01
	R0112	**HF753220**	Carbon Resistor	2.2 1/4 J				01
	R0113	**HF755100**	Carbon Resistor	100.0 1/4 J				01
	R0114	**HF755100**	Carbon Resistor	100.0 1/4 J				01
	R0115	**VU317000**	Metal Oxide Film Resistor	0.1 1W J				01
	R0116	**VU317000**	Metal Oxide Film Resistor	0.1 1W J				01
	R0117	**HF758100**	Carbon Resistor	100.0K 1/4 J				01
	R0118	**HF757470**	Carbon Resistor	47.0K 1/4 J				01
	R0119	**HF756220**	Carbon Resistor	2.2K 1/4 J				01
	R0120	**HF756220**	Carbon Resistor	2.2K 1/4 J				01
	R0121	**HF757470**	Carbon Resistor	47.0K 1/4 J				01
	R0202	**HF755220**	Carbon Resistor	220.0 1/4 J				01
	-0204	**HF755220**	Carbon Resistor	220.0 1/4 J				01
	R0205	**HF756100**	Carbon Resistor	1.0K 1/4 J				01
⚠	TH101	**VV457800**	Protector Switch	RUE135 1.35A 30V		Overcurrent protection		02
	TR101	**VH481100**	Transistor	2SB1416(TA) Q,R				01
	TR102	**IC174070**	Transistor	2SC1740S R,S				01
	VR101	**VZ048400**	Rotary Variable Resistor	A10K XV0141GPVN20F		MASTER VOLUME		02
	W0001	**--**	Connector Assembly	DM-PN1 L=80 9P		(WA81360)		
	W0002	**--**	Connector Assembly	DM-PN2 L=80 15P		(WA81370)		
	W0003	**--**	Connector Assembly	DM-PN3 L=80 6P		(WA81380)		
	W0004	**--**	Connector Assembly	PN1-PN2 L=230 9P		(WA81390)		
	W0005	**--**	Connector Assembly	PN-VR L=90 5P		(WA81400)		
	W0006	**--**	Connector Assembly	SP 2P		(V719660)		
	W0007	**--**	Connector Assembly	SP 2P		(V719660)		
		X3804A00	Speaker	12.0cm 4ohm 3W			2	

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