

SERVICE MANUAL

X5

MUSIC SYNTHESIZER

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KORG

1. SPECIFICATIONS

Tone generation method	:	AI square synthesis system (full digital processing)
Tone generator	:	32 voices 32 oscillators (Single Mode) 16 voices 32 oscillators (Double Mode)
Keyboard	:	61 key with aftertouch sensitive TP-7BA
Waveform memory	:	16 Mbit Mask ROM x 3 (6 Mbyte) 340 MULTI sounds 164 DRUM sounds
Quantization	:	16 bit, 12 bit and 8 bit
Sampling frequency	:	31.25kHz
Programs	:	RAM ; 100 programs ROM ; 128 programs + 8 drum set programs (for GM)
Combinations	:	RAM ; 100 combinations
Effects	:	47 muti digital effects
Arrangements	:	64 arrangements
Demonstration song	:	1 song
Control inputs	:	Assignable pedal, Assignable switch
Outputs	:	L/MONO, R (output impedance : 1.1k Ω residual noise : less than -90dBm) PHONES (output impedance : 10 Ω)
MIDI	:	IN, OUT, THRU
TO HOST	:	Mini DIN 8pin (31.25 KBPS, 38.4 KBPS)
Display	:	16 x 2 LCD with LED back light
Dimensions	:	900(W) x 254.2(D) x 83.4(H)mm
Weight	:	4.7kg
Power consumption	:	12V 700mA

* Specifications and design are subject to change without notice for the purpose of product enhancement.

W=900 mm

D=254.2 mm

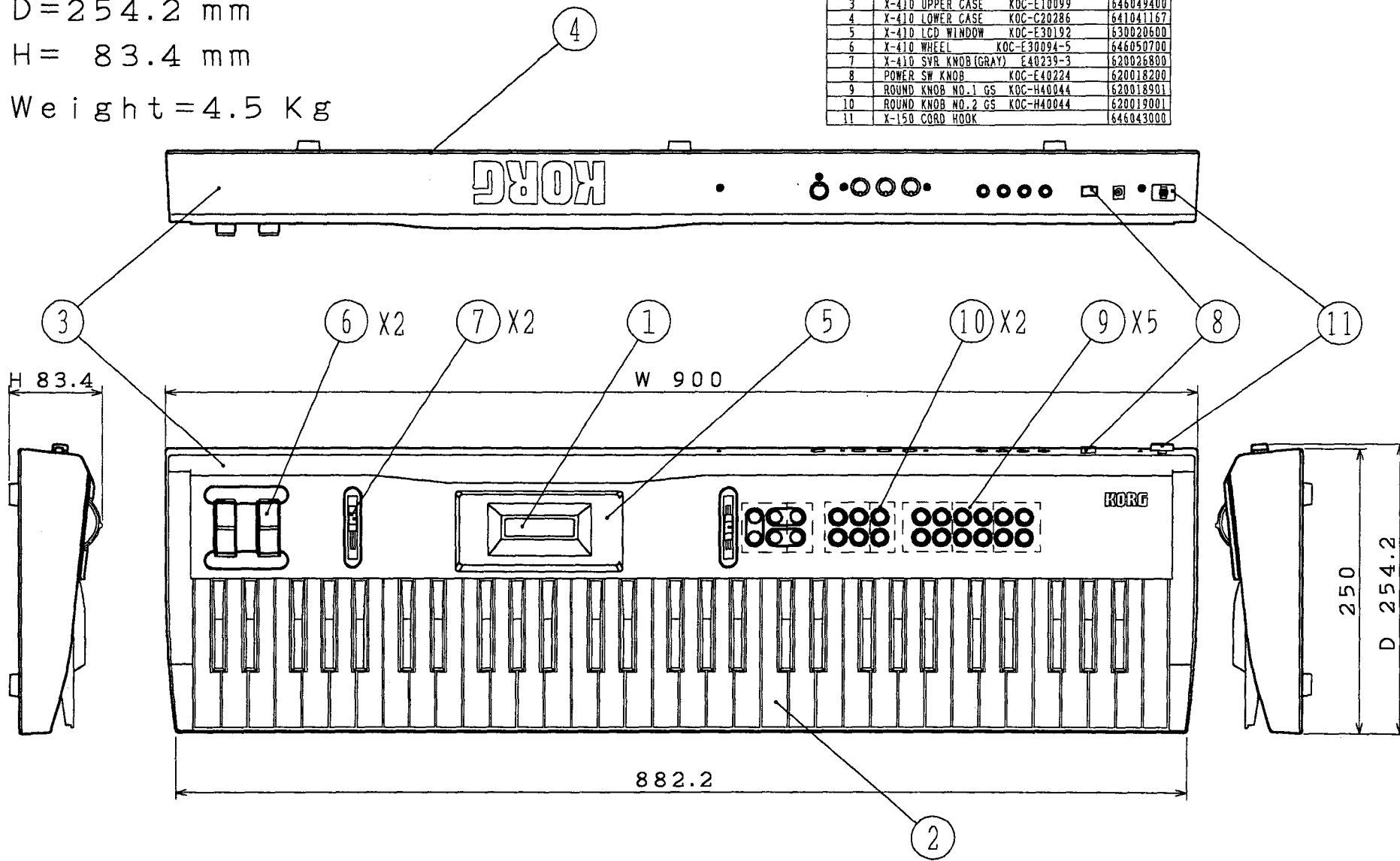
H= 83.4 mm

Weight=4.5 Kg

PART No	PART NAME	PART CODE
1	LCD DMC16205NY-LY W/HARNESS	313003100
2	KEYBOARD ASSY TP/7BA+PCB 61	420005100
3	X-410 UPPER CASE KOC-E10099	646049400
4	X-410 LOWER CASE KOC-C20286	641041167
5	X-410 LCD WINDOW KOC-E30192	630020600
6	X-410 WHEEL KOC-E30094-5	646050700
7	X-410 SYR KNOB (GRAY) E40239-3	620026800
8	POWER SW KNOB KOC-E40224	620018200
9	ROUND KNOB NO.1 GS KOC-H40044	620018901
10	ROUND KNOB NO.2 GS KOC-H40044	620019001
11	X-150 CORD HOOK	646043000

2. FULL VIEW

2



3. DISASSEMBLY

1. Remove the Lower Case

1) Remove all the screws on the lower case and carefully lift the case.

[BT B BZMC 4×10] ×9 (Mark:●)

[TP1 B BZMC 3×14] ×10 (Mark:■)

2. Remove the Main Board(KLM-950)

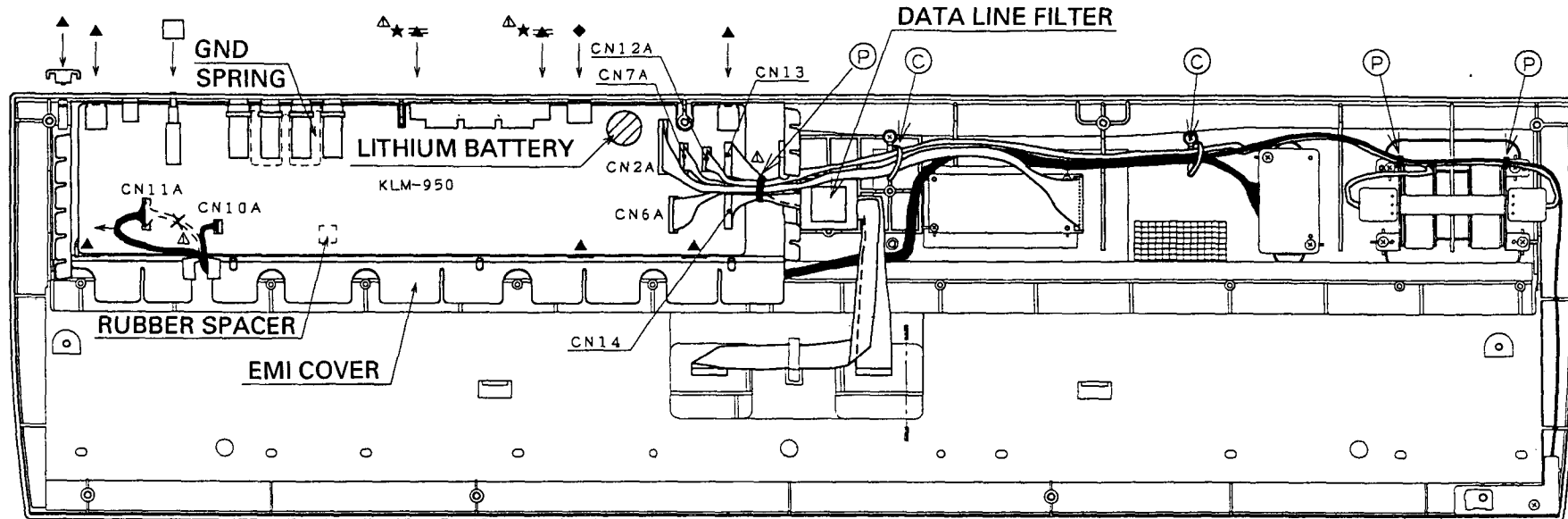
1) Unplug all the harnesses and 8pcs. of the screws on the main board.

[BT B BZMC 3×8] ×5 (Mark:▲)

[FE B BZMC 3×8] ×1 (Mark:◆)

[BT B BZMC 3×12] ×2 (Mark:★)

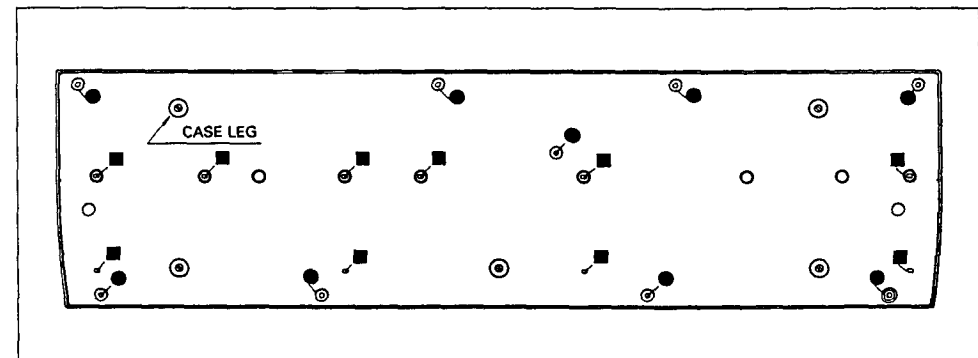
2) Remove the main board and the EMI cover.



HARNESS NO.	CONNECTIONS
HNS-8021	PANEL SW(CN6B) - CN6A
HNS-8022	PANEL LED(CN7B) - CN7A
HNS-8023	PHONES(CN10B) - CN10A
HNS-8024	MASTER VR(CN11B) - CN11A
HNS-8025	PITCH/MOD(CN12B) - CN12A
HNS-8027	KEYBOARD LOW - CN13
HNS-8028	KEYBOARD HIGH - CN14
LCD HARNESS	LCD HARNESS - CN2A

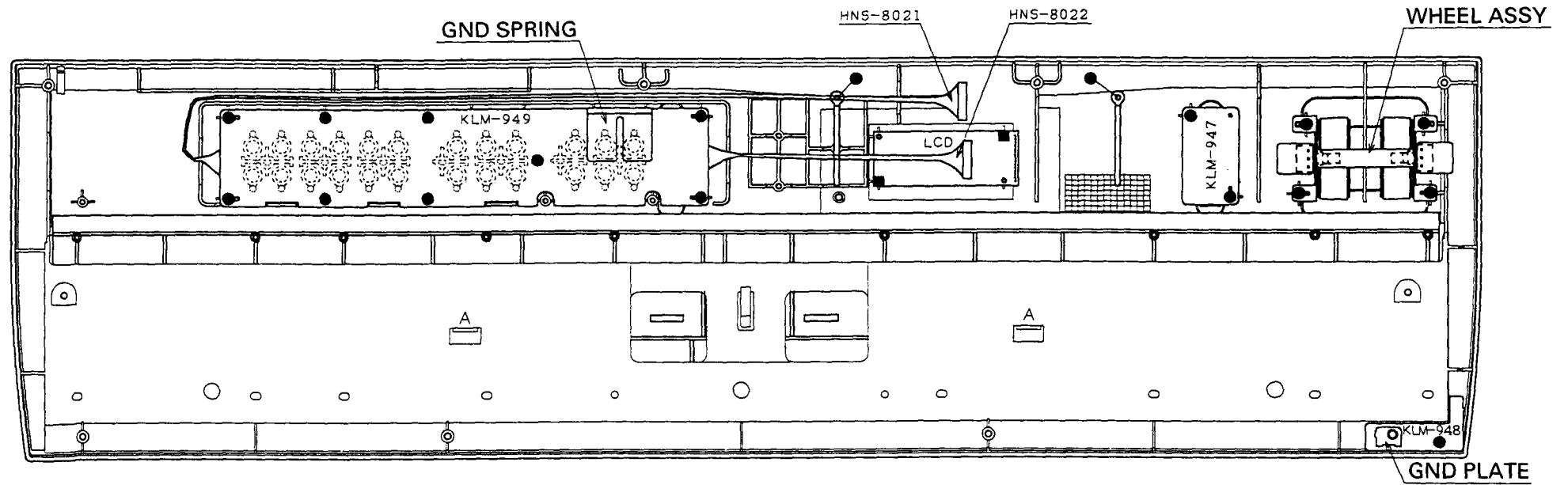
P : WIRE BAND PLT-1M (3 points)

C : SPIRAL CLIP CS-8 (2 points)

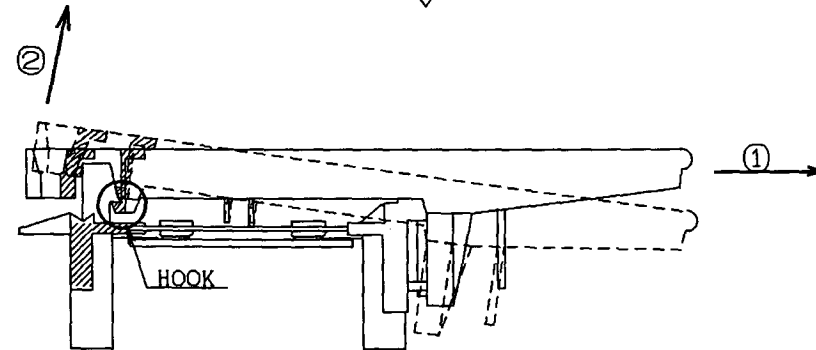
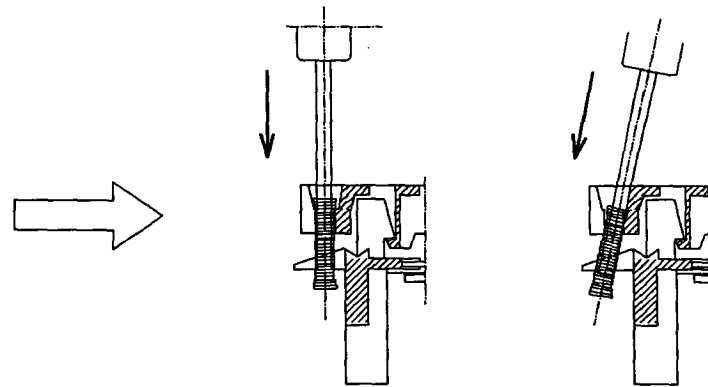
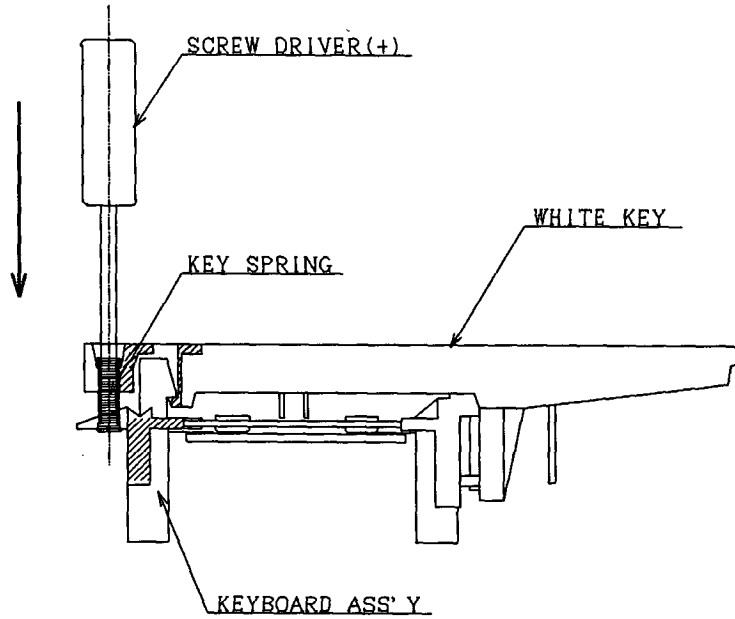


3. Remove the Panel Board(KLM-949)
[BT B BZMC 3×8] ×9 (Mark:●)
4. Remove the LCD Assy
[PLAX B ZMC 2×6] ×2 (Mark:■)
5. Remove the Wheel Assy
[BT B BZMC 3×8] ×4 (Mark:●)

6. Remove the Master VR Board(KLM-947)
[BT B BZMC 3×8] ×2 (Mark:●)
7. Remove the Headphone Board(KLM-948)
[BT B BZMC 3×8] ×1 (Mark:●)

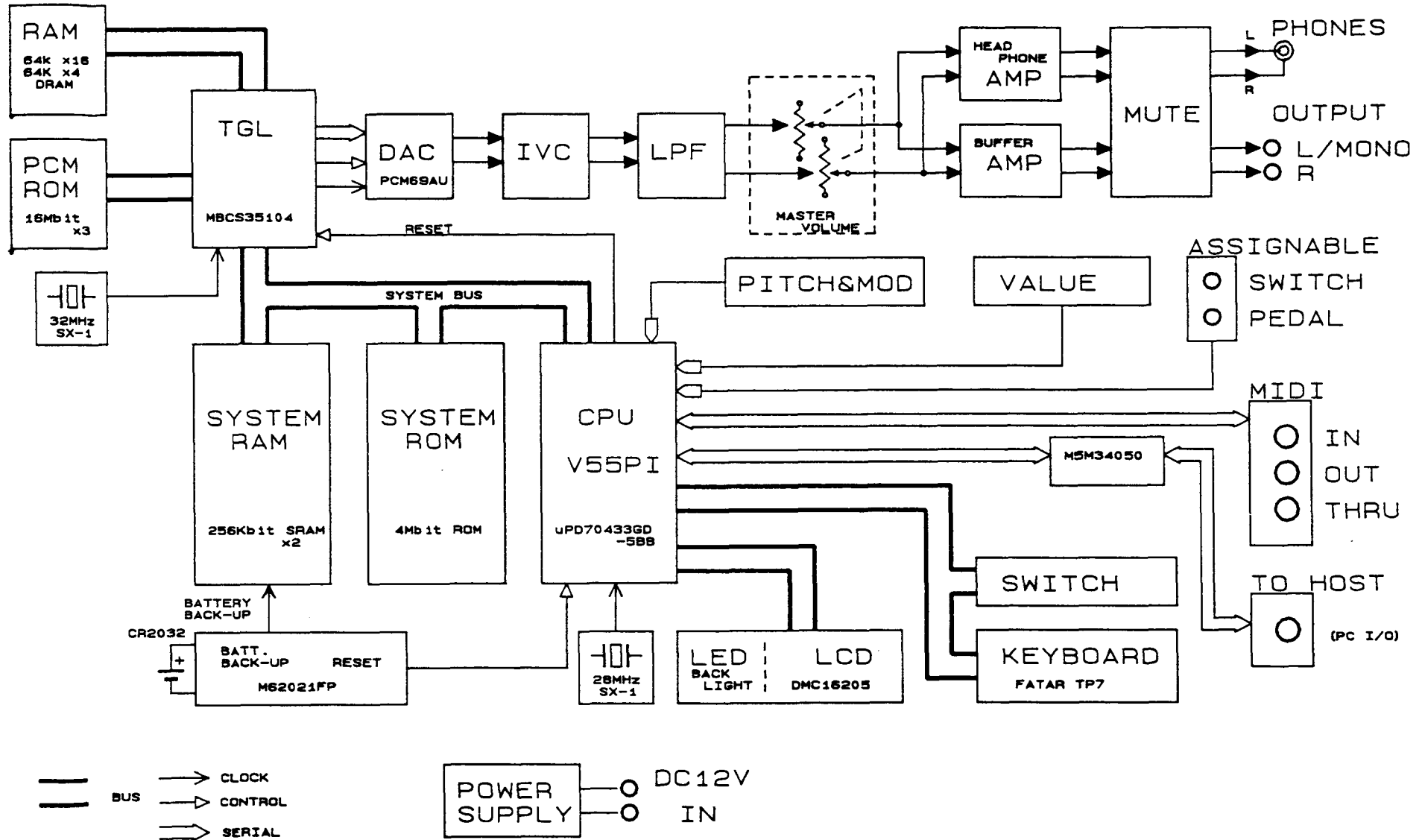


How to remove the FATAR key

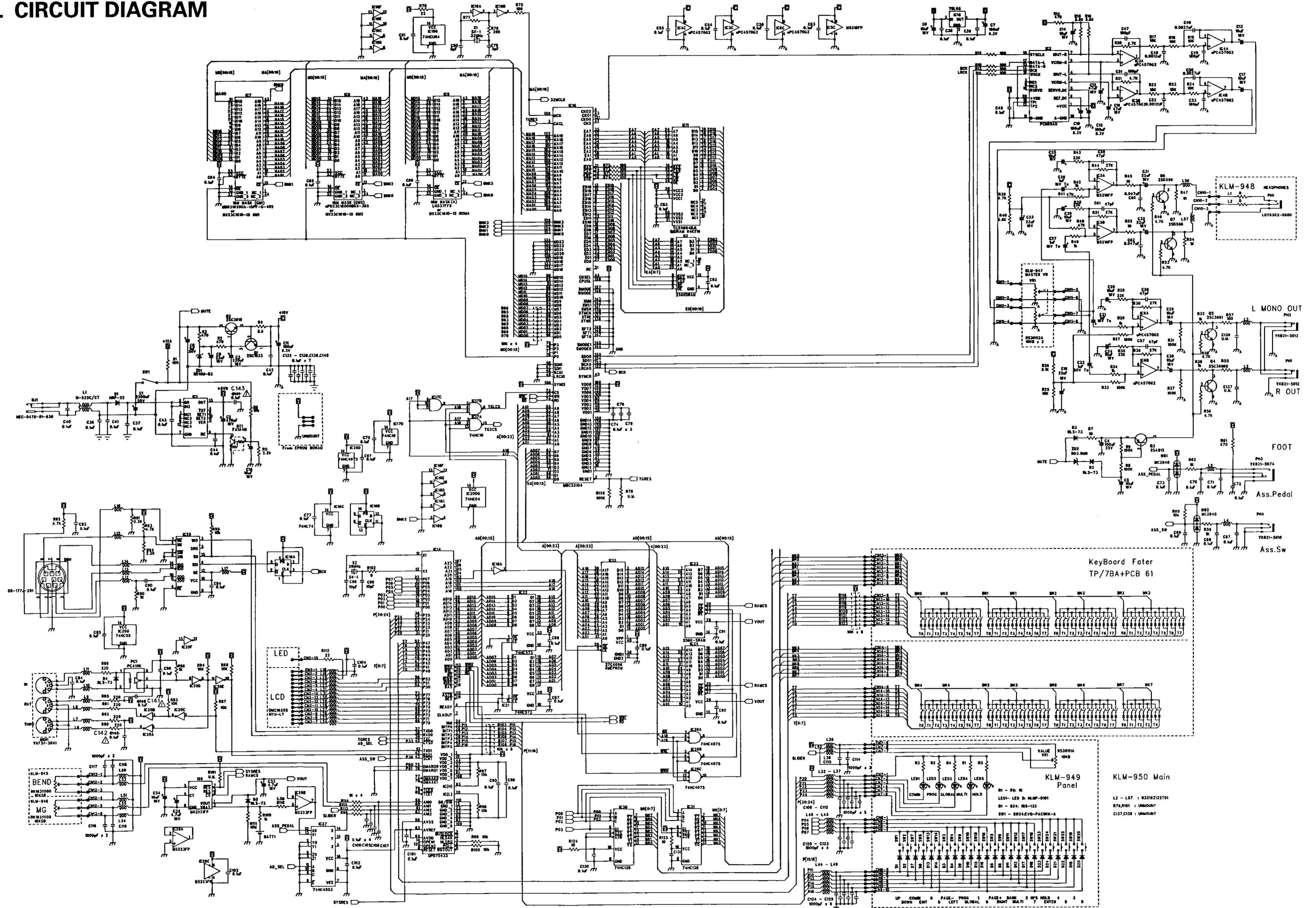


- 1) Set the screw driver (type +) at the key spring.
- 2) Push down the screw driver slowly and remove the key spring.
- 3) Move the key in accordance with the direction → ①.
- 4) Move the key in accordance with the direction ↑ ② and remove it.

4. BLOCK DIAGRAM

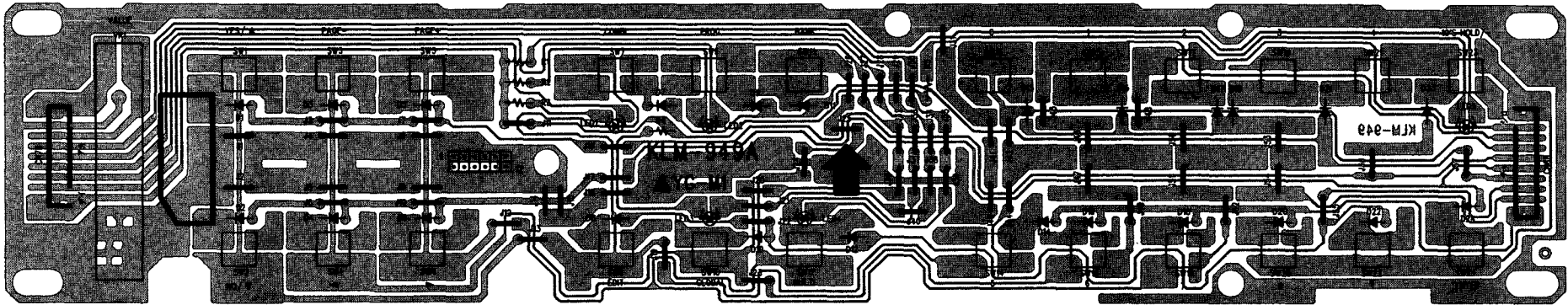
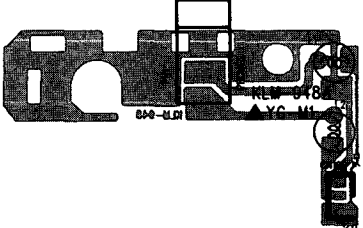
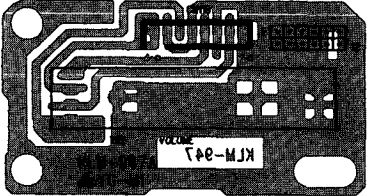


5. CIRCUIT DIAGRAM



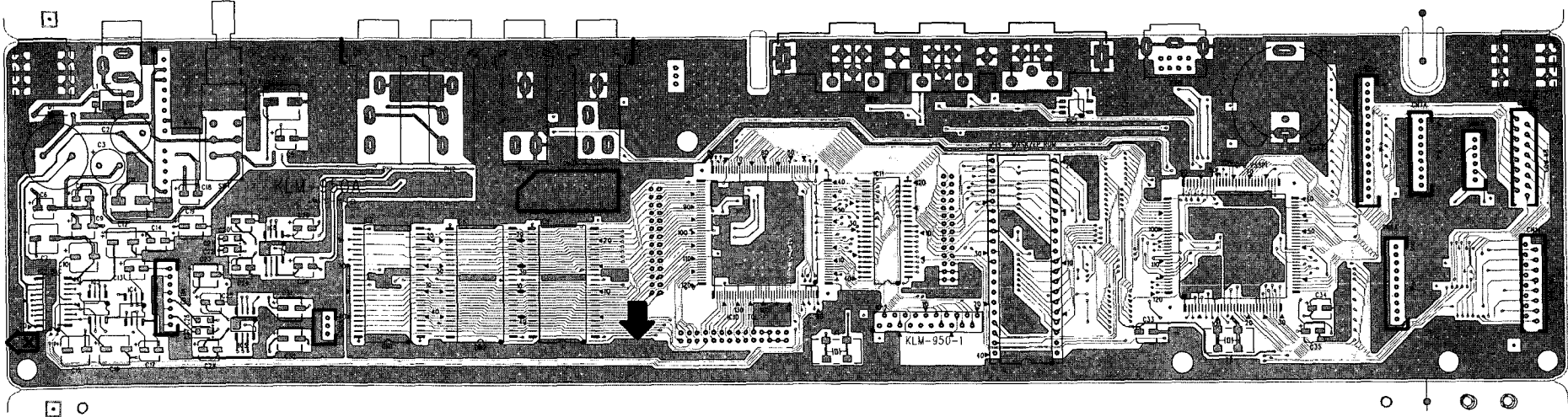
6. P.C. BOARDS

KLM-947/948/949



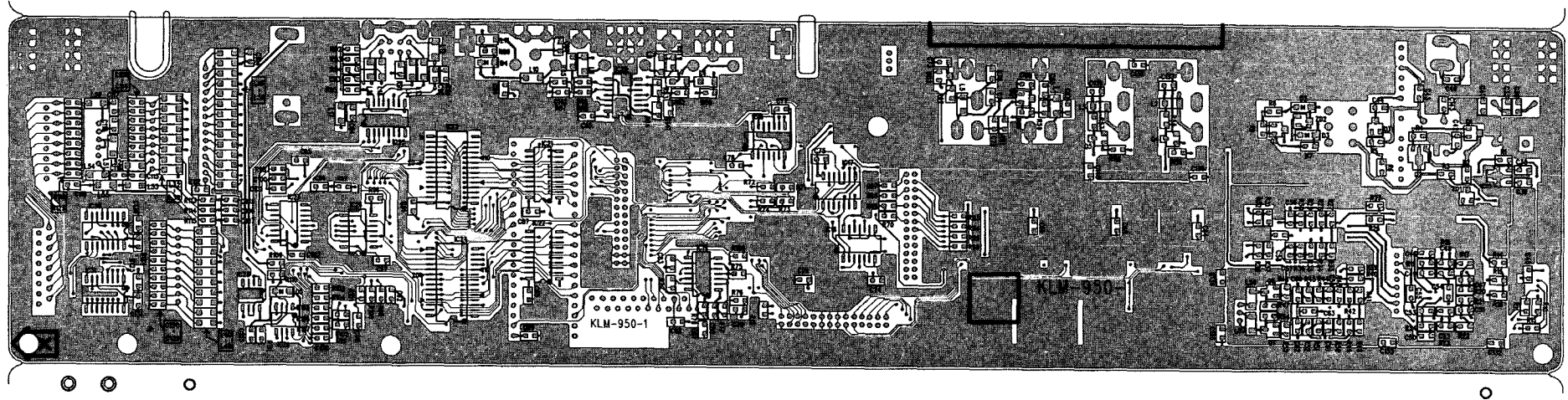
KLM-950

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COMPONENT SIDE

KLM-950

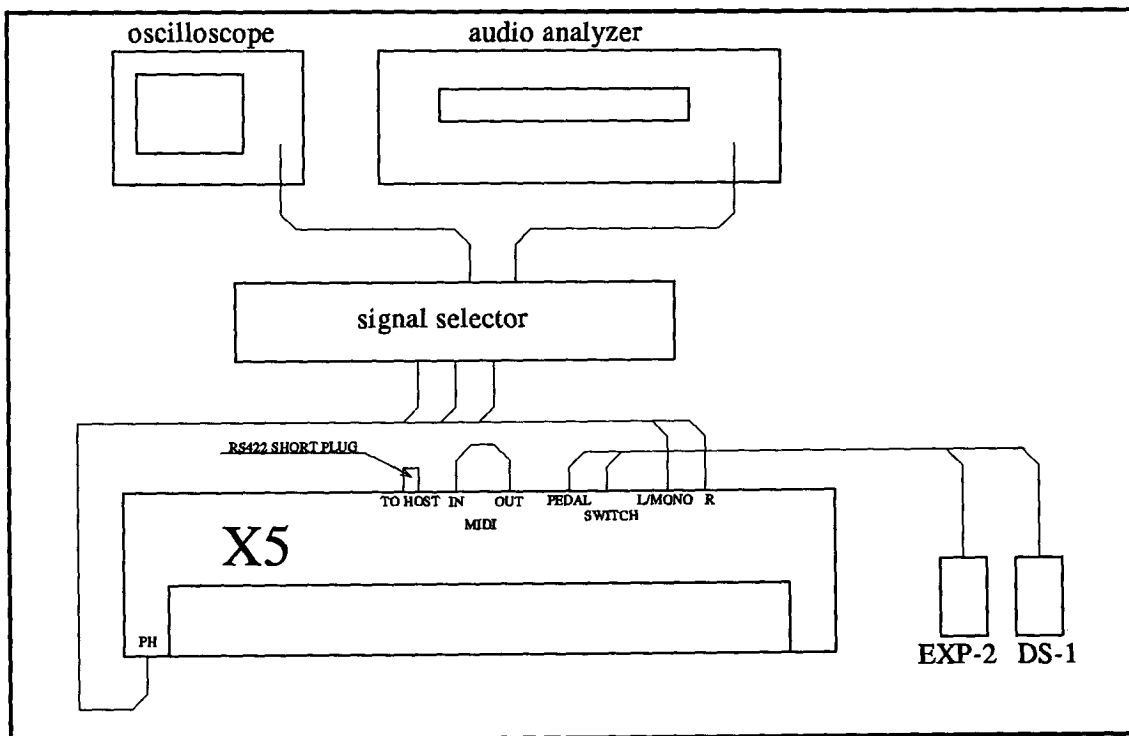


SOLDERING SIDE

7. TEST MODE

The X5 has a test mode for checking numerous functions. When the test mode is activated, the X5 internal data is initialized. Hence, if it contains any necessary data, save this data beforehand in a MIDI data file or other memory device. The figure below shows the equipment and settings required for carrying out tests.

Standard Setting



Activating the Test Mode

Turn the power switch ON while pressing "PAGE+" and "PAGE-".

When the test mode is activated, the internal tests shown below are automatically initialized. If the test results for all of the tests are normal, the next test item <PANEL SW TEST> is moved to.

The initialized internal tests are as follows:

- System ROM Check Sum (Internal Test#01)
- Internal RAM Test (Internal Test#02)
- LCD RAM Test (Internal Test#03)
- TGL I/F Test (Internal Test#04)
- Internal Battery Test (Internal Test#05)
- MIDI Loop Test (Internal Test#06)
- PCIO Loop Test (Internal Test#07)
- PCM ROM TG I/F Test (Internal Test#08)

If any abnormalities are found in the internal test results, all the LEDs flash and the LCD screen displays an error message. Refer to "Internal Test Error Message Chart" about the contents of the message.

Supplement

When an internal test is NG, the next test can be moved to by pressing "YES" and "NO" switches at the same time.

[YES] SW/[ENTER] SW	Test STEP UP
[NO] SW	Test STEP DOWN
[PAGE+] SW	Test item UP
[PAGE-] SW	Test item DOWN

External Testing

TEST ITEM 1

<Panel SW&LED Test>

Confirm that the LEDs for COMBI, PROG, GLOBAL, MULTI, and 10'S HOLD are all lit. Confirm that the functions of the switches pressed in the order shown on the LCD screen are normal.

Confirm that the LEDs are lit when the switches for COMBI, PROG, GLOBAL, MULTI, and 10'S HOLD are pressed.

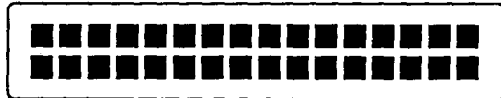
When the test is completed, press the "ENTER" switch to move to the next test item.

TEST ITEM 2

<LCD Pixel Test>

Step 1 Confirm that the whole LCD is lit.

Press the "ENTER" switch and confirm that the whole LCD is lit.



Step 2 Confirm that the whole LCD is not lit.

Press the "ENTER" switch and confirm that the whole LCD is blank.



After confirming it, press the "ENTER" switch to go to the next test item.

TEST ITEM 3

<MDE Test>

Press the "ENTER" switch and confirm the output signal from OUTPUT-L with an oscilloscope. Match MASTER Volume on the panel to the highest level so that the wave form does not clip. Confirm that the MDE Test output wave form is normal. (At least 2 seconds)

Confirm that the P-P value of the wave form is within the stipulated range.

After confirming it, press the "ENTER" switch to go to the next test item.

TEST ITEM 4

<Noise Test>

Turn the MASTER VOLUME on the product to MAX.

Press the "ENTER" switch and measure the noise level of the item to be measured which is displayed on the LCD. Confirm that each noise level is below the stipulated value.

Test OUT-L, OUT-R, PHONE-L, and PHONE-R respectively.

After confirming it, press the "ENTER" switch to go to the next test item.

TEST ITEM 5

<Output Test>

Press the "ENTER" switch and measure the output signal level of the item to be measured which is displayed on the LCD. Confirm that each output signal level is a sine wave within the stipulated range. Also, for OUT-L, OUT-R, PHONE-L, and PHONE-R respectively, confirm that the wave form level changes smoothly when the MASTER VOLUME is controlled and the wave level becomes "0" when the MASTER VOLUME is turned to MIN.

After confirming the signal level of PHONE-R, press the "ENTER" switch to go to the next test item.

TEST ITEM 6

<Keyboard Test>

Following the display on the LCD screen, play the keyboard from the high keys down to the middle keys to confirm that the touch of the keyboard is normal.

TEST ITEM 7

<Ass SW Test>

Step 1 Confirm ASSIGNABLE SWITCH

After pressing the "ENTER" switch, confirm that the LCD display goes on when the pedal connected to ASS SW is stepped on. Confirm that it goes off when the pedal is released.

After confirming it, press the "ENTER" switch to go to the next test item.

TEST ITEM 8
<A/D Test>

Step 1 Confirm PITCH BEND Wheel

Confirm that the value displayed on the LCD changes smoothly when BEND is controlled.

Confirm that "PASS" is displayed with MAX and MIN.

After confirming it, press the "ENTER" switch to go to the next step.

Step 2 Confirm MODULATION Wheel

Confirm that the value displayed on the LCD changes smoothly when MODULATION is controlled.

Confirm that "PASS" is displayed with MAX and MIN.

After confirming it, press the "ENTER" switch to go to the next step.

Step 3 Confirm VALUE Slider

Confirm that the value displayed on the LCD changes smoothly when VALUE is controlled.

Confirm that "PASS" is displayed with MAX and MIN.

After confirming it, press the "ENTER" switch to go to the next step.

Step 4 Confirm ASSIGNABLE Pedal

Confirm that the value displayed on the LCD changes smoothly when the ASSIGNABLE pedal is controlled.

Confirm that "PASS" is displayed with MAX and MIN.

After confirming it, press the "ENTER" switch so that PRELOAD will automatically be executed and the Test Mode will be finished.

Internal Test Error Message Chart

SystemROMChkSum Error: Verify	Checksum of system ROM is NG
SRAM Write/Read Error: Verify	Read/Write of SRAM is NG
LCD RAM W/R Error: Verify	Read/Write for LCD controller is NG
TG CPU I/F Error: [①~④]	①VoiceFlag Trigger on/off for TGL is NG ②TGL1 NG Trigger on/off for TGL1 is NG ③TGL2 NG Trigger on/off for TGL2 is NG ④short/sel TGL1 and TGL2 can not be started separately
VDA CPU I/F Error: Verify	Read/Write of TGL internal VDF and VDA resistor is NG
InternalBattery Error:[①,②]*.**v	①High Measured voltage is high ②Low Measured voltage is low *:**:measured voltage value
MIDI Warning:[①,②]	①OUT-->IN Output data and input data are different ②OUT × IN Input data is not received or MIDI cable is not connected
PCIO Warning:[①,②]	①OUT-->IN Output data and input data are different ②OUT × IN Input data is not received or RS422 short plug is not connected
PCMInt@ A:xxxxxC P:**** R:++++	The read PCM data is NG @ : 0~F xxxx:PCM address ****:correct value ++++:read value

TEST MODE WAVEFORMS

Table 1 Stipulated Range for MDE Wave Form P-P values

5.5~7.8 VP-P

Table 2 Stipulated Range for Residual Noise and Output Signal Level

	Residual Noise	Output Signal Level	Freq.
Out-L	-90.0[dBu] or less	2.00~3.50[dBu]	488 Hz
Out-R	-90.0[dBu] or less	2.00~3.50[dBu]	412 Hz
Ph-L	-90.0[dBu] or less	-1.00~0.50[dBu]33Ω load	548 Hz
Ph-R	-90.0[dBu] or less	-1.00~0.50[dBu]33Ω load	610 Hz

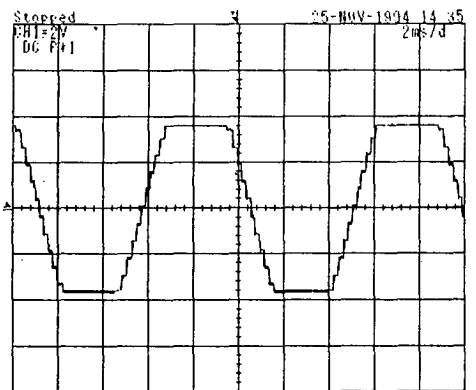
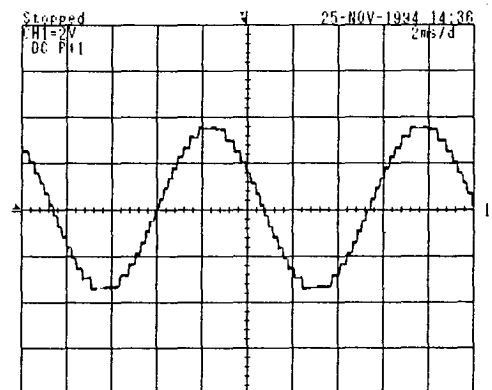


Fig.1 : MDE Waveform (at VOL MAX)



MDE Waveform (at VOL adjust)

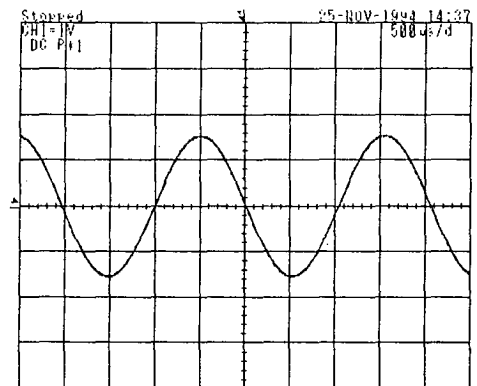


Fig.2 : SIN Waveform

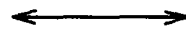
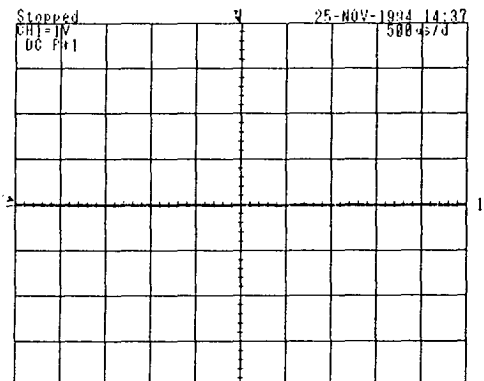
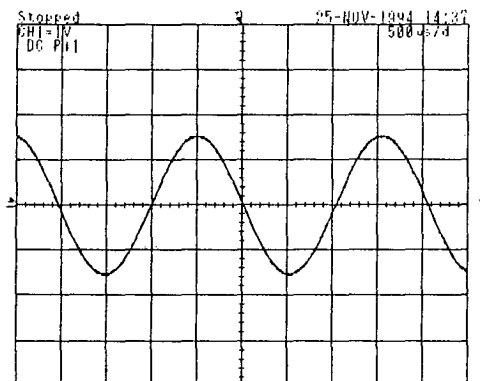


Fig.3 : VOL Action Confirmation

8. REFERENCE DATA

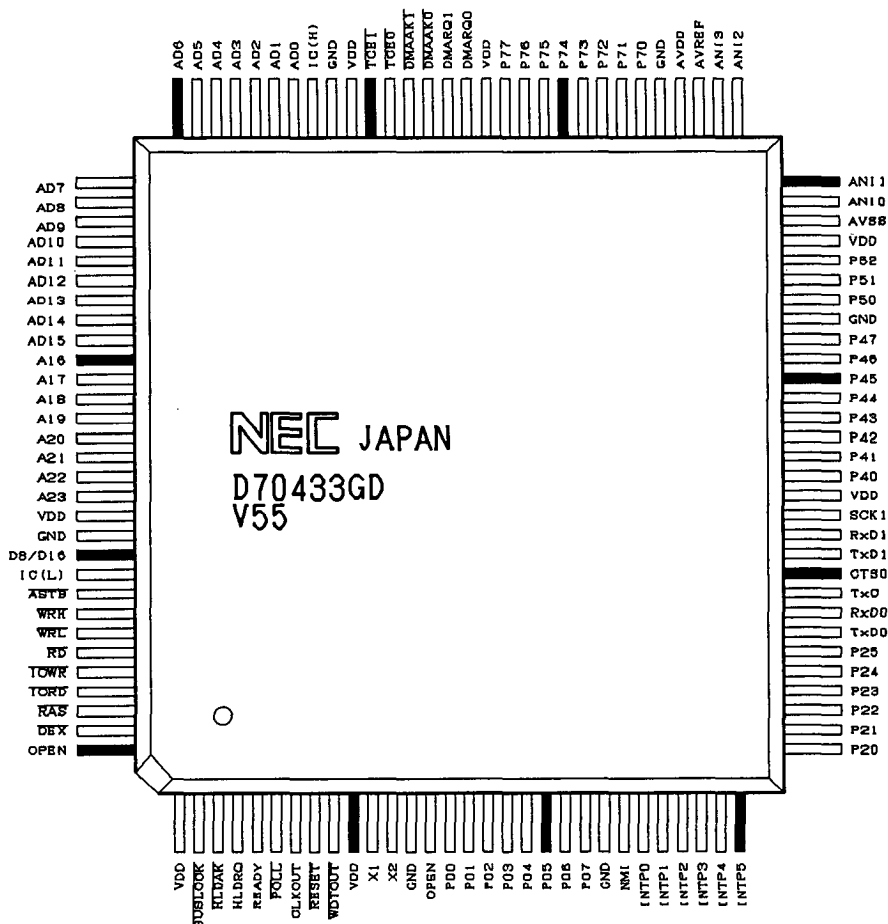
P.C.BOARDS

KLM-945/946 : PITCH/MOD P.C.BOARD
 KLM-947 : MASTER VR P.C.BOARD
 KLM-948 : HEADPHONE P.C.BOARD
 KLM-949 : PANEL SW P.C.BOARD
 KLM-950 : MAIN P.C.BOARD

MAIN ICs

CPU :	UPD70433GD-5BB	IC14
TONE GENERATOR :	MBCS35104(TGL)	IC10
SYSTEM ROM :	MSM534000B-23RS-*** (MASK ROM)	IC13
SYSTEM RAM :	UPD43256BGU-85L-E2	IC23, IC24
	or MB84256A-10LPF-G-BND-EF	
DRAM :	MB81464-10PSZ-G-BB-RS2(64K x 4)	IC12
	TC511664BJL(64K x 16)	IC11
WAVE ROM :	MB8316200-15PF-G-402-HT(for GM1)	IC7
	or MX23C1610MC-15 GM1	
	UPD23C16000BGX-385(for GM2)	IC8
	or MX23C1610MC-15 GM2	
	LH537GG5	IC9
	or MX23C1610MC-15 ROMA	
D/A CONVERTOR :	PCM69AU	IC2

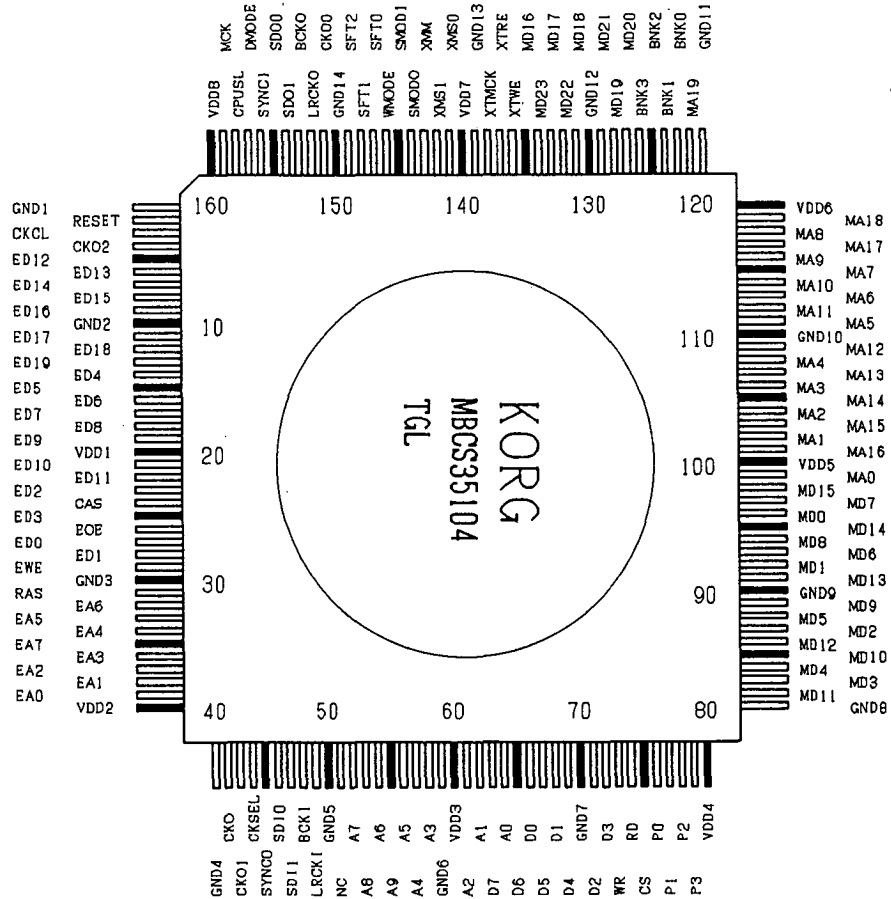
UPD70433GD-5BB(CPU) PIN ASSIGNMENT



UPD70433GD-5BB(CPU) PIN FUNCTION

PIN NAME	I/O	FUNCTION
P00-P07	I/O	PORT 0
NMI	I	NON MASKABLE INTERRUPT
INTP0-INTP5	I	EXTERNAL INTERRUPT REQUEST
P20-P21	I/O	PORT 2
TXD0-TXD1	O	TRANSMIT DATA OUTPUT
RXD0-RXD1	I	RECEIVE DATA INPUT
TXC	O	TRANSMIT CLOCK OUTPUT
CTS0	I	ENABLING SIGNAL INPUT
SCK1	O	SERIAL CLOCK OUTPUT
P40-P47	I/O	PORT 4
P50-P52	I/O	PORT 5
ANI0-ANI3	I	ANALOG SIGNAL INPUT
P70-P77	I/O	PORT 7
DMARQ0-1	I	DMA REQUEST SIGNAL INPUT
GND	---	GROUND
VDD	---	+5V POTENTIAL
AVSS	---	ANALOG GROUND
AVDD	---	ANALOG +5V POTENTIAL
AVREF	I	REFERENCE POTENTIAL INPUT FOR A/D CONVERTER
RESET	I	SYSTEM RESET SIGNAL INPUT
X1, X2	I	SYSTEM CLOCK INPUT
CLKOUT	O	SYSTEM CLOCK OUTPUT
ASTB	O	ADDRESS STROBE SIGNAL OUTPUT
RD	O	DATA READ STROBE SIGNAL OUTPUT
WRL	O	LOW BIT DATA WRITE STROBE SIGNAL OUTPUT
WRH	O	HIGH BIT DATA WRITE STROBE SIGNAL OUTPUT
READY	I	READY SIGNAL INPUT
DEX	O	DATA BUS ENABLE SIGNAL OUTPUT
RAS	O	DRAM ROW ADDRESS LATCH TIMING SIGNAL OUTPUT
D8/D16	I	BUS SIZE SELECT INPUT
BUSLOCK	O	BUS LOCK SIGNAL OUTPUT
POLL	I	POLL SIGNAL INPUT
HLDRQ	I	BUS HOLD REQUEST SIGNAL INPUT
HLDAK	O	BUS HOLD ACKNOWLEDGE SIGNAL OUTPUT
AD0-AD15	I/O	ADDRESS/DATA SIGNAL
A16-A23	O	ADDRESS SIGNAL OUTPUT
IORD	O	I/O READ STROBE SIGNAL OUTPUT
IOWR	O	I/O WRITE STROBE SIGNAL OUTPUT
DMAAK0-1	O	DMA ACKNOWLEDGE SIGNAL OUTPUT
TCE0-TCE1	O	DMA FINISH SIGNAL OUTPUT

MBCS35104 (TGL) PIN ASSIGNMENT



MBCS35104 (TGL) PIN FUNCTION

PIN NAME	I/O	FUNCTION
VDD	---	+5V
VSS	---	Ground
Rest	I	System Rest
MCK	I	Master Clock
CKO	O	32MHz
CKO0-1	O	CLK/2 duty 50% output
CKO2	O	CLK/4 duty 50% output
CKSEL	I	Phase Analog Select for CKO0
CKCL	I	CKO0 Reset input
XMM	I	for Test mode
XMS2-0	I	for Test mode
XTMCK	I	for Test mode
XTRE	I	for Test mode
XTWE	I	for Test mode
<hr style="border-top: 1px dashed black;"/>		
for CPU		
CPUSL	I	CPU select V25/H8
CS	I	Chip select
WR	I	CPU WRITE pulse
RD	I	CPU READ pulse
A0-9	I	CPU Address Bus
D0-9	I/O	CPU Data Bus
P0-3	O	Output Port

for PCM ROM -----		
MD0-15	I/O	PCM Memory Data Bus 0-15
MD16-23	I	PCM Memory Data Bus 16-23 (for 2TGs mode)
MA0-19	O	PCM Memory Address Bus
BNK0-3	O	PCM Memory Bank Select
DMODE	I	DECODE Mode Select H: Decode BNK# L: Thru BNK#
WMODE	I	PCM Memory -word Select H: 64 osc. , 2TGs Mode L: 32 osc. , 1TG Mode
SYNCO	O	Counter Synchro Output (only 2TGs Mode)
SYNCI	I	Counter Synchro Input (only 2TGs Mode)
for Serial Interface -----		
SDO0-1	O	Serial Data Outout 0,1 SDO0: C ch & D ch SDO1: A ch & B ch
BCKO	O	Bit Clock Output (2MHz, 500nsec.)
LRCKO	O	LR Clock Output L: R ch H: L ch
SDI0-1	I	Serial Data Input 0,1 SDI0: C ch & D ch SDI1: A ch & B ch
BCKI	I	Bit Clock Input (2MHz, 500nsce.)
LRCKI	I	LR Clock Input L: R ch H: L ch
SMOD0-3	I	Serial I/F Format Select
for DRAM -----		
EA0-7	O	DRAM Address
ED0-19	I/O	DRAM Data
EWE	O	DRAM WE
EOE	O	DRAM OE
RAS	O	DRAM RAS
CAS	O	DRAM CAS

TGL check points

1. Voltage check of power supply

Check that a voltage of +5V ($\pm 5\%$) is input at the VDD pin.

$$4.75V \leq VDD \leq 5.25V$$

2. Check of input/output pins, regardless of the CPU interface setting

PIN NAME	FUNCTION
BCKO	2.0 MHz bit clock signal outputs to the D/A converter.
LRCKO	31.25 KHz L/R clock signal output to the D/A converter.

If the voltage level of these pins is +3V or less, check the soldering of peripheral pins and the voltage of the connected device. Also, if any of these pins is 0V or +5V, check to see whether RESET(TGRES) or the master clock(32.0MHz) has been input. If RESET and MCK are normal, and the test mode setting pins have been set as below, check the soldering and the pattern on the circuit board.

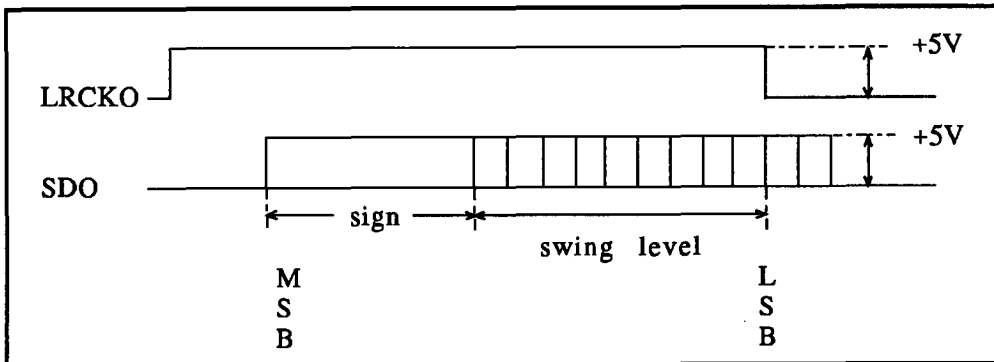
3. Check of input/output pins, when any key is on

PIN NAME	FUNCTION
XCS, XWE	Control signal from the CPU

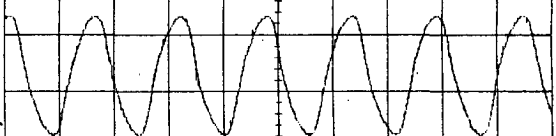
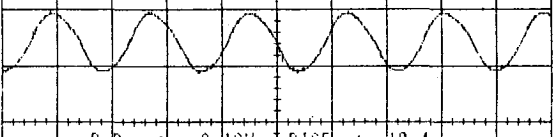
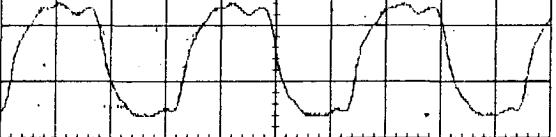
During KEY ON or PROG. CHANGE, check that a low level pulse signal is input from the CPU to the above pins(XSC, XWE). If these signals cannot be observed with the oscilloscope, check the CPU and its peripheral circuits.

PIN NAME	FUNCTION
SDO0, SDO1	serial data output to the D/A converter

In case of observing the waveform with the oscilloscope, it is best to input the LRCKO clock signal to the external trigger input of the oscilloscope. If the serial data cannot be output, check the PCM address bus. To find whether normal serial data is output or not, check whether there is a different bit from the code bit at the left side of the leading and the trailing edge of LRCKO on the oscilloscope screen.



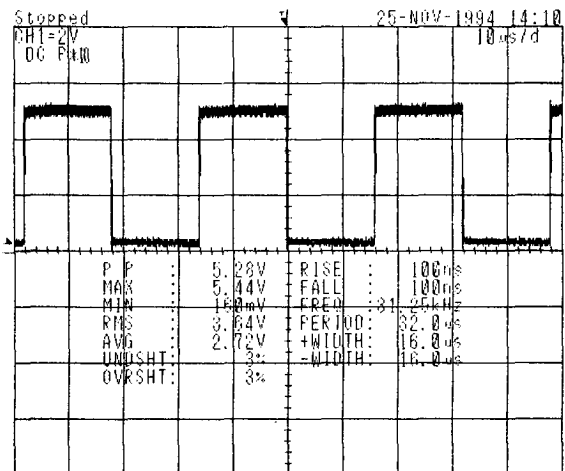
CHECK POINTS

<p>1. CLOCK CIRCUIT - TGL</p> <p>From 4pin of IC19 To 159pin(MCK) of IC10</p> <p>f= 32.00MHz</p>	<p>Stopped 25-NOV-1994 14 05 CH1=2V 20ns/div DC FWD</p>  <table border="1" data-bbox="793 498 1347 725"> <tr> <td>P-P</td> <td>4.24V</td> <td>RISE</td> <td>9.2ns</td> </tr> <tr> <td>MAX</td> <td>4.72V</td> <td>FALL</td> <td>8.8ns</td> </tr> <tr> <td>MIN</td> <td>420mV</td> <td>FREQ</td> <td>32.05MHz</td> </tr> <tr> <td>RMS</td> <td>3.04V</td> <td>PERIOD</td> <td>31.2ns</td> </tr> <tr> <td>AVG</td> <td>2.64V</td> <td>+WIDTH</td> <td>15.4ns</td> </tr> <tr> <td>UNDSHT</td> <td>2%</td> <td>-WIDTH</td> <td>15.2ns</td> </tr> <tr> <td>OVRSHT</td> <td>0%</td> <td></td> <td></td> </tr> </table>	P-P	4.24V	RISE	9.2ns	MAX	4.72V	FALL	8.8ns	MIN	420mV	FREQ	32.05MHz	RMS	3.04V	PERIOD	31.2ns	AVG	2.64V	+WIDTH	15.4ns	UNDSHT	2%	-WIDTH	15.2ns	OVRSHT	0%		
P-P	4.24V	RISE	9.2ns																										
MAX	4.72V	FALL	8.8ns																										
MIN	420mV	FREQ	32.05MHz																										
RMS	3.04V	PERIOD	31.2ns																										
AVG	2.64V	+WIDTH	15.4ns																										
UNDSHT	2%	-WIDTH	15.2ns																										
OVRSHT	0%																												
<p>2. CLOCK CIRCUIT - CPU</p> <p>From X2(28MHz) To 11pin(X1) and 12pin(X2) of IC14</p> <p>f= 28.00MHz</p>	<p>Stopped 25-NOV-1994 14 07 CH1=2V 20ns/div DC FWD</p>  <table border="1" data-bbox="793 1077 1347 1304"> <tr> <td>P-P</td> <td>2.16V</td> <td>RISE</td> <td>10.4ns</td> </tr> <tr> <td>MAX</td> <td>4.00V</td> <td>FALL</td> <td>10.4ns</td> </tr> <tr> <td>MIN</td> <td>1.84V</td> <td>FREQ</td> <td>28.00MHz</td> </tr> <tr> <td>RMS</td> <td>3.00V</td> <td>PERIOD</td> <td>35.8ns</td> </tr> <tr> <td>AVG</td> <td>2.38V</td> <td>+WIDTH</td> <td>18.0ns</td> </tr> <tr> <td>UNDSHT</td> <td>4%</td> <td>-WIDTH</td> <td>17.8ns</td> </tr> <tr> <td>OVRSHT</td> <td>4%</td> <td></td> <td></td> </tr> </table>	P-P	2.16V	RISE	10.4ns	MAX	4.00V	FALL	10.4ns	MIN	1.84V	FREQ	28.00MHz	RMS	3.00V	PERIOD	35.8ns	AVG	2.38V	+WIDTH	18.0ns	UNDSHT	4%	-WIDTH	17.8ns	OVRSHT	4%		
P-P	2.16V	RISE	10.4ns																										
MAX	4.00V	FALL	10.4ns																										
MIN	1.84V	FREQ	28.00MHz																										
RMS	3.00V	PERIOD	35.8ns																										
AVG	2.38V	+WIDTH	18.0ns																										
UNDSHT	4%	-WIDTH	17.8ns																										
OVRSHT	4%																												
<p>3. TGL - DAC</p> <p>From 151pin(CKO0) of IC10 To 15pin(SYSCLK) of IC2</p> <p>f= 16.00MHz</p>	<p>Stopped 25-NOV-1994 14 09 CH1=2V 20ns/div DC FWD</p>  <table border="1" data-bbox="793 1610 1347 1837"> <tr> <td>P-P</td> <td>4.00V</td> <td>RISE</td> <td>10.8ns</td> </tr> <tr> <td>MAX</td> <td>4.88V</td> <td>FALL</td> <td>11.2ns</td> </tr> <tr> <td>MIN</td> <td>880mV</td> <td>FREQ</td> <td>16.02MHz</td> </tr> <tr> <td>RMS</td> <td>3.32V</td> <td>PERIOD</td> <td>62.3ns</td> </tr> <tr> <td>AVG</td> <td>2.38V</td> <td>+WIDTH</td> <td>33.4ns</td> </tr> <tr> <td>UNDSHT</td> <td>0%</td> <td>-WIDTH</td> <td>29.4ns</td> </tr> <tr> <td>OVRSHT</td> <td>4%</td> <td></td> <td></td> </tr> </table>	P-P	4.00V	RISE	10.8ns	MAX	4.88V	FALL	11.2ns	MIN	880mV	FREQ	16.02MHz	RMS	3.32V	PERIOD	62.3ns	AVG	2.38V	+WIDTH	33.4ns	UNDSHT	0%	-WIDTH	29.4ns	OVRSHT	4%		
P-P	4.00V	RISE	10.8ns																										
MAX	4.88V	FALL	11.2ns																										
MIN	880mV	FREQ	16.02MHz																										
RMS	3.32V	PERIOD	62.3ns																										
AVG	2.38V	+WIDTH	33.4ns																										
UNDSHT	0%	-WIDTH	29.4ns																										
OVRSHT	4%																												

4. TGL - DAC

From 152pin(LRCKO) of IC10
To 16pin(WDCK) of IC2

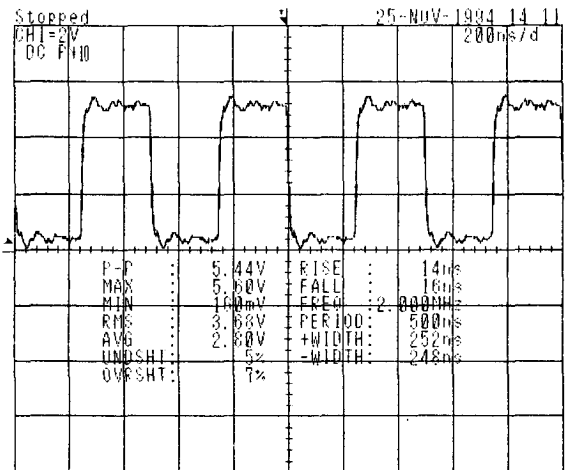
f= 31.25KHz



5. TGL - DAC/PC IF(TO HOST)

From 153pin(BCKO) of IC10
To 14pin(BCK) of IC2

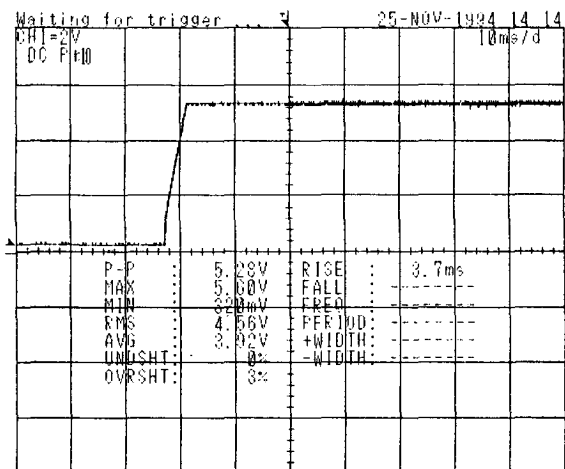
f= 2.00MHz



6. RESET - CPU

From 7pin(RES) of IC29
To 8pin(RESET) of IC14

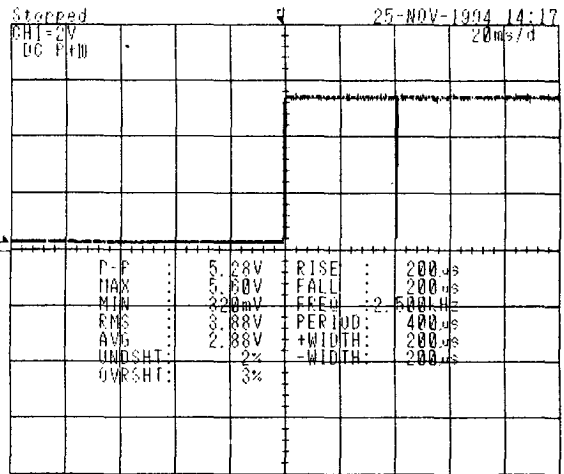
※ when the power is turned on



7. CPU - TGL

From 39pin(TXC) of IC14
To 2pin(RESET) of IC10

※ when the power is turned on

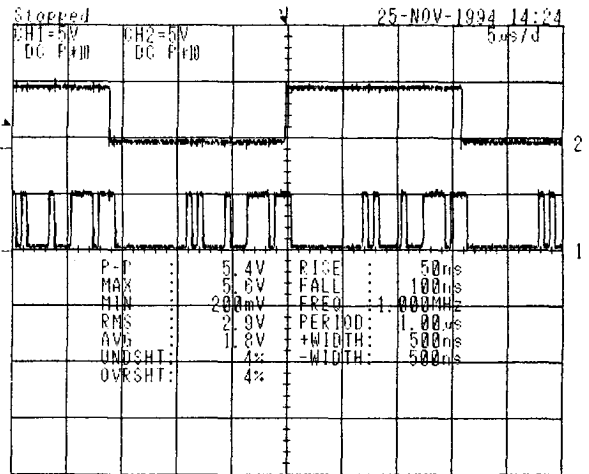


8. TGL - DAC

From 155pin(SDO0) of IC10
To 17pin(DATA-L) of IC2

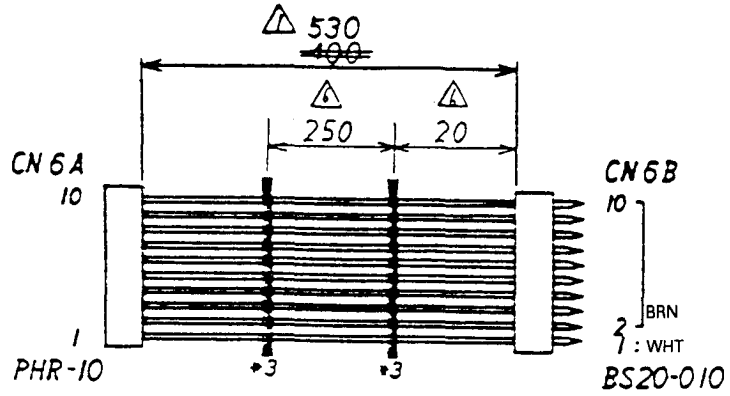
※ when the MDE test waveform is transmitted

Ch1: LRCK
Ch2: DATA

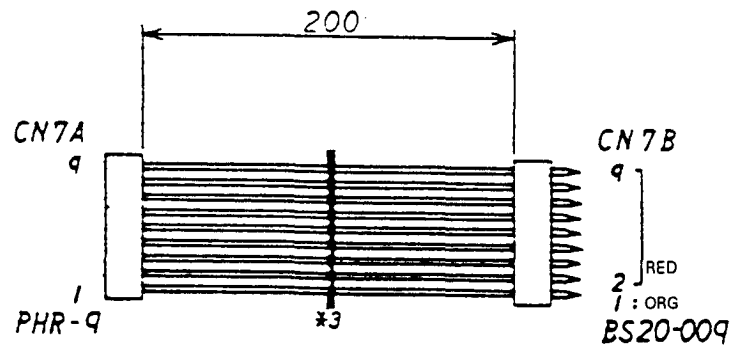


FOR HARNESS

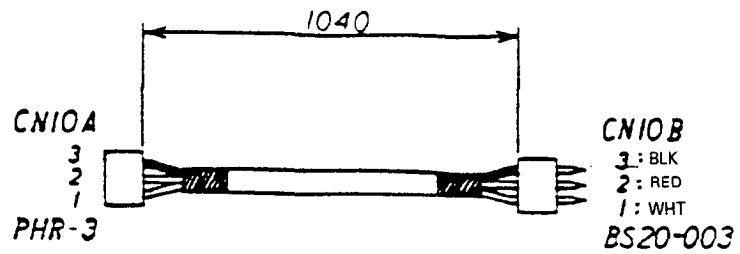
HNS-8021
<PANEL SW>



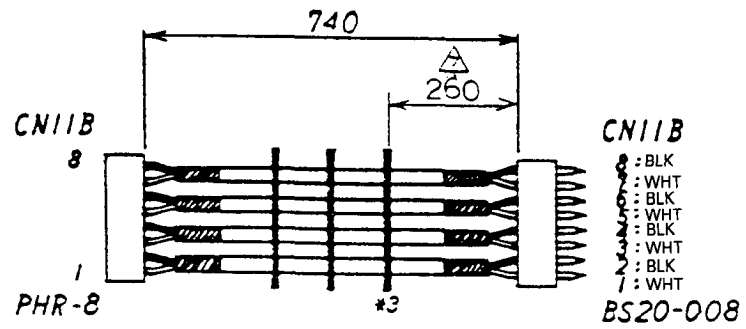
HNS-8022
<PANEL LED>



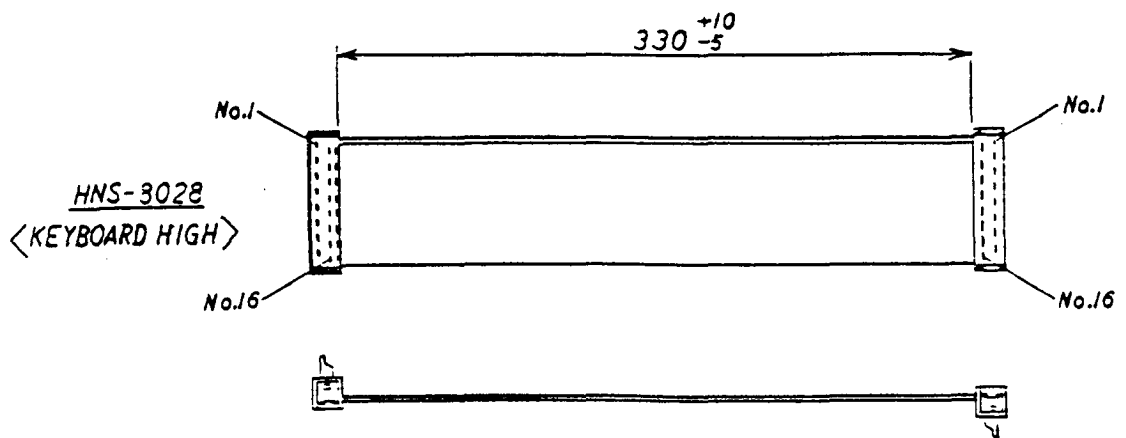
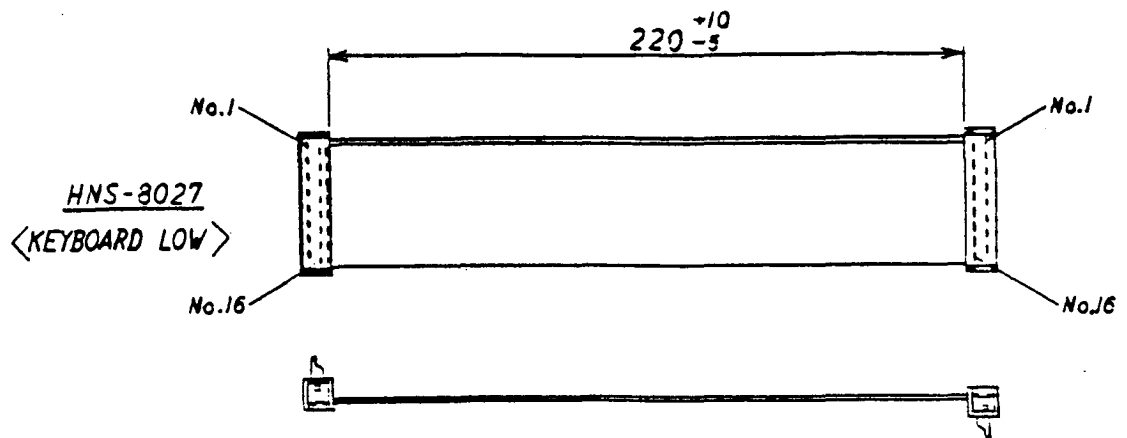
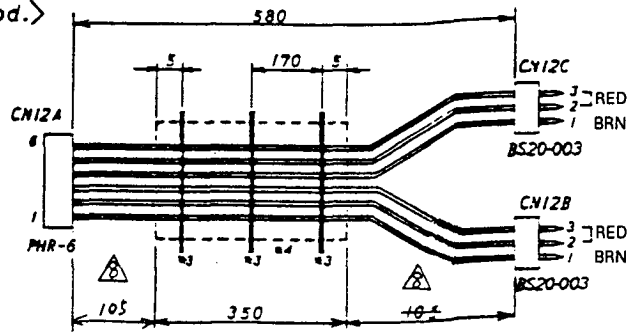
HNS-8023
<Phones>



HNS-8024
<Master VR>



5 HNS-8025
 <Pitch.Mod.>



FOR MULTI SOUNDS

No.	MultiSound	GM1	GM2	typeA	typeB	No.	MultiSound	GM1	GM2	typeA	typeB
000	A.Piano 1	...	011	...	...	040	Accordion	009	...	...	...
001	A.Piano1LP	...	011	...	...	041	AcordionLP	009	...	...	...
002	A.Piano 2	...	010	...	...	042	Harmonica	011	...	...	...
003	E.Piano 1	006	...	...	...	043	G.Guitar	002	008	...	...
004	E.Piano1LP	006	...	...	...	044	G.GuitarLP	002	008	...	...
005	E.Piano 2	001	...	004	...	045	F.Guitar	002	006	...	...
006	E.Piano2LP	001	...	004	...	046	F.GuitarLP	002	006	...	...
007	Soft EP	...	009	...	...	047	F.Guitar V	002	004	...	...
008	Soft EP LP	...	009	...	...	048	A.Gtr Harm	...	...	002	...
009	Hard EP	...	...	009	...	049	E.Guitar 1	001	007	...	...
010	Hard EP LP	...	...	009	...	050	E.Guitr1 V	001	007	...	...
011	PianoPad 1	...	...	002	...	051	E.Guitar 2	...	...	009	...
012	PianoPad 2	...	...	002	...	052	E.Guitar 3	...	005	...	...
013	Clav	005	002	...	...	053	MuteGuitar	002	006	...	...
014	Clav LP	005	002	...	...	054	Funky Gtr	...	...	006	...
015	Harpsicord	008	...	...	...	055	FunkyGtr V	...	...	005	...
016	HarpsicdLP	008	...	...	...	056	E.Gtr Harm	...	...	005	...
017	PercOrgan1	...	...	007	...	057	DistGuitar	019	...	...	...
018	PercOrg1LP	...	...	007	...	058	Dist GtrLP	019	...	...	...
019	PercOrgan2	002	004	...	...	059	DistGuitrV	019	...	...	...
020	PercOrg2LP	002	004	...	...	060	Over Drive	016	...	...	...
021	Organ 1	...	...	006	...	061	OverDrv LP	016	...	...	...
022	Organ 1 LP	...	...	006	...	062	OverDrv F4	008	...	...	...
023	Organ 2	...	...	006	...	063	MuteDstGtr	...	...	021	...
024	Organ 2 LP	...	...	006	...	064	MtDstGtr V	...	...	021	...
025	Organ 3	...	012	...	...	065	PowerChord	...	...	047	...
026	Organ 4	...	...	012	...	066	PowerChd V	...	...	008	...
027	Organ 5	...	...	009	...	067	OverDvChrd	008	...	043	...
028	RotaryOrg1	004	...	...	...	068	Gtr Slide	...	...	002	...
029	RotaryOrg2	...	...	011	...	069	GtrSlide V	...	...	002	...
030	PipeOrgan1	006	...	...	...	070	Sitar 1	002	...	...	...
031	PipeOrg1LP	006	...	...	...	071	Sitar 2	...	...	006	...
032	PipeOrgan2	...	...	007	...	072	Sitar 2 LP	...	...	006	...
033	PipeOrg2LP	...	...	007	...	073	Santur	003	...	...	...
034	PipeOrgan3	009	...	...	...	074	Bouzouki	...	...	005	...
035	PipeOrg3LP	009	...	...	...	075	BouzoukiLP	...	...	005	...
036	Musette	006	...	...	...	076	Banjo	005	...	...	...
037	Musette V	006	...	...	...	077	Shamisen	004	002	...	...
038	Bandneon	...	...	012	...	078	Koto	006	...	...	...
039	BandneonLP	...	...	012	...	079	Uood	...	...	003	...

GM1: MB8316200-15PF-G-402-HT GM2: UPD23C16000BGX-385 typeA: LH537FFS typeB: UPD23C16000BGX-835

No.	MultiSound	GM1	GM2	typeA	typeB	No.	MultiSound	GM1	GM2	typeA	typeB
080	Harp	...	010	...	...	120	Pole	...	...	001	...
081	MandlinTrm	...	...	007	...	121	Pole LP	...	...	001	...
082	A.Bass 1	...	006	...	...	122	Tubular	005	...	...	...
083	A.Bass1 LP	...	006	...	...	123	Split Drum	...	008	004	...
084	A.Bass 2	...	...	006	...	124	Split Bell	...	017	007	...
085	A.Bass2 LP	...	...	006	...	125	Flute	...	007	...	...
086	E.Bass 1	002	004	...	...	126	Pan Flute	003	...	...	...
087	E.Bass1 LP	002	004	...	...	127	PanFluteLP	003	...	...	...
088	E.Bass 2	...	...	008	...	128	Shakuhachi	006	...	...	...
089	E.Bass2 LP	...	...	008	...	129	ShakhachLP	006	...	...	...
090	Pick Bass1	004	002	...	...	130	Bottle	003	...	...	...
091	PicBass1LP	004	002	...	...	131	Recorder	005	...	...	...
092	Pick Bass2	...	...	008	...	132	Ocarina	002	...	...	...
093	Fretless	001	004	...	...	133	Oboe	007	...	...	...
094	FretlessLP	001	004	...	...	134	EnglishHrn	015	...	...	...
095	Slap Bass1	006	001	...	...	135	Eng.HornLP	015	...	...	...
096	Slap Bass2	003	002	...	...	136	BasoonOboe	004	008	...	...
097	SlpBass2LP	003	002	...	...	137	BsonOboeLP	004	008	...	...
098	Slap Bass3	...	...	010	...	138	Clarinet	011	...	...	...
099	SynthBass1	003	002	...	...	139	ClarinetLP	011	...	...	...
100	SynBass1LP	003	002	...	...	140	Bari Sax	011	...	...	...
101	SynthBass2	003	002	...	...	141	Bari.SaxLP	011	...	...	...
102	SynBass2LP	003	002	...	...	142	Tenor Sax	013	...	...	...
103	House Bass	...	...	006	...	143	T.Sax LP	013	...	...	...
104	FM Bass	...	...	004	...	144	Alto Sax	009	...	...	...
105	FM Bass LP	...	...	004	...	145	A.Sax LP	009	...	...	...
106	Kalimba	...	002	...	...	146	SopranoSax	012	...	...	...
107	Music Box	001	001	...	...	147	S.Sax LP	012	...	...	...
108	MusicBoxLP	001	001	...	...	148	Tuba	001	006	...	...
109	Log Drum	...	...	005	...	149	Tuba LP	001	006	...	...
110	Marimba	...	005	...	...	150	Horn	001	012	...	...
111	Xylophone	...	007	...	...	151	FlugelHorn	...	...	007	...
112	Vibe	...	005	...	...	152	Trombone 1	003	005	...	...
113	Celesta	...	002	...	...	153	Trombone 2	001	008	...	...
114	Glocken	...	005	...	...	154	Trumpet	006	003	...	...
115	BrightBell	...	003	...	...	155	Trumpet LP	006	003	...	...
116	B.Bell LP	...	003	...	...	156	Mute TP	009	...	...	...
117	Metal Bell	...	002	...	...	157	Mute TP LP	009	...	...	...
118	M.Bell LP	...	002	...	...	158	Brass 1	...	...	009	...
119	Gamelan	...	...	004	...	159	Brass 1 LP	...	...	009	...

GM1: MB8316200-15PF-G-402-HT

GM2: UPD23C16000BGX-385

typeA: LH537FFS

typeB: UPD23C16000BGX-835

No.	MultiSound	GM1	GM2	typeA	typeB	No.	MultiSound	GM1	GM2	typeA	typeB
160	Brass 2	004	...	...	...	200	Clicker	003	...	...	...
161	Brass 2 LP	004	...	...	...	201	Clicker NT	001	...	...	...
162	StringEns.	009	004	005	...	202	Crickets 1	001	...	...	...
163	StrEns. V1	009	004	005	...	203	Crickts1NT	001	...	...	...
164	StrEns. V2	009	004	005	...	204	Crickets 2	...	...	001	...
165	StrEns. V3	009	004	004	...	205	Crickts2NT	...	...	001	...
166	AnaStrings	005	...	...	...	206	Magic Bell	...	...	001	...
167	PWM	005	...	...	...	207	Sporing	...	001	...	...
168	Violin	010	...	...	...	208	Rattle	...	002	...	...
169	Cello	006	...	...	...	209	Kava 1	...	...	001	...
170	Cello LP	006	...	...	...	210	Kava 2	...	...	001	...
171	Pizzicato	...	007	...	...	211	Fever 1	001	...	...	...
172	Voice	002	...	...	...	212	Fever 2	001	...	...	...
173	Choir	006	...	...	...	213	Zappers 1	...	...	001	...
174	Soft Choir	001	...	...	...	214	Zappers 2	...	...	001	...
175	Air Vox	004	...	...	...	215	Bugs	...	014	...	...
176	Doo Voice	007	...	...	...	216	Surfy	001	...	...	...
177	DooVoiceLP	007	...	...	...	217	SleighBell	002	...	...	...
178	Syn Vox	002	...	...	...	218	Elec Beat	...	...	002	...
179	Syn Vox LP	002	...	...	...	219	Idling	...	003	...	...
180	White Pad	002	...	...	...	220	EthnicBeat	...	...	013	...
181	Ether Bell	004	...	...	...	221	Taps	001	001	004	...
182	E.Bell LP	004	...	...	...	222	Tap 1	001	...	002	...
183	Mega Pad	002	...	...	...	223	Tap 2	001	...	002	...
184	Spectrum 1	...	...	003	...	224	Tap 3	001	...	002	...
185	Spectrum 2	...	...	002	...	225	Tap 4	001	001	001	...
186	Stadium	002	...	...	...	226	Tap 5	001	001	...	...
187	Stadium NT	002	...	...	...	227	Orch Hit	001	...	...	...
188	BrushNoise	013	...	...	...	228	SnareRI/Ht	...	...	002	...
189	BruNoiseNT	001	...	...	...	229	Syn Snare	001	...	...	...
190	Steel Drum	004	...	...	...	230	Rev Snare	...	...	013	...
191	SteelDrmLP	004	...	...	...	231	PowerSnare	...	001	...	...
192	BrushSwirl	013	...	...	...	232	Orch Perc	002	002	001	...
193	Belltree	001	...	...	...	233	Crash Cym	013	...	...	...
194	BelltreeNT	001	...	...	...	234	CrashCymLP	013	...	...	...
195	BeltreV NT	001	...	...	...	235	CrashLP NT	001	...	...	...
196	Tri Roll	004	...	...	...	236	China Cym	002	...	...	...
197	TriRoll NT	001	...	...	...	237	Splash Cym	002	...	...	...
198	Telephon	002	...	...	...	238	Orch Crash	...	...	013	...
199	TelephonNT	001	...	...	...	239	Tite HH	001	...	...	...

GM1: MB8316200-15PF-G-402-HT

GM2: UPD23C16000BGX-385

typeA: LH537FFS

typeB: UPD23C16000BGX-835

No.	MultiSound	GM1	GM2	typeA	typeB	No.	MultiSound	GM1	GM2	typeA	typeB
240	Tite HH NT	001	...	...	...	280	Gt Scratch	001	...	...	...
241	Bell Ride	...	002	...	...	281	Side Stick	...	001	...	...
242	Ping Ride	...	002	...	...	282	SideStikNT	...	001	...	...
243	Timpani	...	001	...	...	283	TimbleSide	...	...	001	...
244	Timpani LP	...	001	...	...	284	TimbISidNT	...	...	001	...
245	Cabasa	013	...	...	...	285	Syn Rim	...	001	...	...
246	Cabasa NT	001	...	...	...	286	Syn Rim NT	...	001	...	...
247	Agogo	...	001	...	...	287	Open HH	...	001	...	...
248	Cow Bell	...	001	...	...	288	OpenSyn HH	001	...	...	...
249	Low Bongo	...	001	...	...	289	CloseSynHH	...	001	...	...
250	Claves	...	001	...	...	290	Sagat	...	...	001	...
251	Timbale	...	001	...	...	291	Sagat NT	...	...	001	...
252	WoodBlock1	...	001	...	...	292	Sagatty	...	...	001	...
253	WoodBlock2	...	001	...	...	293	Sagatty NT	...	...	001	...
254	WoodBlock3	...	001	...	...	294	JingleBell	002	...	...	...
255	Taiko Hit	...	001	...	...	295	Taiko	...	002	...	...
256	Syn Claves	...	001	...	...	296	Slap Bongo	...	...	001	...
257	Melo Tom	...	001	...	...	297	Open Conga	...	001	...	...
258	ProccesTom	001	...	...	...	298	Slap Conga	...	...	001	...
259	Syn Tom 1	...	001	...	...	299	Palm Conga	...	...	001	...
260	Syn Tom 2	...	002	...	...	300	Mute Conga	...	001	...	...
261	VocalSnare	...	...	002	...	301	Tabla 1	...	...	001	...
262	Zap 1	...	...	001	...	302	Tabla 2	...	...	001	...
263	Zap 2	...	...	001	...	303	Maracas	...	001	...	...
264	Fret Zap 1	001	...	...	...	304	SynMaracas	...	001	...	...
265	Fret Zap 2	001	...	...	...	305	SynMarcsNT	...	001	...	...
266	Vibra Slap	013	...	...	...	306	MuteTriang	001	...	...	...
267	Indust	...	...	001	...	307	OpenTriang	...	001	...	...
268	Thing	...	...	002	...	308	Guiro	...	002	...	...
269	Thing NT	...	...	001	...	309	Guiro LP	...	002	...	...
270	FingerSnap	...	...	001	...	310	Scratch Hi	001	...	...	...
271	FingSnapNT	...	...	001	...	311	ScratchHiNT	001	...	...	...
272	Tambourine	...	001	...	...	312	Scratch Lo	001	...	...	...
273	Hand Clap	...	001	...	...	313	ScratchLoNT	001	...	...	...
274	HandClapNT	...	001	...	...	314	ScratchDbl	...	...	001	...
275	Gun Shot	001	...	...	...	315	ScratchDblNT	...	...	001	...
276	Castanet	...	001	...	...	316	Mini 1a	...	001	009	...
277	CastanetNT	...	001	...	...	317	Digital 1	...	002	008	...
278	Snap	...	...	001	...	318	VS 102	...	...	010	...
279	Snap NT	...	...	001	...	319	VS 48	...	001	009	...

GM1: MB8316200-15PF-G-402-HT GM2: UPD23C16000BGX-385 typeA: LH537FFS typeB: UPD23C16000BGX-835

No.	MultiSound	GM1	GM2	typeA	typeB
320	VS 52	...	001	009	...
321	VS 58	009	001	...	...
322	VS 71	...	001	009	...
323	VS 72	...	001	009	...
324	VS 88	...	001	009	...
325	VS 89	...	001	009	...
326	13-35	...	001	009	...
327	DWGSOrgan1	...	001	009	...
328	DWGSOrgan2	...	001	009	...
329	DWGS E.P.	...	001	009	...
330	Saw	009	001	...	...
331	Square	009	001	...	...
332	Ramp	...	001	009	...
333	Pulse 25%	...	001	009	...
334	Pulse 8%	...	001	009	...
335	Pulse 4%	...	001	009	...
336	Syn Sine	...	010	...	...
337	Sine	001	009	...	...
338	DJ Kit 1	009	001	009	...
339	DJ Kit 2	010	010	016	...
340	A.Piano 3	...	...	...	088

GM1: MB8316200-15PF-G-402-HT GM2: UPD23C16000BGX-385
typeA: LH537FFS typeB: UPD23C16000BGX-835

FOR DRUM SOUNDS

No.	DrumSound	GM1	GM2	typeA	typeB	No.	DrumSound	GM1	GM2	typeA	typeB
000	Fat Kick	...	...	001	...	041	Crash LP	001	...	...	...
001	Rock Kick	...	...	001	...	042	China Cym	001	...	...	...
002	Ambi.Kick	...	...	001	...	043	China LP	001	...	...	...
003	Crisp Kick	...	...	001	...	044	Splash Cym	001	...	...	...
004	Punch Kick	...	...	001	...	045	Splash LP	001	...	...	...
005	Real Kick	...	001	...	...	046	Orch Crash	...	...	001	...
006	Dance Kick	...	...	001	...	047	OrchCym LP	...	...	001	...
007	Gated Kick	...	...	001	...	048	Tite HH	001	...	...	...
008	ProcesKick	...	001	...	...	049	Open HH	...	001	...	...
009	Metal Kick	...	001	...	...	050	Pedal HH	001	...	...	...
010	Syn Kick 1	...	001	...	...	051	CloseSynHH	...	001	...	...
011	Syn Kick 2	...	...	001	...	052	Open SynHH	001	...	...	...
012	Syn Kick 3	...	...	001	...	053	Sagat	...	...	001	...
013	Orch B.Drm	...	...	001	...	054	Ride Edge	...	001	...	...
014	Snare 1	...	...	001	...	055	Ride Cup	...	001	...	...
015	Snare 2	...	...	001	...	056	Ride Cym 1	...	...	001	...
016	Snare 3	...	...	001	...	057	Ride Cym 2	...	...	001	...
017	Snare 4	...	...	001	...	058	Tom Hi	...	001	...	...
018	PicloSnare	...	...	001	...	059	Tom Lo	...	001	...	...
019	Soft Snare	...	...	001	...	060	ProcessTom	001	...	...	...
020	LightSnare	...	001	...	...	061	SynTom1 Hi	...	001	...	...
021	TightSnare	...	...	001	...	062	SynTom1 Lo	...	001	...	...
022	Ambi.Snare	...	...	001	...	063	Syn Tom 2	...	001	...	...
023	Rev Snare	...	...	001	...	064	Brush Tom	...	001	...	...
024	RollSnare1	...	...	001	...	065	Agogo	...	001	...	...
025	RollSnare2	...	...	001	...	066	Lo Bongo	...	001	...	...
026	Rock Snare	...	001	...	...	067	Hi Bongo	...	001	...	...
027	GatedSnare	...	001	...	...	068	Slap Bongo	...	...	001	...
028	PowerSnare	...	001	...	...	069	Claves	...	001	...	...
029	Syn Snare1	...	001	...	...	070	Syn Claves	...	001	...	...
030	Syn Snare2	001	...	...	...	071	Open Conga	...	001	...	...
031	Gun Shot	001	...	...	...	072	Slap Conga	...	...	001	...
032	Brush Slap	...	001	...	...	073	Palm Conga	...	...	001	...
033	BrushSwish	001	...	...	...	074	Mute Conga	...	001	...	...
034	BrushSwirl	001	...	...	...	075	Baya 1	...	...	001	...
035	Brush Tap	...	001	...	...	076	Baya 2	...	...	001	...
036	Side Stick	...	001	...	...	077	Tabla 1	...	...	001	...
037	Syn Rim	...	001	...	...	078	Tabla 2	...	...	001	...
038	VocalSnr 1	...	...	001	...	079	Tabla 3	...	...	001	...
039	VocalSnr 2	...	...	001	...	080	Maracas	...	001	...	...
040	Crash Cym	001	...	...	...	081	Cabasa	001	...	...	...

GM1: MB8316200-15PF-G-402-HT

GM2: UPD23C16000BGX-385

typeA: LH537FFS

typeB: UPD23C16000BGX-835

No.	DrumSound	GM1	GM2	typeA	typeB	No.	DrumSound	GM1	GM2	typeA	typeB
082	SynMaracas	...	001	...	...	123	Log Drum 5	...	...	001	...
083	MuteTriang	001	...	...	...	124	Snap	...	...	001	...
084	OpenTriang	...	001	...	...	125	BrightBell	...	001	...	...
085	Tambourine	...	001	...	...	126	Metal Bell	...	001	...	...
086	Cowbell	...	001	...	...	127	Gamelan 1	...	...	...	...
087	SynCowbell	001	...	...	...	128	Gamelan 2	...	...	001	...
088	R-Timbal	...	...	001	...	129	Celeste	...	001	...	...
089	Hi Timbal	...	001	...	...	130	Glocken	...	001	...	...
090	Lo Timbal	...	001	...	...	131	Vibe 1	...	001	...	...
091	WoodBlock1	...	001	...	...	132	Vibe 2	...	001	...	...
092	WoodBlock2	...	001	...	...	133	Vibe 3	...	001	...	...
093	WoodBlock3	...	001	...	...	134	Vibe 4	...	001	...	...
094	Hand Claps	...	001	...	...	135	Pole	...	...	001	...
095	Syn Claps	...	...	001	...	136	TubulBell1	001	...	...	...
096	Zap 1	...	...	001	...	137	TubulBell2	001	...	...	...
097	Zap 2	...	...	001	...	138	TubulBell3	001	...	...	...
098	Scratch Hi	001	...	...	...	139	Gt Scratch	001	...	...	...
099	Scratch Lo	001	...	...	...	140	Chic 1	...	...	001	...
100	ScratchDbl	...	...	001	...	141	Chic 2	...	...	001	...
101	Thing	...	...	001	...	142	Spectrum 1	...	...	001	...
102	Mute Cuica	...	001	...	...	143	Spectrum 2	...	...	001	...
103	Open Cuica	...	001	...	...	144	Stadium	001	...	...	...
104	Vibraslap	001	...	...	...	145	BrushNoise	001	...	...	...
105	Guiro S	...	001	...	...	146	Gt Slide	...	...	001	...
106	Guiro L	...	001	...	...	147	Bell Tree	001	...	...	...
107	Castanet	...	001	...	...	148	Tri Roll	001	...	...	...
108	FingerSnap	...	...	001	...	149	JingleBell	001	...	...	...
109	Timbales	...	...	001	...	150	Whistle S	001	...	...	...
110	Kalimba 1	...	001	...	...	151	Whistle L	001	...	...	...
111	Kalimba 2	...	001	...	...	152	Timpani	...	001	...	...
112	Marimba 1	...	001	...	...	153	Taiko Hi	...	001	...	...
113	Marimba 2	...	001	...	...	154	Taiko Lo	...	001	...	...
114	Marimba 3	...	001	...	...	155	Music Box1	...	001	...	...
115	Marimba 4	...	001	...	...	156	Music Box2	001	...	...	...
116	Xylofon 1	...	001	...	...	157	Clicker 1	001	...	...	...
117	Xylofon 2	...	001	...	...	158	Clicker 2	001	...	...	...
118	Xylofon 3	...	001	...	...	159	Clicker 3	001	...	...	...
119	Log Drum 1	...	...	001	...	160	Crickets	001	...	...	...
120	Log Drum 2	...	...	001	...	161	Orch Hit	001	...	...	...
121	Log Drum 3	...	...	001	...	162	Metronome1	...	001	...	...
122	Log Drum 4	...	...	001	...	163	Metronome2	...	001	...	...

GM1: MB8316200-15PF-G-402-HT

GM2: UPD23C16000BGX-385

typeA: LH537FFS

typeB: UPD23C16000BGX-835

10. PARTS LIST

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	QTY	MARK
001094500	P.C.BOARD ASSY KLM-945/946	M.PART	PITCH/MOD	1	NEW
001094700	P.C.BOARD ASSY KLM-947/8/9	M.PART	VR/PH/PANEL	1	NEW
001095000	P.C.BOARD ASSY KLM-950	M.PART	MAIN	1	NEW

312009500	LED HLMP-D101 (YHP)	949		5	

313003100	LCD DMC16205NY-LY W/HARNESS	M.PART		1	NEW

320001328	IC UPD70433GD-5BB	950	CPU	1	
320006025	IC MSM51C464A-7/8ZS	950	D_RAM	1	
320006033	IC MSM534000B-23RS	950	MASK ROM	1	
320012141	IC MBCS35104-001PF-G-BND	950	TGL	1	
320040004	IC MX23C1610MC-15 KORG GM1	950	WAVE ROM	1	NEW
320040005	IC MX23C1610MC-15 KORG GM2	950	WAVE ROM	1	NEW
320040006	IC MX23C1610MC-15 KORG ROMA	950	WAVE ROM	1	NEW
324001006	IC UPD74HCU04GS-E2 (SOP)	950	HC_MOS	1	
324001015	IC UPC4570G2-E2 (SOP)	950	OP_AMP	3	
324001037	IC UPD43256AGU-10/12L-E2	950	S_RAM	2	
324001069	IC UPD74HC4075GS-E2	950	HC-MOS	1	NEW
324004007	IC HD74HC573FPER	950	HC_MOS	2	
324004011	IC HD74HC04FPER	950	HC_MOS	1	
324004014	IC HD74HC10FPER	950	HC_MOS	1	NEW
324004024	IC HD74HC74FPER	950	HC_MOS	1	
324004050	IC HD74HC138FPER	950	HC_MOS	2	
324004168	IC HD74HC4053FPER	950	HC_MOS	1	
324004176	IC HD74HC05FPER	950	HC_MOS	1	
324005003	IC LC321664AJ-80-TRM	950	D_RAM	1	
324009004	IC NJM78L05UA-TE2	950	REGULATOR	1	
324011002	IC M5223FP-600C (8P SOP)	950	OP_AMP	1	
324011004	IC M5216FP-600C-TP3	950	OP_AMP	1	
324011013	IC M62021FP-600C	950	RESET	1	
324011021	IC M5M34050FP-42A	950	TRANSCEIVER	1	
324036001	IC PCM69AU-T1	950	DAC	1	

333000400	DC-DC CONVERTOR HLD050R6	950		1	

334000600	PHOTO COUPLER PC-410K-TP	950		1	

335400080	CRYSTAL OSC SX-1 32.000MHZ	950		1	
335400115	CRYSTAL OSC SX-1 28.000MHZ	950		1	

360024100	VR RK 163111 10KB (SPECIAL)	945		1	NEW
		946		1	
365007800	SLIDE VR RS30111AC00NB 10KB	949		1	
365008000	SLIDE VR RS30112AC00JB 10KBX2	947		1	

375010500	TOUCH SW EVQ-PAC09K-A	949		24	
375010800	PUSH SW SPUL19303A	950		1	

405009800	AC ADAPTOR KA111 100JP	M.PART	100JP	1	NEW
405009900	AC ADAPTOR KA113 117US/CN	M.PART	117US	1	NEW
		M.PART	117CN	1	

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	QTY	MARK
405010200	AC ADAPTOR KA115 240AU	M.PART	240AU	1	NEW
405010300	AC ADAPTOR KA116 240UK	M.PART	240UK	1	NEW
405010400	AC ADAPTOR KA112 117EX	M.PART	117EX	1	NEW

420005100	KEYBOARD ASSY TP/7BA+PCB 61	M.PART		1	NEW

450003000	MINI PHONE JACK LGY-6502-0600	948		1	NEW
454004300	PHONE JACK YKB21-5012	950		2	
454004400	PHONE JACK YKB21-5010	950		1	
454006200	JACK HEC-0470-01-630	950		1	
454009300	MINI DIN CONNECTOR D8-177J-201	950		1	
454009900	PHONE JACK YKB21-5074G	950		1	NEW

480010380	DIN JACK YKF51-5041 (3P)	950		1	

520002600	LITHIUM BATTERY CR2032-H04	M.PART		1	

620018200	POWER SW KNOB KOC-E40224	M.PART		1	
620018901	ROUND KNOB NO.1 GS KOC-H40044	M.PART		5	
620019001	ROUND KNOB NO2. GS KOC-H40044	M.PART		2	
620026800	X-410 SVR KNOB (GRAY) E40239-3	M.PART		2	NEW

630020600	X-410 LCD WINDOW KOC-E30192	M.PART		1	NEW

641037300	X-145/146 METAL FITTING OF PCB	950		2	
641040900	X-181 GND PLATE(C) KOC-C40920	M.PART		1	
641041165	X-410 WHEEL METAL FITTING	M.PART		1	NEW
641041166	X-410 EMI COVER KOC-C10158	M.PART		1	NEW
641041167	X-410 LOWER CASE KOC-C20286	M.PART		1	NEW

644003000	X-507 GND SPRING	M.PART		2	
644007300	X-410 WHEEL SPRING C40689-2	M.PART		1	NEW

646043000	X-150 CORD HOOK	M.PART		1	
646049400	X-410 UPPER CASE KOC-E10099	M.PART		1	NEW
646050700	X-410 WHEEL KOC-E30094-5	M.PART		2	NEW

MEMO

VAROITUS

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

ADVARSELI

Lithiumbatteri – Eksplosionsfare ved fejlagtig handling.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandør ren.

ADVERSEL

Lithiumbatteri – Eksplosjonsfare.
Ved utskifting benyttes kun batteri som
• anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandør ren.

VARNING

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

CAUTION

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

KORG

KORG INC. 15-12, Shimotakaido 1-chome, Suginami-ku, Tokyo 168
