SERVICE MANUAL

X3

MUSIC WORKSTATION

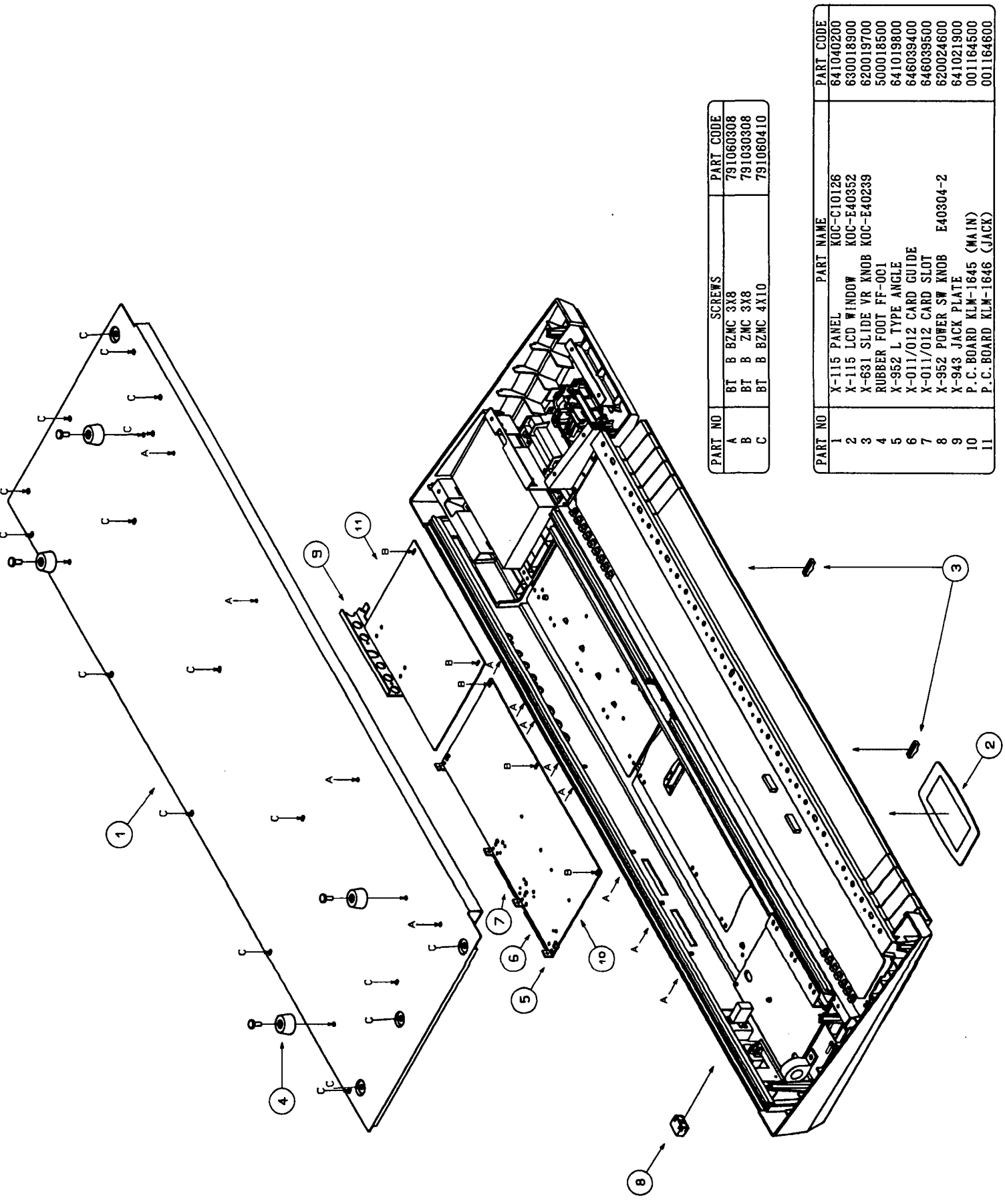
CONTENTS

KORG

1. SPECIFICATIONS

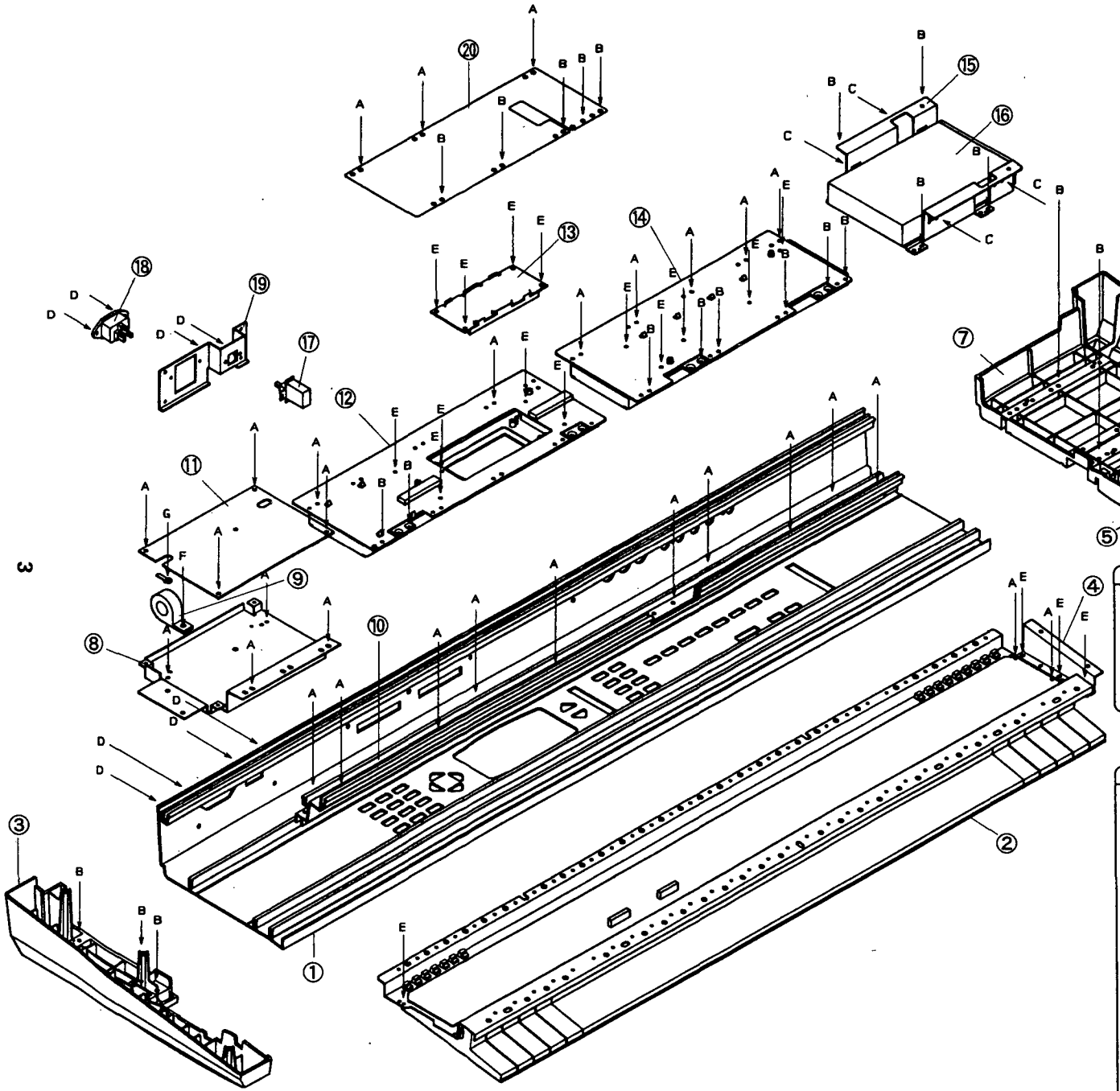
Tone generation method	: AI square synthesis system (full digital processing)
Tone generator	: 32 voices 32 oscillators (Single Mode) 16 voices 32 oscillators (Double Mode)
Keyboard	: 61 key with after touch sensor LC-61
Waveform memory	: 16M bit Mask ROM x 3 340 MULTI sounds & 164 Drum sounds
Quantization	: 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	: L/MONO, R & 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	: 1,055(W) x 338.3(D) x 96(H)mm
Weight	: 10kg
Power consumption	: 10W

2. STRUCTURAL DIAGRAM



PART NO	SCREWS	PART CODE
A	BT B BZMC 3X8	791060308
B	BT B ZMC 3X8	791030308
C	BT B BZMC 4X10	791060410

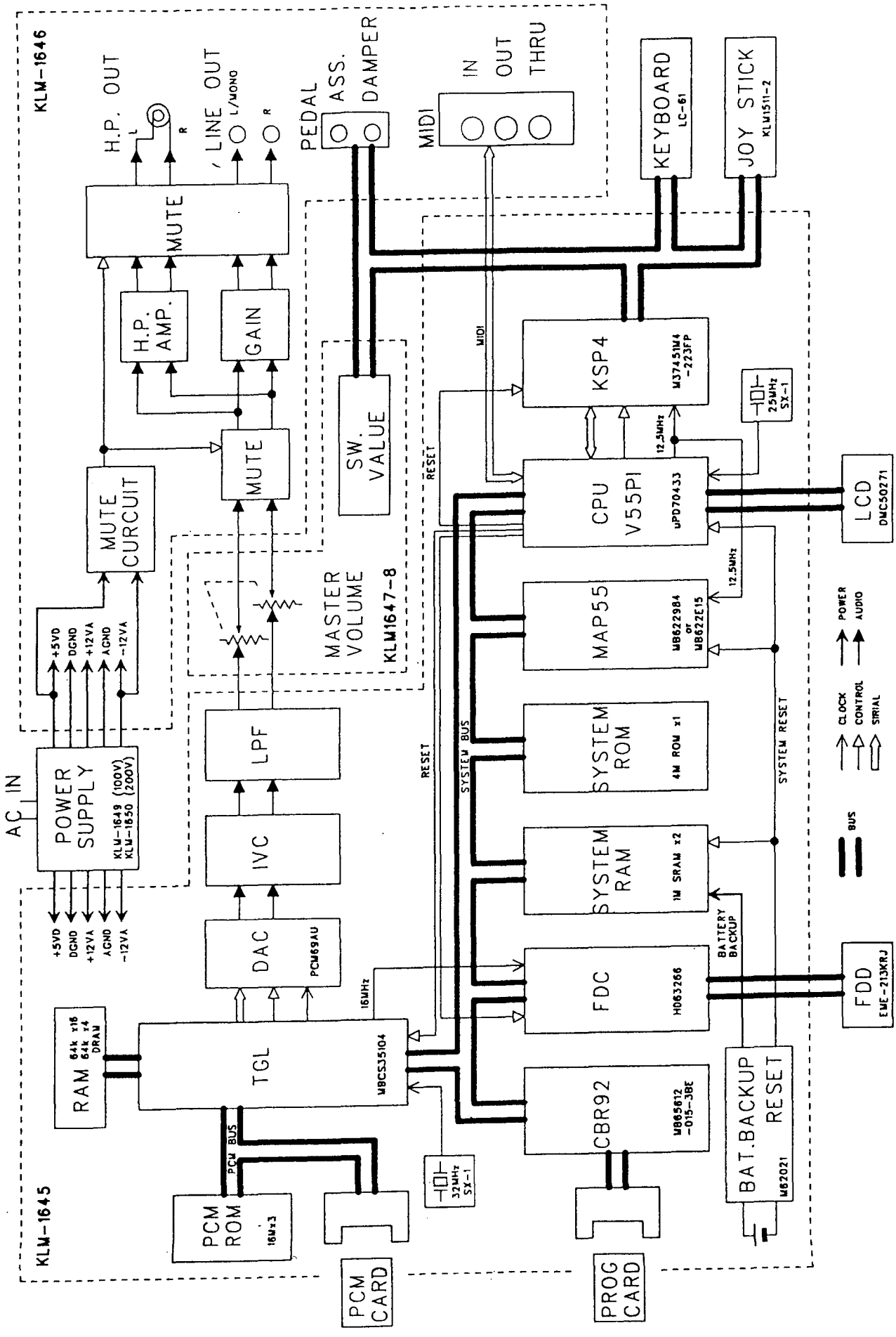
PART NO	PART NAME	PART CODE
1	X-115 PANEL KOC-C10126	641040200
2	X-115 LCD WINDOW KOC-E40352	630018900
3	X-631 SLIDE VR KNOB KOC-E40239	620019700
4	RUBBER FOOT FF-001	500018500
5	X-952 L TYPE ANGLE	641019800
6	X-011/012 CARD GUIDE	646039400
7	X-011/012 CARD SLOT	646039500
8	X-952 POWER SW KNOB E40304-2	620024600
9	X-943 JACK PLATE	641021900
10	P.C.BOARD KLM-1645 (MAIN)	001164500
11	P.C.BOARD KLM-1646 (JACK)	001164600



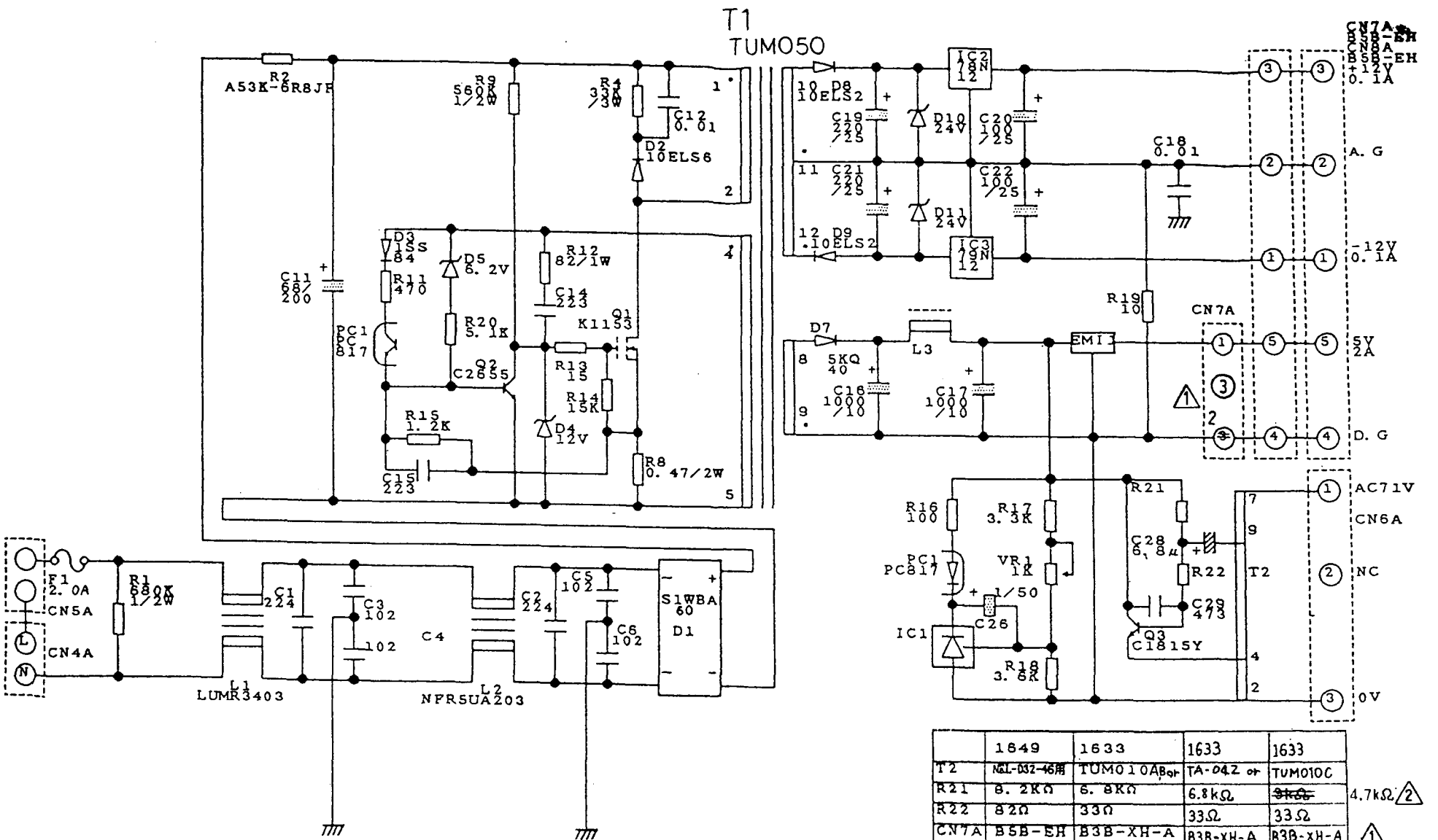
PART NO	SCREWS	PART CODE
A	BT B ZMC 3X8	791030308
B	BT B ZMC 3X10	791030310
C	CT B ZMC 3X6	715230306
D	BT B BZMC 3X8	791060308
E	BT B ZMC 3X8	791030308
F	BT B BZMC 4X10	791060410
G	TS SSE ZMC 4X10	715130411

PART NO	PART NAME	PART CODE
1	X-115 PANEL KOC-C10126	641040200
2	KEYBOARD NEW LC-61	420004700
3	X-115 SIDE PLATE R KOC-E10086	646046700
4	X-115 KB SUPPORT KOC-C40913	641039600
5	JOYSTICK ASSEMBLY	---------
6	X-115 CP ANGLE KOC-C40916	641039900
7	X-115 SIDE PLATE L E10084/85	646046600
8	X-115 PU CHASSIS KOC-C30411	641039500
9	DATA LINE FILTER ESD-R-25D-B	525000100
10	X-115 SUPPORT RAIL KOC-C20272	641040000
11	POWER SUPPLY UNIT KLM-1649 JU	002164900
11	POWER SUPPLY UNIT KLM-1650 E	002165000
12	P.C.BOARD KLM-1648 (PANEL)	001164700
13	LCD DMC50271N-SEW-B-1	313002800
14	P.C.BOARD KLM-1647 (PANEL)	001164700
15	X-115 FDD ANGLE KOC-C20273	641039400
16	FDD EME213KRJ	430008107
17	POWER SW J-U3065#01	375011500
18	INLET SOCKET PA-125-10	540012400
19	X-115 METAL FITTING OF POWER SW	641039700
20	X-115 SHIELD SHEET KOC-C30414	630019300

3. BLOCK DIAGRAM

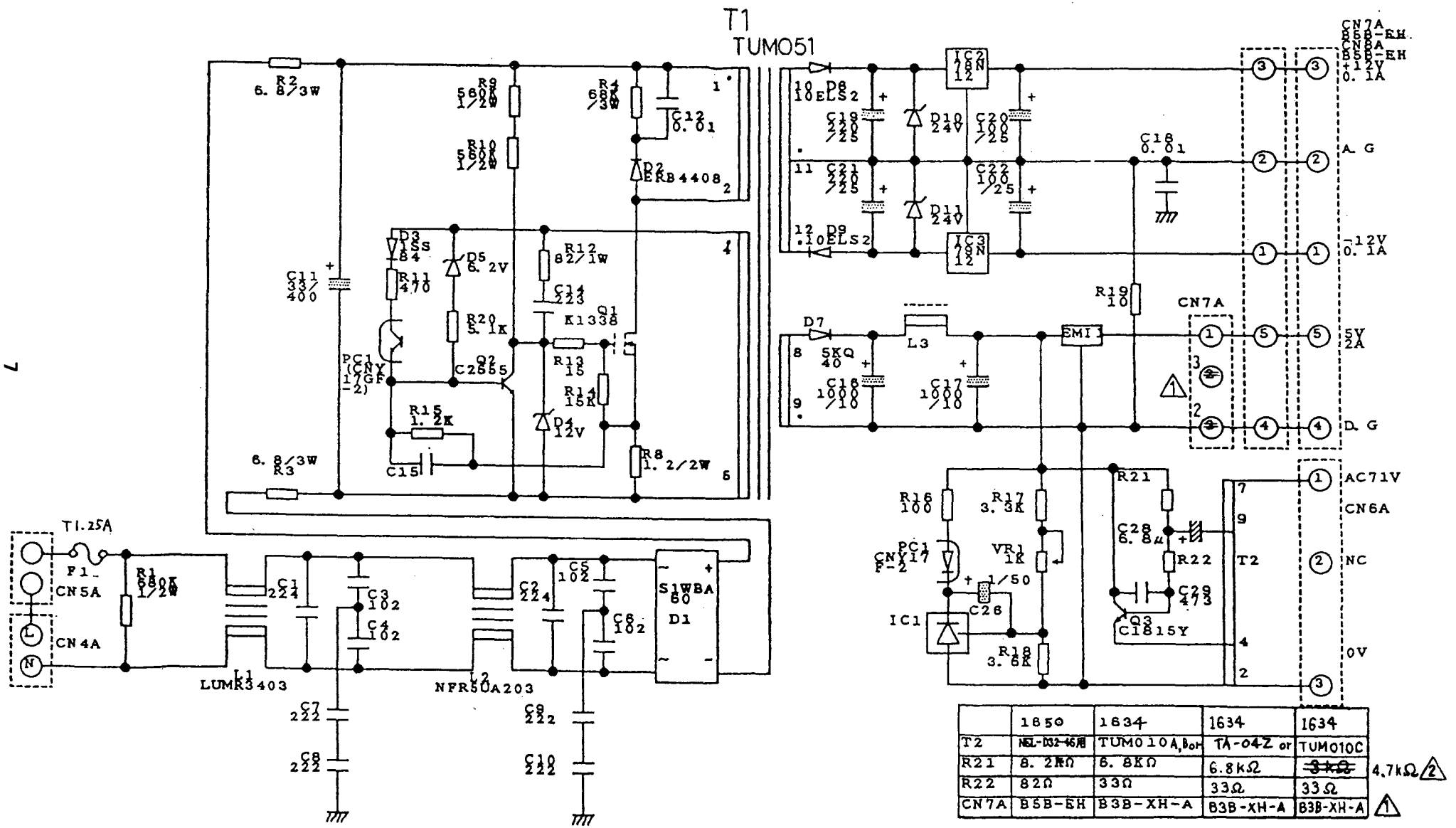


4. CIRCUIT DIAGRAM



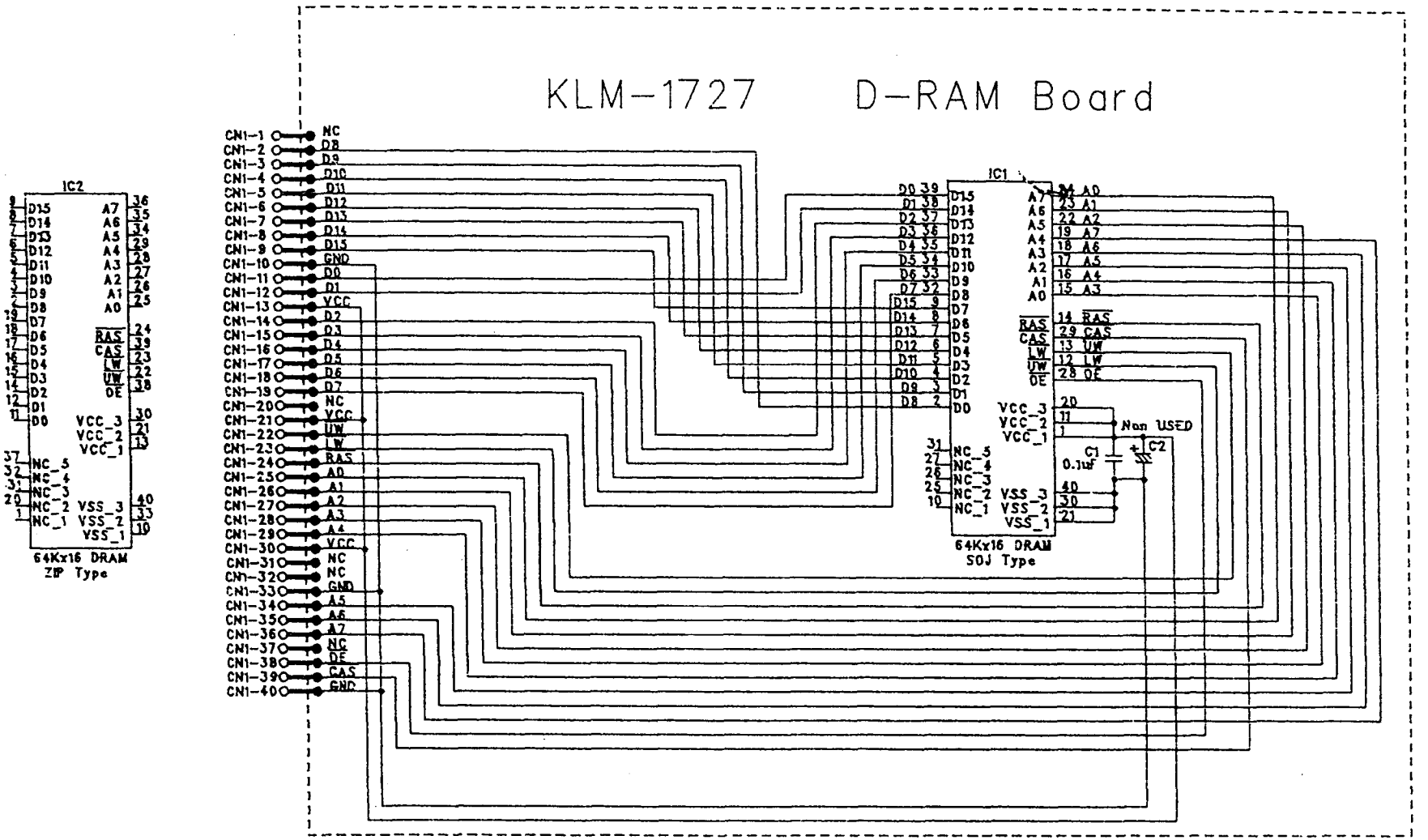
	1649	1633	1633	1633
T2	N&L-032-46用	TUM010A or	TA-042 or	TUM010C
R21	8.2KΩ	6.8KΩ	6.8kΩ	~~91kΩ~~ 4.7kΩ △2
R22	82Ω	33Ω	33Ω	33Ω
CN7A	B5B-EH	B3B-XH-A	B3B-XH-A	B3B-XH-A △1

KLM-1650



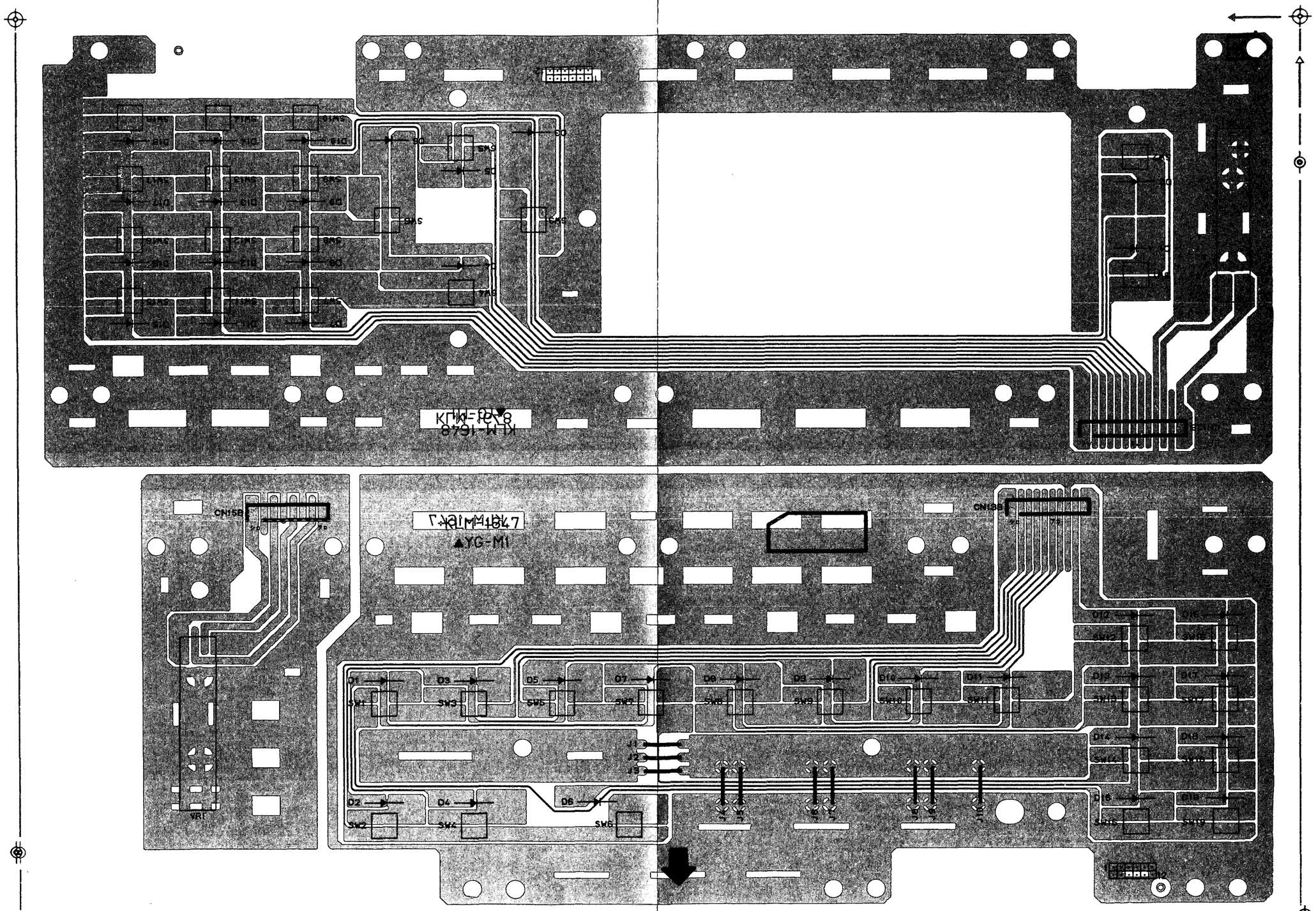
	1650	1634	1634	1634
T2	NEL-D32-46A	TUM010A, B or	TA-04Z or	TUM010C
R21	8.2kΩ	6.8kΩ	6.8kΩ	~~3kΩ~~ 4.7kΩ ⚠2
R22	82Ω	33Ω	33Ω	33Ω
CN7A	B5B-EH	B3B-XH-A	B3B-XH-A	B3B-XH-A ⚠1

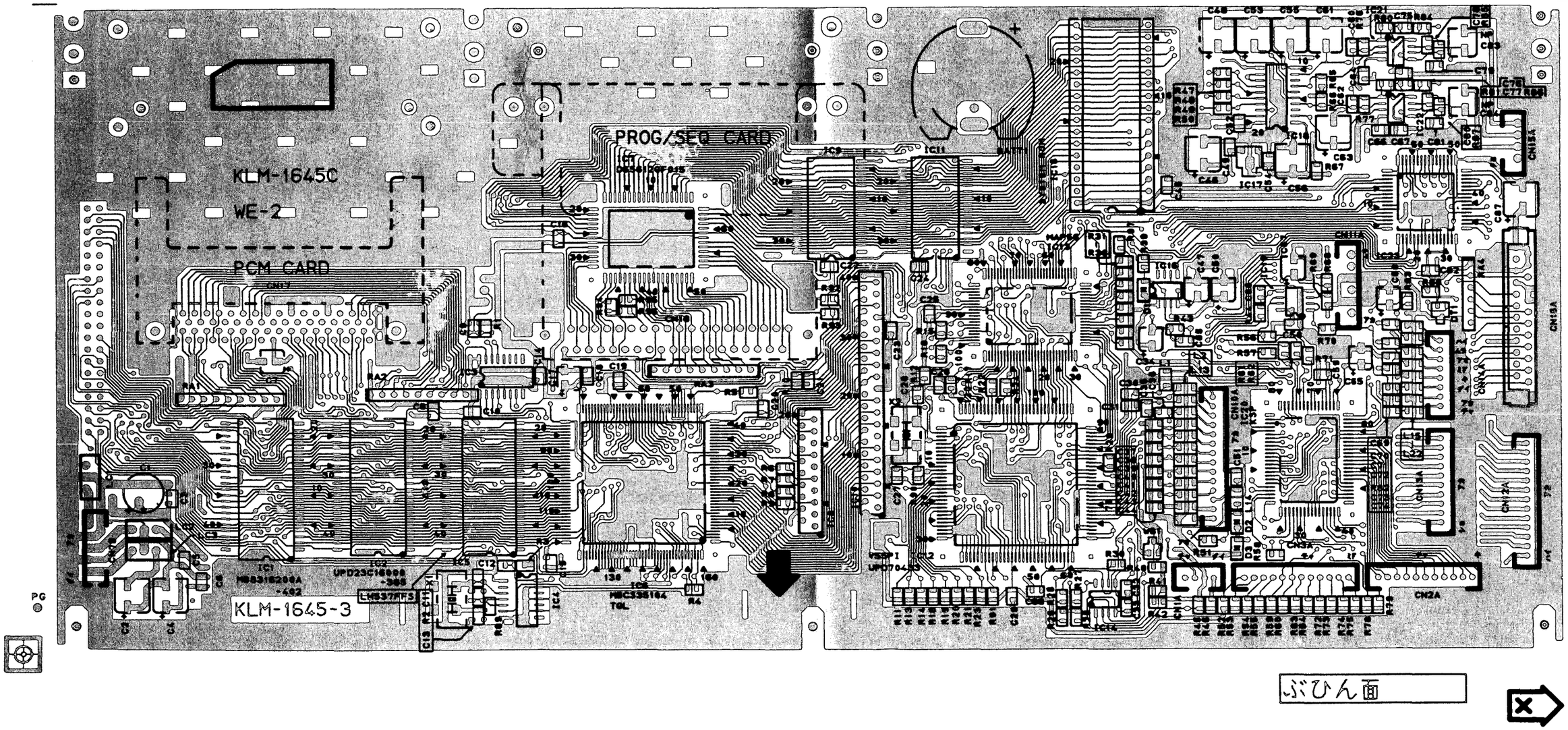
KLM-1727


KLM-1727 D-RAM Board
IC2
64Kx16 DRAM
ZIP Type
IC1
64Kx16 DRAM
SOJ Type
Non USED
C1
0.1uF
C2

5. P.C. BOARDS

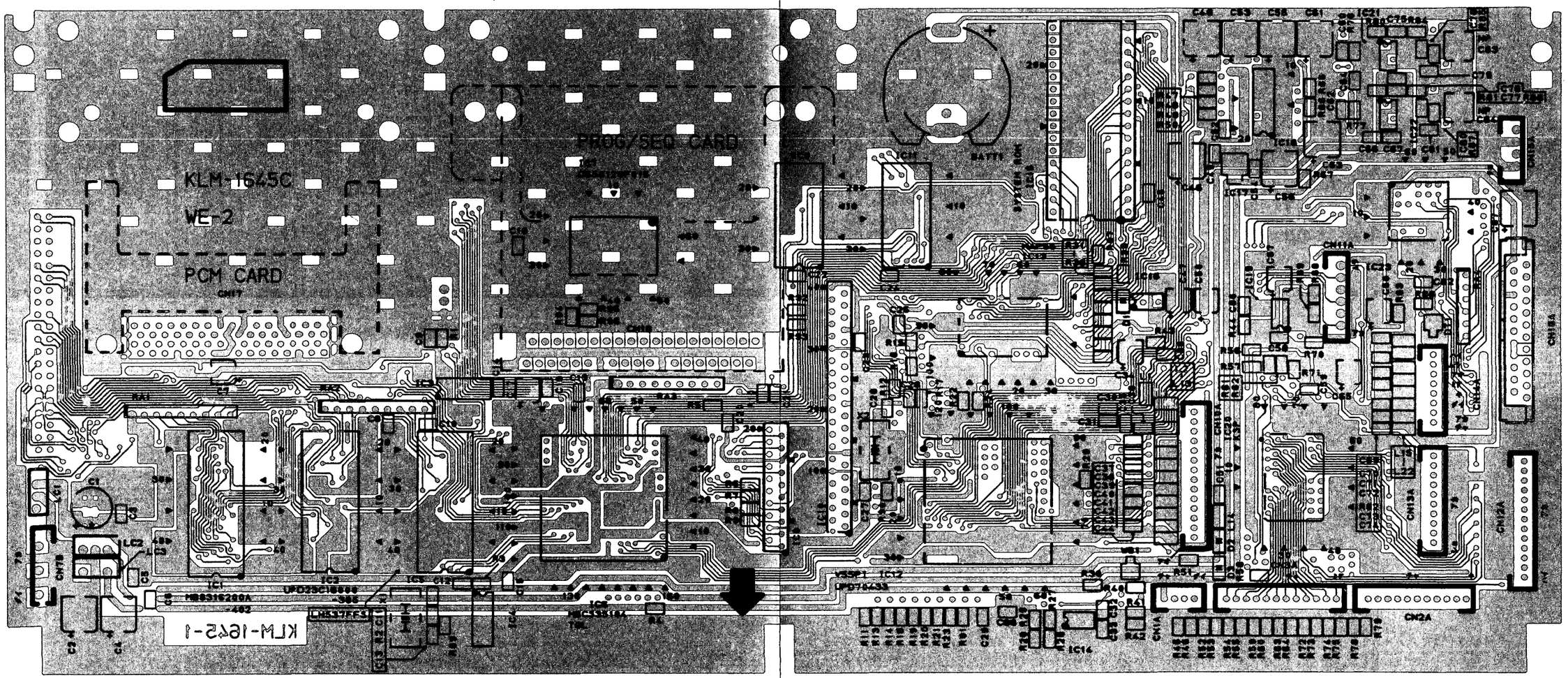
KLM-1647 KLM-1648



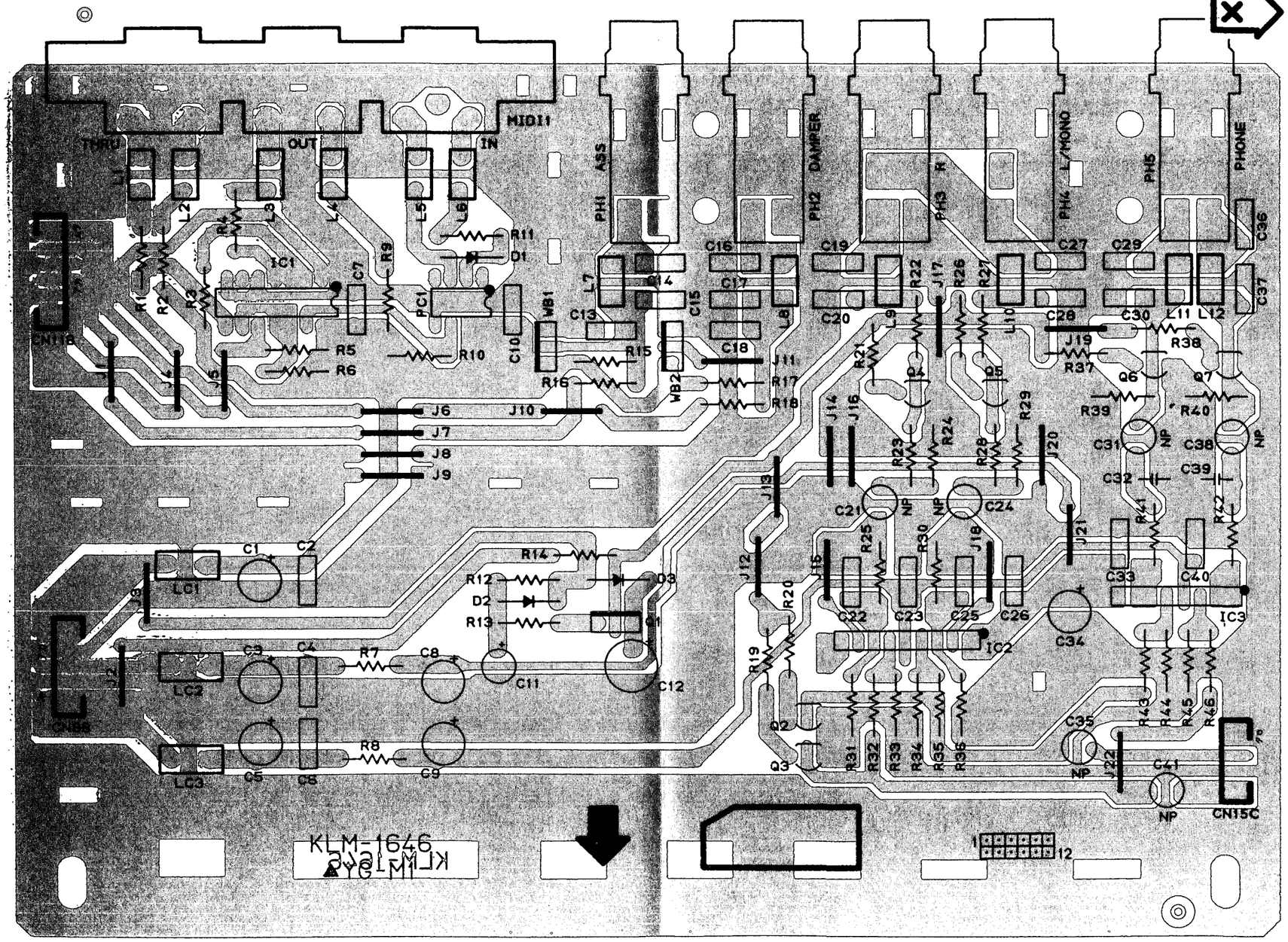


COMPONENT SIDE

KLM-1645c



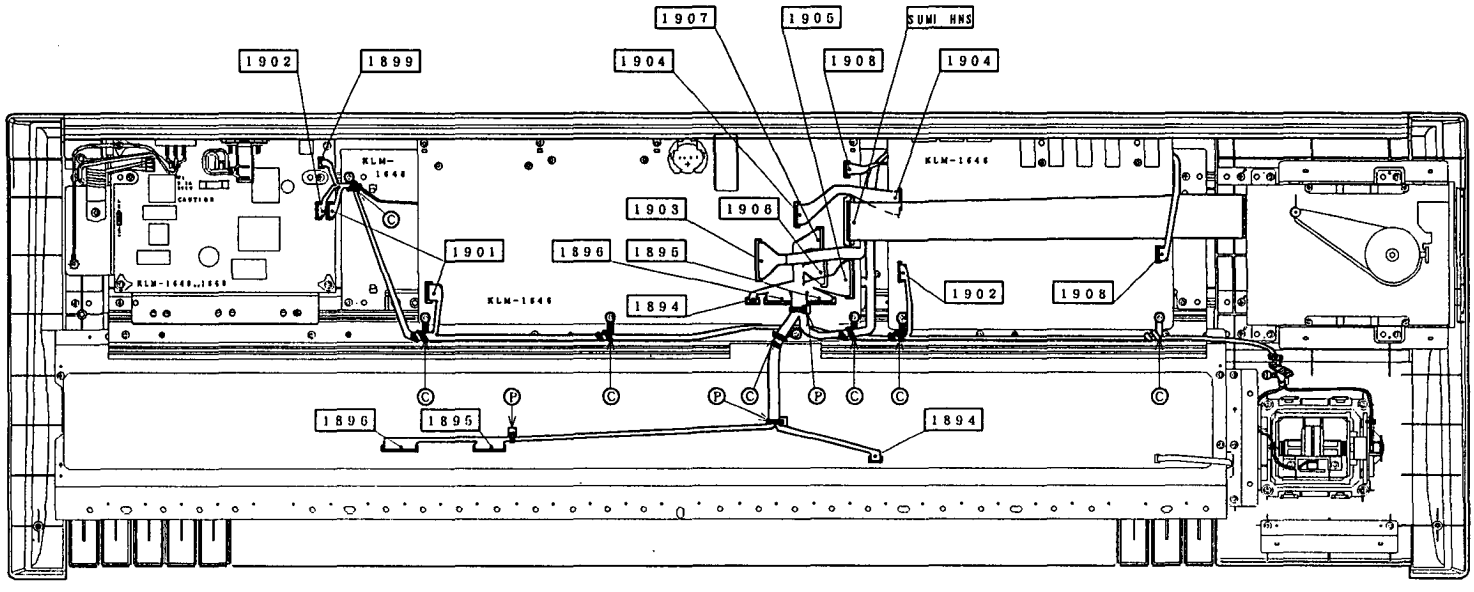
NO COMPONENT SIDE


MIDI
THRU
OUT
IN
PH1 ASS
PH2 DAMPER
PH3 R
PH4 L/MONO
PHS
PHONE
CN11B
CN15B
CN15C
IC1
IC2
IC3
LC1
LC2
LC3
D1
D2
D3
Q1
Q2
Q3
Q4
Q5
Q6
Q7
WB1
WB2
NP
KLM-1646

6. HOW TO DISASSEMBLY

1.Remove the Bottom Plate

1) Remove all the screws on the bottom plate and carefully lift the plate.
   [BT B BZMC 3×8] ×4
   [BT B BZMC 4×10] ×18



2.Remove the Main board(KLM-1645)

1) Unplug all the harnesses on the KLM-1645 board.
2) Remove 3pcs. of the screws on the side of the keyboard.
   [BT B ZMC 3×8] ×3
3) Remove 4pcs. of the screws on the back side
   and remove the KLM-1645 board.
   [BT B BZMC 3×8] ×4

3.Remove the Analog board(KLM-1648)

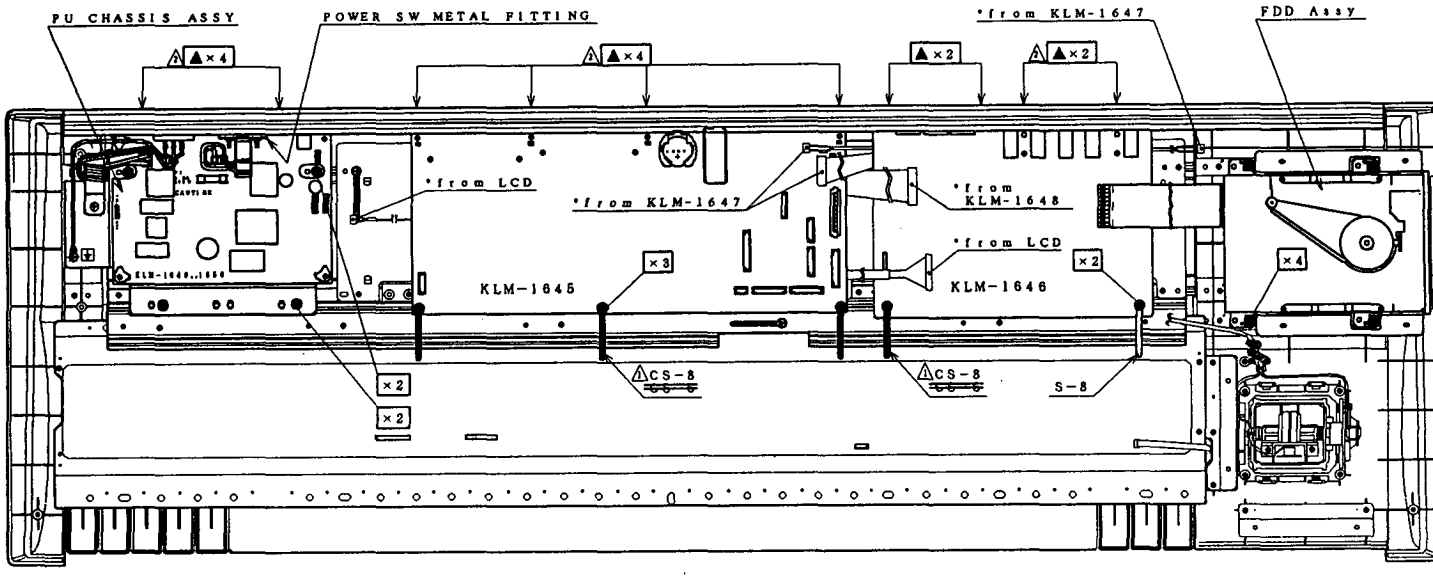
1) Unplug all the harnesses on the KLM-1648 board.
2) Remove 2pcs. of the screws on the side of the keyboard.
   [BT B ZMC 3×8] ×2
3) Remove 4pcs. of the screws on the back side
   and remove the KLM-1648 board.
   [BT B BZMC 3×8] ×4

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
3) Remove 4pcs. of the screws on the back side
   and remove the power supply unit assembly
   [BT B BZMC 3×8] ×4

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



6.Remove the LCD Unit

1) Remove 9pcs. of the screws on the KLM-1648 board
   and remove the shield sheet.
   [BT B ZMC 3×8] ×4
   [BT B ZMC 3×10] ×5
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
3) Remove 3pcs. of the screws on the LCD and remove the LCD unit.
   [BT B ZMC 3×8] ×3

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

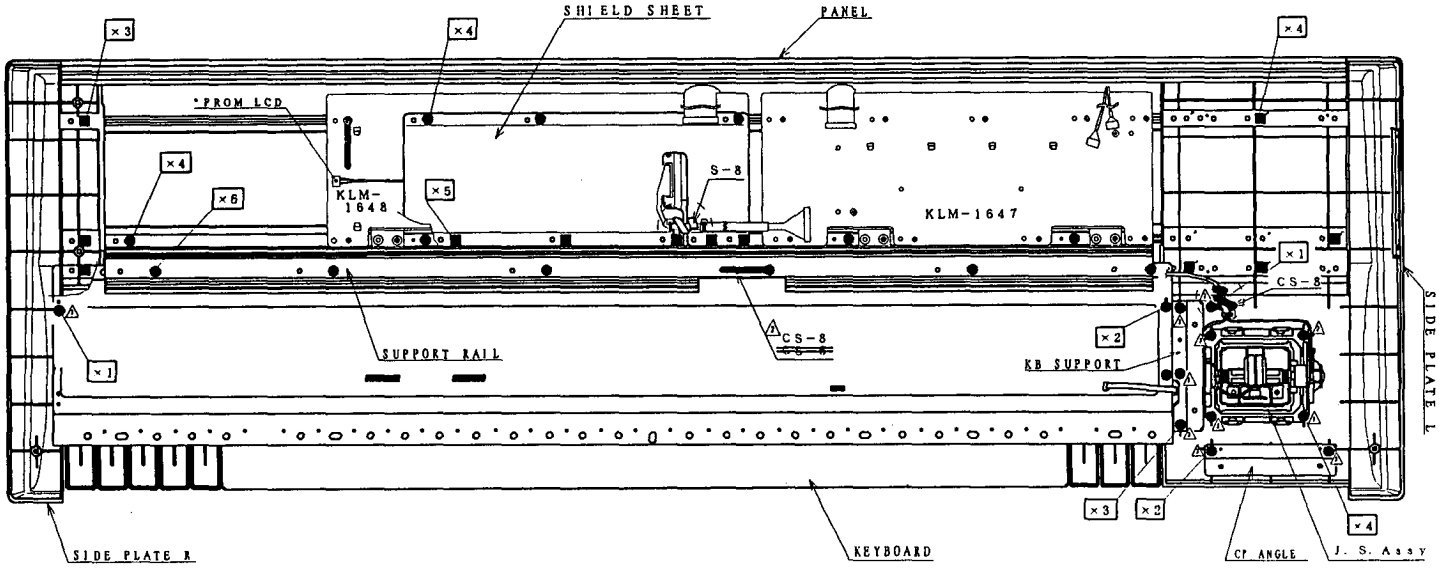
1) Remove 2pcs. of the screws on the KLM-1648 board
   and remove the KLM-1648 board.
   [BT B ZMC 3×8] ×1
   [BT B ZMC 3×10] ×1
2) Remove 9pcs. of the screws on the KLM-1647 board
   and remove the KLM-1647 board.
   [BT B ZMC 3×8] ×5
   [BT B ZMC 3×10] ×4

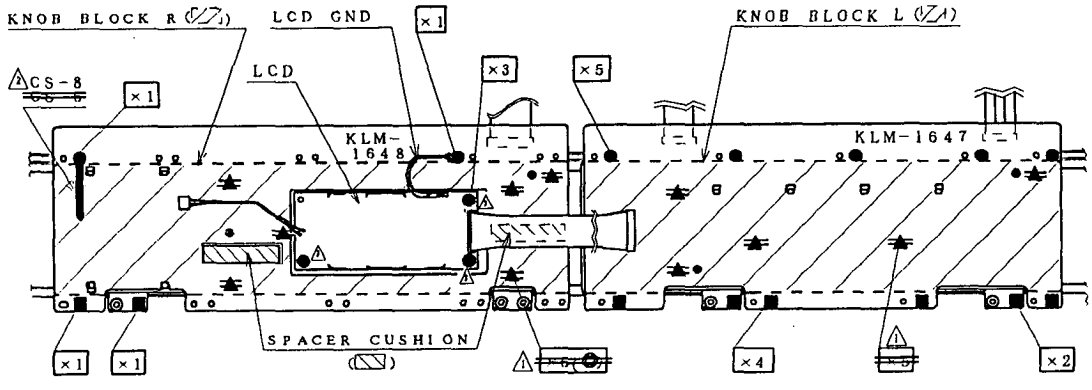
8.Remove the Keyboard

1) Remove 6pcs. of the screws on the support rail.
   [BT B ZMC 3×8] ×6
2) Remove 4pcs. of the screws on the keyboard and remove the keyboard.
   [BT B ZMC 3×8] ×4

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

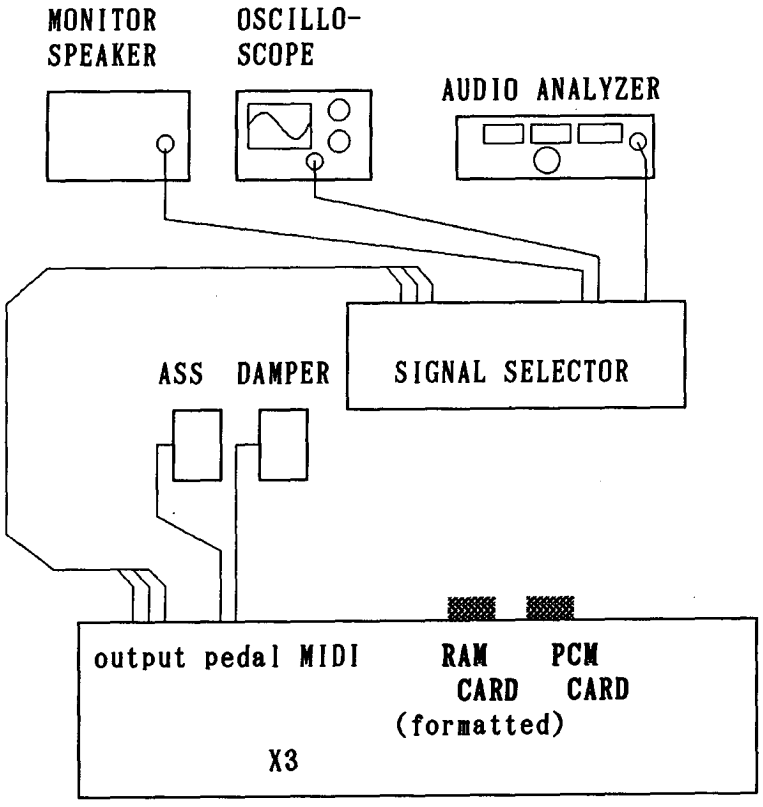




7. DIAGNOSTIC TEST

The X3 has a test mode for checking numerous functions.
When the test mode is activated, the X3 internal data is initialized. Hence, if the X3 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 RAM 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** (Interanl 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** (Interanl 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.

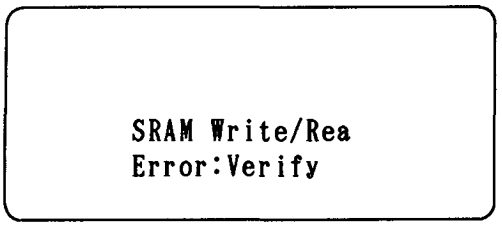
Ordinarily, ☆ is used.

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

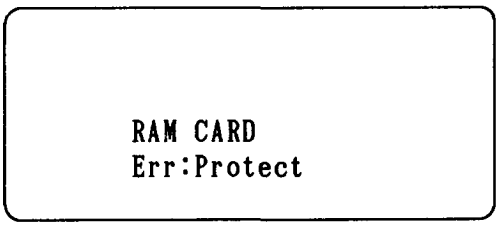
Cursor key [▶]: Move forward
Cursor key [◀]: Move backward

* **<Error Messages>**

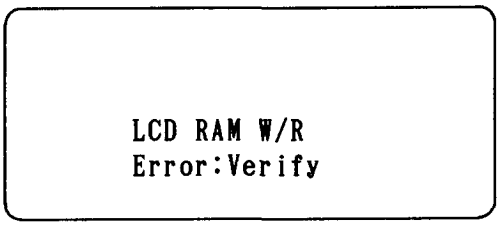
Internal RAM Test
- When an error occurs in the RAM data bus



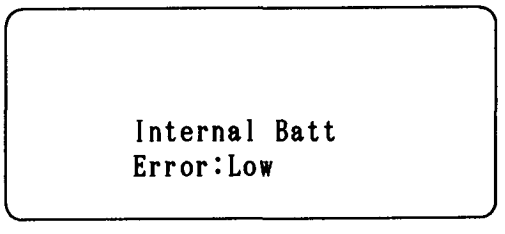
Card RAM Test
- When the protect switch is on



LCD RAM Test
- When an error occurs in the LCD data bus

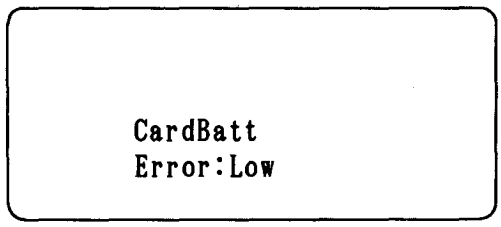


Internal Battery Test
- When the internal battery is low, or when a battery is not loaded



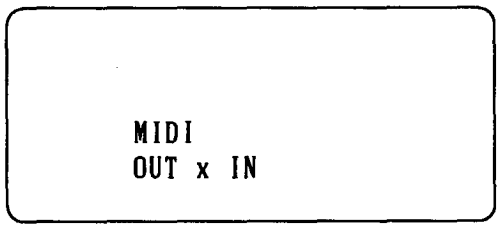
Card Battery Test

- When the RAM card is low, or when the battery is not set



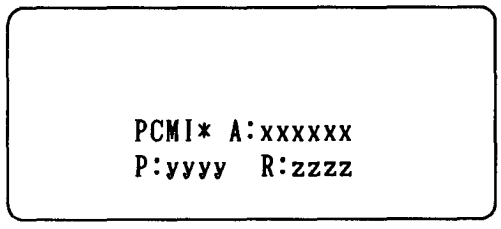
MIDI Loop Test

- When the MIDI cable is not connected



PCM ROM TG I/F Test

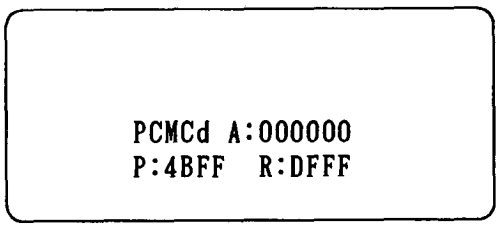
- When an error occurs in the PCM ROM data bus



*: 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 TG I/F Test

- When a PCM card (XSC-801) is not set



* **<External Test>**

<Panel SW Test> External Test#01

- This test is done by pressing the switches in the order 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.

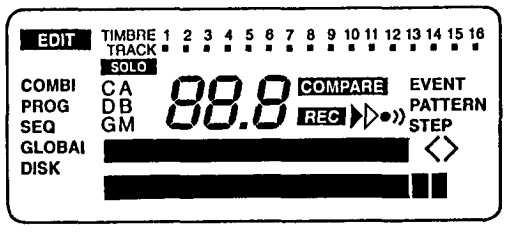
- If the check of [ENTER] is normal, the system automatically moves on to the next test.

<LCD Pixel & FDD Test> External Test#02

Step 1 Checking that LCD pixels light

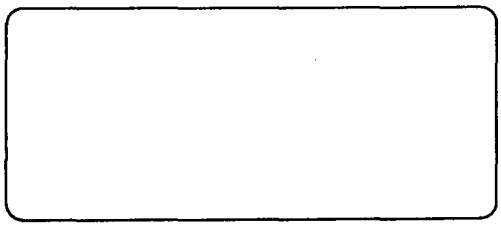
- Press ENTER and check that all the LCD pixels are lit.

Here, also move the VALUE slider 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.

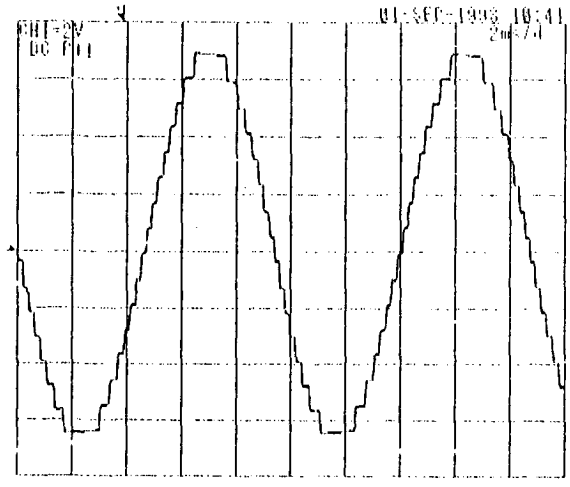
<MDE Test> External Test#03

- 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.

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

Fig. 1



<Noise Test> External Test#04

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 -87.0[dBu] or less as on the table 1.

OUTPUT L/MONO
OUTPUT R
PHONE L
PHONE R

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

<Output Test> External Test#05

- 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 turned, and that the level of the waveform goes to 0 when the master VR is turned 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 L/MONO
OUTPUT R
PHONE L
PHONE R

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

Fig. 2

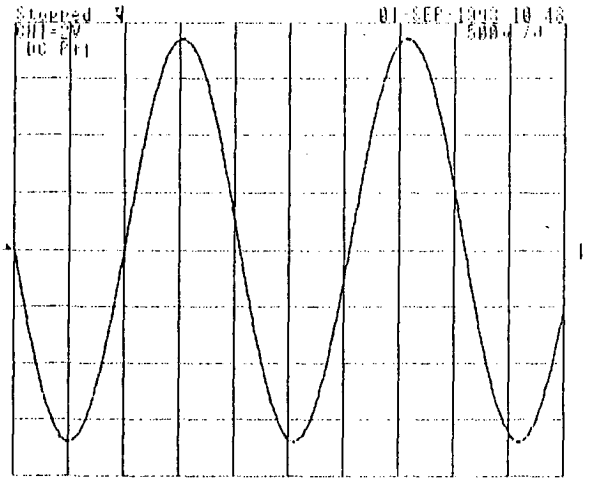


Table 1 Residual noise, and specified ranges of output signal levels

	Residual noise	Output signal level	Frequency
Out-L	-87.0[dBu] max	15.0~18.0[dBu]	488 Hz
Out-R	-87.0[dBu] max	15.0~18.0[dBu]	412 Hz
Ph-L	-87.0[dBu] max	7.0~9.0[dBu] / 33Ω	548 Hz
Ph-R	-87.0[dBu] max	7.0~9.0[dBu] / 33Ω	610 Hz

<Keyboard & A.T Test> External Test#06

- 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#07

- 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 left,	JOY-Y: MIN	-127
When dropped fully to the right,	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.

<PRELORD> External Test#08

- 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.

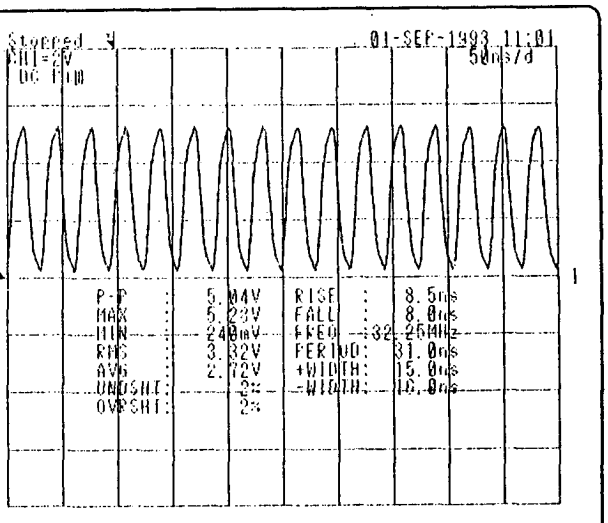
* **<Method of initializing RAM data>**
To initialize the RAM data, turn on the power while holding down the [ENTER] and [▼] keys.

8. CHECK POINTS

1.Clock Generator - TGL

From 6pin of IC4
To 159pin(MCK) of IC6

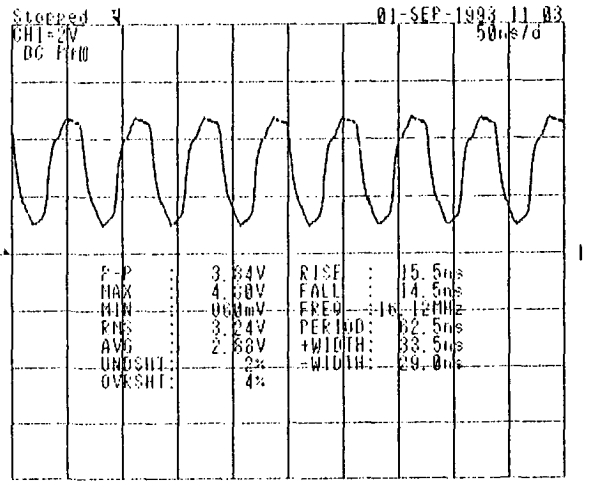
f=32MHz



2.TGL - FDC

From 43pin(CKO1) of IC6
To 40pin(EXTAL1) of IC23

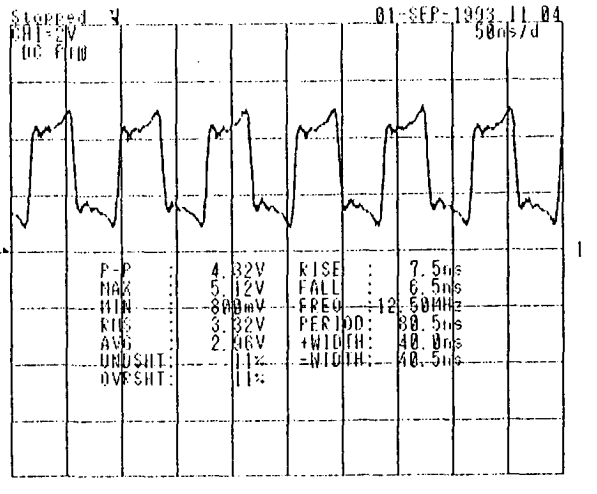
f=16MHz



3.CPU - MAP55 - KSP

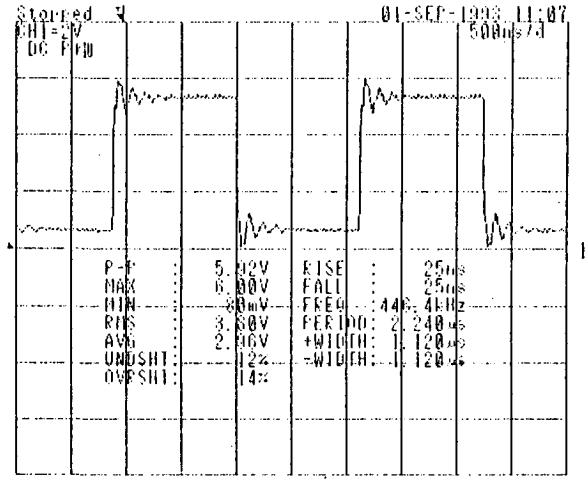
From 7pin(CLKOUT) of IC12
To 92pin(MCLK) of IC13
and 28pin(XIN) of IC20

f=12.5MHz



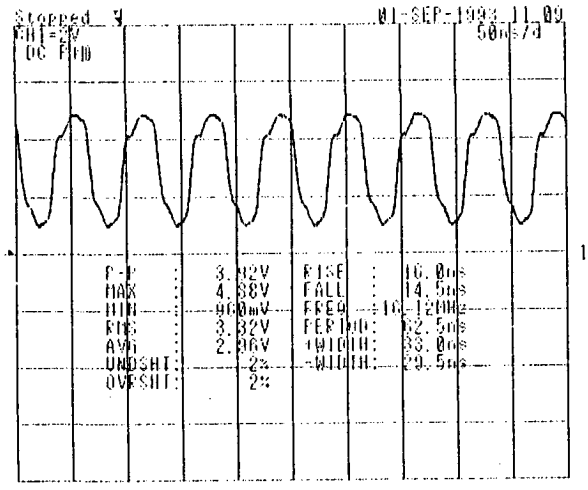
4.CPU - KSP

From 43pin(SCK1) of IC12
To 75pin(SCLK) of IC20



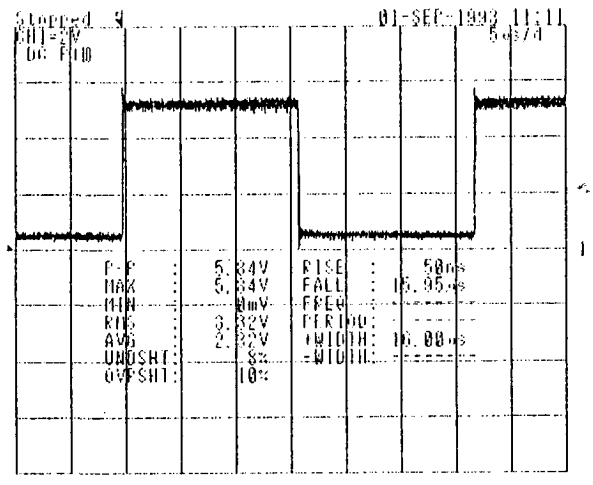
5.TGL - DAC

From 151pin(CKOO) of IC6
To 15pin(SYSCLK) of IC18



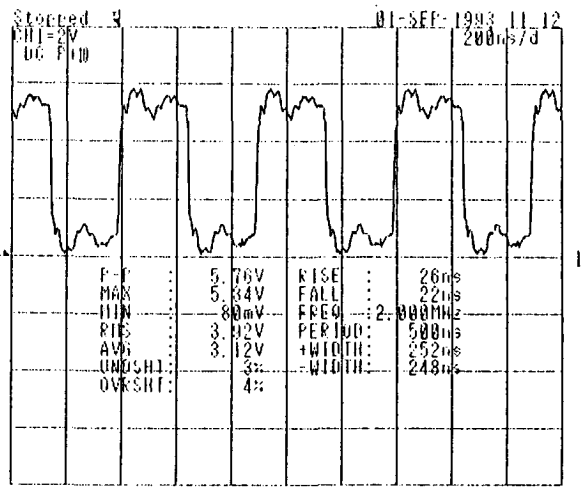
6.TGL - DAC

From 152pin(LRCKO) of IC6
To 16pin(WDCK) of IC18



7.TGL - DAC

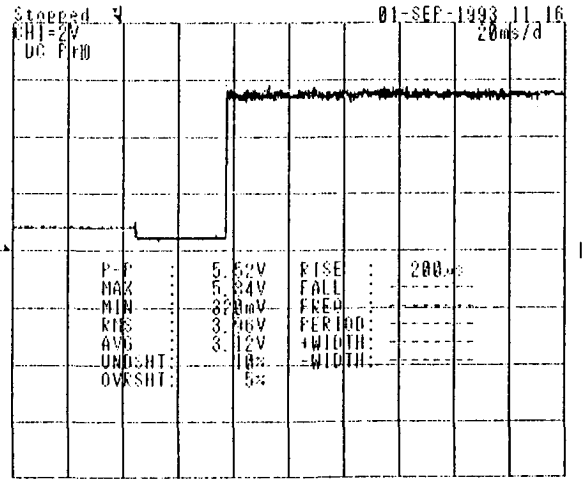
From 153pin(BCKO) of IC6
To 14pin(BCK) of IC18



8.Reset - CPU / MAP55 / SRAMs

From 7pin of IC16
To 8pin(RESET) of IC12,
89pin(XRES) of IC13,
30pin(CE2) of IC9
and 30pin(CE2) of IC11

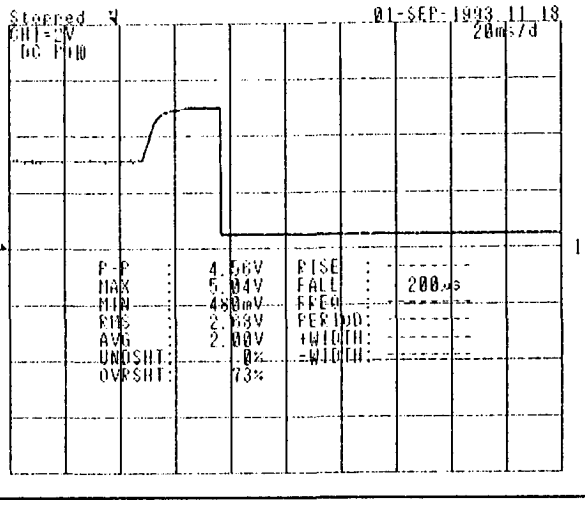
※ when turn the power on



9.Reset - FDD

From 8pin of IC16
To base of DT1(FN1A3Q)

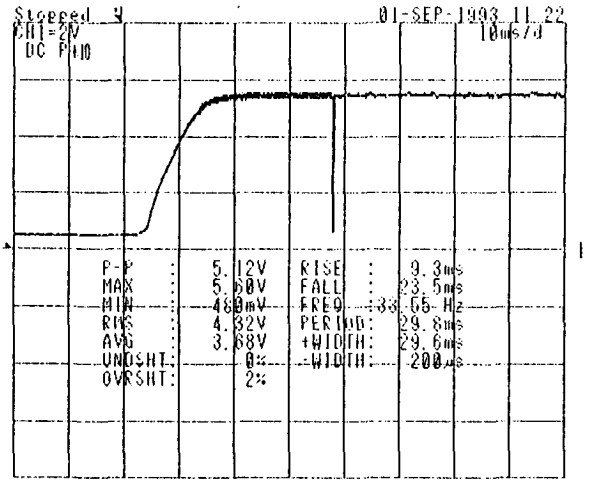
※ when turn the power on



10.CPU - TGL

From 15pin(P00) of IC12
To 2pin(RESET) of IC6

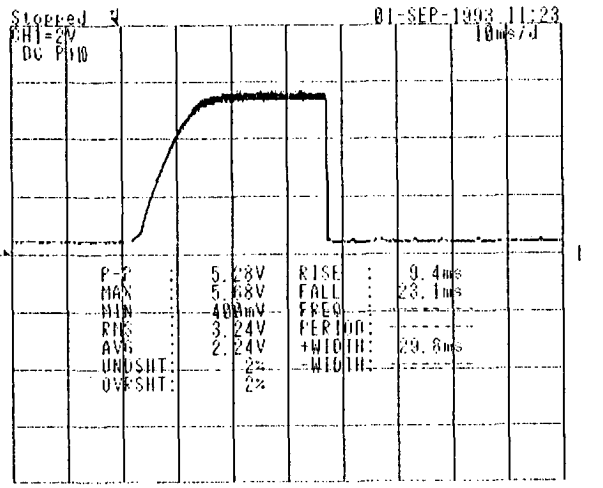
※ when turn the power on



11.CPU - KSP

From 16pin(P01) of IC12
To 26pin(RESET) of IC20

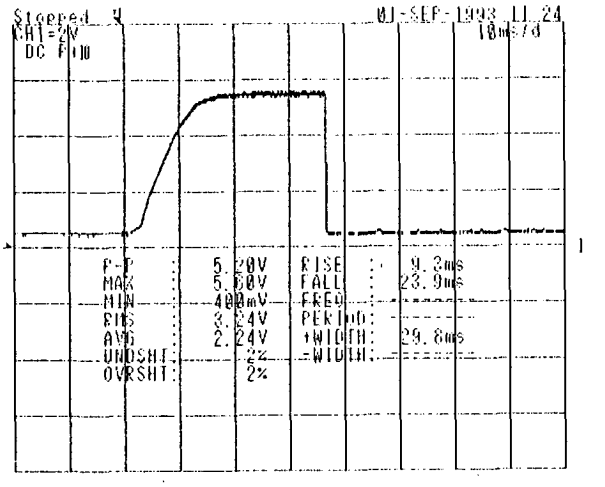
※ when turn the power on



12.CPU - FDC

From 17pin(P02) of IC12
To 3pin(RESET) of IC23

※ when turn the power on



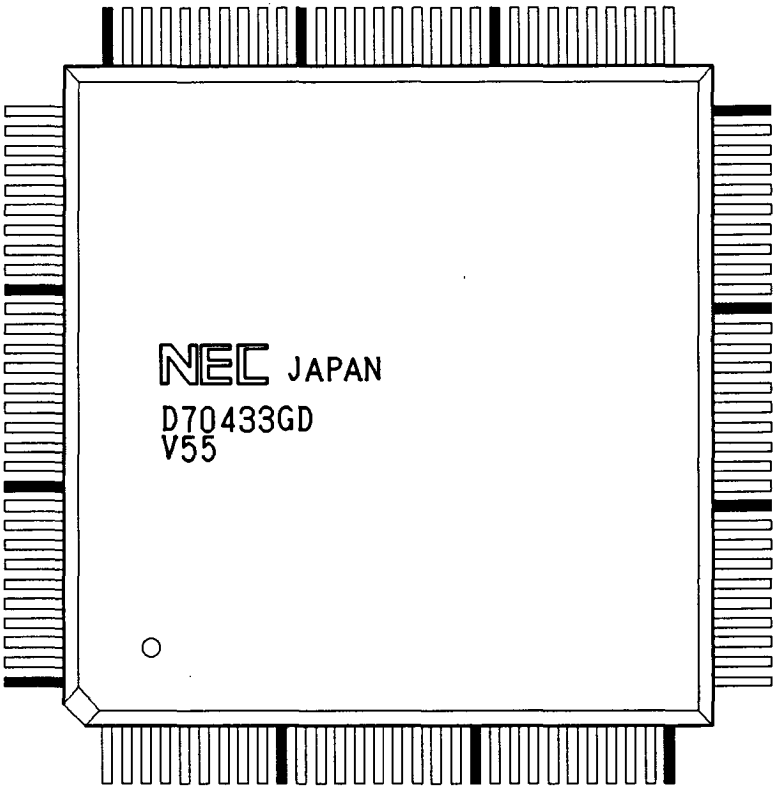
9. REFERENCE DATA

MAIN ICs

CPU:	UPD70433GD	IC12
DECODER:	MB622984PF(MAP55) or MB622E15PF(MAP55A)	IC13
TONE GENERATOR:	MBCS35104(TGL)	IC6
CARD BUFFER:	MB65612-015-3BE(CBR92)	IC7
KEY SCANNING:	M37451M4-322FP	IC20
SYSTEM ROM:	MB834000B-15P-G-47T(4M MASK ROM)	
	or (4M EP ROM)	IC15
SYSTEM RAM:	UPD431000AGW-70L(1M SRAM)	IC15
DRAM:	TC511664BZ-10/80(64K x 16)	
	for multi digital effect	IC10
	MB81464-10PSZ-G-BB-RS2(64K x 4)	
	for multi digital effect	IC8
WAVE ROM:	MB8316200-15PF-G-402-HT(for GM1)	IC1
	UPD23C16000BGX-385(for GM2)	IC2
	LH537FFS	IC5
FD CONTROLLER:	HD63266FP	IC23
D/A CONVERTOR:	PCM69AU	IC18

UPD70433GD (CPU)

PIN ASSIGNMENT



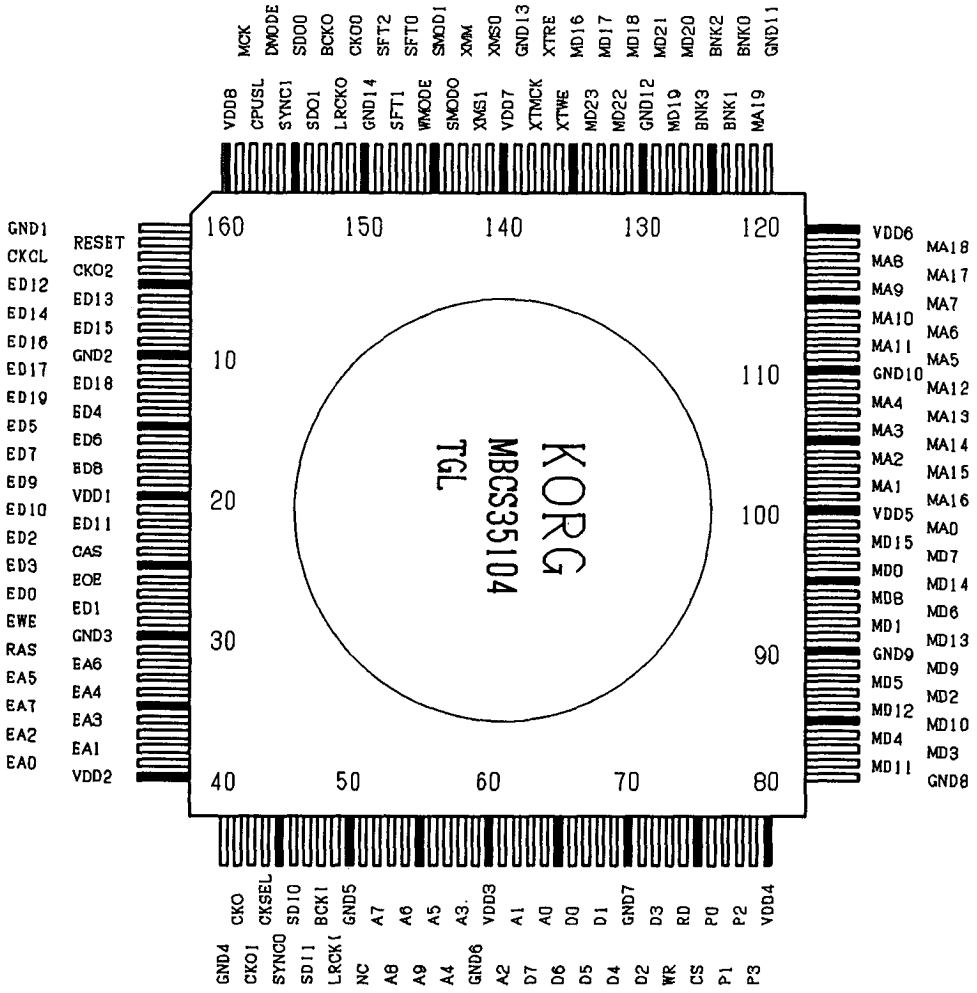
UPD70433GD (CPU)

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	0	TRANSMIT DATA OUTPUT
RXD0-RXD1	I	RECEIVE DATA INPUT
$\overline{\text{TXC}}$	0	TRANSMIT CLOCK OUTPUT
$\overline{\text{CTS0}}$	I	ENABLING SIGNAL INPUT
$\overline{\text{SCK1}}$	0	SIRIAL CLOCK OUTPUT
P40-P47	I/O	PORT 4
P50-P52	I/O	PORT 5
AN10-AN13	I	ANALOG SIGNAL INPUT
P70-P77	I/O	PORT 7
DMARQ0-DMARQ1	I	DMA REQUEST SIGNAL INPUT
GND	---	GROUND
VDD	---	+5V POTENTIAL
AVSS	---	ANALOG GROUND
AVDD	---	ANALOG +5V POTENTIAL
$\overline{\text{AVREF}}$	I	REFERENCE POTENTIAL INPUT FOR A/D CONVERTER
$\overline{\text{RESET}}$	I	SYSTEM RESET SIGNAL INPUT
X1, X2	I	SYSTEM CLOCK INPUT
$\overline{\text{CLKOUT}}$	0	SYSTEM CLOCK OUTPUT
$\overline{\text{ASTB}}$	0	ADDRESS STROBE SIGNAL OUTPUT
$\overline{\text{RD}}$	0	DATA READ STROBE SIGNAL OUTPUT
$\overline{\text{WRL}}$	0	LOW BIT DATA WRITE STROBE SIGNAL OUTPUT
$\overline{\text{WRH}}$	0	HIGHT BIT DATA WRITE STROBE SIGNAL OUTPUT
$\overline{\text{READY}}$	I	READY SIGNAL INPUT
$\overline{\text{DEX}}$	0	DATA BUS ENABLE SIGNAL OUTPUT
$\overline{\text{RAS}}$	0	DRAM ROW ADDRESS LATCH TIMMING SIGNAL OUTPUT
D8/$\overline{\text{D16}}$	I	BUS SIZE SELECT INPUT
$\overline{\text{BUSLOCK}}$	0	BUS LOCK SIGNAL OUTPUT
$\overline{\text{POLL}}$	I	POLL SIGNAL INPUT
$\overline{\text{HLDRQ}}$	I	BUS HOLD REQUEST SIGNAL INPUT
$\overline{\text{HLDAK}}$	0	BUS HOLD ACKNOWLEDGE SIGNAL OUTPUT
AD0-AD15	I/O	ADDRESS/DATA SIGNAL
A16-A23	0	ADDRESS SIGNAL OUTPUT
$\overline{\text{IORD}}$	0	I/O READ STROBE SIGNAL OUTPUT
$\overline{\text{IOWR}}$	0	I/O WRITE STROBE SIGNAL OUTPUT
$\overline{\text{DMAAK0}}$-$\overline{\text{DMAAK1}}$	0	DMA ACKNOWLEDGE SIGNAL OUTPUT
$\overline{\text{TCE0}}$-$\overline{\text{TCE1}}$	0	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
CKOO-1	O	CLK/2 duty 50% output
CKO2	O	CLK/4 duty 50% output
CKSEL	I	Phase Analog Select for CKOO
CKCL	I	CKOO 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 (±5%) is input at the VDD pin.

$$4.75V \leqq VDD \leqq 5.25V$$

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.

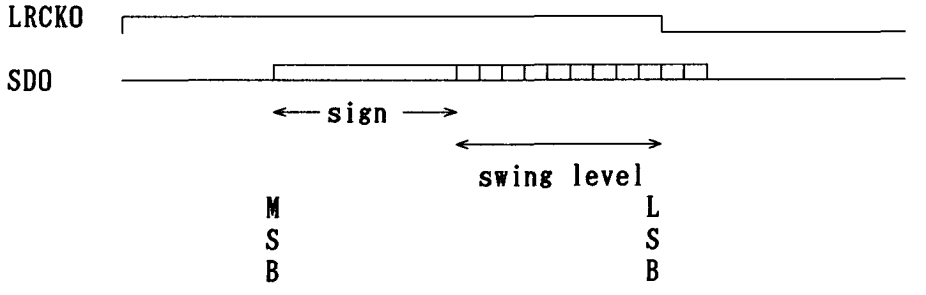
3. Check of input/output pins, when the key on

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.

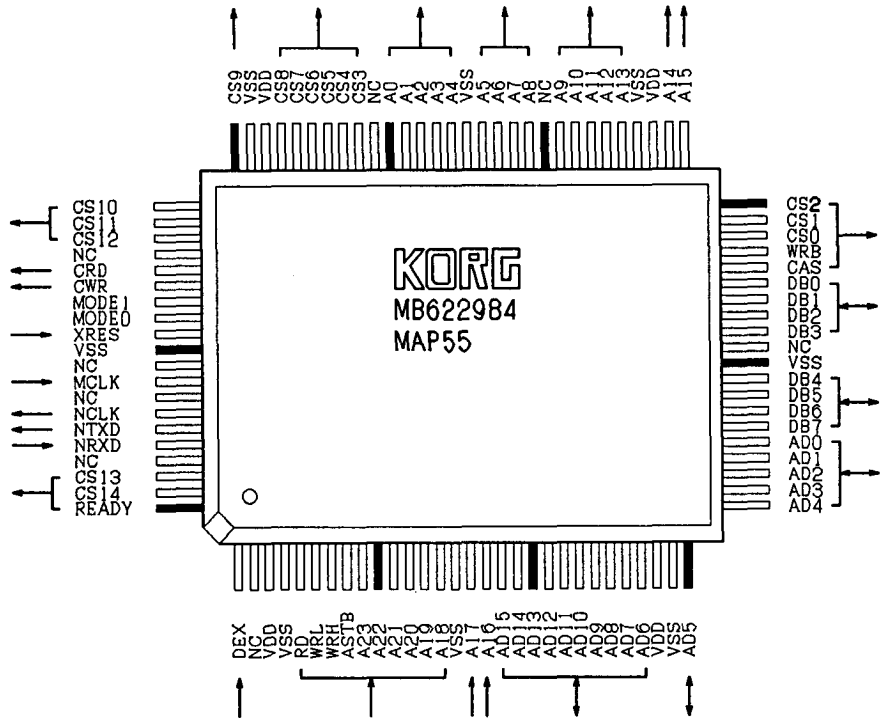
PIN NAME	FUNCTION
SDO0, SDO1	serial data output to the D/A converter

In case of observing the waveform with the oscilloscope, it is best to input the 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.



MB622E15 (MAP55A)

PIN ASSIGNMENT



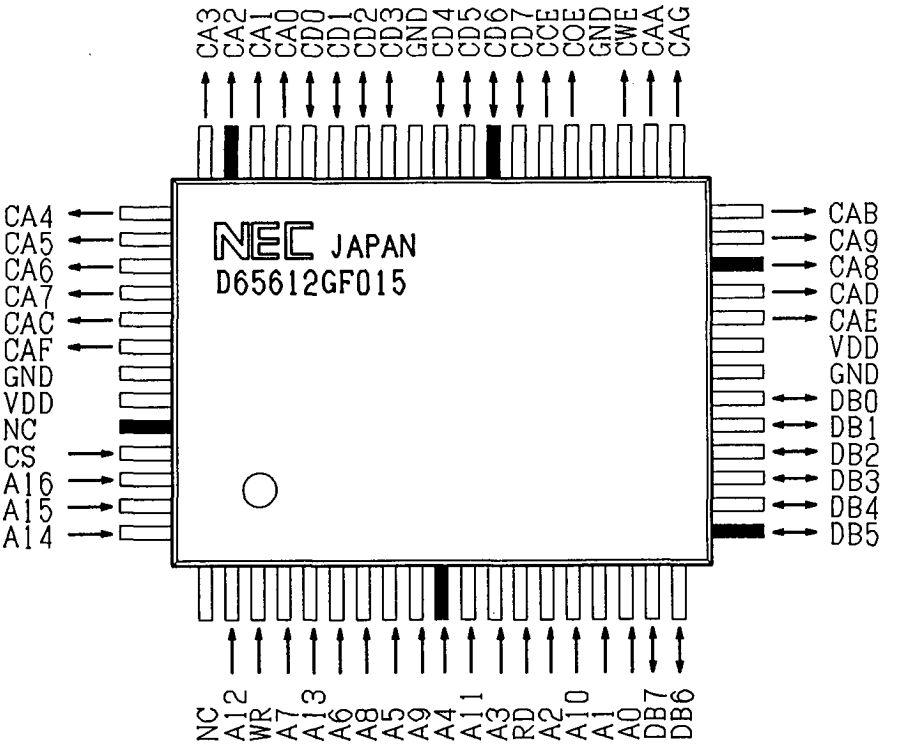
MB622E15 (MAP55A)

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



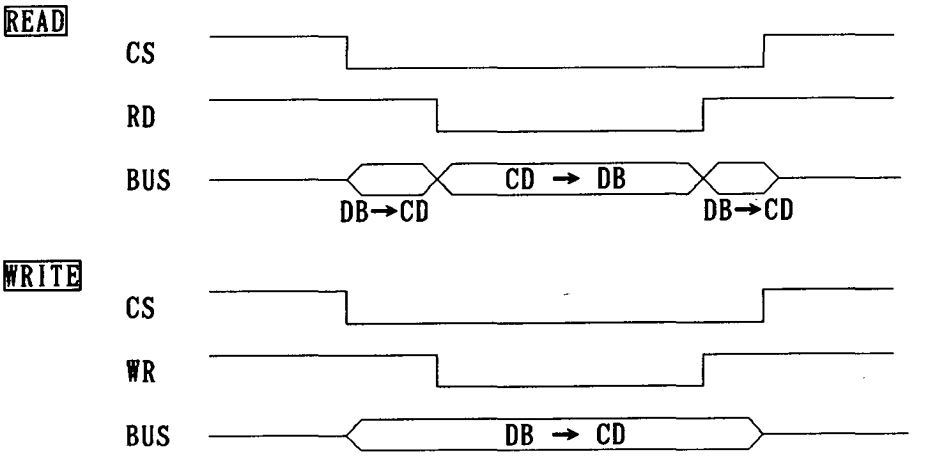
UPD65612-015-3BE (CBR92)

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

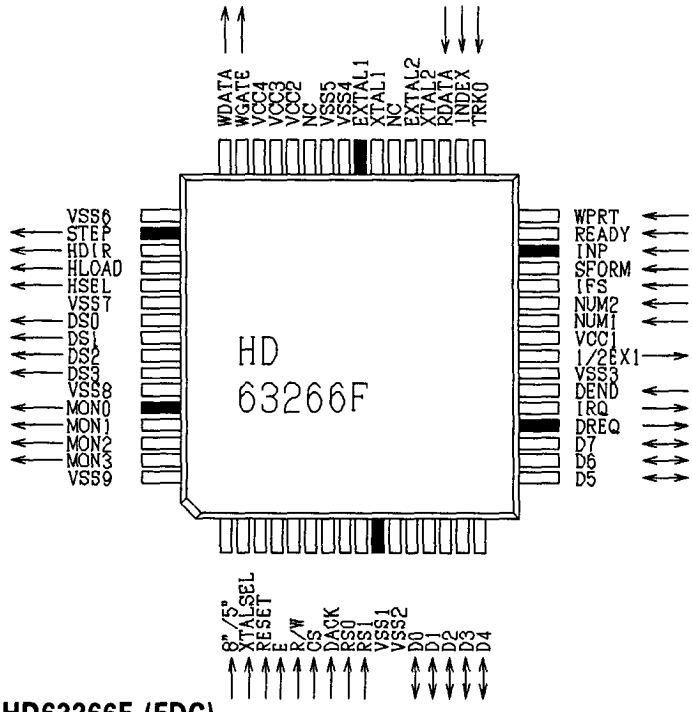
UPD65612-015-3BE (CBR92)

TIMMING CHART



HD63266F (FDC)

PIN ASSIGNMENT



HD63266F (FDC)

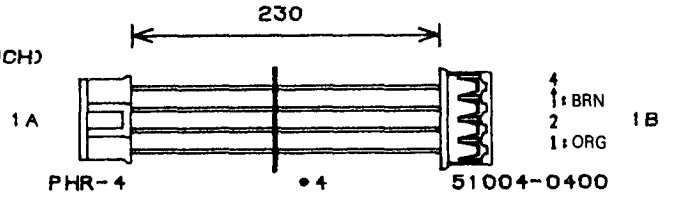
PIN I/O

PIN NO	I/O	PIN NAME	PIN NO	I/O	PIN NAME
1	I	8"/5"	33	I	$\overline{\text{TRK0}}$
2	I	XTALSEL	34	I	$\overline{\text{INDEX}}$
3	I	$\overline{\text{RESET}}$	35	I	RDATA
4	I	E,($\overline{\text{RD}}$)	36	---	XTAL2
5	I	R/$\overline{\text{W}}$($\overline{\text{WR}}$)	37	---	EXTAL2
6	I	$\overline{\text{CS}}$	38	---	NC
7	I	$\overline{\text{DACK}}$	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	$\overline{\text{WGATE}}$
16	I/O	D4	48	O	$\overline{\text{WDATA}}$
17	I/O	D5	49	---	Vss6
18	I/O	D6	50	O	$\overline{\text{STEP}}$
19	I/O	D7	51	O	$\overline{\text{HDIR}}$
20	O	DREQ	52	O	$\overline{\text{HLOAD}}$
21	O	$\overline{\text{IRQ}}$	53	O	$\overline{\text{HSEL}}$
22	I	$\overline{\text{DEND}}$	54	---	Vss7
23	---	Vss3	55	O	$\overline{\text{DS0}}$
24	O	1/2EX1	56	O	$\overline{\text{DS1}}$
25	---	Vcc1	57	O	$\overline{\text{DS2}}$
26	I	NUM1	58	O	DS3
27	I	NUM2	59	---	Vss8
28	I	IFS	60	O	$\overline{\text{MON0}}$
29	I	$\overline{\text{SFORM}}$	61	O	$\overline{\text{MON1}}$
30	I	$\overline{\text{INP}}$	62	O	$\overline{\text{MON2}}$
31	I	$\overline{\text{READY}}$	63	O	MON3
32	I	$\overline{\text{WPRT}}$	64	---	Vss9

FOR HARNESSES

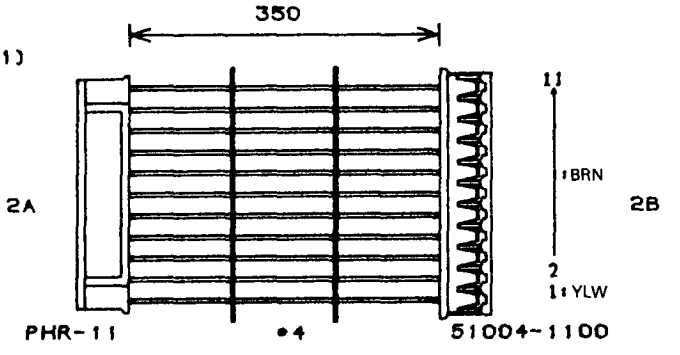
HNS-1694

(AFTER TOUCH)



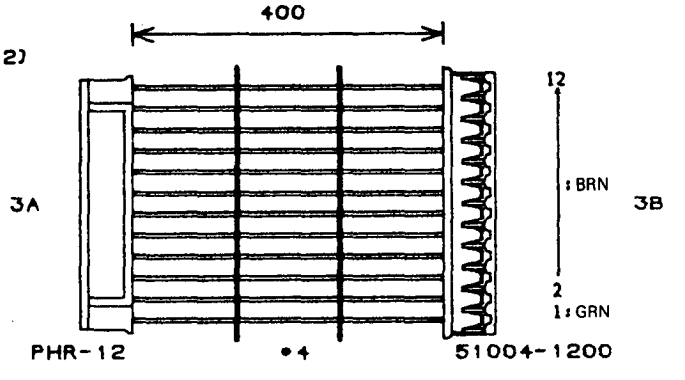
HNS-1695

(KEYBOARD-1)



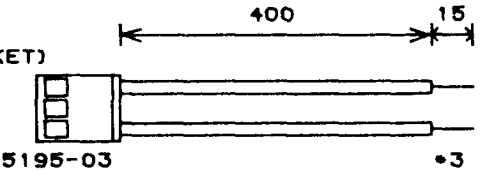
HNS-1696

(KEYBOARD-2)



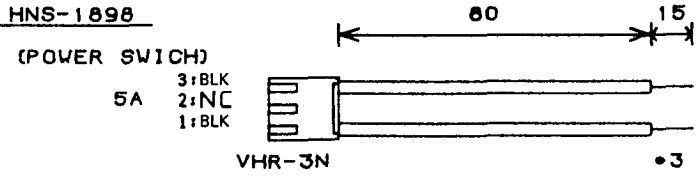
HNS-1697

(INLET SOCKET)



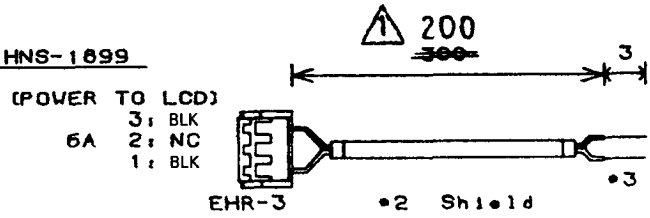
HNS-1898

(POWER SWICH)



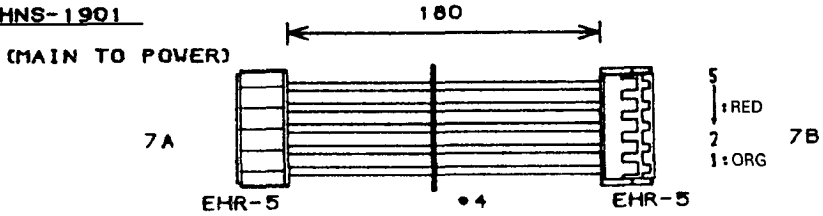
HNS-1899

(POWER TO LCD)



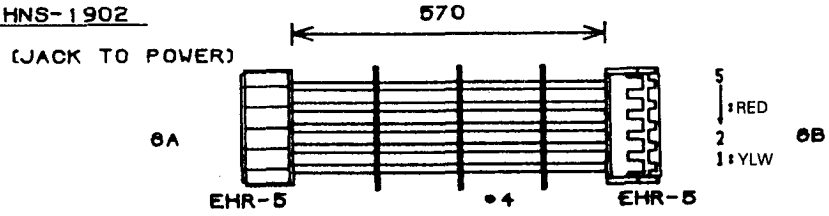
HNS-1901

(MAIN TO POWER)



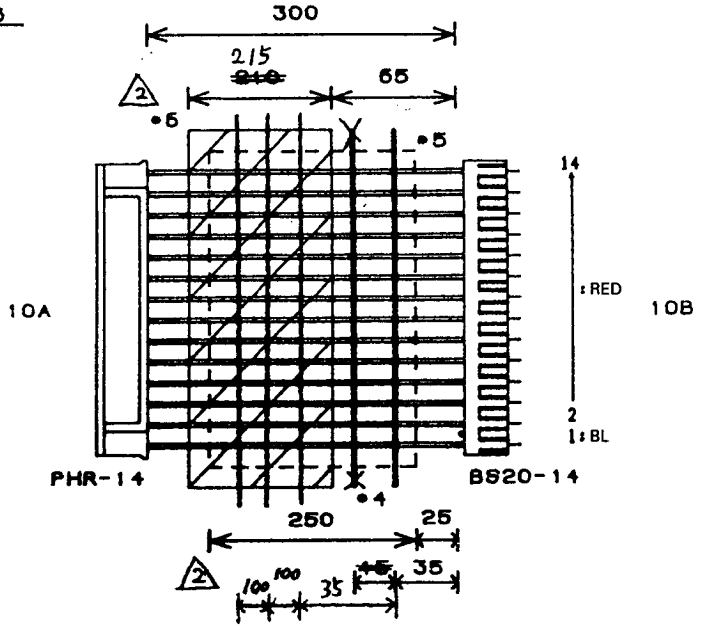
HNS-1902

(JACK TO POWER)



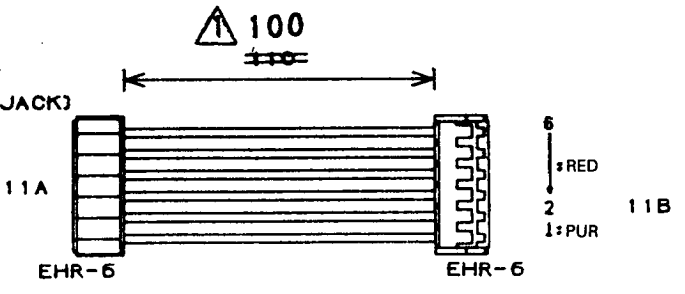
HNS-1903

(LCD)



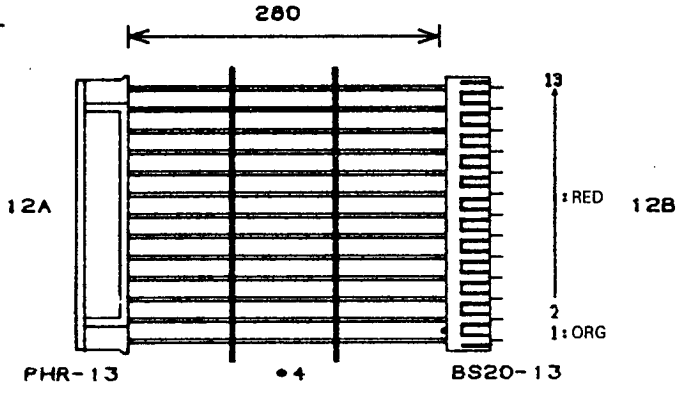
HNS-1904

(MAIN TO JACK)



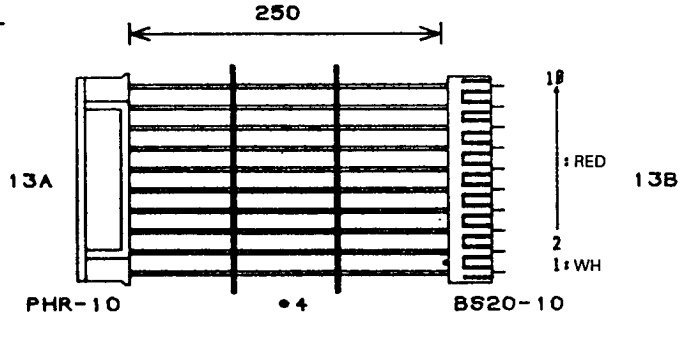
HNS-1905

(PANEL-R)



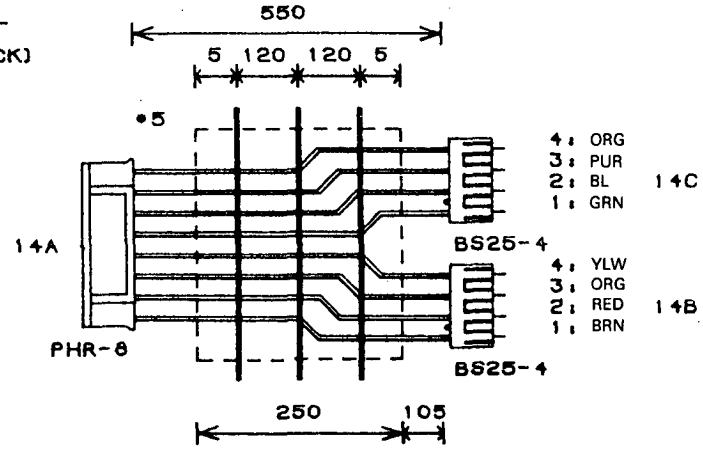
HNS-1906

(PANEL-L)



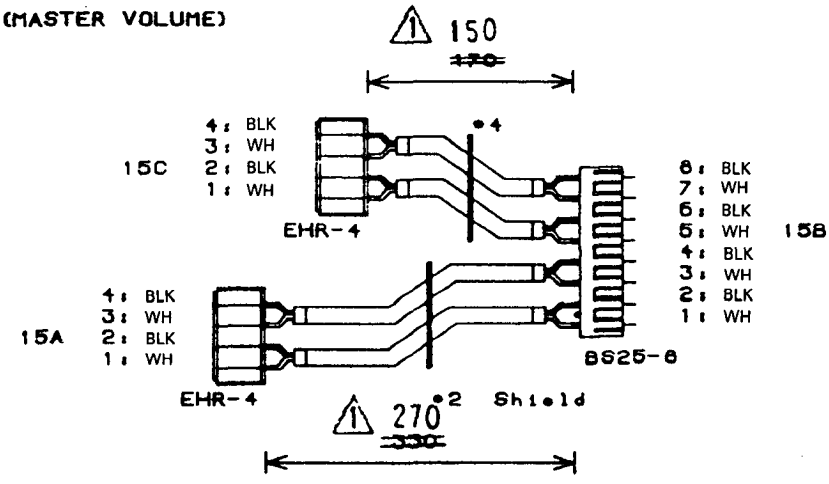
HNS-1907

(JOY STICK)



HNS-1908

(MASTER VOLUME)



FOR Multi Sounds

No.	MultiSound	GM1	GM2	typeA	typeB
000	[A.Piano 1]	...	011	...	...
001	[A.Piano1LP]	...	011	...	...
002	[A.Piano 2]	...	010	...	...
003	[E.Piano 1]	006	...	...	...
004	[E.Piano1LP]	006	...	...	...
005	[E.Piano 2]	001	...	004	...
006	[E.Piano2LP]	001	...	004	...
007	[Soft EP]	...	009	...	...
008	[Soft EP LP]	...	009	...	...
009	[Hard EP]	...	...	009	...
010	[Hard EP LP]	...	...	009	...
011	[PianoPad 1]	...	...	002	...
012	[PianoPad 2]	...	...	002	...
013	[Clav]	005	002	...	...
014	[Clav LP]	005	002	...	...
015	[Harpsicord]	008	...	...	...
016	[HarpsicdLP]	008	...	...	...
017	[PercOrgan1]	...	...	007	...
018	[PercOrg1LP]	...	...	007	...
019	[PercOrgan2]	002	004	...	...
020	[PercOrg2LP]	002	004	...	...
021	[Organ 1]	...	...	006	...
022	[Organ 1 LP]	...	...	006	...
023	[Organ 2]	...	...	006	...
024	[Organ 2 LP]	...	...	006	...
025	[Organ 3]	...	012	...	...
026	[Organ 4]	...	...	012	...
027	[Organ 5]	...	...	009	...
028	[RotaryOrg1]	004	...	...	...
029	[RotaryOrg2]	...	...	011	...
030	[PipeOrgan1]	006	...	...	...
031	[PipeOrg1LP]	006	...	...	...
032	[PipeOrgan2]	...	...	007	...
033	[PipeOrg2LP]	...	...	007	...
034	[PipeOrgan3]	009	...	...	...
035	[PipeOrg3LP]	009	...	...	...
036	[Musette]	006	...	...	...
037	[Musette V]	006	...	...	...
038	[Bandneon]	...	...	012	...
039	[BandneonLP]	...	...	012	...

No.	MultiSound	GM1	GM2	typeA	typeB
040	[Accordion]	009	...	...	...
041	[AcordionLP]	009	...	...	...
042	[Harmonica]	011	...	...	...
043	[G.Guitar]	002	008	...	...
044	[G.GuitarLP]	002	008	...	...
045	[F.Guitar]	002	006	...	...
046	[F.GuitarLP]	002	006	...	...
047	[F.Guitar V]	002	004	...	...
048	[A.Gtr Harm]	...	...	002	...
049	[E.Guitar 1]	001	007	...	...
050	[E.Guitr1 V]	001	007	...	...
051	[E.Guitar 2]	...	...	009	...
052	[E.Guitar 3]	...	005	...	...
053	[MuteGuitar]	002	006	...	...
054	[Funky Gtr]	...	...	006	...
055	[FunkyGtr V]	...	...	005	...
056	[E.Gtr Harm]	...	...	005	...
057	[DistGuitar]	019	...	...	...
058	[Dist GtrLP]	019	...	...	...
059	[DistGuitrV]	019	...	...	...
060	[Over Drive]	016	...	...	...
061	[OverDrv LP]	016	...	...	...
062	[OverDrv F4]	008	...	...	...
063	[MuteDstGtr]	...	...	021	...
064	[MtDstGtr V]	...	...	021	...
065	[PowerChord]	...	...	047	...
066	[PowerChd V]	...	...	008	...
067	[OverDvChrd]	008	...	043	...
068	[Gtr Slide]	...	...	002	...
069	[GtrSlide V]	...	...	002	...
070	[Sitar 1]	002	...	...	...
071	[Sitar 2]	...	...	006	...
072	[Sitar 2 LP]	...	...	006	...
073	[Santur]	003	...	...	...
074	[Bouzouki]	...	...	005	...
075	[BouzoukiLP]	...	...	005	...
076	[Banjo]	005	...	...	...
077	[Shamisen]	004	002	...	...
078	[Koto]	006	...	...	...
079	[Uood]	...	...	003	...

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

No.	MultiSound	GM1	GM2	typeA	typeB
080	[Harp]	...	010	...	...
081	[MandlinTrm]	...	...	007	...
082	[A.Bass 1]	...	006	...	...
083	[A.Bass1 LP]	...	006	...	...
084	[A.Bass 2]	...	...	006	...
085	[A.Bass2 LP]	...	...	006	...
086	[E.Bass 1]	002	004	...	...
087	[E.Bass1 LP]	002	004	...	...
088	[E.Bass 2]	...	...	008	...
089	[E.Bass2 LP]	...	...	008	...
090	[Pick Bass1]	004	002	...	...
091	[PicBass1LP]	004	002	...	...
092	[Pick Bass2]	...	...	008	...
093	[Fretless]	001	004	...	...
094	[FretlessLP]	001	004	...	...
095	[Slap Bass1]	006	001	...	...
096	[Slap Bass2]	003	002	...	...
097	[SlpBass2LP]	003	002	...	...
098	[Slap Bass3]	...	...	010	...
099	[SynthBass1]	003	002	...	...
100	[SynBass1LP]	003	002	...	...
101	[SynthBass2]	003	002	...	...
102	[SynBass2LP]	003	002	...	...
103	[House Bass]	...	...	006	...
104	[FM Bass]	...	...	004	...
105	[FM Bass LP]	...	...	004	...
106	[Kalimba]	...	002	...	...
107	[Music Box]	001	001	...	...
108	[MusicBoxLP]	001	001	...	...
109	[Log Drum]	...	...	005	...
110	[Marimba]	...	005	...	...
111	[Xylophone]	...	007	...	...
112	[Vibe]	...	005	...	...
113	[Celesta]	...	002	...	...
114	[Glocken]	...	005	...	...
115	[BrightBell]	...	003	...	...
116	[B.Bell LP]	...	003	...	...
117	[Metal Bell]	...	002	...	...
118	[M.Bell LP]	...	002	...	...
119	[Gamelan]	...	...	004	...

No.	MultiSound	GM1	GM2	typeA	typeB
120	[Pole]	...	...	001	...
121	[Pole LP]	...	...	001	...
122	[Tubular]	005	...	...	...
123	[Split Drum]	...	008	004	...
124	[Split Bell]	...	017	007	...
125	[Flute]	...	007	...	...
126	[Pan Flute]	003	...	...	...
127	[PanFluteLP]	003	...	...	...
128	[Shakuhachi]	006	...	...	...
129	[ShakhachLP]	006	...	...	...
130	[Bottle]	003	...	...	...
131	[Recorder]	005	...	...	...
132	[Ocarina]	002	...	...	...
133	[Oboe]	007	...	...	...
134	[EnglishHrn]	015	...	...	...
135	[Eng.HornLP]	015	...	...	...
136	[BasoonOboe]	004	008	...	...
137	[BsonOboeLP]	004	008	...	...
138	[Clarinet]	011	...	...	...
139	[ClarinetLP]	011	...	...	...
140	[Bari Sax]	011	...	...	...
141	[Bari.SaxLP]	011	...	...	...
142	[Tenor Sax]	013	...	...	...
143	[T.Sax LP]	013	...	...	...
144	[Alto Sax]	009	...	...	...
145	[A.Sax LP]	009	...	...	...
146	[SopranoSax]	012	...	...	...
147	[S.Sax LP]	012	...	...	...
148	[Tuba]	001	006	...	...
149	[Tuba LP]	001	006	...	...
150	[Horn]	001	012	...	...
151	[FlugelHorn]	...	...	007	...
152	[Trombone 1]	003	005	...	...
153	[Trombone 2]	001	008	...	...
154	[Trumpet]	006	003	...	...
155	[Trumpet LP]	006	003	...	...
156	[Mute TP]	009	...	...	...
157	[Mute TP LP]	009	...	...	...
158	[Brass 1]	...	...	009	...
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
160	[Brass 2]	004	...	...	...
161	[Brass 2 LP]	004	...	...	...
162	[StringEns.]	009	004	005	...
163	[StrEns. V1]	009	004	005	...
164	[StrEns. V2]	009	004	005	...
165	[StrEns. V3]	009	004	004	...
166	[AnaStrings]	005	...	...	...
167	[PWM]	005	...	...	...
168	[Violin]	010	...	...	...
169	[Cello]	006	...	...	...
170	[Cello LP]	006	...	...	...
171	[Pizzicato]	...	007	...	...
172	[Voice]	002	...	...	...
173	[Choir]	006	...	...	...
174	[Soft Choir]	001	...	...	...
175	[Air Vox]	004	...	...	...
176	[Doo Voice]	007	...	...	...
177	[DooVoiceLP]	007	...	...	...
178	[Syn Vox]	002	...	...	...
179	[Syn Vox LP]	002	...	...	...
180	[White Pad]	002	...	...	...
181	[Ether Bell]	004	...	...	...
182	[E.Bell LP]	004	...	...	...
183	[Mega Pad]	002	...	...	...
184	[Spectrum 1]	...	...	003	...
185	[Spectrum 2]	...	...	002	...
186	[Stadium]	002	...	...	...
187	[Stadium NT]	002	...	...	...
188	[BrushNoise]	013	...	...	...
189	[BruNoiseNT]	001	...	...	...
190	[Steel Drum]	004	...	...	...
191	[SteelDrmLP]	004	...	...	...
192	[BrushSwirl]	013	...	...	...
193	[Belltree]	001	...	...	...
194	[BelltreeNT]	001	...	...	...
195	[BeltreV NT]	001	...	...	...
196	[Tri Roll]	004	...	...	...
197	[TriRoll NT]	001	...	...	...
198	[Telephon]	002	...	...	...
199	[TelephonNT]	001	...	...	...

No.	MultiSound	GM1	GM2	typeA	typeB
200	[Clicker]	003	...	...	...
201	[Clicker NT]	001	...	...	...
202	[Crickets 1]	001	...	...	...
203	[Cricktslnt]	001	...	...	...
204	[Crickets 2]	...	...	001	...
205	[Cricktslnt]	...	...	001	...
206	[Magic Bell]	...	...	001	...
207	[Sporing]	...	001	...	...
208	[Rattle]	...	002	...	...
209	[Kava 1]	...	...	001	...
210	[Kava 2]	...	...	001	...
211	[Fever 1]	001	...	...	...
212	[Fever 2]	001	...	...	...
213	[Zappers 1]	...	...	001	...
214	[Zappers 2]	...	...	001	...
215	[Bugs]	...	014	...	...
216	[Surfy]	001	...	...	...
217	[SleighBell]	002	...	...	...
218	[Elec Beat]	...	...	002	...
219	[Idling]	...	003	...	...
220	[EthnicBeat]	...	...	013	...
221	[Taps]	001	001	004	...
222	[Tap 1]	001	...	002	...
223	[Tap 2]	001	...	002	...
224	[Tap 3]	001	...	002	...
225	[Tap 4]	001	001	001	...
226	[Tap 5]	001	001	...	...
227	[Orch Hit]	001	...	...	...
228	[SnareRl/Ht]	...	...	002	...
229	[Syn Snare]	001	...	...	...
230	[Rev Snare]	...	...	013	...
231	[PowerSnare]	...	001	...	...
232	[Orch Perc]	002	002	001	...
233	[Crash Cym]	013	...	...	...
234	[CrashCymLP]	013	...	...	...
235	[CrashLP NT]	001	...	...	...
236	[China Cym]	002	...	...	...
237	[Splash Cym]	002	...	...	...
238	[Orch Crash]	...	...	013	...
239	[Tite HH]	001	...	...	...

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

No.	MultiSound	GM1	GM2	typeA	typeB
240	[Tite HH NT]	001	...	...	...
241	[Bell Ride]	...	002	...	...
242	[Ping Ride]	...	002	...	...
243	[Timpani]	...	001	...	...
244	[Timpani LP]	...	001	...	...
245	[Cabasa]	013	...	...	...
246	[Cabasa NT]	001	...	...	...
247	[Agogo]	...	001	...	...
248	[Cow Bell]	...	001	...	...
249	[Low Bongo]	...	001	...	...
250	[Claves]	...	001	...	...
251	[Timbale]	...	001	...	...
252	[WoodBlock1]	...	001	...	...
253	[WoodBlock2]	...	001	...	...
254	[WoodBlock3]	...	001	...	...
255	[Taiko Hit]	...	001	...	...
256	[Syn Claves]	...	001	...	...
257	[Melo Tom]	...	001	...	...
258	[ProccesTom]	001	...	...	...
259	[Syn Tom 1]	...	001	...	...
260	[Syn Tom 2]	...	002	...	...
261	[VocalSnare]	...	...	002	...
262	[Zap 1]	...	...	001	...
263	[Zap 2]	...	...	001	...
264	[Fret Zap 1]	001	...	...	...
265	[Fret Zap 2]	001	...	...	...
266	[Vibra Slap]	013	...	...	...
267	[Indust]	...	...	001	...
268	[Thing]	...	...	002	...
269	[Thing NT]	...	...	001	...
270	[FingerSnap]	...	...	001	...
271	[FingSnapNT]	...	...	001	...
272	[Tambourine]	...	001	...	...
273	[Hand Clap]	...	001	...	...
274	[HandClapNT]	...	001	...	...
275	[Gun Shot]	001	...	...	...
276	[Castanet]	...	001	...	...
277	[CastanetNT]	...	001	...	...
278	[Snap]	...	...	001	...
279	[Snap NT]	...	...	001	...

No.	MultiSound	GM1	GM2	typeA	typeB
280	[Gt Scratch]	001	...	...	...
281	[Side Stick]	...	001	...	...
282	[SideStikNT]	...	001	...	...
283	[TimbleSide]	...	...	001	...
284	[TimblSidNT]	...	...	001	...
285	[Syn Rim]	...	001	...	...
286	[Syn Rim NT]	...	001	...	...
287	[Open HH]	...	001	...	...
288	[OpenSyn HH]	001	...	...	...
289	[CloseSynHH]	...	001	...	...
290	[Sagat]	...	...	001	...
291	[Sagat NT]	...	...	001	...
292	[Sagatty]	...	...	001	...
293	[Sagatty NT]	...	...	001	...
294	[JingleBell]	002	...	...	...
295	[Taiko]	...	002	...	...
296	[Slap Bongo]	...	...	001	...
297	[Open Conga]	...	001	...	...
298	[Slap Conga]	...	...	001	...
299	[Palm Conga]	...	...	001	...
300	[Mute Conga]	...	001	...	...
301	[Tabla 1]	...	...	001	...
302	[Tabla 2]	...	...	001	...
303	[Maracas]	...	001	...	...
304	[SynMaracas]	...	001	...	...
305	[SynMarcsNT]	...	001	...	...
306	[MuteTriang]	001	...	...	...
307	[OpenTriang]	...	001	...	...
308	[Guiro]	...	002	...	...
309	[Guiro LP]	...	002	...	...
310	[Scratch Hi]	001	...	...	...
311	[ScratchHiNT]	001	...	...	...
312	[Scratch Lo]	001	...	...	...
313	[ScratcLoNT]	001	...	...	...
314	[ScratchDbl]	...	...	001	...
315	[ScratDblNT]	...	...	001	...
316	[Mini 1a]	...	001	009	...
317	[Digital 1]	...	002	008	...
318	[VS 102]	...	...	010	...
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
000	[Fat Kick]	...	...	001	...
001	[Rock Kick]	...	...	001	...
002	[Ambi.Kick]	...	...	001	...
003	[Crisp Kick]	...	...	001	...
004	[Punch Kick]	...	...	001	...
005	[Real Kick]	...	001	...	...
006	[Dance Kick]	...	...	001	...
007	[Gated Kick]	...	...	001	...
008	[ProcesKick]	...	001	...	...
009	[Metal Kick]	...	001	...	...
010	[Syn Kick 1]	...	001	...	...
011	[Syn Kick 2]	...	...	001	...
012	[Syn Kick 3]	...	...	001	...
013	[Orch B.Drm]	...	...	001	...
014	[Snare 1]	...	...	001	...
015	[Snare 2]	...	...	001	...
016	[Snare 3]	...	...	001	...
017	[Snare 4]	...	...	001	...
018	[PicloSnare]	...	...	001	...
019	[Soft Snare]	...	...	001	...
020	[LightSnare]	...	001	...	...
021	[TightSnare]	...	...	001	...
022	[Ambi.Snare]	...	...	001	...
023	[Rev Snare]	...	...	001	...
024	[RollSnare1]	...	...	001	...
025	[RollSnare2]	...	...	001	...
026	[Rock Snare]	...	001	...	...
027	[GatedSnare]	...	001	...	...
028	[PowerSnare]	...	001	...	...
029	[Syn Snare1]	...	001	...	...
030	[Syn Snare2]	001	...	...	...
031	[Gun Shot]	001	...	...	...
032	[Brush Slap]	...	001	...	...
033	[BrushSwish]	001	...	...	...
034	[BrushSwirl]	001	...	...	...
035	[Brush Tap]	...	001	...	...
036	[Side Stick]	...	001	...	...
037	[Syn Rim]	...	001	...	...
038	[VocalSnr 1]	...	...	001	...
039	[VocalSnr 2]	...	...	001	...
040	[Crash Cym]	001	...	...	...

No.	DrumSound	GM1	GM2	typeA	typeB
041	[Crash LP]	001	...	...	...
042	[China Cym]	001	...	...	...
043	[China LP]	001	...	...	...
044	[Splash Cym]	001	...	...	...
045	[Splash LP]	001	...	...	...
046	[Orch Crash]	...	...	001	...
047	[OrchCym LP]	...	...	001	...
048	[Tite HH]	001	...	...	...
049	[Open HH]	...	001	...	...
050	[Pedal HH]	001	...	...	...
051	[CloseSynHH]	...	001	...	...
052	[Open SynHH]	001	...	...	...
053	[Sagat]	...	...	001	...
054	[Ride Edge]	...	001	...	...
055	[Ride Cup]	...	001	...	...
056	[Ride Cym 1]	...	...	001	...
057	[Ride Cym 2]	...	...	001	...
058	[Tom Hi]	...	001	...	...
059	[Tom Lo]	...	001	...	...
060	[ProcessTom]	001	...	...	...
061	[SynTom1 Hi]	...	001	...	...
062	[SynTom1 Lo]	...	001	...	...
063	[Syn Tom 2]	...	001	...	...
064	[Brush Tom]	...	001	...	...
065	[Agogo]	...	001	...	...
066	[Lo Bongo]	...	001	...	...
067	[Hi Bongo]	...	001	...	...
068	[Slap Bongo]	...	...	001	...
069	[Claves]	...	001	...	...
070	[Syn Claves]	...	001	...	...
071	[Open Conga]	...	001	...	...
072	[Slap Conga]	...	...	001	...
073	[Palm Conga]	...	...	001	...
074	[Mute Conga]	...	001	...	...
075	[Baya 1]	...	...	001	...
076	[Baya 2]	...	...	001	...
077	[Tabla 1]	...	...	001	...
078	[Tabla 2]	...	...	001	...
079	[Tabla 3]	...	...	001	...
080	[Maracas]	...	001	...	...
081	[Cabasa]	001	...	...	...

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

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

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

11. PARTS LIST

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	Q'TY
001151100	P.C.BOARD ASSEMBLY KLM-1511/12	M.PART	JOYSTICK	1
001164500	P.C.BOARD ASSEMBLY KLM-1645	M.PART	MAIN	1
001164600	P.C.BOARD ASSEMBLY KLM-1646	M.PART	JACK	1
001164700	P.C.BOARD ASSEMBLY 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	230SE	1
		M.PART	230WG	1
		M.PART	230SC	1
		M.PART	240UK	1
304000020	TR 2SA1175 T K	1646		1
304020180	TR 2SC2878 A/B TPE2	1646		6
304060130	TR FN1A3Q-T1B	1645		1
313002800	LCD DMC50271N-SEW-B-1	M.PART		1
314000300	DIODE 1S-2473 T-77	1646		3
		1647		19
		1648		18
314001400	DIODE RLS-73 TE-11	1645		2
315000400	DOUBLE DIODE MC932-T12	1646		2
315000500	DOUBLE DIODE MC-2840-T12-1	1645		1
320001242	IC UPC4570HA	1646	OP_AMP	1
320001316	IC UPD65612GF-015-3BE	1645	CBR92	1
320001328	IC UPD70433GD-5BB	1645	CPU	1
320001343	IC UPD23C16000BGX-385	1645	WAVE_ROM	1
320003202	IC TC511664Z-10	1645	S_RAM	1
320004359	IC HD74HC05P	1646	HC_MOS	1
320004538	IC HD63266F	1645	FDC	1
320011026	IC M5216L-600Y	1646	OP.AMP	1
320011167	IC M37451M4-322FP	1645	KSP	1
320012066	IC MB81464-10PSZ-G-BB-RS2	1645	D_RAM	1
320012141	IC MBCS35104-001PF-G-BND	1645	TGL	1
320012146	IC MB622E15PF-G-LBND	1645	MAP55A	1
320012148	IC MB8316200A-15PF-G-402-HT	1645	WAVE_ROM	1
320012151	IC MB83400B-15P-G-47T	1645	MASK_ROM	1
320013052	IC LH537FFS	1645	WAVE_ROM	1
324001006	IC UPD74HCU04GS-E2 (SOP)	1645	HC_MOS	1
324001015	IC UPC4570G2-E2 (SOP)	1645	OP_AMP	2
324001066	IC UPD431000AGW-70L-E2	1645	S_RAM	2

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	Q'TY
324004050	IC HD74HC138FPER	1645	HC_MOS	1
324009004	IC NJM78L05UA-TE2	1645	REGULATER	1
324011002	IC M5223FP-600C (8P SOP)	1645	OP_AMP	1
324011006	IC M5218FP-600C (8P SOP)	1645	OP_AMP	1
324011013	IC M62021FP-600C	1645	RESET	1
324036002	IC PCM69AU-T1(SELECTED)	1645	DAC	1
330001400	PHOTO COUPLER PC-910K	1646		1
334000500	SB COIL SBT-0260 TF	1646		13
335400060	CRYSTAL OSC SX-1 25.000MHZ	1645		1
335400080	CRYSTAL OSC SX-1 32.000MHZ	1645		1
360023600	VR RK11K1140(X-011/012) 10KB	M.PART	JOYSTICK	2
365007800	SLIDE VR RS30111AC00NB 10KB	1648	VALUE	1
365008000	SLIDE VR RS30112AC00JB 10KBX2	1647	M.VOLUME	1
375010500	TOUCH SW EVQ-PAC09K-A	1647		19
		1648		18
375011500	POWER SW J-U3065#01	M.PART		1
420004700	KEYBOARD NEW LC-61	M.PART		1
430008107	FDD EME213KRJ	M.PART		1
450002300	PHONE JACK LGR4502-5000 (STEREO)	1646		3
450002400	PHONE JACK LGR4501-5000 (MONO)	1646		2
471060400	CONNECTOR TOP B4B-EH	1645	M.VOLUME	1
		1646		1
471060500	CONNECTOR TOP B5B-EH-A	1645	POWER	1
		1646		1
471060600	CONNECTOR TOP B6B-EH	1645	JACK	1
		1646		1
471070400	CONNECTOR TOP B4B-PH	1645	KEY PRESSURE	1
471070800	CONNECTOR TOP B8B-PH	1645	JOYSTICK	1
471071000	CONNECTOR TOP B10B-PH	1645	PANEL L	1
471071100	CONNECTOR TOP B11-PH-K-S	1645	KEYBOARD	1
471071200	CONNECTOR TOP B12B-PH	1645	KEYBOARD	1
471071300	CONNECTOR TOP B13B-PH	1645	PANEL R	1
471071400	CONNECTOR TOP B14B-PH-K-S	1645	LCD	1
474004725	CARD FIT CONNECTOR ZC-024	1645	FDD	1
474011300	CARD CONNECTOR HGC-0338-01-010	1645	PROG CARD	1
474015400	CARD CONNECTOR FCN-565P068-G/C	1645	PCM CARD	1
475001894	HARNESS HNS-1894 4P	M.PART	KEY PRESSURE	1
475001895	HARNESS HNS-1895 11P	M.PART	KEYBOARD	1
475001896	HARNESS HNS-1896 12P	M.PART	KEYBOARD	1
475001897	HARNESS HNS-1897 (BOARD IN)	M.PART	INLET	1
475001898	HARNESS HNS-1898 (BOARD IN)	M.PART	POWER SW	1
475001899	HARNESS HNS-1899 (BOARD IN)	M.PART	LCD	1
475001901	HARNESS HNS-1901 5P	M.PART	POWER	1
475001902	HARNESS HNS-1902 5P	M.PART	POWER	1
475001903	HARNESS HNS-1903	M.PART	LCD	1
475001904	HARNESS HNS-1904 6P	M.PART	JACK	1

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	Q'TY
475001905	HARNESS HNS-1905 (BOARD IN) 13P	1648	PANEL R - MAIN	1
475001906	HARNESS HNS-1906 (BOARD IN) 10P	1647	PANEL L - MAIN	1
475001907	HARNESS HNS-1907 (BOARD IN)	M.PART	JOYSTICK	1
475001908	HARNESS HNS-1908 (BOARD IN) 8P	1647	PANEL L - JACK	1
480001324	IC SOCKET 32P DICF-32CS-E	1645		1
480010380	DIN JACK YKF51-5041 (3P)	1646		1
500018500	RUBBER FOOT FF-001	M.PART		4
500021000	SPACER CUSHION 5X10X50 F40610	M.PART		2
520001700	LITHIUM BATTERY CR2032VPX	M.PART		1
525000100	DATA LINE FILTER ESD-R-25D-B	M.PART		1
540007200	WIRE BAND PLT-1M	M.PART		8
540008600	SPIRAL CLIP CS-8	M.PART		8
540012400	INLET SOCKET PA-125-10	M.PART		1
540019000	CLIP S-8	M.PART		2
540020100	PCB SPACER SPLS-6	M.PART		1
545020470	SMCD-24X368-BDX10(2.7)10-P1.25	M.PART		1
600003200	AC CORD UC-948-J02	M.PART	117EX	1
600003300	AC CORD UC-953-J01	M.PART	117US	1
		M.PART	117CN	1
600003500	AC CORD SC-304-J01	M.PART	240AU	1
600003800	AC CORD DC-480-J01	M.PART	100JP	1
600004700	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
600004800	AC CORD EC-472-J01	M.PART	230SE	1
600005100	AC CORD KP-610 GTBS-3	M.PART	240UK	1
620019700	X-631 SLIDE VR KNOB	M.PART		2
620024600	X-952 POWER SW KNOB	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	M.PART		1
641039400	X-115 FDD ANGLE KOC-C20273	M.PART		1
641039500	X-115 PU CHASSIS KOC-C30411	M.PART		1
641039600	X-115 KB SUPPORT KOC-C40913	M.PART		1
641039700	X-115 METAL FITTING OF POWER SW	M.PART		1
641039900	X-115 CP ANGLE KOC-C40916	M.PART		1
641040000	X-115 SUPPORT RAIL KOC-C20272	M.PART		1
641040100	X-115 LOWER CASE KOC-C10132	M.PART		1
641040200	X-115 PANEL KOC-C10126	M.PART		1
644006200	X-011/012 WHEEL SPRING	M.PART		2
646038900	X-011/012 JS FRAME KOC-C30145	M.PART		1

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	Q'TY
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
646046700	X-115 SIDE PLATE R KOC-E10086	M.PART		1
646046800	X-115 KNOB BLOCK L KOC-E10087	M.PART		1
646046900	X-115 KNOB BLOCK R KOC-E10088	M.PART		1
649007400	BATTERY HOLDER	1645		1

LC-61 COMPONENT PARTS LIST

PART CODE	PART NAME/SPECIFICATION	P.C.BOARD	NOTE	Q'TY
422008503	LC-61 KEY CF VL57000	M.PART		10
422008504	LC-61 KEY D VL57010	M.PART		5
422008505	LC-61 KEY BE VL57020	M.PART		10
422008506	LC-61 KEY G VL57030	M.PART		5
422008507	LC-61 KEY A VL57040	M.PART		5
422008508	LC-61 KEY C' VL57050	M.PART		1
422008509	LC-61 BLACK KEY VL57060	M.PART		25
422008510	LC-61 KEY SPRING VC07760	M.PART		61
422008511	LC-61 MK SHEET VQ07270	M.PART		1
422008512	LC-61 CONTACT RUBBER VF83410	M.PART		1
422008513	LC-61 ISOLATION SPACER VM63010	M.PART		1
422008514	LC-61 STOPPER VC07980	M.PART		1

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 handtering.
Udskiftning má kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverand ø ren.

ADVERSEL

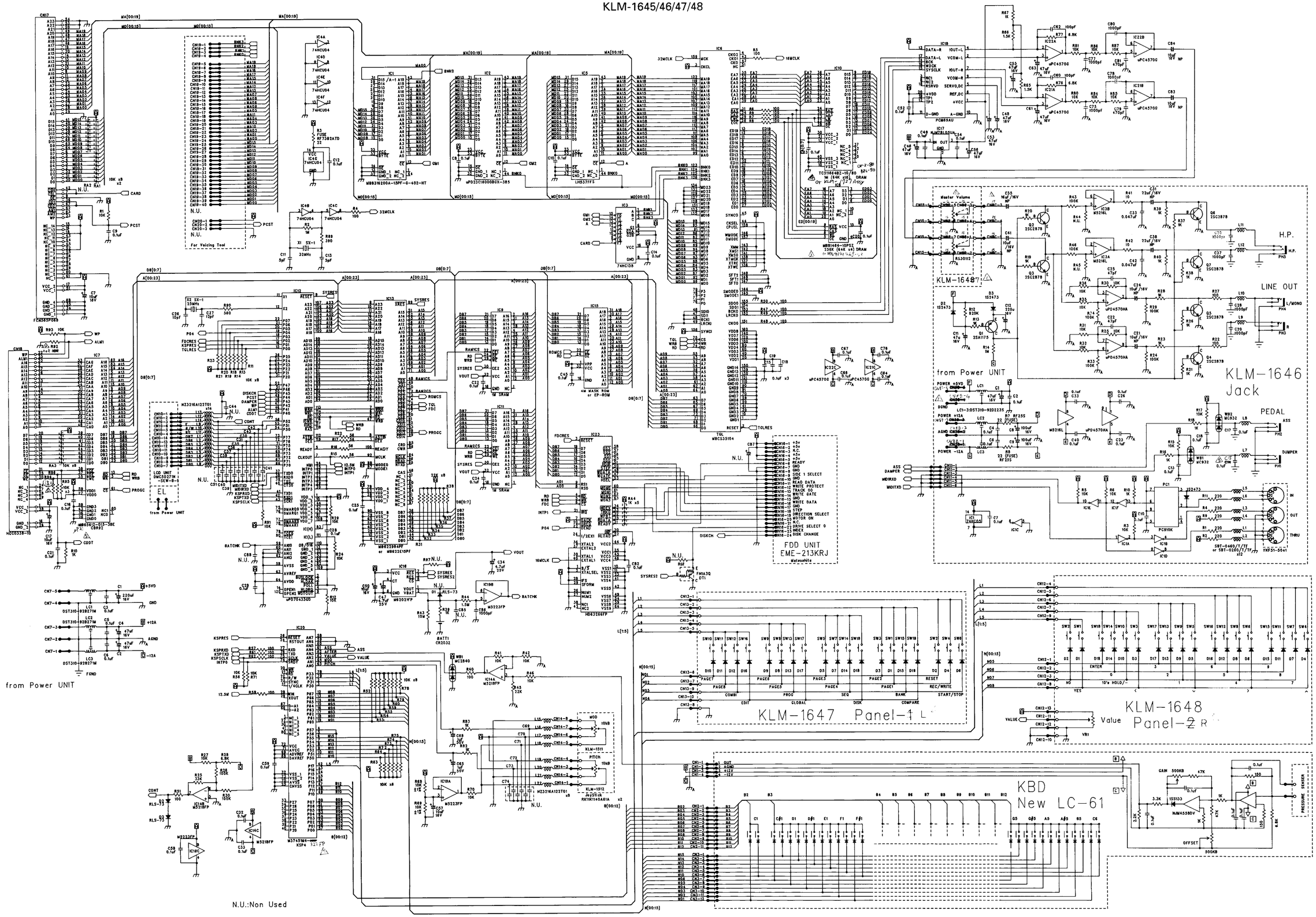
Lithiumbatteri – Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverand ø ren.

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.


KLM-1647 Panel-1
KLM-1648 Panel-2
KLM-1646 Jack
KBD New LC-61
FDD UNIT EME-213KRJ
from Power UNIT
LINE OUT
PEDAL
H.P.
N.U.:Non Used

KORG

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

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