

SERVICE MANUAL

X2

MUSIC WORKSTATION

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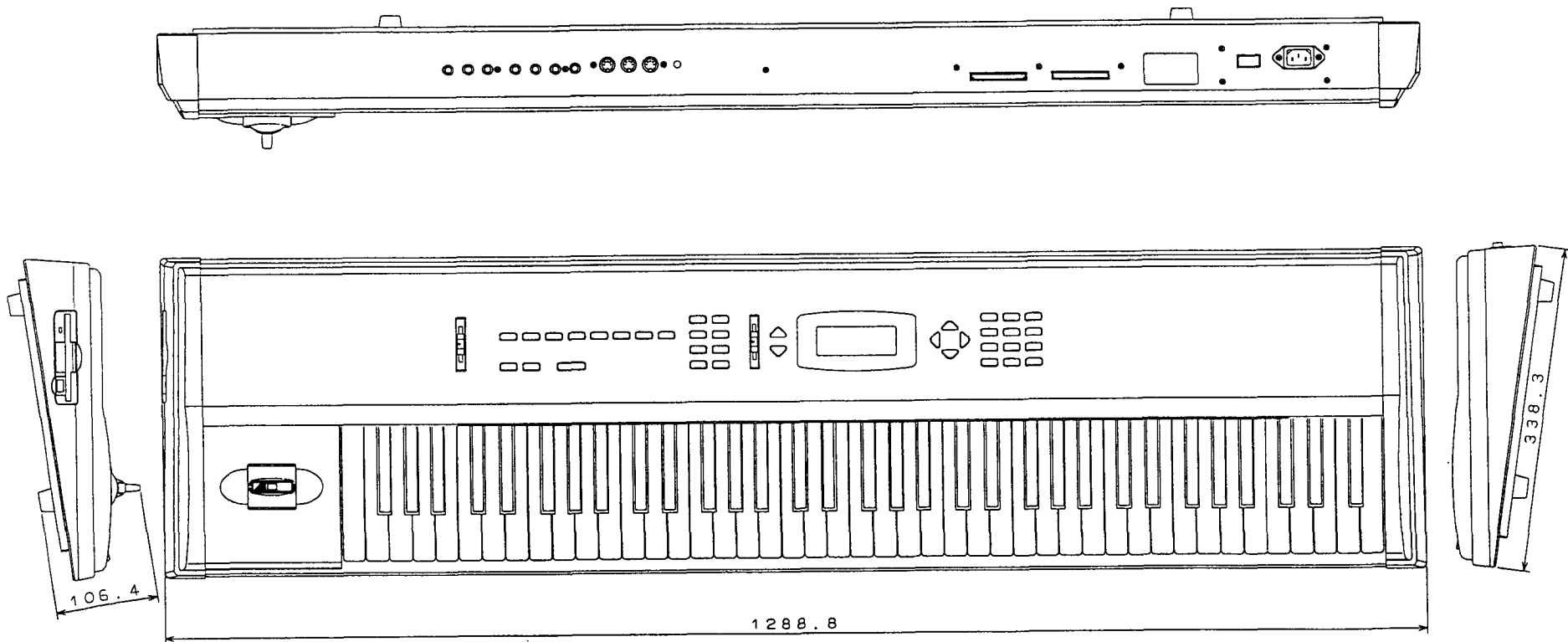
KORG

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	: 76 key with after touch sensor N.V TP/9SYNTH 76
Waveform memory	: 16M bit Mask ROM x 4 341 MULTI sounds & 164 Drum sounds
Quantization	: 16 bit, 12 bit & 8 bit
Sampling frequency	: 31.25kHz
Programs	: RAM ... 200 programs ROM ... 136 programs (for General MIDI) Card .. 200 programs
Combinations	: RAM ... 200 combinations Card .. 200 combinations
Effects	: 47 multi digital effects
Sequencer	: 10 songs 100 patterns 32,000 notes(Internal) 7,000 notes(Card) 16 tracks & 16 timbers / 1 song
Card slots	: PROG/SEQ data card slot & PCM data card slot
Pedals	: Damper pedal & Assignable pedal
Outputs	: 1/L/MONO, 2/R, 3, 4 & PHONES
MIDI	: IN, OUT & THRU
Indicators	: 16 x 2 custom LCD indicator with EL backlight
Floppy disk drive	: 3.5 inch / 2DD disk drive(720k byte for MS-DOS format)
Dimensions	: 1,288.8(W) x 338.3(D) x 106.4(H)mm
Weight	: 13.9kg
Power consumption	: 10W

※ Appearance and specifications are subject to change without notice.

2. FULL VIEW



W=1288.8
D= 338.3
H= 106.4
Weight=13.9kg

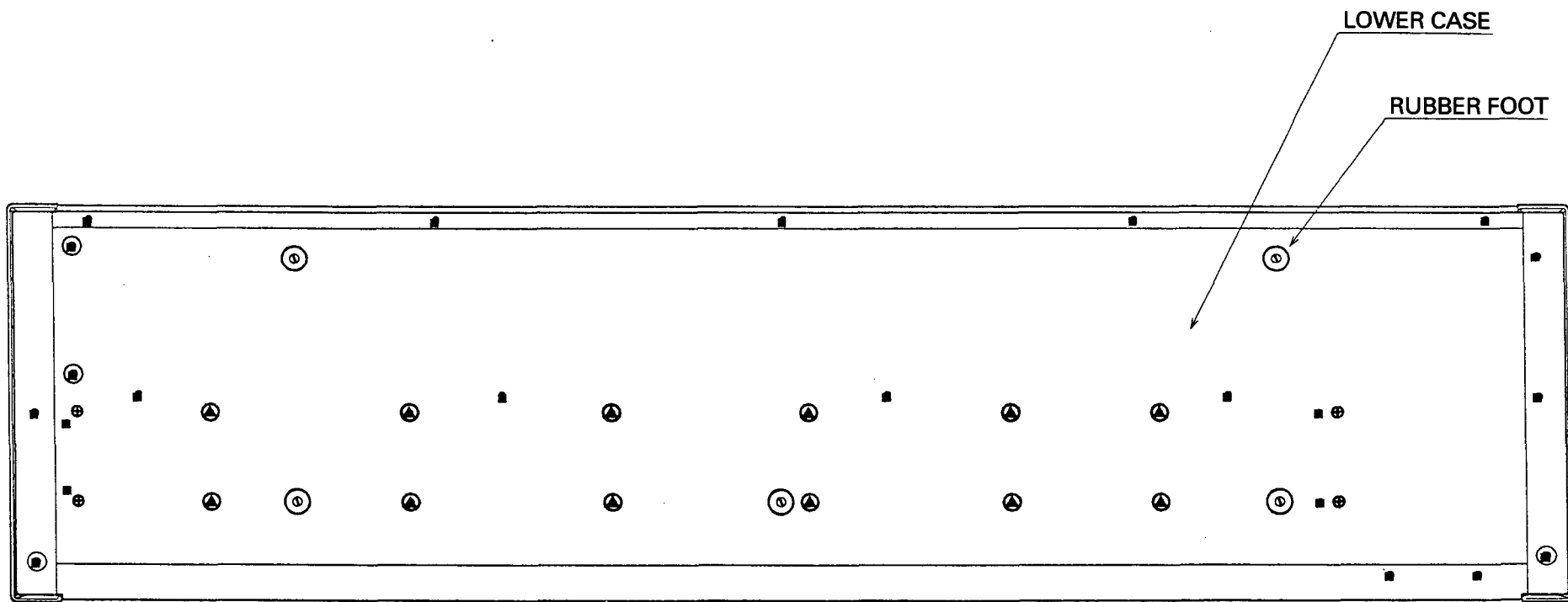
3. DISASSEMBLY

1. Remove the Lower Case

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

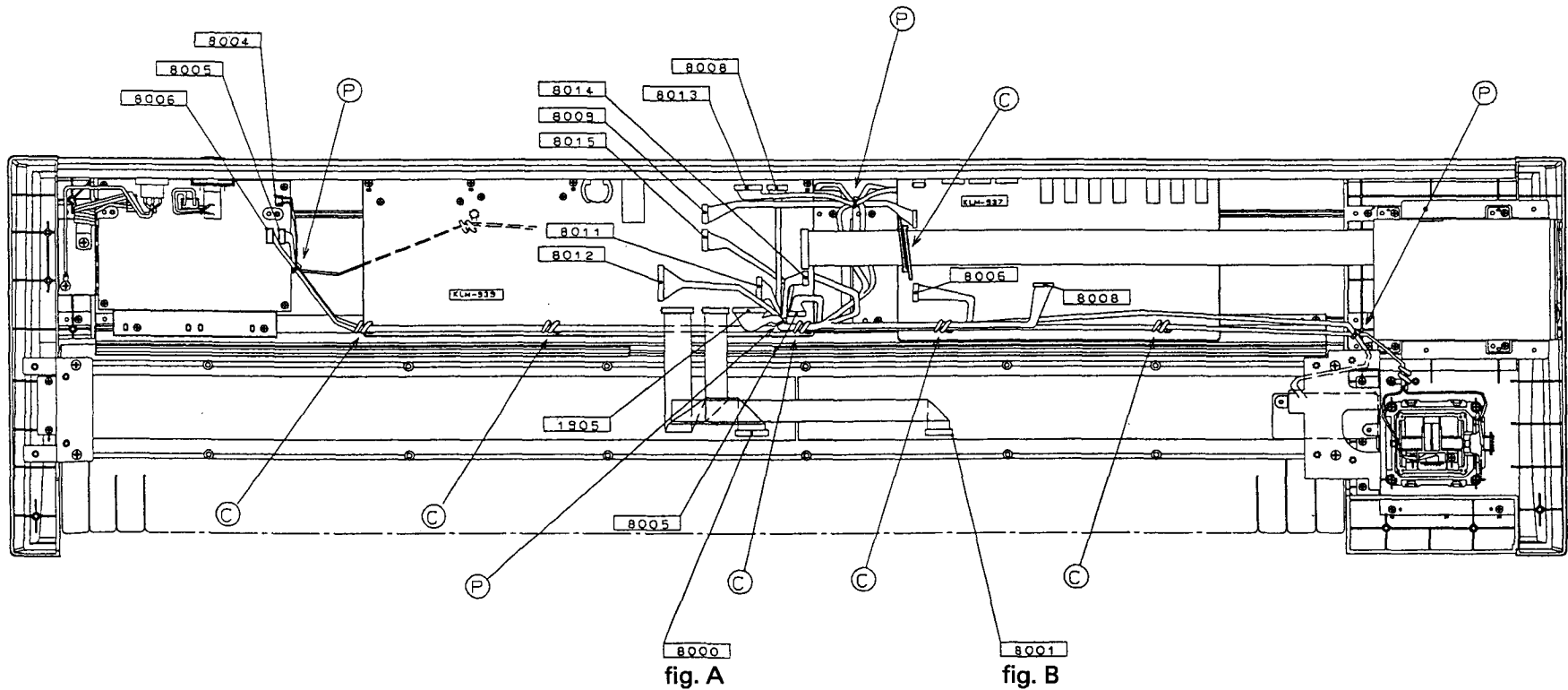
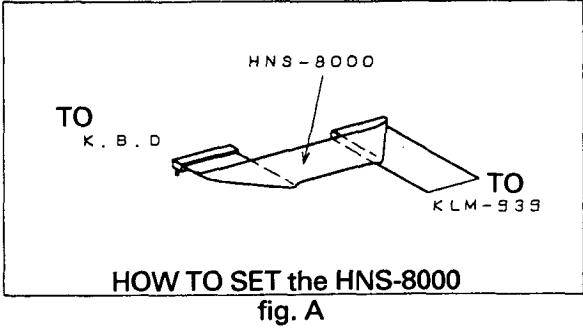
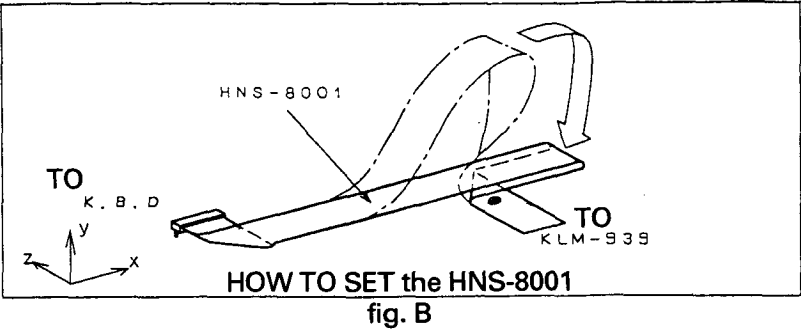
[BT B BZMC 4×8] ×12 (mark: ▲)

[BT B BZMC 4×10] ×22 (mark: ■)



HARNESS CONNECTIONS

CN NO	HNS	NOTE	CN NO	HNS	NOTE
1*	8000	KBD	10*	8008	JACK1
2*	8001	KBD	11*	8009	JACK2
			12*	1905	PANEL R
4*	1897	INLET	13*	8011	PANEL L
5*	1898	POWER SW	14*	8012	LCD1
6*	8004	LCD2	15*	8013	PANEL L
7*	8005	POWER	16*	8014	AFTER
8*	8006	POWER	17*	8015	JS
9*	SUMJ	FDD			



2. Remove the Main board(KLM-939)

- 1) Unplug all the harnesses on the KLM-939 board .
- 2) Remove 3pcs. of the screws on the side of the keyboard.
[BT B ZMC 3×8] ×3 (mark: ●)
- 3) Remove 4pcs. of the screws on the back side
and remove the KLM-939 board.
[BT B BZMC 3×8] ×4 (mark: ▲)

3. Remove the Analog board(KLM-937)

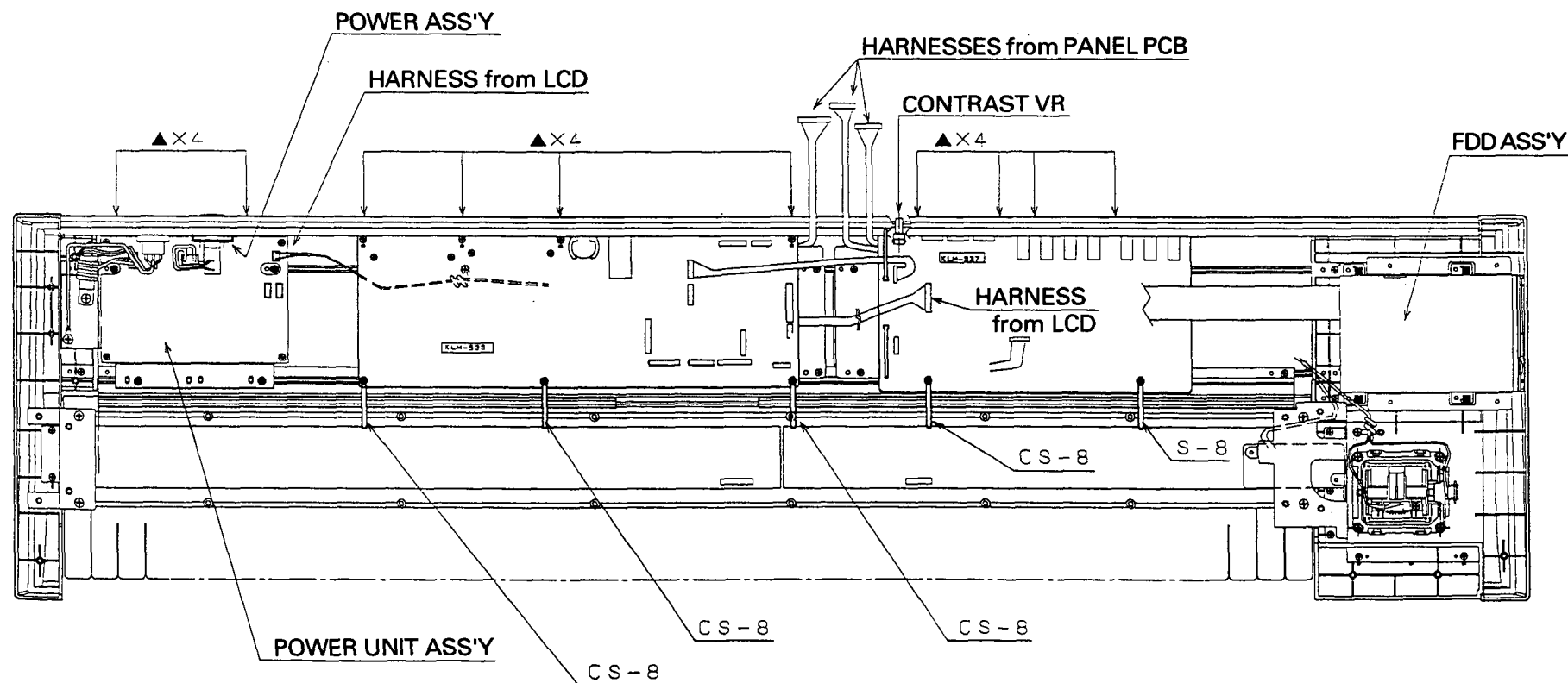
- 1) Unplug all the harnesses on the KLM-937 board.
- 2) Remove 2pcs. of the screws on the side of the keyboard.
[BT B ZMC 3×8] ×2 (mark: ●)
- 3) Remove 4pcs. of the screws on the back side
and remove the KLM-937 board.
[BT B BZMC 3×8] ×4 (mark: ▲)

4. Remove the Power Supply Unit Assembly

- 1) Unplug 3pcs. of the harnesses on the power supply board.
- 2) Remove 4pcs. of the screws on the power supply unit chassis.
[BT B ZMC 3×8] ×4 (mark: ●)
- 3) Remove 4pcs. of the screws on the back side
and remove the power supply unit assembly.
[BT B BZMC 3×8] ×4 (mark: ▲)

5. Remove the Floppy Disk Drive Assembly

- 1) Unplug the SUMI harness from the floppy disk drive.
- 2) Remove 4pcs. of the screws on the FDD angle
and remove the floppy disk drive.
[BT B ZMC 3×10] ×4 (mark: ■)



6. Remove the LCD Unit

- 1) Remove 8pcs. of the screws on the KLM-1648 board and remove the shield sheet.
[BT B ZMC 3×8] ×3 (mark: ●)
[BT B ZMC 3×10] ×5 (mark: ■)
- 2) Remove a screw on the KLM-1648 board (mark: LCD GND) and remove the ground harness of the LCD.
[BT B ZMC 3×8] ×1 (mark: ●)
- 3) Remove 3pcs. of the screws on the LCD and remove the LCD unit.
[BT B ZMC 3×8] ×3 (mark: ●)

7. Remove the Panel Boards(KLM-1647/16478)

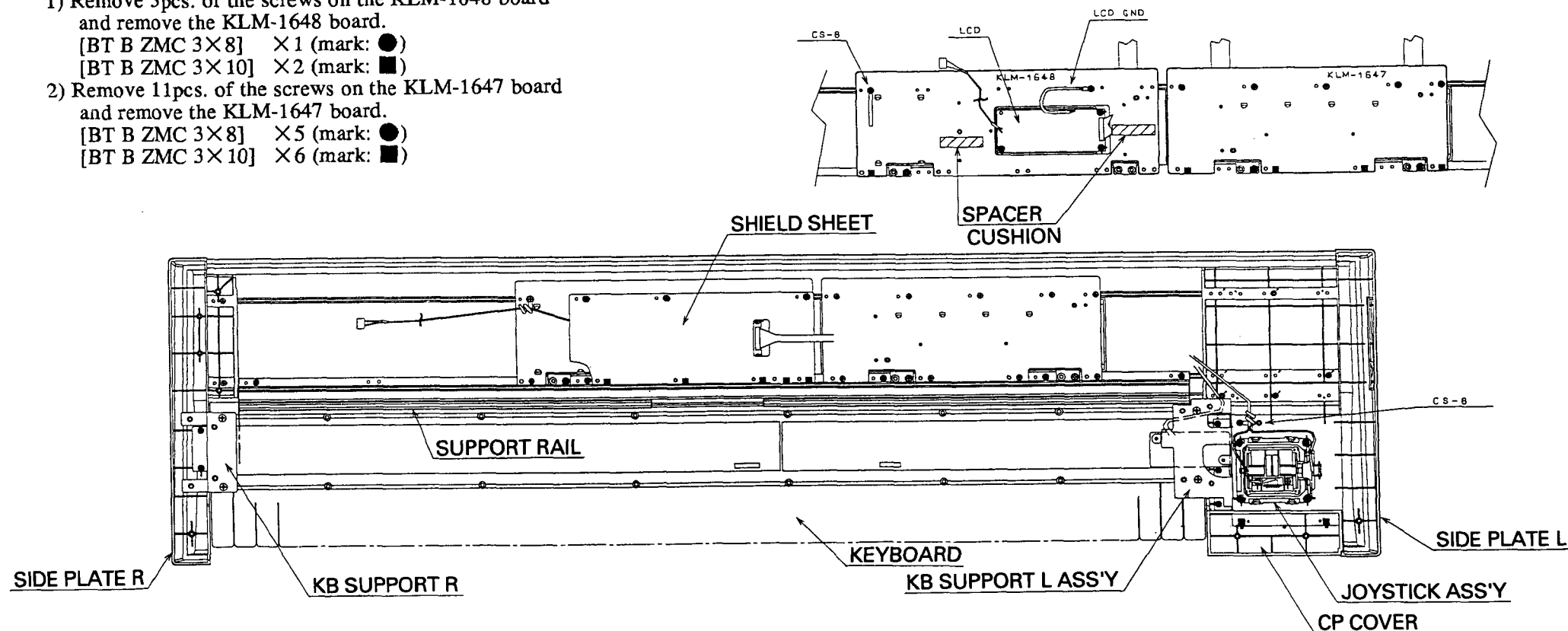
- 1) Remove 3pcs. of the screws on the KLM-1648 board and remove the KLM-1648 board.
[BT B ZMC 3×8] ×1 (mark: ●)
[BT B ZMC 3×10] ×2 (mark: ■)
- 2) Remove 11pcs. of the screws on the KLM-1647 board and remove the KLM-1647 board.
[BT B ZMC 3×8] ×5 (mark: ●)
[BT B ZMC 3×10] ×6 (mark: ■)

8. Remove the Keyboard

- 1) Remove 5pcs. of the screws on the support rail.
[BT B ZMC 3×8] ×5 (mark: ●)
- 2) Remove 5pcs. of the screws on the keyboard and remove the keyboard.
[BT B ZMC 3×8] ×5 (mark: ●)

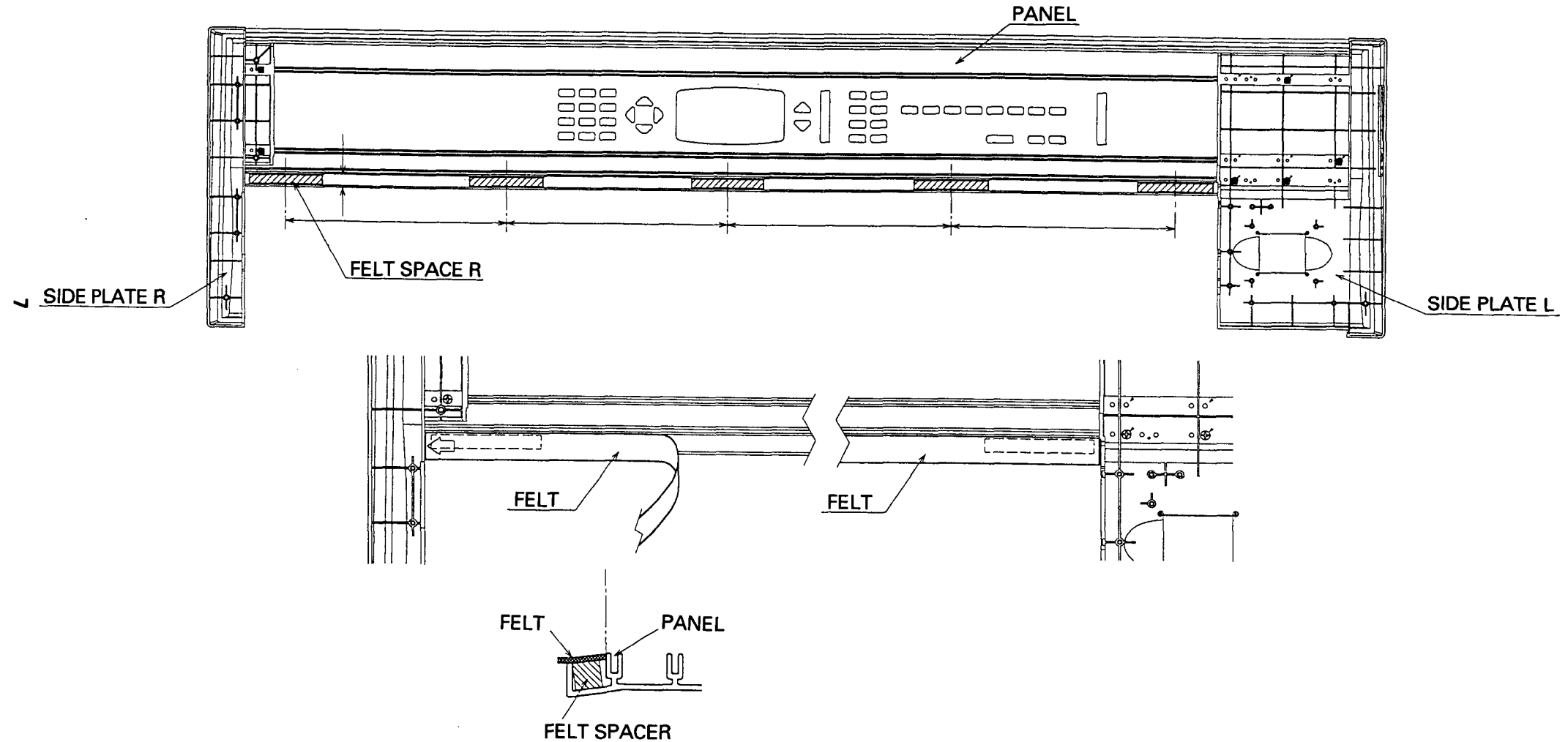
9. Remove the Joystick Assembly

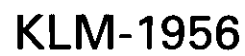
- 1) Loosen the spiral clip of the joystick harness.
- 2) Remove 4pcs. of the screws on the joystick frame and remove the joystick assembly.
[BT B ZMC 3×8] ×4 (mark: ●)

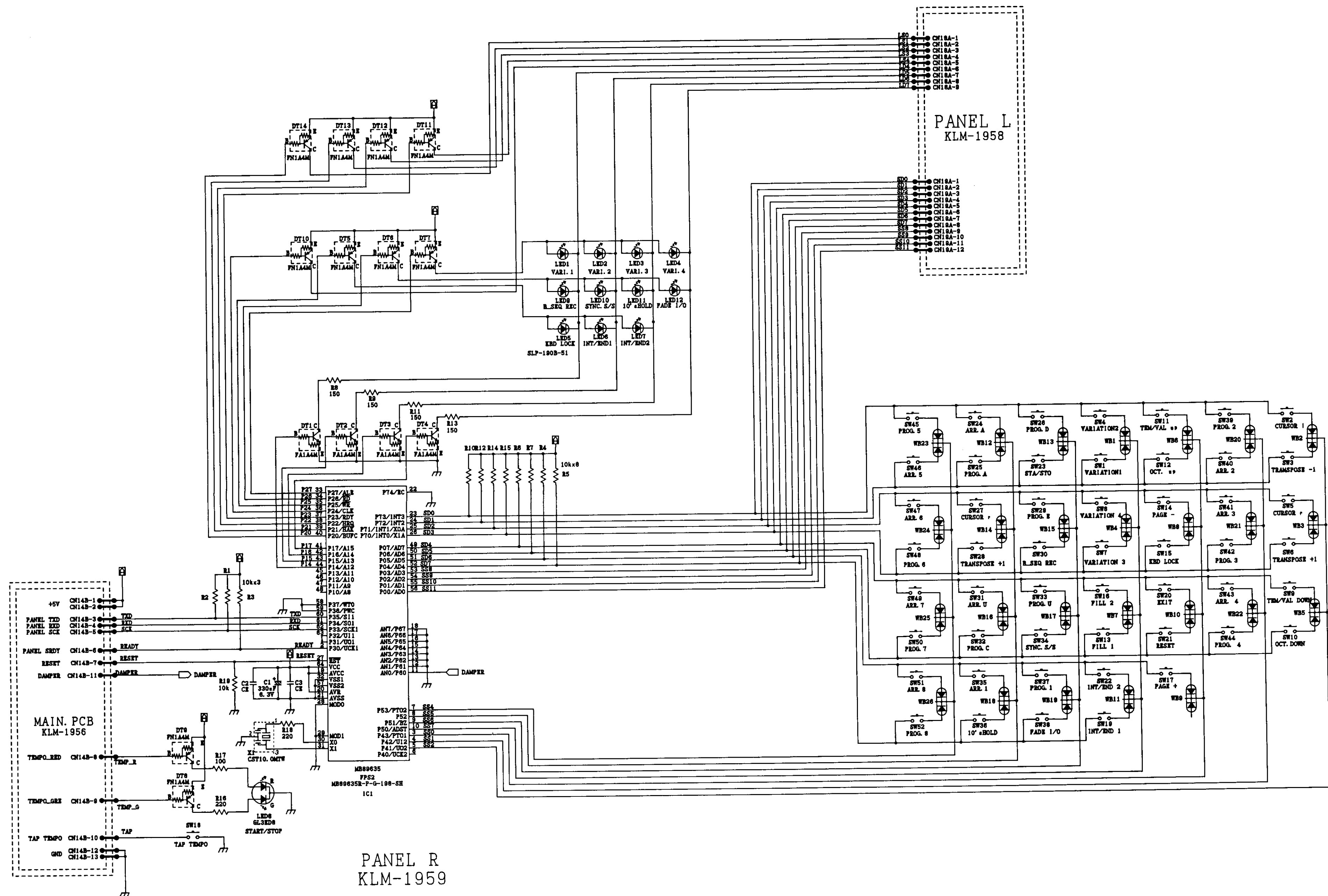


10. Remove the Side Plates

- 1) Remove 2pcs. of the screws on the panel and remove the side panel R.
[BT B ZMC 3×10] ×2 (mark: ■)
- 2) Remove 4pcs. of the screws on the panel and remove the side panel L.
[BT B ZMC 3×10] ×4 (mark: ■)

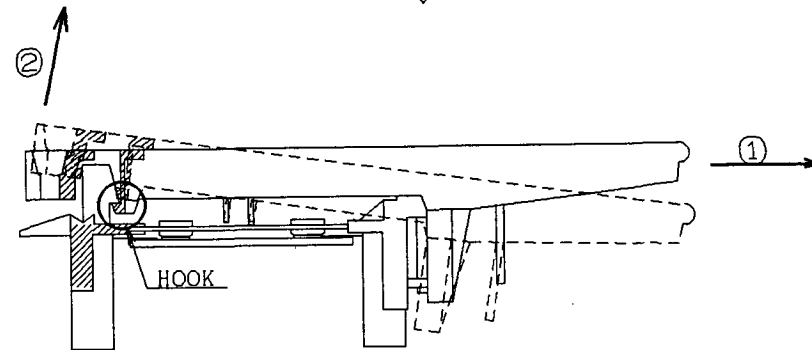
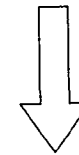
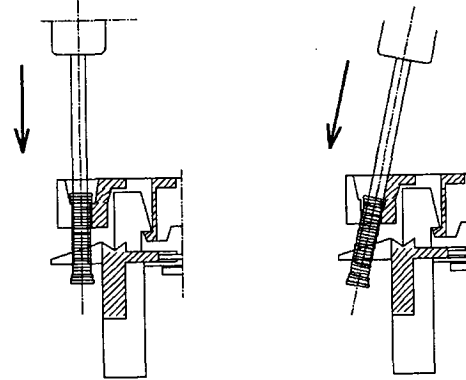
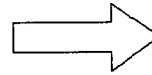
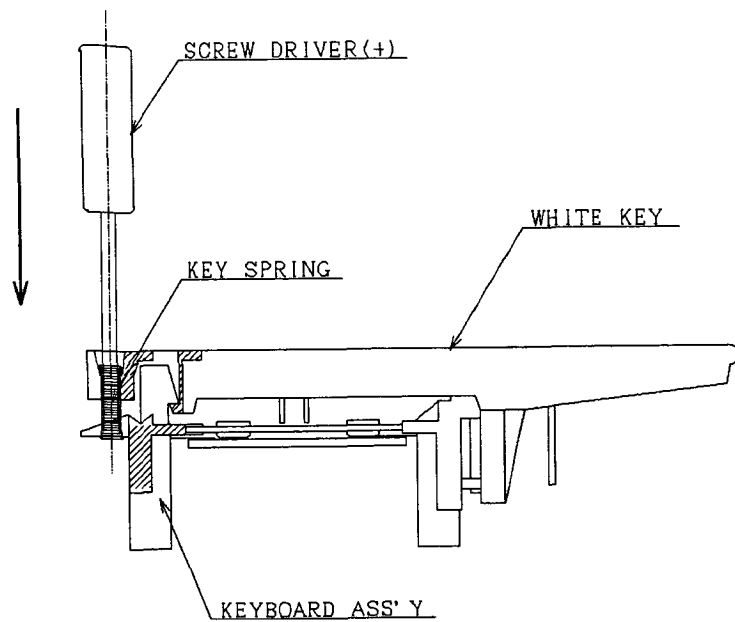






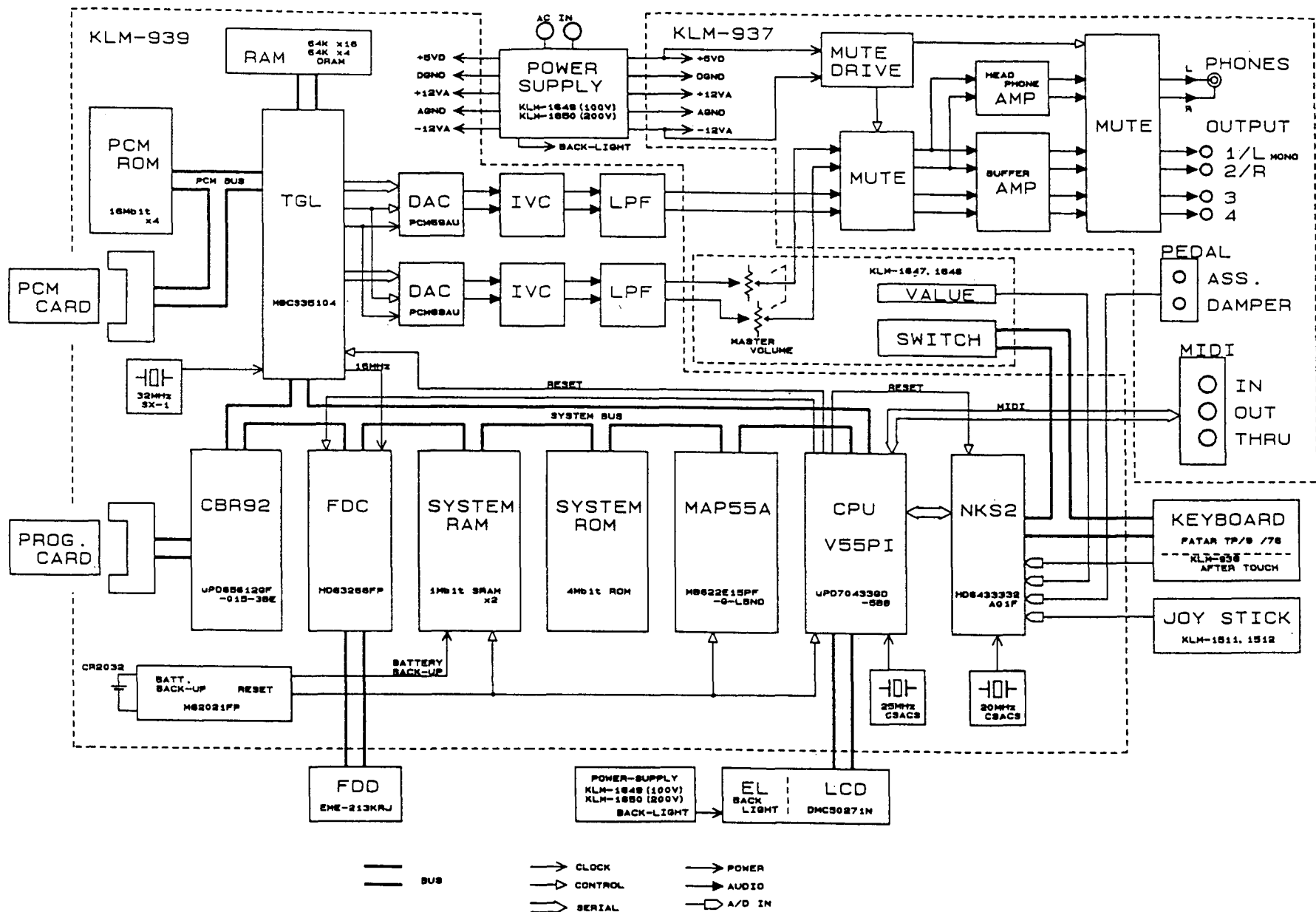
KLM-1959

How to remove the FATAR key



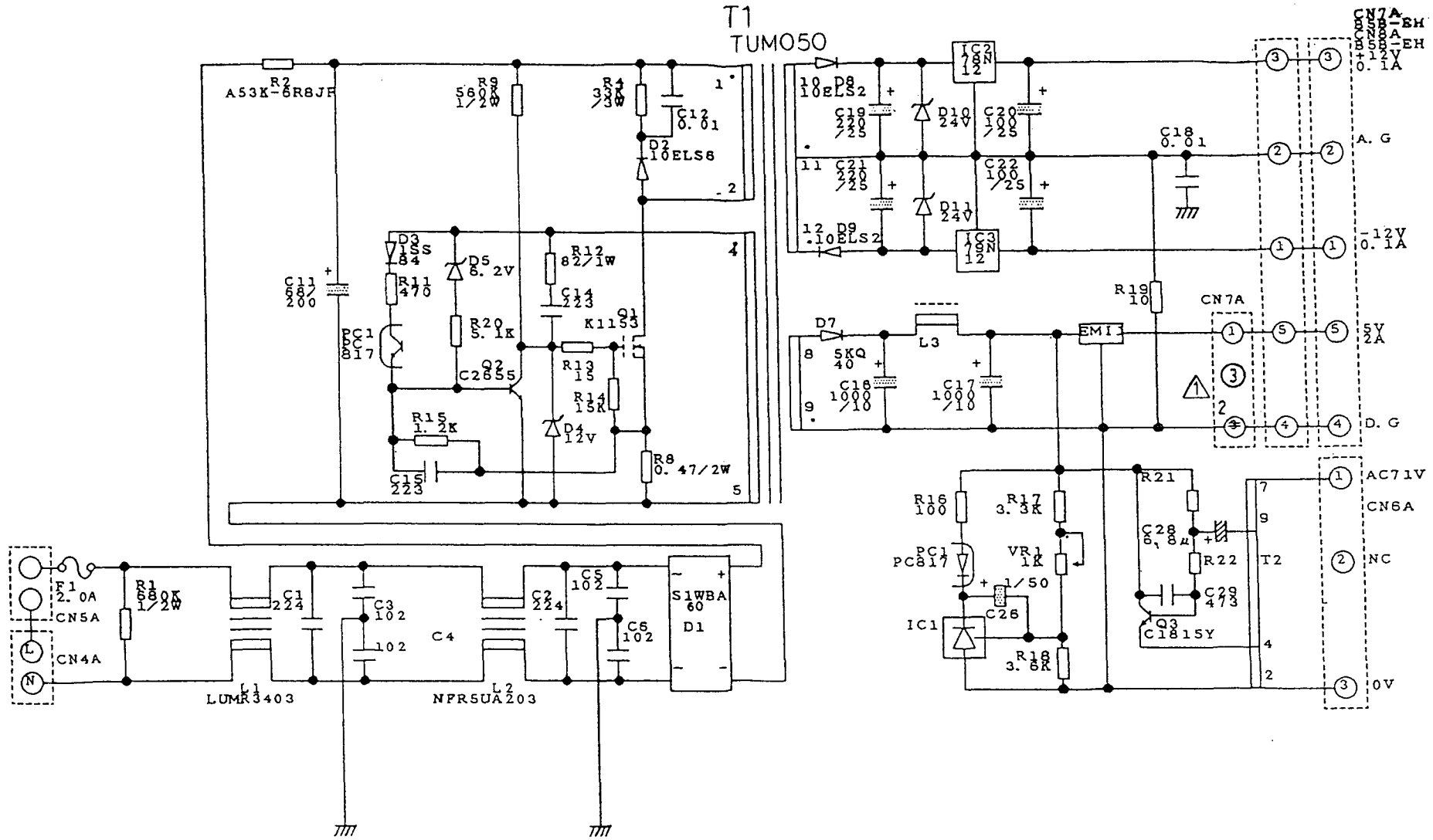
- 1) Set the screw driver (type +) at the key spring.
- 2) Push down the screw driver slowly and remove the key spring.
- 3) Move the key in accordance with the direction → ①.
- 4) Move the key in accordance with the direction ↑ ② and remove it.

4. BLOCK DIAGRAM

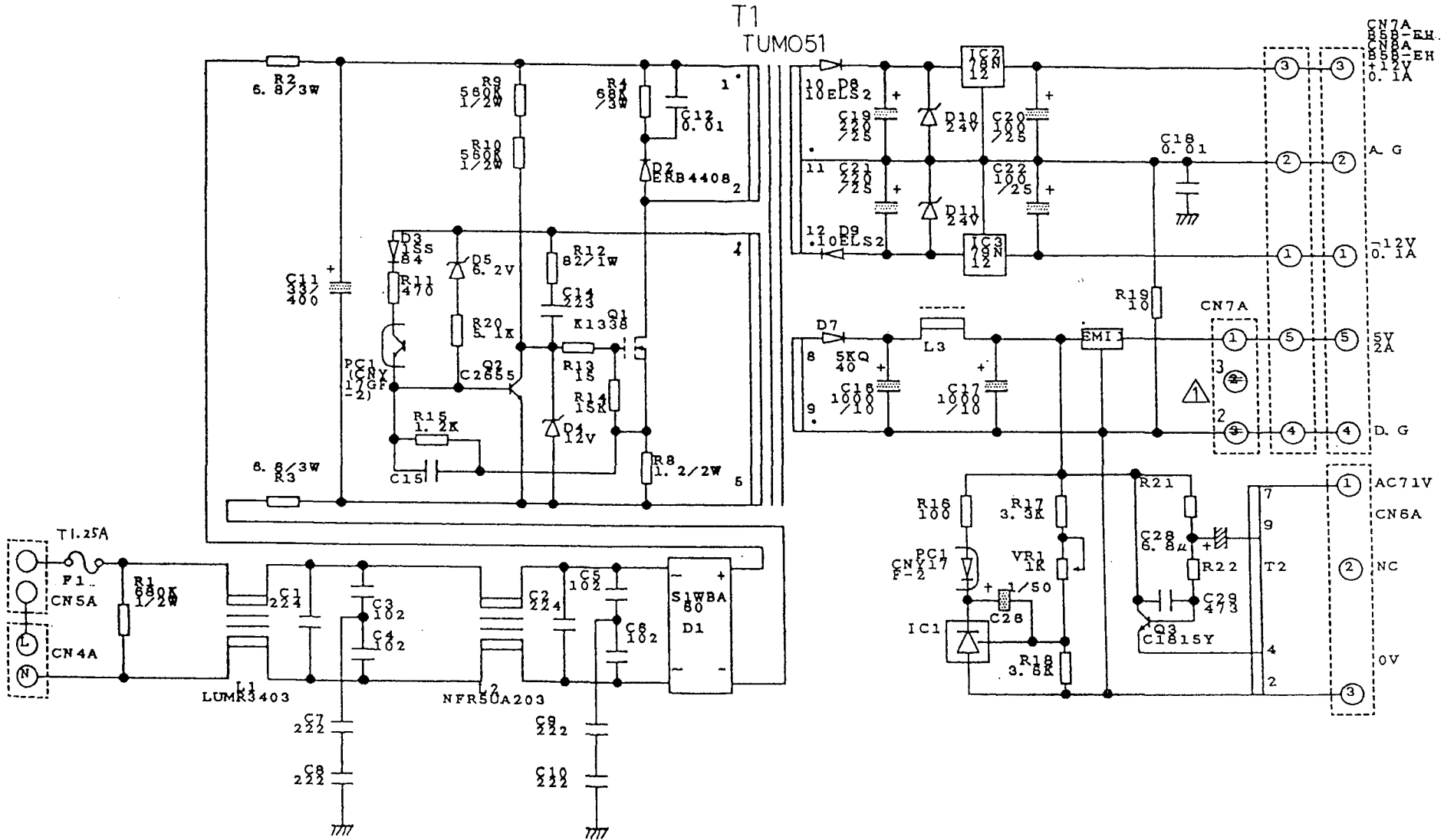


KLM-1649

5. CIRCUIT DIAGRAM

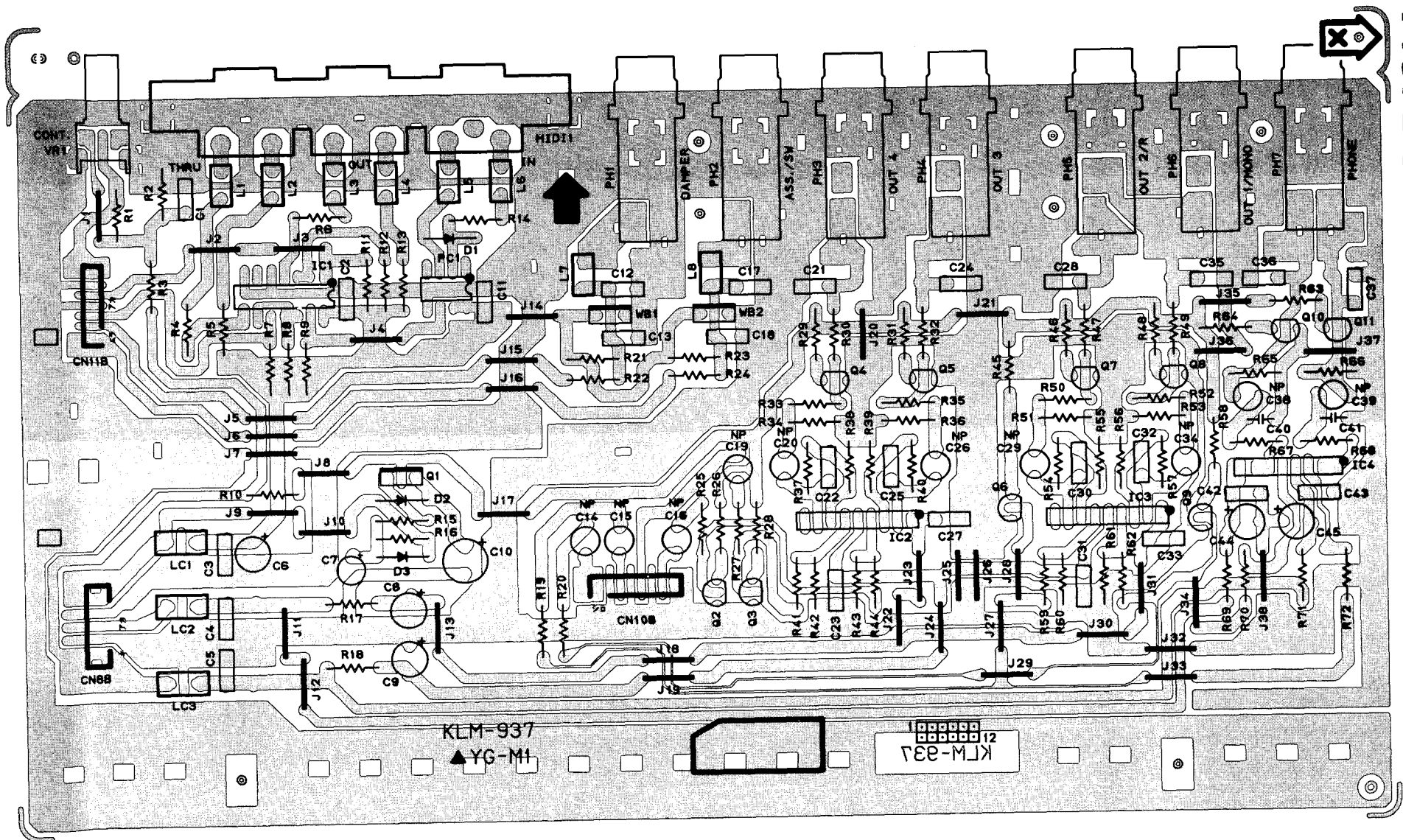


T1
TUM051

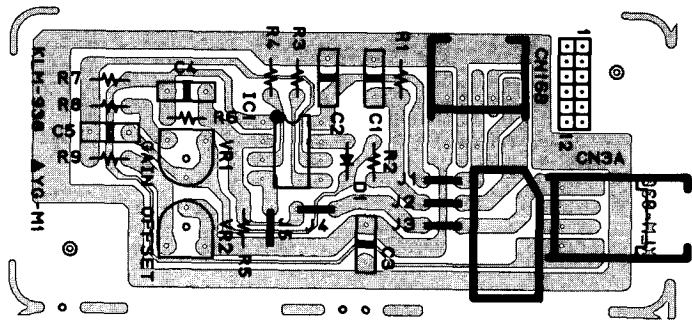


6. P.C. BOARDS

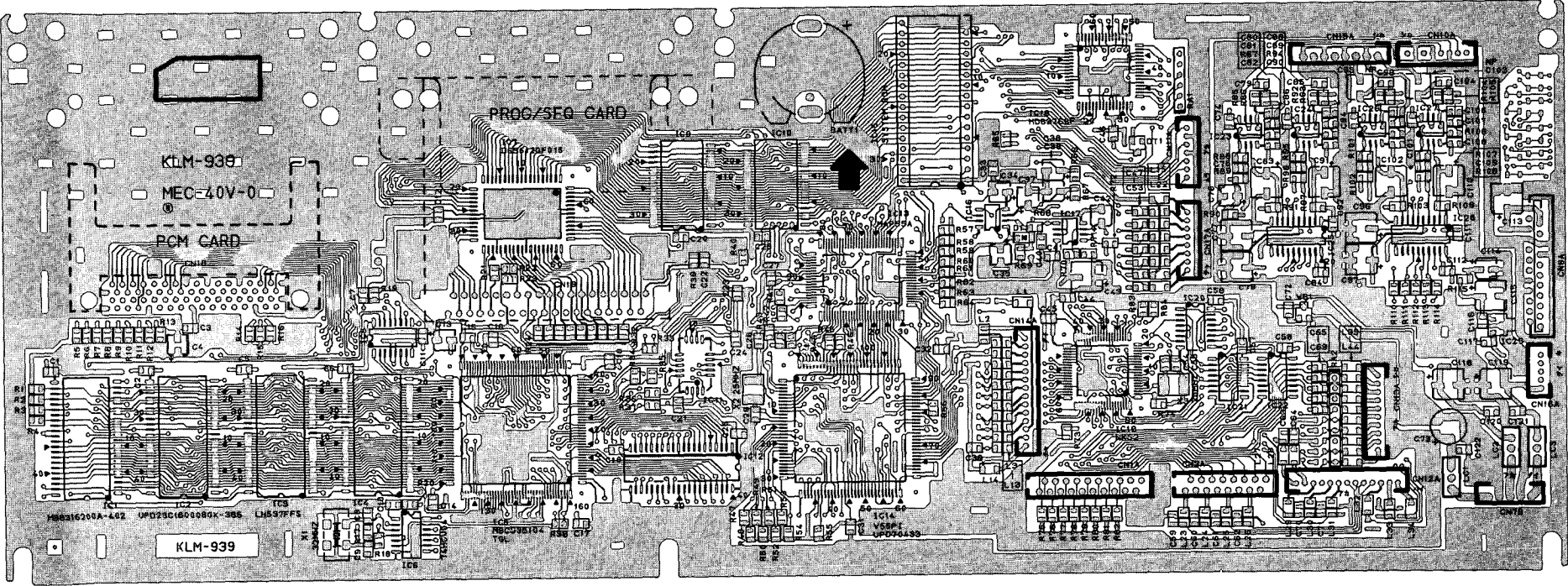
KLM-937



KLM-938

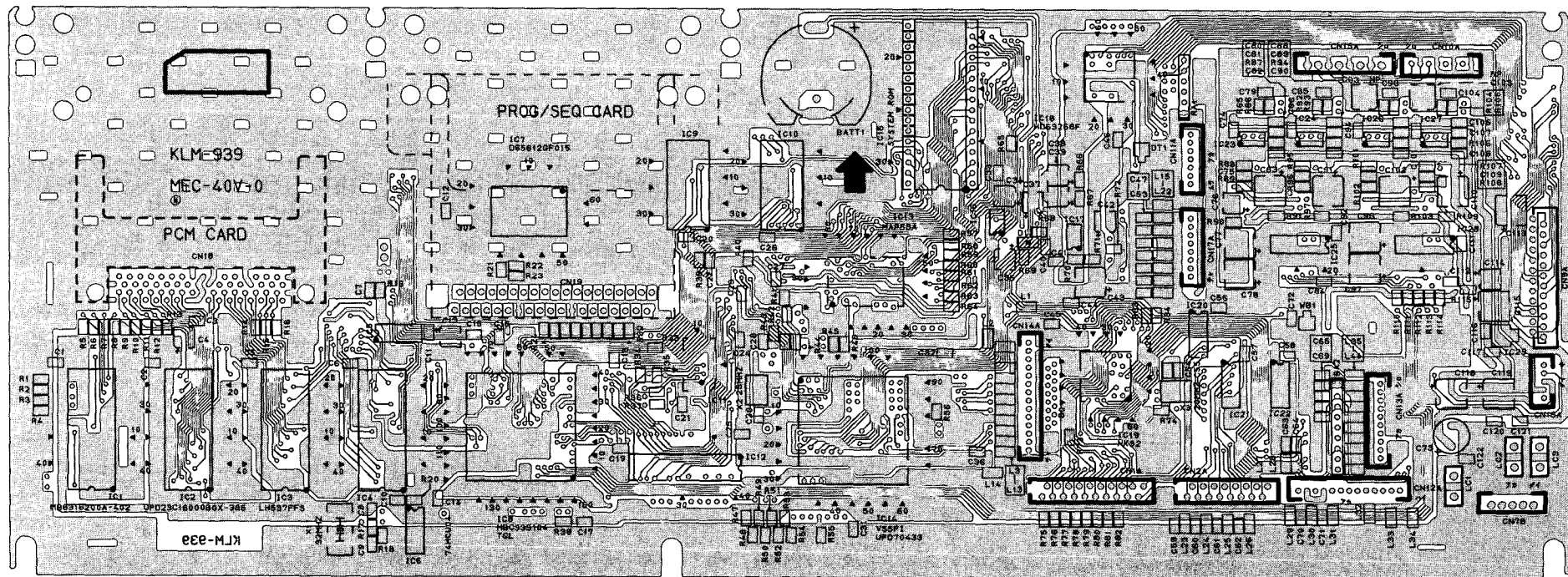


KLM-939



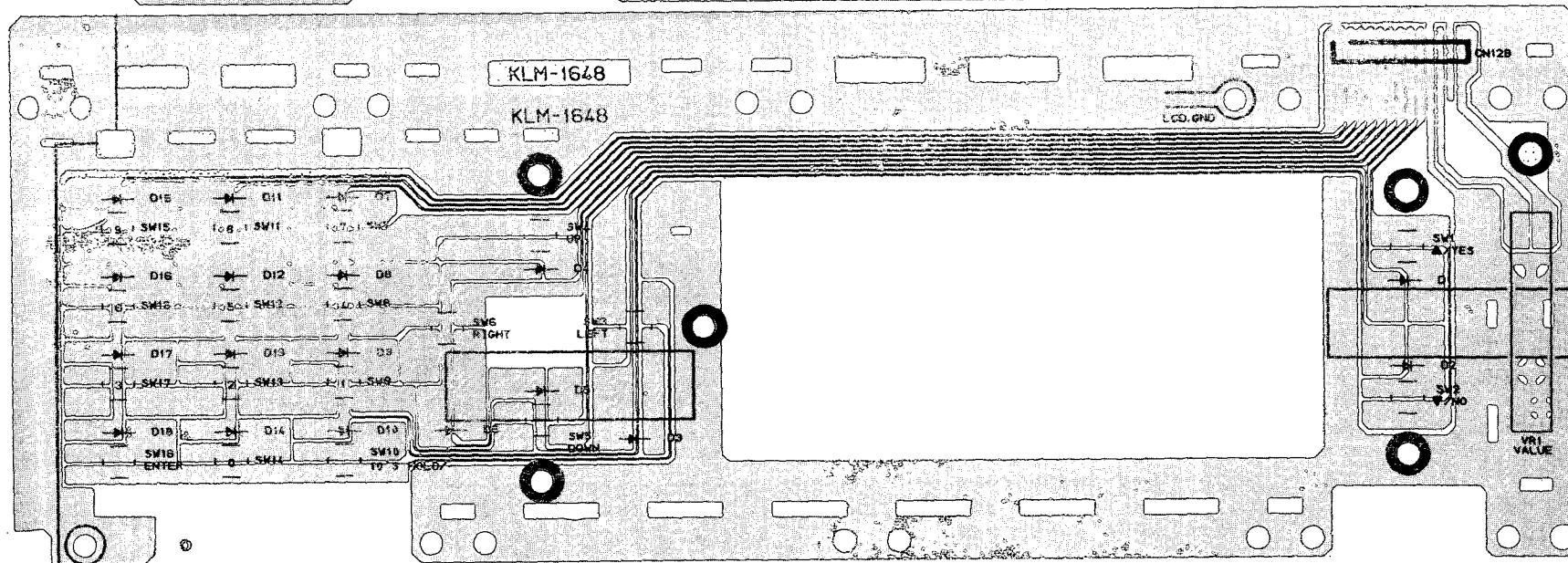
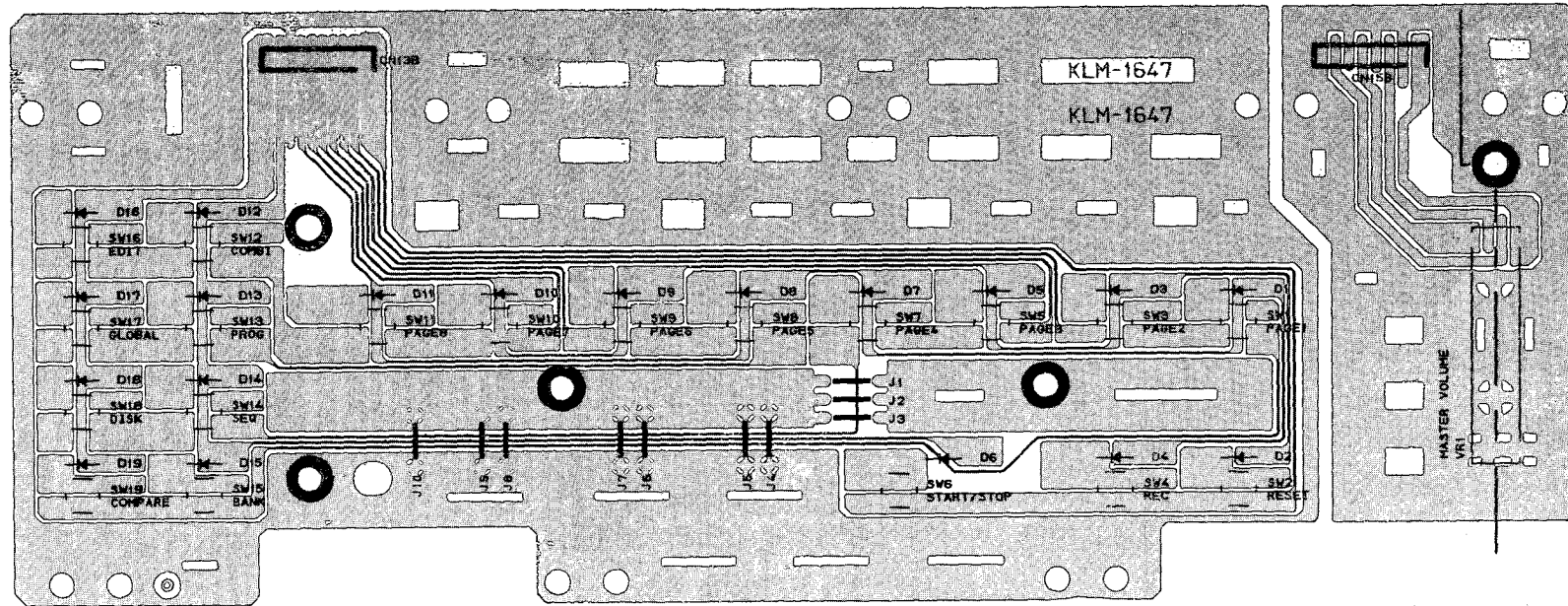
COMPONENT SIDE

KLM-939



NO COMPONENT SIDE

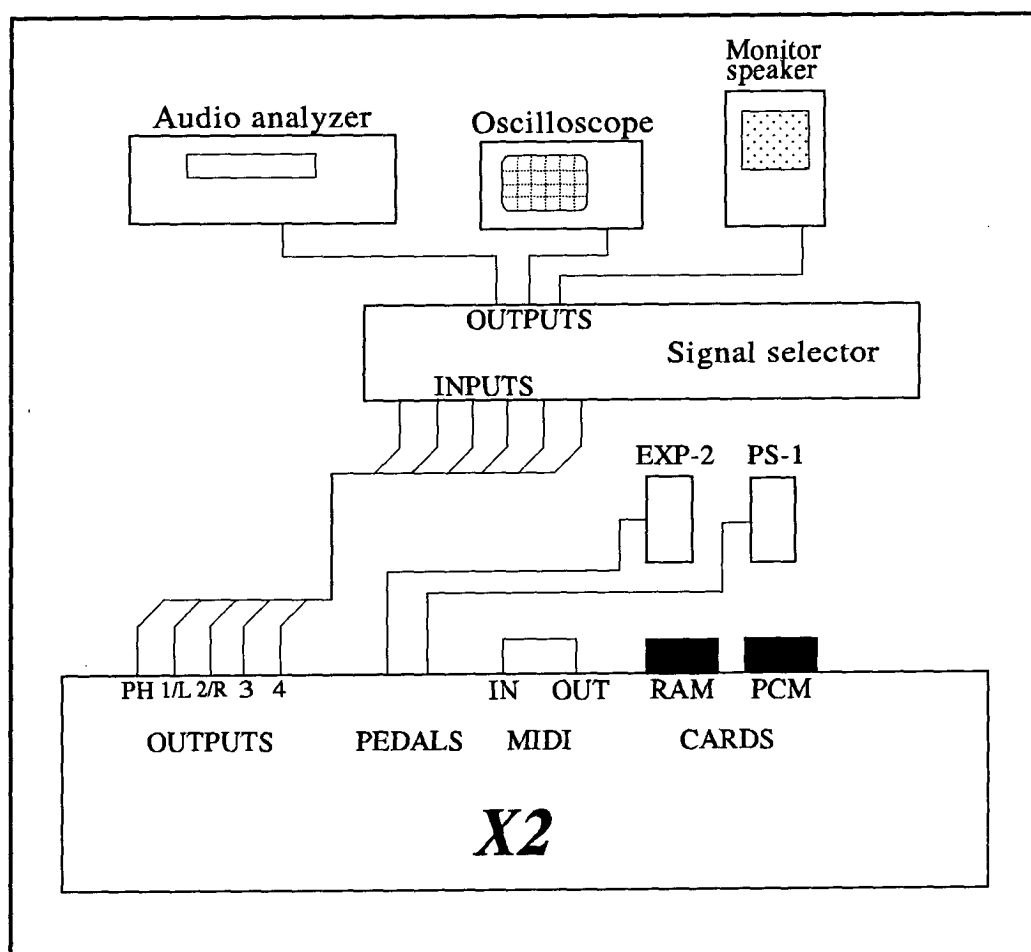
KLM-1647/1648



7. TEST MODE

The X2 has a test mode for checking numerous functions. When the test mode is activated, the X2 internal data is initialized. Hence, if the X2 contains any necessary data, save this data on a floppy disk beforehand. The figure below shows the equipment and settings required for carrying out tests.

Settings for Tests



- ※ The blank RAM(SRC-512) card used in the test mode must be formatted in advance, and the protect switch must be OFF.
Use XSC-801 as the PCM card.

Activating Test Mode

Insert the PCM card and the RAM card into their respective slots, and insert a blank disk for testing into the floppy disk drive. Turn on the power while pressing both [ENTER] and [5]. This activates the test mode.

When the test mode is activated, the internal tests listed below are done automatically. If the results of these tests are all normal, the system moves on to the external test Item 1, <Panel SW Test>.

The internal test items are as follows:

- System ROM Check Sum (Internal Test#01)
- Internal RAM Test (Internal Test#02)
- Card RAM Test (Internal Test#03)
- LCD RAM Test (Internal Test#04)
- TGL I/F Test (Internal Test#05)
- Internal Battery Test (Internal Test#06)
- Card Battery Test (Internal Test#07)
- MIDI Loop Test (Internal Test#08)
- PCM ROM TG I/F Test (Internal Test#09)
- PCM CARD TG I/F Test (Internal Test#10)

If any of the internal tests results in an error, the details are displayed on the LCD.

※ Notes:

- The form of activation of the test mode depends on the combination of keys' pressing while the power is turned on. They are as follows:

[1]+[ENTER]	To perform tests using the test menu.
☆[5]+[ENTER]	To perform internal and external tests.
[7]+[ENTER]	To display the System Version No. only.
[8]+[ENTER]	To perform external tests only.
[▼]+[ENTER]	To initialize the RAM data.

Ordinarily, ☆ is used.

- Use the following keys to move back and forth among the test steps:

Cursor key [▶]:	Move forward
Cursor key [◀]:	Move backward
Cursor key [▲]:	Exit from the current test item (to the following item)
Cursor key [▼]:	Exit from the current test item (to the head item in the current test)

Error Messages

[Test step]	[LCD indication]	[Error content]
System ROM checksum	SysROM ChkSum Error:Verify	Verify error
Internal RAM	SRAM W/R Error:Verify	Verify error
CARD RAM	RAM CARD Err:No Card	Card is not inserted.
	RAM CARD Err:Illegal Card	No KORG card is inserted.
	RAM CARD Port Chattering	Protect terminal is unstable.
	RAM CARD Port Protected	Protect terminal is in protected state.
	RAM CARD Err:Protect	Unable to write to the card.
	RAM CARD Err:Wr/Rd	Verify error
LCD RAM	LCD RAM W/R Error:Verify	Verify error
TGL I/F	TG CPU I/F Error: VoiceFlag	Verify error in TG section
	DF CPU I/F Error: VoiceFlag	Verify error in DF section
Internal Battery	InternalBatt Error:Low	Voltage is low.
	InternalBatt Error:High	Voltage is high.
CARD Battery	CardBatt Error:No Card	Card is not inserted.
	CardBatt Error:Low	Voltage is low.

MIDI LOOP	MIDI OUT X IN	OUT and IN are not connected.
	MIDI OUT-->IN	Verify error
PCM ROM I/F	PCMI* A:000001 P:yyyy R:xxxx	*: Bank number where PCM ROM error found x: Address where PCM ROM error found y: Correct data for indicated address z: Data read from indicated address
PCM CARD I/F	PCMCd A:000000 P:4BFF R:FFFF	PCM card (XSC-801) is not set.

Panel SW Test

External Test#21

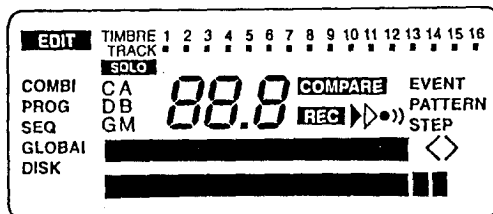
- This test is done by pressing the switches in the order indicated on the LCD. Confirm that the voltage of the internal battery is indicated on the LCD. When [ENTER] is pressed once, the LCD displays the name of the switch being checked. If the switch that was pressed does not go on, or if the switch that was pressed is not the one displayed on the LCD, the test cannot proceed.
- If the check of [ENTER] is normal, the system automatically moves on to the next test.

LCD Pixel & FDD Test

External Test#22

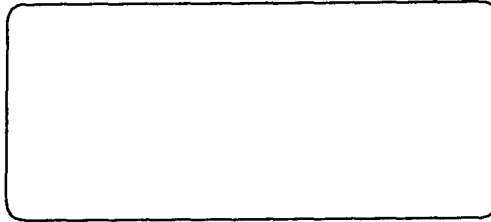
Step 1 Checking that LCD pixels light

- Press ENTER and check that all the LCD pixels are lit. Here, also turn the contrast knob and check that the contrast (brightness) changes smoothly.



Step 2 Checking that LCD pixels go out

- Press [ENTER] and check that the LCD goes completely blank.



Step 3 Checking that the floppy disk drive access LED lights

- Press [ENTER] and check that the floppy disk drive access LED is lit. After you have completed this check, press [ENTER] and proceed to the next test.

Step 4 Checking disk change

- Check that the LCD goes from HI to LOW when the floppy disk drive eject button is pressed and the disk is taken out. After you have completed this check, press [ENTER] and proceed to the next test.

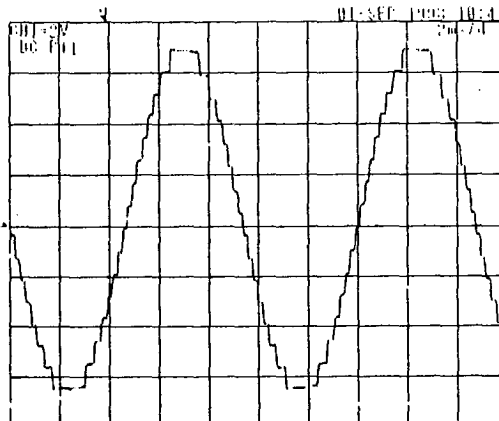
MDE Test

External Test#23

- Testing the MDE part of TGL

Press [ENTER] and check that the output waveform of the MDE Test (Fig. 1) is normal. If the output waveform is abnormal, check the TGL and neighboring analog circuits.

<Fig.1>



After you have completed this check, press [ENTER] and proceed to the next test.

Noise Test

External Test#24

Set the MASTER VR on the panel to MAX.

- Press [ENTER] and measure the noise level of the OUTPUT indicated on the LCD. Check that the OUTPUT noise level does not exceed the allowed value. Measure the noise levels in the order shown below and confirm if each level is -85.0[dBu] or less as on the table 1.

OUTPUT 1/L, OUTPUT 2/R
OUTPUT 3, OUTPUT 4
PHONE L, PHONE R

After you have completed this check, press [ENTER] and proceed to the next test.

Output Test

External Test#25

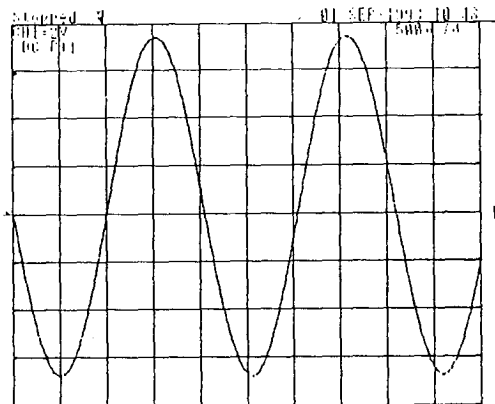
- Press [ENTER] and measure the signal level of the output indicated on the LCD. Check that the signal level of each output is within the allowed range and that it forms a sine wave. Here, confirm that the output waveform is not distorted and that the frequency is correct (see Fig. 2).

Also, confirm that the waveform changes smoothly when the master VR on the panel is moved, and that the level of the waveform goes to 0 when the master VR is moved to MIN.

Measure the output levels in the order shown below and confirm if each level is within the range of regulation as on the table 1.

OUTPUT 1/L, OUTPUT 2/R
OUTPUT 3, OUTPUT 4
PHONE L, PHONE R

<Fig.2>



After checking the signal level for PHONE R, press [ENTER] and proceed to the next test.

Table 1 Residual noise, and specified ranges of output signal levels

	Residual noise	Output signal level	Frequency
Out-1	-85.0[dBu] max	15.0~18.0[dBu]	488 Hz
Out-2	-85.0[dBu] max	15.0~18.0[dBu]	412 Hz
Out-3	-85.0[dBu] max	15.0~18.0[dBu]	305 Hz
Out-4	-85.0[dBu] max	15.0~18.0[dBu]	244 Hz
Ph-L	-85.0[dBu] max	1.3~2.5[dBu] / 33Ω	548 Hz
Ph-R	-85.0[dBu] max	1.3~2.5[dBu] / 33Ω	610 Hz

Keyboard & A.T Test

External Test#26

- Press [ENTER] and the LCD will indicate which key to test.
 Play the keys in descending order from the highest and test the contact units.
 If the key hitting strength (velocity value) is between 20 and 100, this test will proceed to the next key. If a contact unit is abnormal, you will not be able to move on to the next key.
 After you have played the lowest note, the system will automatically move on to the After Touch Test.

- Press any key on the keyboard, and check that the after touch values indicated on the LCD change smoothly between 0 and 127.

After you have completed this check, press [ENTER] and proceed to the next test.

A/D Test

External Test#27

- Press [ENTER] and operate the joystick X. Check that the JOY-X values indicated on the LCD change smoothly as set out below.

Step 1 Checking the X axis of the joystick
 When dropped fully to the left, JOY-X : MIN -127
 When dropped fully to the right, JOY-X : MAX +127
 When the hand is released, JOY-X : +0

After you have completed this check, press [ENTER] and proceed to the next test.

- Operate the joystick Y, and check that the JOY-Y values indicated on the LCD change smoothly as set out below.

Step 2 Checking the Y axis of the joystick

When dropped fully to the lower,	JOY-Y : MIN	-127
When dropped fully to the upper,	JOY-Y : MAX	+127
When the hand is released,	JOY-Y :	+0

After you have completed this check, press [ENTER] and proceed to the next test.

Step 3 Checking the VALUE slider

- Move the VALUE slider, and check that the values indicated on the LCD change smoothly between 255 max. and 0 min.

After you have completed this check, press [ENTER] and proceed to the next test.

Step 4 Checking the ASS pedal

- Operate the ASS pedal connected to the rear panel, and check that the values indicated on the LCD change smoothly. Confirm that the value is 127 when the pedal is pressed, and 0 when the pedal is released.

After you have completed this check, press [ENTER] and proceed to the next test.

Step 5 Checking the damper pedal

- Press the damper pedal connected to the rear panel, and check that the LCD indicates ON, then release the pedal and check that OFF is displayed on the LCD.

After you have completed this check, press [ENTER] to call up the menu display.

PRELOAD

External Test#28

- Take out the PCM card that is in the PCM card slot, and replace it with the preload card.(※) Then, press [9] to begin preloading.
- After ending the test mode, produce a few tones and check that they have been preloaded correctly.

- ※ The preload card mentioned above is the card used at shipment.
If you wish to load your own data, or if there is no preload card, switch off the power to forcibly end the test mode and then switch the power on again, and load your data from a floppy disk.

Floppy Disk Drive Test

This test checks the READ, WRITE and COMPARE functions of the floppy disk drive.

- Turn the power on while pressing both [ENTER] and [1].
- When the menu screen appears, press [0] to enter the Floppy Disk Drive Test mode.
- Insert a blank floppy disk into the floppy disk drive and press [ENTER] to start testing the floppy disk drive.
(It takes about four minutes to complete this test.)
When the result is normal, 'Completed' is displayed on the LCD.
When an error is found, the LCD blinks and an error message is displayed.

Error messages during FDD test

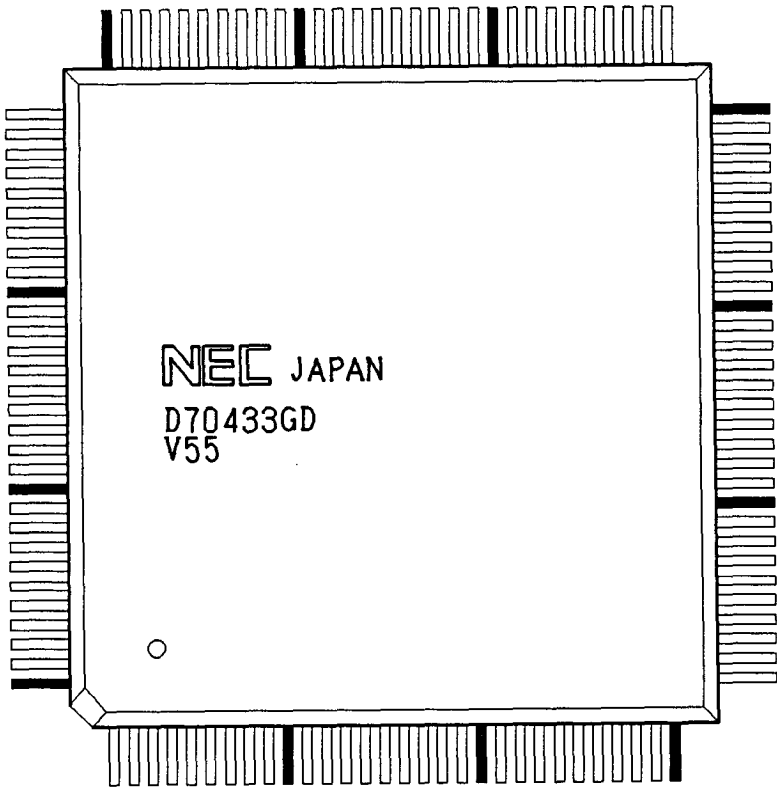
[Test step]	[LCD indication]	
During format type check	error(1),(2),(4) ENTER To Cont.	error number: (1) Drive Not Ready (2) Data Error (3) Write Protected (4) Disk Type Error (5) No File (6) Verify Error
During disk formatting	error(1),(2),(3) @Format	
During verifying after formatting	error(1),(2) @Format Verify	
During the writing to all sectors	error(1),(2),(3) @Write	
During the reading to all sectors	error(1),(2) @Read	
During initialization of the boot sector	error(1),(2),(3) @Write Boot	
During file writing	error(1),(2),(3),(4) @Write Verify	
During verifying after reading the file	error(1),(2),(4),(5),(6) @Verify	

8. REFERENCE DATA

MAIN ICs

CPU	: UPD70433GD-5BB	IC14
DECODER	: MB622984PF(MAP55) or MB622E15PF(MAP55A)	IC13
TONE GENERATOR	: MB622984PF(MAP55) or MB622E15PF(MAP55A)	IC8
CARD BUFFER	: MB65612-015-3BE(CBR92)	IC7
KEY SCANNING	: HD643332A01F(NKS2)	IC19
SYSTEM ROM	: MB834000B-15P-G-3RL(4M MASK ROM) or (4M EP ROM)	IC15
SYSTEM RAM	: UPD431000AGW-70L(1M SRAM)	IC9, IC10
DRAM	: TC511664BJ-80(64K x 16) for multi digital effect	IC12
	MB81464-10PSZ-G-BB-RS2(64K x 4) for multi digital effect	IC11
WAVE ROM	: MB8316200-15PF-G-402-HT(for GM1)	IC1
	UPD23C16000BGX-385(for GM2)	IC2
	LH537FFS	IC3
	UPD23C16000BGX-825(SWP)	IC4
FD CONTROLLER	: HD63266FP	IC18
D/A CONVERTOR	: PCM69AU	IC25, IC28

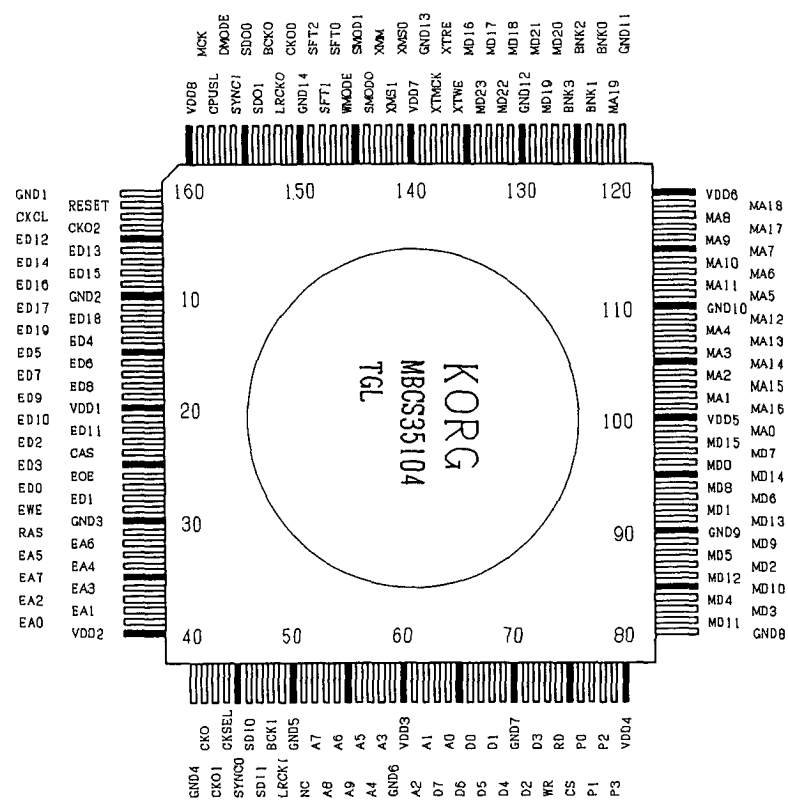
UPD70433GD-5BB(CPU) PIN ASSIGNMENT



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 TIMMING 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

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.

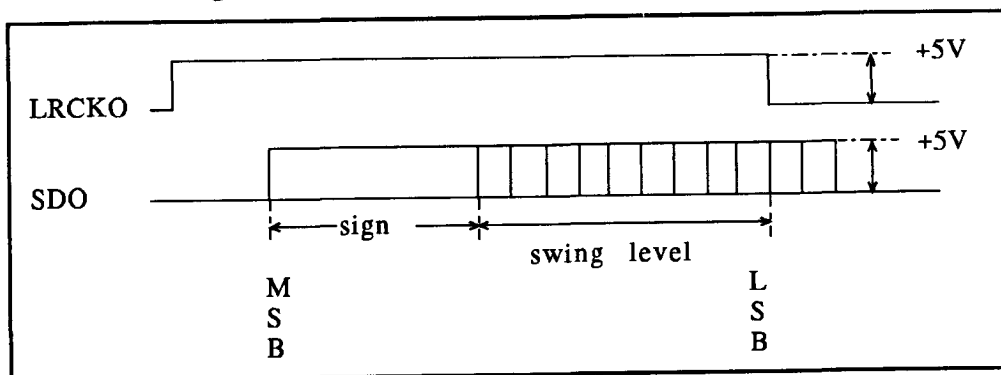
3. Check of input/output pins, when the key on

PIN NAME	FUNCTION
XCS, XWE	Control signal from the CPU

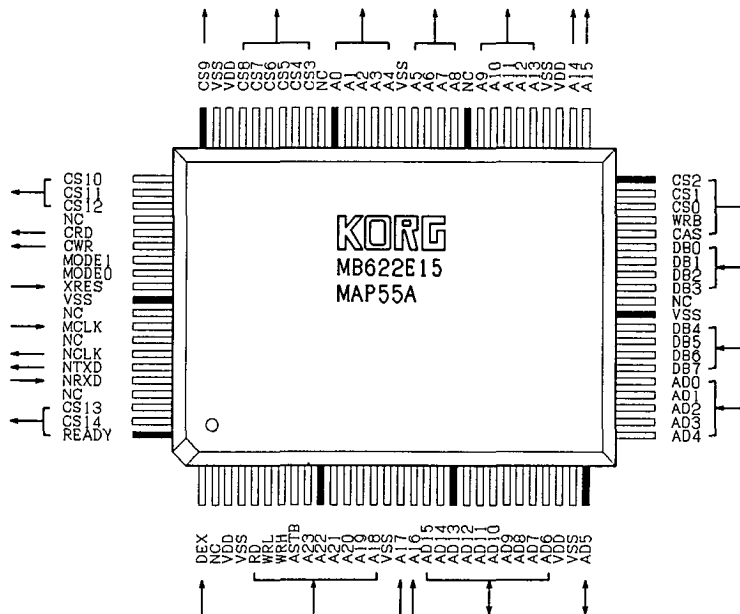
During KEY ON or PROG. CHANGE, check that a low level pulse signal is input from the CPU to the above pins(XSC, XWE). If these signals cannot be observed with the oscilloscope, check the CPU and its peripheral circuits.

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 LRCK0 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 LRCK0 on the oscilloscope screen.



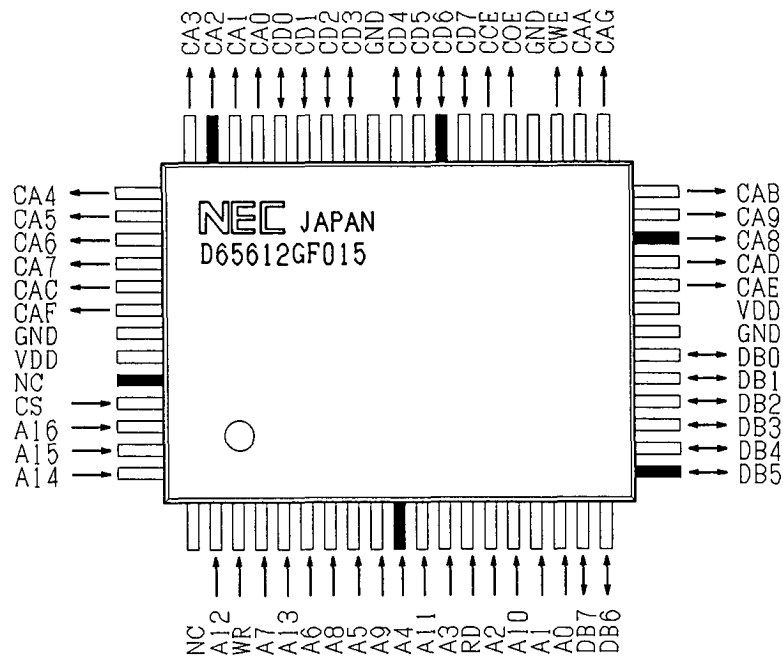
MB622E15 (MAP55A) PIN ASSIGNMENT



MB622E15(MAP55A) PIN FUNCTIONS

PIN NO	PIN NAME	I/O	FUNCTION
1	DEX	I	V55 DEX INPUT
5	RD	I	V55 RD INPUT
6	WRL	I	V55 WRL INPUT
7	WRH	I	V55 WRH INPUT
8	ASTB	I	V55 ASTB INPUT
9-14	A23-18	I	ADDRESS INPUT A23-16
16,17	A17-16	I	
18-27	AD15-6	I/O	MULTIPLEX DATA BUS A15-0
30-35	AD5-0	I/O	
36-39	DB7-4	I/O	8BIT DATA BUS
42-45	DB3-0	I/O	
46	CAS	O	DRAM CAS OUTPUT
47	WRB	O	WRITE PULSE OUTPUT
48-50	CS0-2	O	CHIP SELECT OUTPUT
51,52	A15,14	O	ADDRESS LATCH OUTPUT
55-59	A13-9	O	
62-64	A8-6	O	
66-71	A5-0	O	
72-77	CS3-8	O	CHIP SELECT OUTPUT
80-83	CS9-12	O	
85	CRD	O	VDC READ PULSE OUTPUT
86	CWR	O	VDC WRITE PULSE OUTPUT
87,88	MODE1-0	I	DECODE MODE SELECT
89	XRES	I	SYSTEM RESET INPUT
92	MCLK	I	MASTER CLOCK INPUT
94	NCLK	O	SERIAL I/F CLOCK OUTPUT
95	NTXD	O	SERIAL I/F TRANSMIT DATA OUTPUT
96	NRXD	I	SERIAL I/F RECIEVE DATA INPUT
98,99	CS13,14	O	CHIP SELECT OUTPUT
100	READY	O	V55 READY OUTPUT

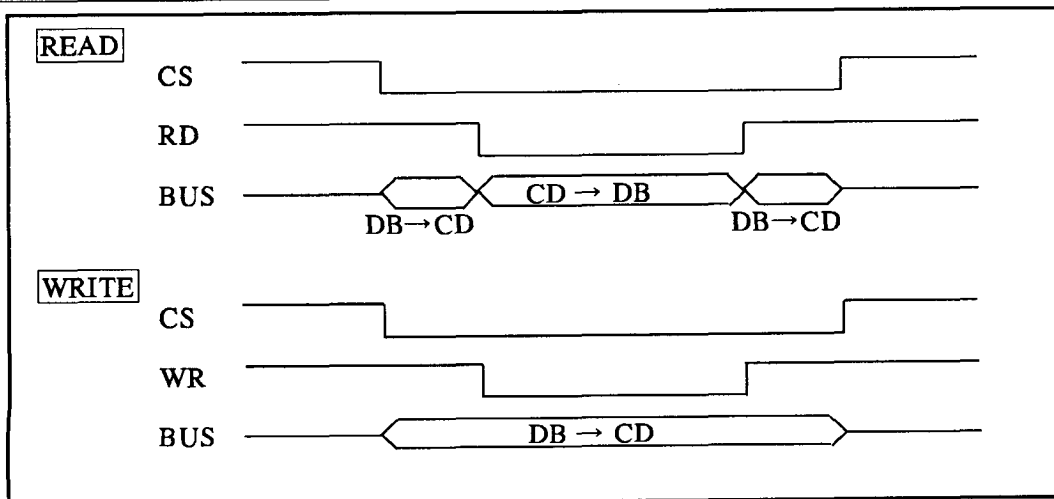
UPD65612-015-3BE (CBR92) PIN ASSIGNMENT



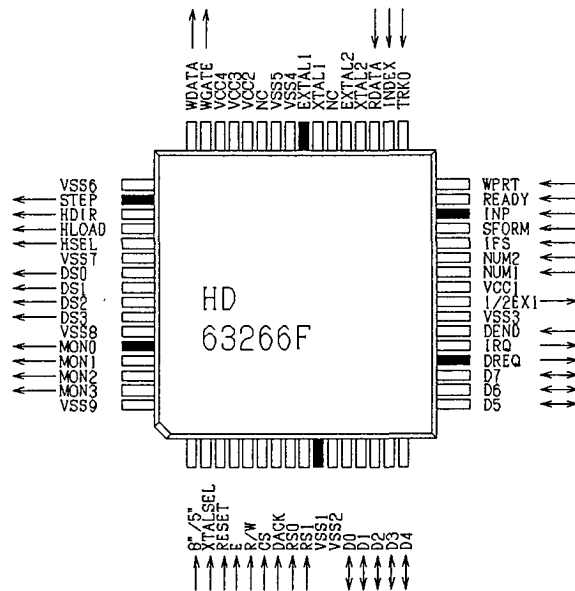
UPD65612-015-3BE (CBR92) PIN FUNCTIONS

PIN NAME	I/O	FUNCTION
A16-0	I	ADDRESS INPUT
CS	I	CHIP SELECT INPUT
RD	I	READ STROBE INPUT
WR	I	WRITE STROBE INPUT
CCE	O	CARD CHIP SELECT OUTPUT
COE	O	CARD OUTPUT ENABLE
CAF-0(CA16-0)	O	CARD ADDRESS OUTPUT
DB7-0	I/O	CPU DATA BUS
CD7-0	I/O	CARD DATA BUS

UPD65612-015-3BE(CBR92) TIMMING CHART



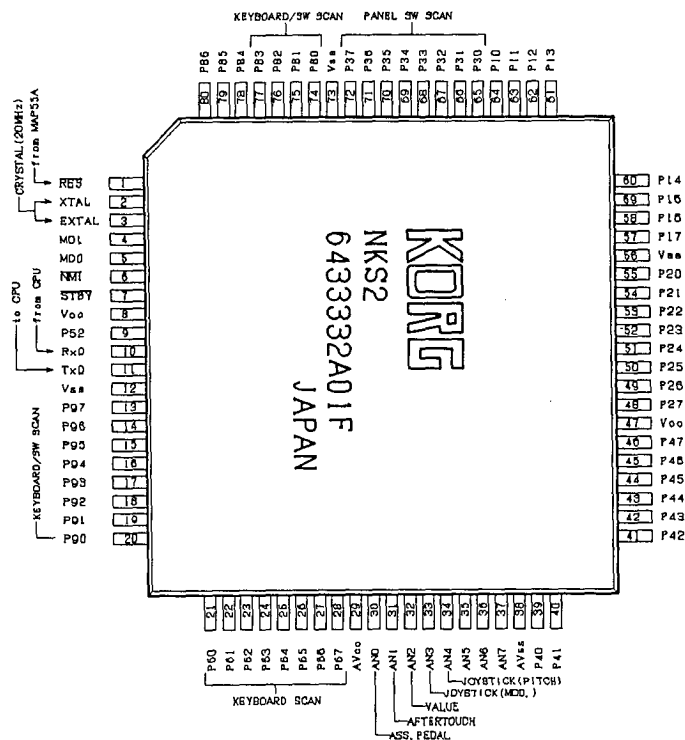
HD63266F (FDC) PIN ASSIGNMENT



HD63266F (FDC) PIN I/O

PIN NO	I/O	PIN NAME	PIN NO	I/O	PIN NAME
1	I	8"/5"	33	I	TRKO
2	I	XTALSEL	34	I	INDEX
3	I	RESET	35	I	RDATA
4	I	E,(RD)	36	---	XTAL2
5	I	R/W(WR)	37	---	EXTAL2
6	I	CS	38	---	NC
7	I	DACK	39	---	XTAL1
8	I	RAS0	40	---	EXTAL1
9	I	RAS1	41	---	Vss4
10	---	Vss1	42	---	Vss5
11	---	Vss2	43	---	NC
12	I/O	D0	44	---	Vcc2
13	I/O	D1	45	---	Vcc3
14	I/O	D2	46	---	Vcc4
15	I/O	D3	47	O	WGATE
16	I/O	D4	48	O	WDATA
17	I/O	D5	49	---	Vss6
18	I/O	D6	50	O	STEP
19	I/O	D7	51	O	HDIR
20	O	DREQ	52	O	HLOAD
21	O	IRQ	53	O	HSEL
22	I	DEND	54	---	Vss7
23	---	Vss3	55	O	DS0
24	O	1/2EX1	56	O	DS1
25	---	Vcc1	57	O	DS2
26	I	NUM1	58	O	DS3
27	I	NUM2	59	---	Vss8
28	I	IFS	60	O	MON0
29	I	SFORM	61	O	MON1
30	I	INP	62	O	MON2
31	I	READY	63	O	MON3
32	I	WPRT	64	---	Vss9

HD6433332A01F (NKS2) PIN ASSIGNMENT



HD6433332A01F (NKS2) I/O PORT MAPPING

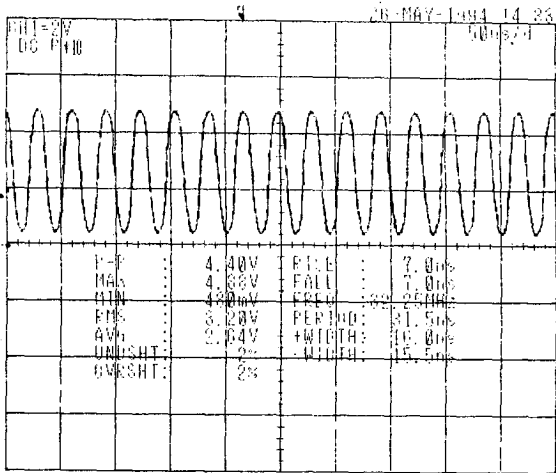
PORT	FUNCTION	I/O	NOTE	X2
P10-17	LED OUT	O		×
P20-23	LED DECODER	O		×
P24	A/D SEL 0-7/8-15	O		×
P25-27	TOUCH PANEL SEL 1-3	O		×
P30-27	SWITCH DATA IN	I		○
P40-47	ROTARY ENCODER 1-4	I		×
TXD0	SERIAL DATA OUT	O		○
RXD0	SERIAL DATA IN	I		○
P52	NOT USE	I	SYNC MODE: SCK	×
P60-67	KEYBOARD DATA IN	I		○
AN0-7	A/D IN (8CH)	I		○
P80-83	SW & KEYBOARD SEL B0-3	O		○
P84	SEND READY	O		×
P85	ASYNC/SYNC MODE	I	0:SYNC, 1:ASYNC	○
P86	TOUCH PANEL GATE	I		×
P90	SW & KEYBOARD SEL	O	0:MAKE, SW	○
P91	SW & KEYBOARD SEL	O	0:BRAKE	×
P92-97	NOT USE	I		×

CHECK POINTS

1. Clock Generator - TGL

From 6pin of IC6
To 159pin(MCK) of IC8

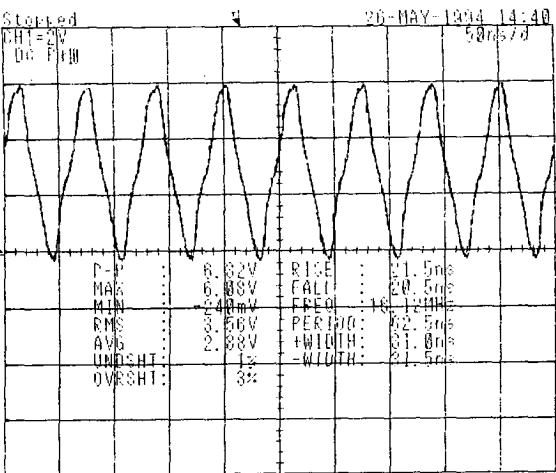
f=32.00MHz



2. TGL - FDC

From 43pin(CKO1) of IC8
To 40pin(EXTAL1) of IC18

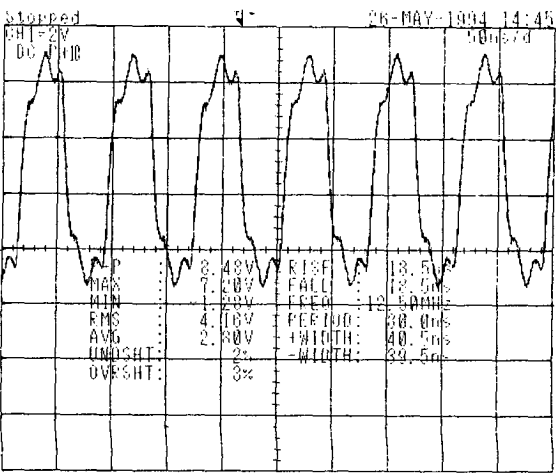
f=16.00MHz



3. CPU - MAP55A

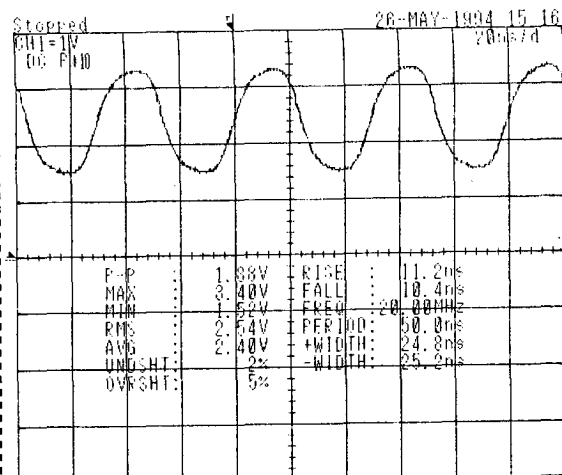
From 7pin(CLKOUT) of IC14
To 92pin(MCLK) of IC13

f=12.50MHz



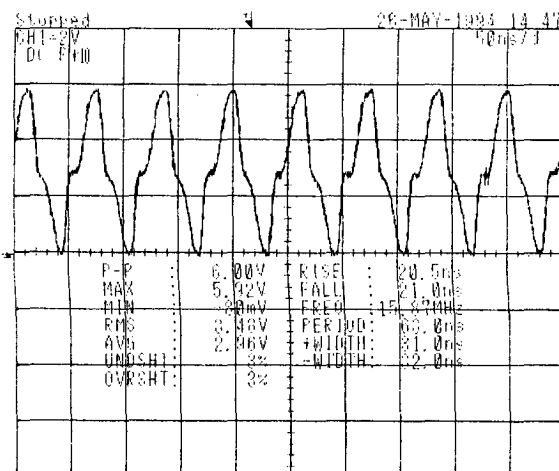
4. CRYSTAL OSC. - NKS2

From X3(20MHz)
To 2pin(XTAL) of IC19
 $f=20.00\text{MHz}$



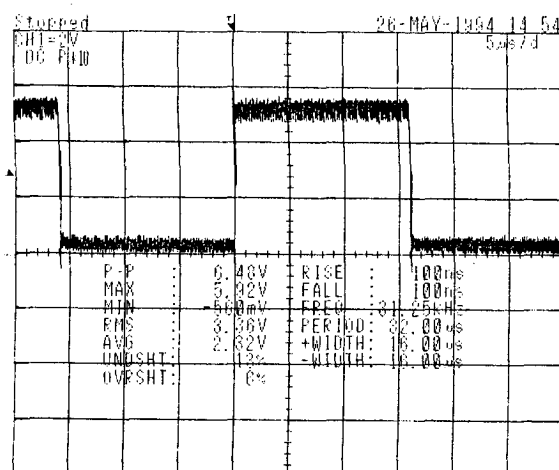
5. TGL - DAC

From 151pin(CKO0) of IC8
To 15pin(SYCLK) of IC25
and 15pin(SYCLK) of IC28
 $f=16.00\text{MHz}$



6. TGL - DAC

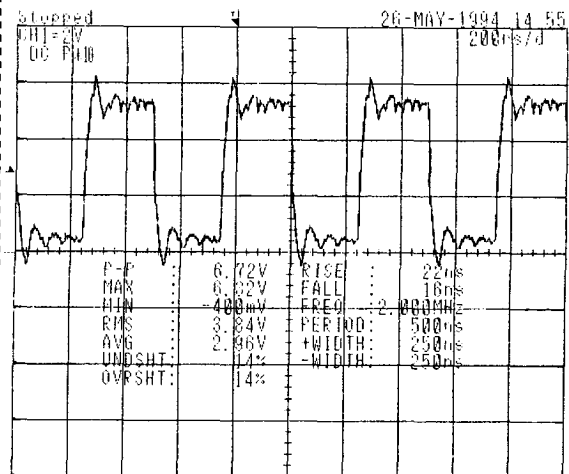
From 152pin(LRCKO) of IC8
To 16pin(WDCK) of IC25
and 16pin(WDCK) of IC28
 $f=31.25\text{KHz}$



7. TGL - DAC

From 153pin(BCKO) of IC8
To 14pin(BCK) of IC25
and 14pin(BCK) of IC28

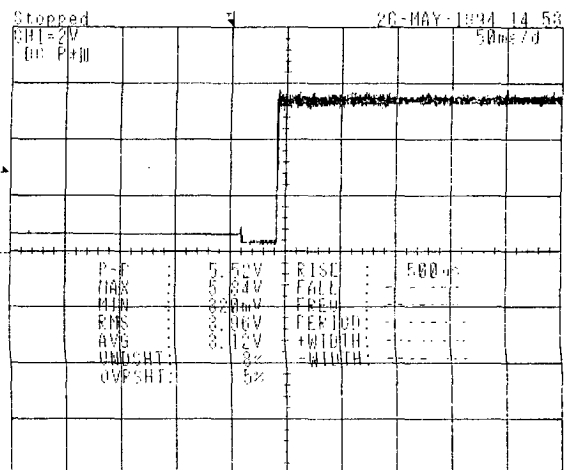
$f=2.00\text{MHz}$



8. RESET - CPU/MAP55A/SRAMs

From 7pin of IC16
To 8pin(REAET) of IC14,
89pin(XRES) of IC13,
30pin(CE2) of IC9
and 30pin(CE2) of IC10

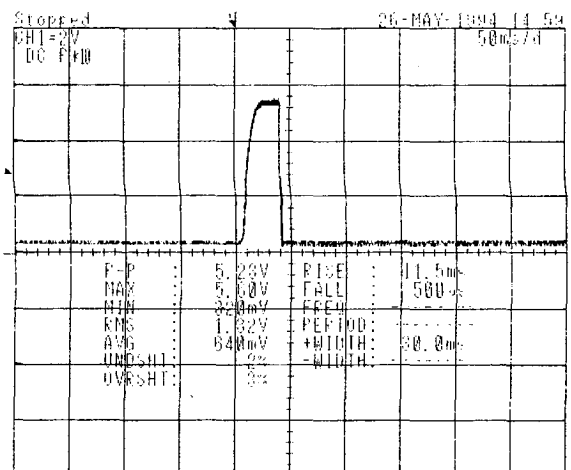
※ when turn the power on



9. RESET - FDD

From 5pin of IC16
To base of DT1(FN1A3Q)

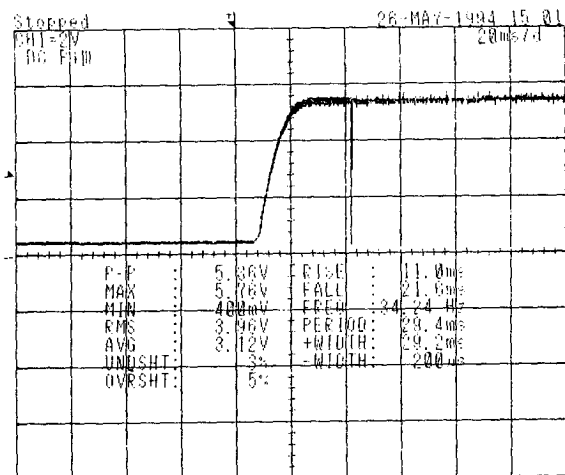
※ when turn the power on



10. CPU - TGL

From 15pin(P00) of IC14
To 2pin(RESET) of IC8

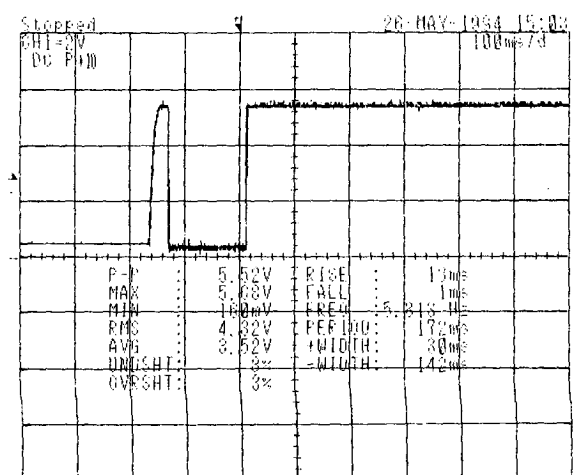
※ when turn the power on



11. CPU - NKS2

From 16pin(P01) of IC14
To 1pin(RESET) of IC19

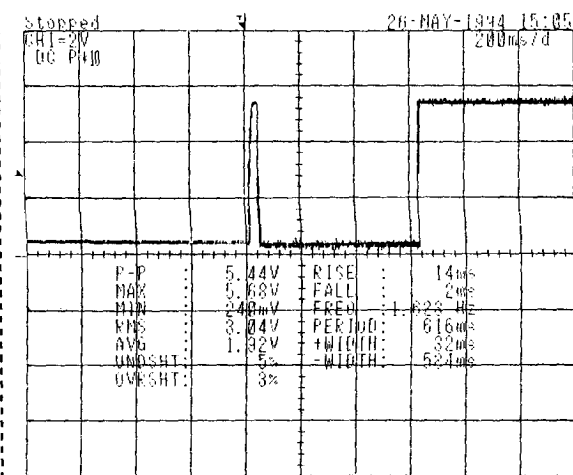
※ when turn the power on



12. CPU - FDC

From 17pin(P02) of IC14
To 3pin(RESET) of IC18

※ when turn the power on

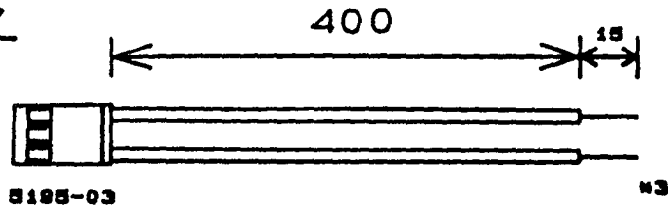


FOR HARNESS

HNS-1897

(INLET SOCKET)

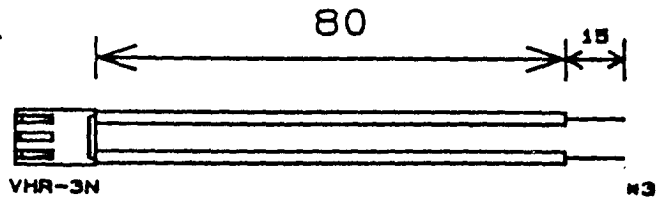
CN4A 3: YLW
2: NC
1: BLK



HNS-1898

(POWER SW)

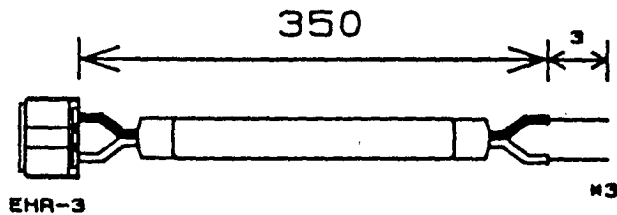
CN5A 3: BLK
2: NC
1: BLK



HNS-8004

(POWER TO LCD)

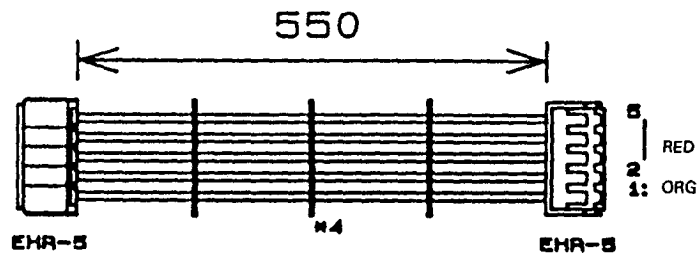
CN6A 3: BLK
2: NC
1: WH



HNS-8005

(POWER TO MAIN)

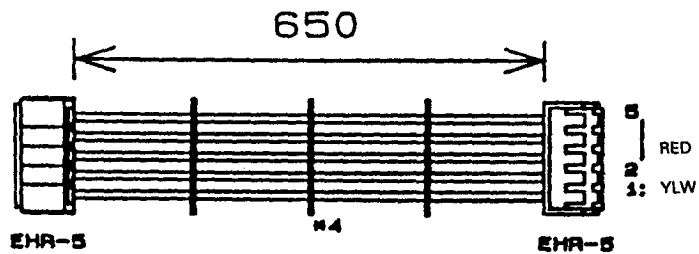
CN7A



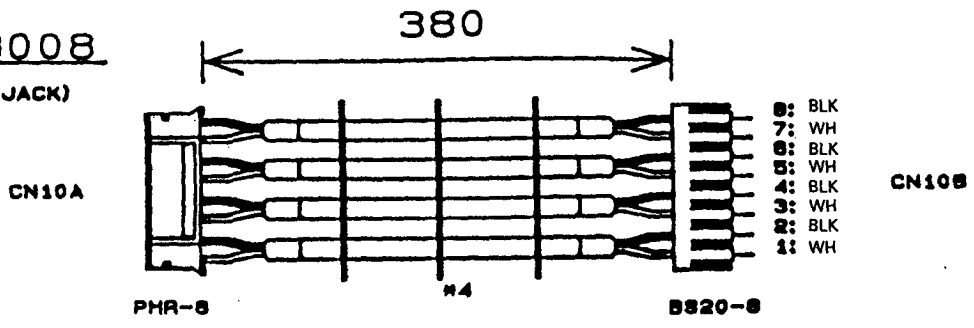
HNS-8006

(POWER TO JACK)

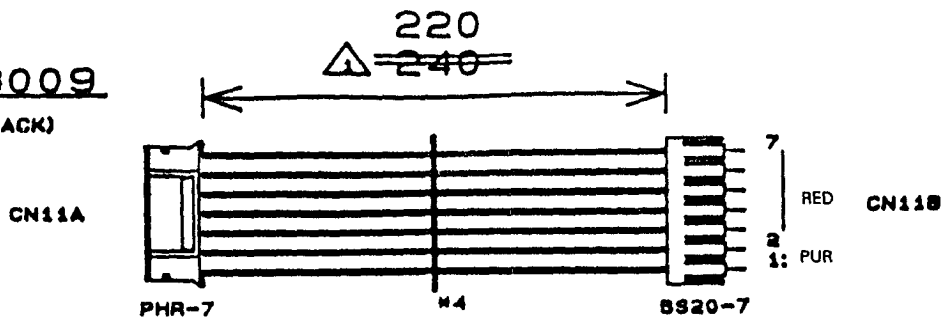
CN8A



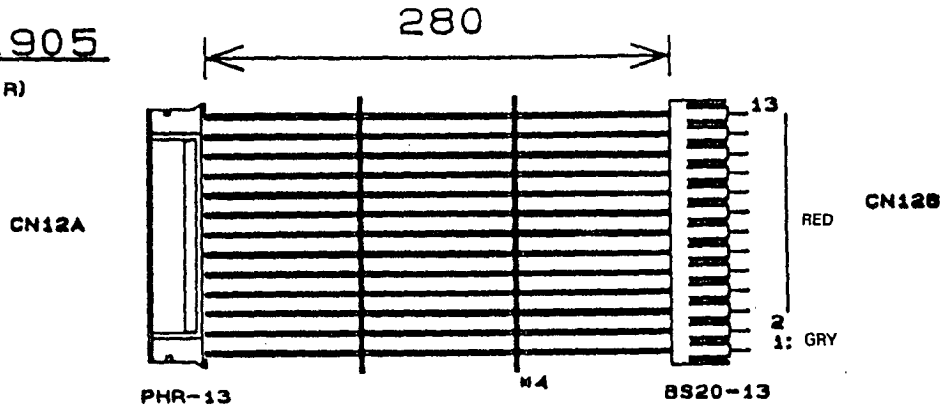
HNS-8008
(AUDIO JACK)



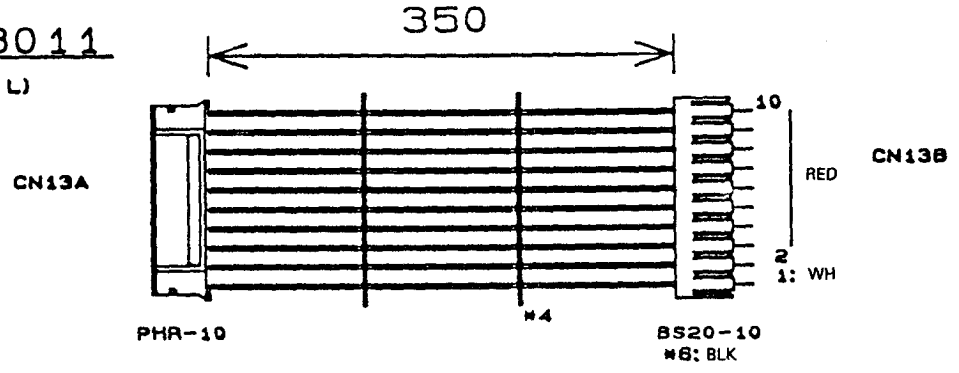
HNS-8009
(MIDI JACK)



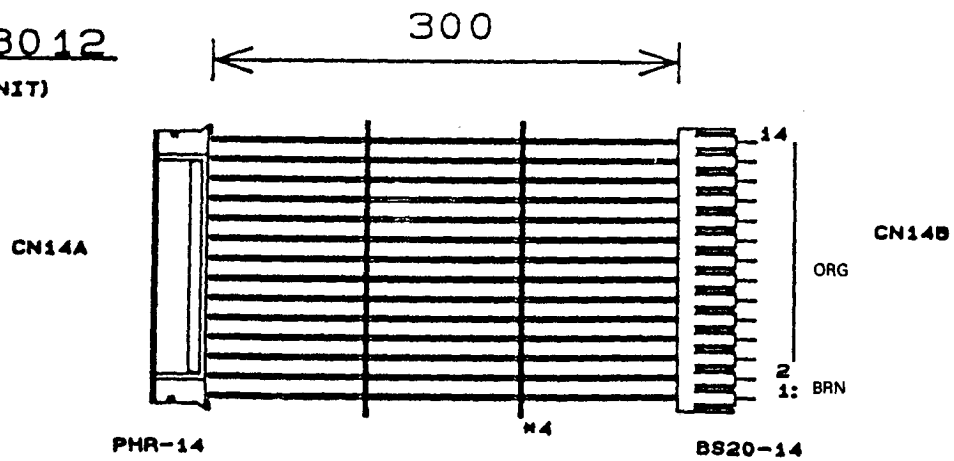
HNS-1905
(PANEL R)



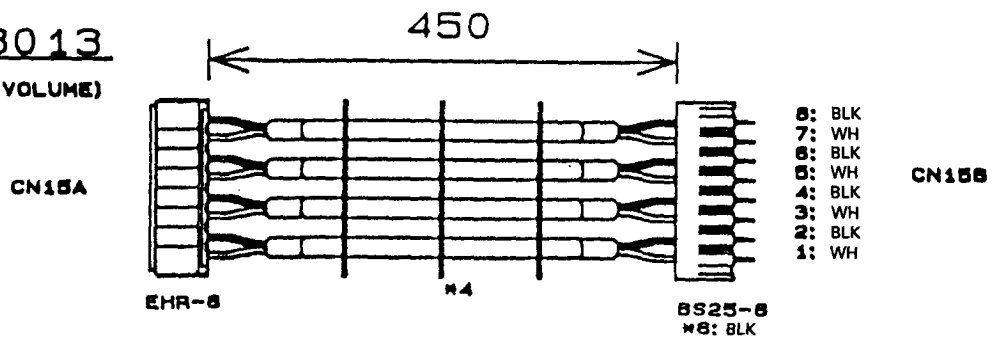
HNS-8011
(PANEL L)



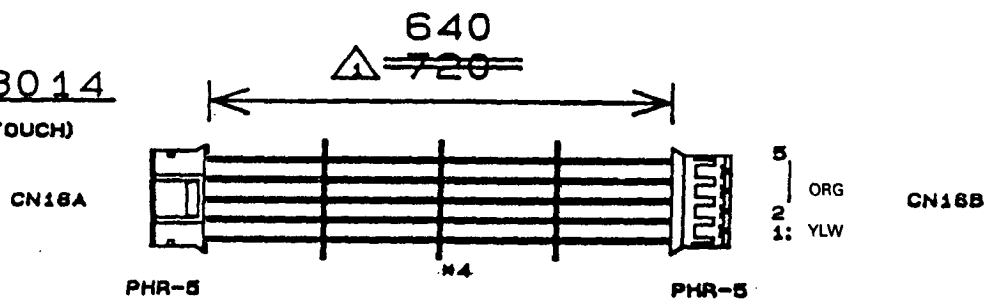
HNS-8012
(LCD UNIT)



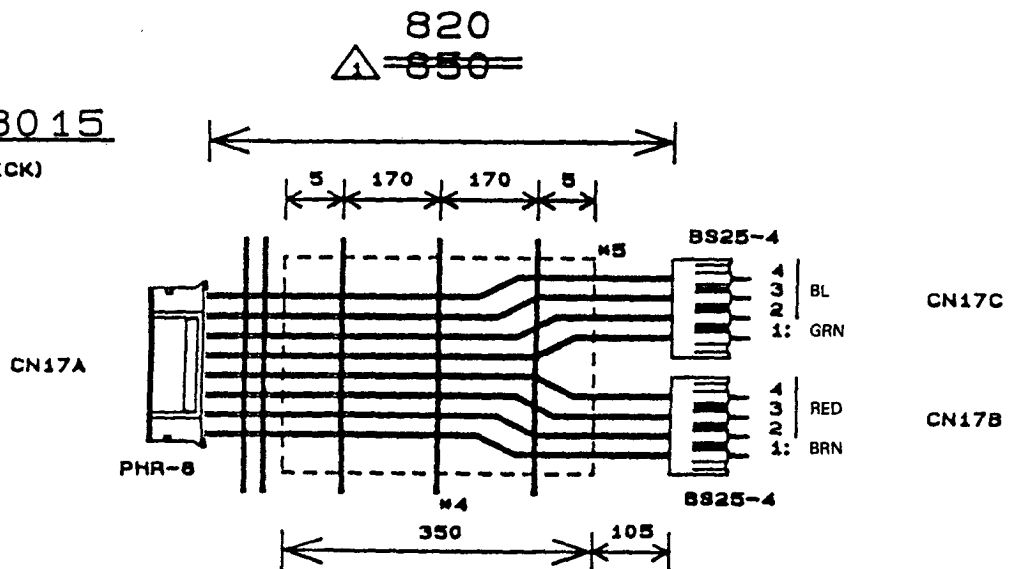
HNS-8013
(MASTER VOLUME)

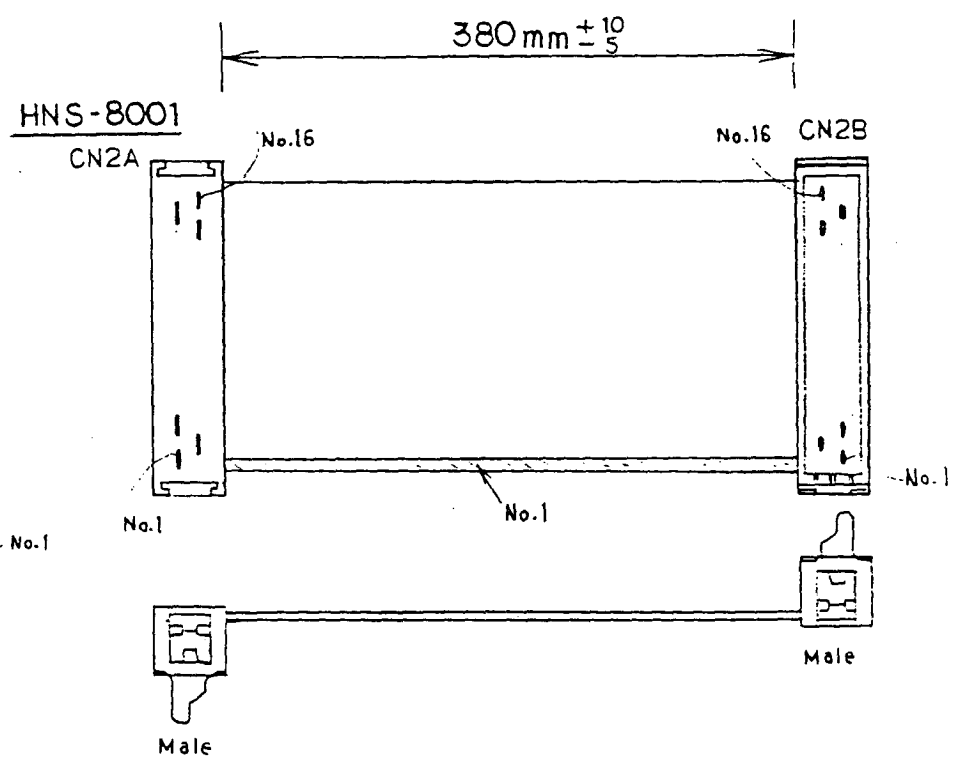
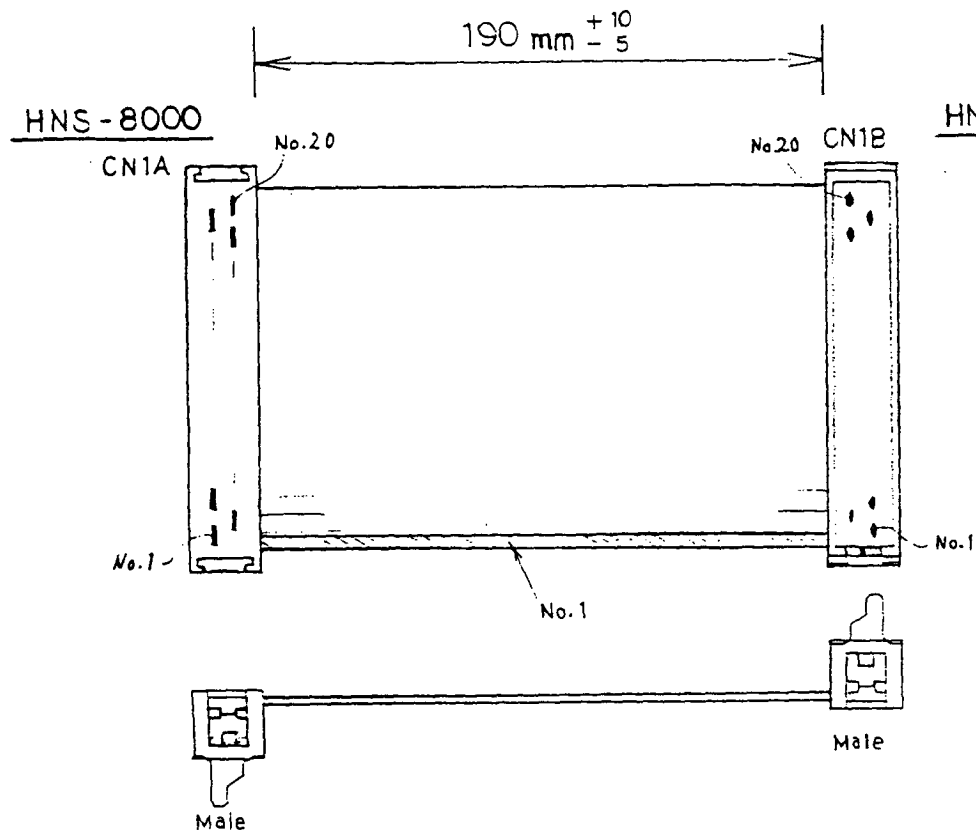


HNS-8014
(AFTER TOUCH)



HNS-8015
(JOY-STICK)





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

9. WAVE ROM SOUND LIST

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	...	...	001	...
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/IDENTIFICATION	P.C.BOARD	NOTE	Q'TY
001093700	P.C.BOARD KLM-937	M.PART	JACK	1
001093800	P.C.BOARD KLM-938	M.PART	AFTER TOUCH	1
001093900	P.C.BOARD KLM-939	M.PART	MAIN	1
001151100	P.C.BOARD KLM-1511/1512	M.PART	JOYSTICK	1
001164700	P.C.BOARD KLM-1647/48	M.PART	PANEL	1

002164900	POWER SUPPLY UNIT KLM-1649 JU	M.PART	117US	1
		M.PART	117CN	1
		M.PART	117EX	1
		M.PART	100JP	1
002165000	POWER SUPPLY UNIT KLM-1650 E	M.PART	220GE	1
		M.PART	240GE	1
		M.PART	240AU	1
		M.PART	240AF	1
		M.PART	230GE	1
		M.PART	230FR	1
		M.PART	230WG	1
		M.PART	230SC	1
		M.PART	240UK	1

313002800	LCD DMC50271N-SEW-B-1	1647		1

320001242	IC UPC4570HA	937	OP_AMP	2
320001316	IC UPD65612GF-015-3BE	939	CBR92	1
320001328	IC UPD70433GD-5BB	939	CPU	1
320001343	IC UPD23C16000BGX-385	939	WAVE_ROM(GM2	1
320001399	IC UPD23C16000BGX-825 (S)	939	WAVE_ROM(SWP	1
320004359	IC HD74HC05P	937	HC_MOS	1
320004538	IC HD63266F	939	FDC	1
320004556	IC HD6433332A01F	939	NKS2	1
320009001	IC NJM-4558D-V	938	OP_AMP	1
320011026	IC M5216L	937	OP_AMP	1
320012141	IC MBCS35104-001PF-G-BND	939	TGL	1
320012146	IC MB622E15PF-G-LBND	939	MAP55A	1
320012148	IC MB8316200A-15PF-G-402-HT	939	WAVE_ROM(GM1	1
320012179	IC MB834000B-15P-G-3RL	939	MASK_ROM	1
320013052	IC LH537FFS	939	WAVE_ROM	1
324001006	IC UPD74HCU04GS-E2 (SOP)	939	HC_MOS	1
324001015	IC UPC4570G2-E2 (SOP)	939	OP_AMP	4
324003006	IC TC511664BJ-80 EL	939	DRAM	1
324004050	IC HD74HC138FPER	939	HC_MOS	4
324009004	IC NJM78L05UA-TE2	939	REGULATER	1
324011002	IC M5223FP-600C (8P SOP)	939	OP_AMP	1
324011013	IC M62021FP-600C	939	RESET	1
324011022	IC M5M51008AFP-70L-TT4	939	SRAM	2
324012001	IC MB81464-10PD-G-BB-RS2-EF	939	DRAM	1
324036001	IC PCM69AU-T1	939	DAC	2

330001400	PHOTO COUPLER PC-910K	937		1

334000500	SB COIL SBT-0260 TF	937		8

335400080	CRYSTAL OSC SX-1 32.000MHZ	939		1
335400110	CERAMIC OSC CSACS25MX-040-TC	939		1
335400113	CERAMIC OSC CSACS20MX-040-TC	939		1

350002422	SEMI FIXED VR RH0615C J5 220K	938		1
350002447	SEMI FIXED VR RH0615C S5 470K	938		1

PART CODE	PART NAME/IDENTIFICATION	P.C.BOARD	NOTE	Q'TY
360023600	VR RK11K1140(X-011/012) 10KB	M.PART		2
362006400	VR RK09K1110 10KB	937		1
365007800	SLIDE VR RS30111AC00NB 10KB	1648		1
365008000	SLIDE VR RS30112AC00JB 10KBX2	1647		1
375010500	TOUCH SW EVQ-PAC09K-A	1647		19
		1648		18
375011500	POWER SW J-U3065#01	M.PART		1
420004900	KEYBOARD N.V TP/9SYNTH 76	M.PART		1
435001100	FDD EME213KR	M.PART		1
450002300	PHONE JACK LGR4502-5000 (STEREO)	937		3
450002400	PHONE JACK LGR4501-5000 (MONO)	937		4
480001324	IC SOCKET 32P DICF-32CS-E	939		1
480010380	DIN JACK YKF51-5041 (3P)	937		1
520001700	LITHIUM BATTERY CR2032VPX	M.PART		1
540012400	INLET SOCKET PA-125-10	M.PART		1
545020500	SMCD-24X520-BDX10(BL)-P1.25	M.PART		1
600003300	AC CORD UC-953-J01	M.PART	117US	1
		M.PART	117CN	1
600004800	AC CORD EC-472-J01	M.PART	230SE	1
600005100	AC CORD KP-610 GTBS-3 KS-31AY	M.PART	240UK	1
600005200	AC CORD SC-111-J01	M.PART	240AU	1
600005300	AC CORD DC-480-J01	M.PART	100JP	1
600005400	AC CORD EC-652-E03	M.PART	220GE	1
		M.PART	240GE	1
		M.PART	240AF	1
		M.PART	230GE	1
		M.PART	230FR	1
		M.PART	230WG	1
		M.PART	230SC	1
600005500	AC CORD UC-948-J01	M.PART	117EX	1
620019700	X-631 SLIDE VR KNOB KOC-E40239	M.PART		2
620024600	X-952 POWER SW KNOB E40304-2	M.PART		1
630018900	X-115 LCD WINDOW KOC-E40352	M.PART		1
630019300	X-115 SHIELD SHEET KOC-C30414	M.PART		1
641019800	X-952 L TYPE ANGLE	M.PART		4
641021900	X-943 JACK PLATE	937		1
641039400	X-115 FDD ANGLE KOC-C20273	M.PART		1
641039500	X-115 PU CHASSIS KOC-C30411	M.PART		1
641039700	X-115 METAL FITTING OF POWER SW	M.PART		1
641041110	X-316 SUPPORT RAIL KOC-C20276	M.PART		1
641041145	X-316 PANEL KOC-C10145	M.PART		1
641041146	X-316 LOWER CASE KOC-C10146	M.PART		1
641041147	X-316 KB SUPPORT L KOC-C30425	M.PART		1
641041148	X-316 KB SUPPORT R KOC-C40940	M.PART		1
644006200	X-011/012 WHEEL SPRING	M.PART		2

PART CODE	PART NAME/IDENTIFICATION	P.C.BOARD	NOTE	Q'TY
646038900	X-011/012 JOYSTICK FRAME	M.PART		1
646039000	X-011/012 VR PLATE	M.PART		1
646039100	X-011/012 WHEEL SUPPORT	M.PART		1
646039200	X-011/012 JOYSTICK LEVER	M.PART		1
646039300	X-011/012 JOYSTICK WHEEL	M.PART		1
646039400	X-011/012 CARD GUIDE	M.PART		1
646039500	X-011/012 CARD SLOT	M.PART		1
646040000	X-011/012 JOYSTICK COVER	M.PART		1
646046600	X-115 SIDE PLATE L E10084/85	M.PART		1
646046800	X-115 KNOB BLOCK L KOC-E10087	1647		1
646046900	X-115 KNOB BLOCK R KOC-E10088	1647		1
646048500	X-316 SIDE PLATE R KOC-E10095	M.PART		1
646048600	X-316 CP COVER KOC-E30186	M.PART		1
649007400	BATTERY HOLDER	939		1

FATAR KEYBOARD ASS'Y PARTS LIST

PART CODE	PART NAME/IDENTIFICATION
422008518	TP/9S AFTERTOUCH UNIT 76 NOTE
422008519	TP/9S OCTAVE WHITE KEYS 76NOTE
422008520	TP/9S OCTAVE BLACK KEYS 76NOTE
422008521	TP/9S KEY SPRING 76 NOTE
422008522	TP/9S KEY CONTACT BOARD LOWER
422008523	TP/9S KEY CONTACT BOARD UPPER
422008524	TP/9S KEY CONTACT RUBBER 12 POINTS
422008525	TP/9S KEY CONTACT RUBBER 1 POINT
422008532	TP/9S LOWEST WHITE KEY 76NOTE
422008533	TP/9S HIGHEST WHITE KEY 76NOTE

VAROITUS

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

ADVARSEL!

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

ADVERSEL

Lithiumbatteri – Eksplosjonsfare.
Ved utskifting benyttes kun batteri som
anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverand ø 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

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