

# SERVICE MANUAL & PARTS LIST

(Without price)

**ELECTRONIC KEYBOARD**

## CZ-101

**JAN. 1985**

*Scanned  
& Paid for  
By  
The Reverse  
Engineers.  
Do Not Ever  
Pay for This  
Scan!*



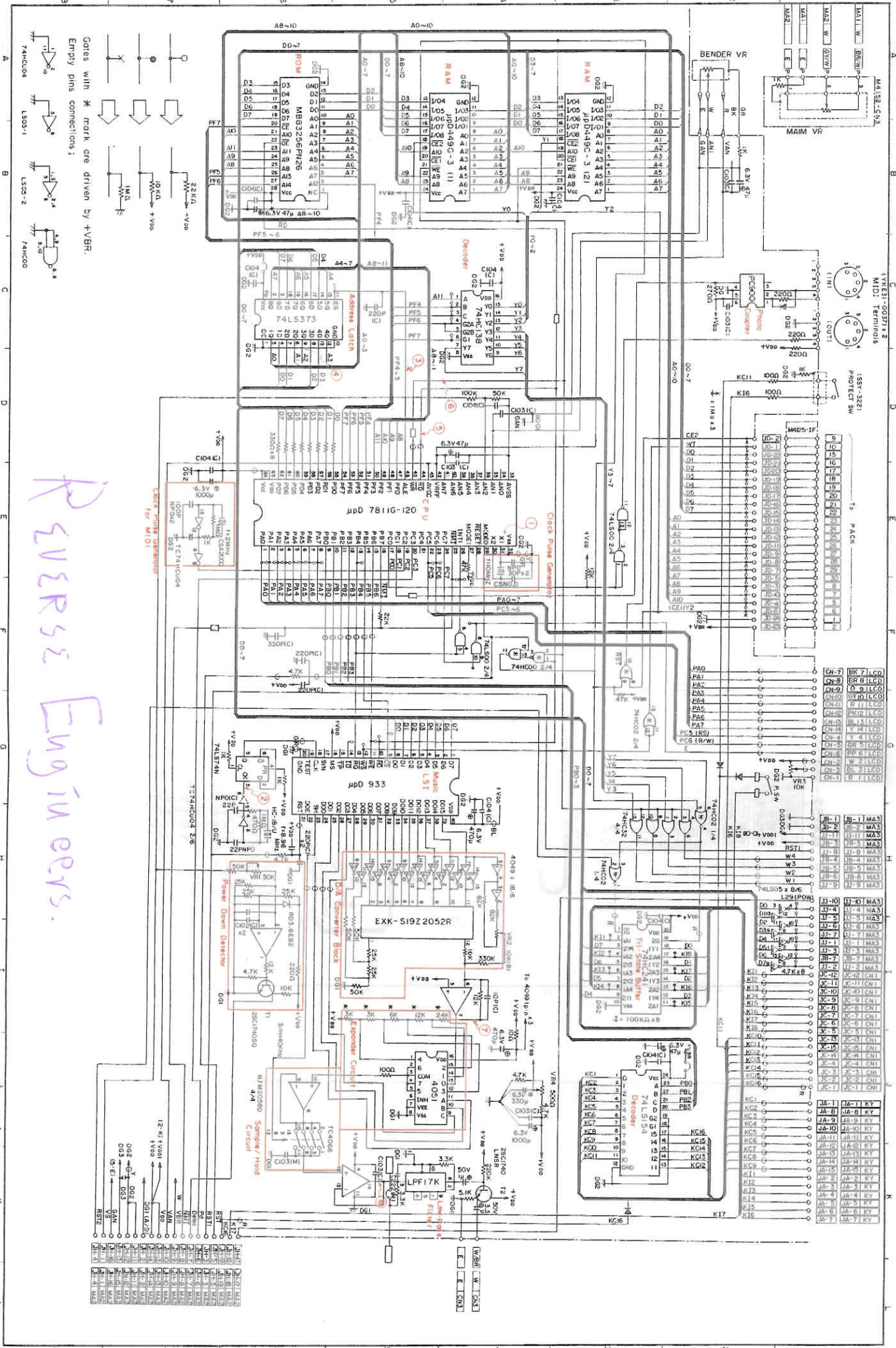
CZ-101

# CASIO®

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1. SCHEMATIC DIAGRAM  
1-1. PCBs M4152 - M41M, CN3M



Reverse Engineers.

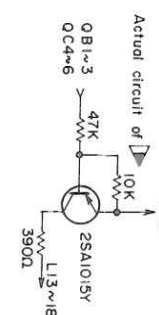
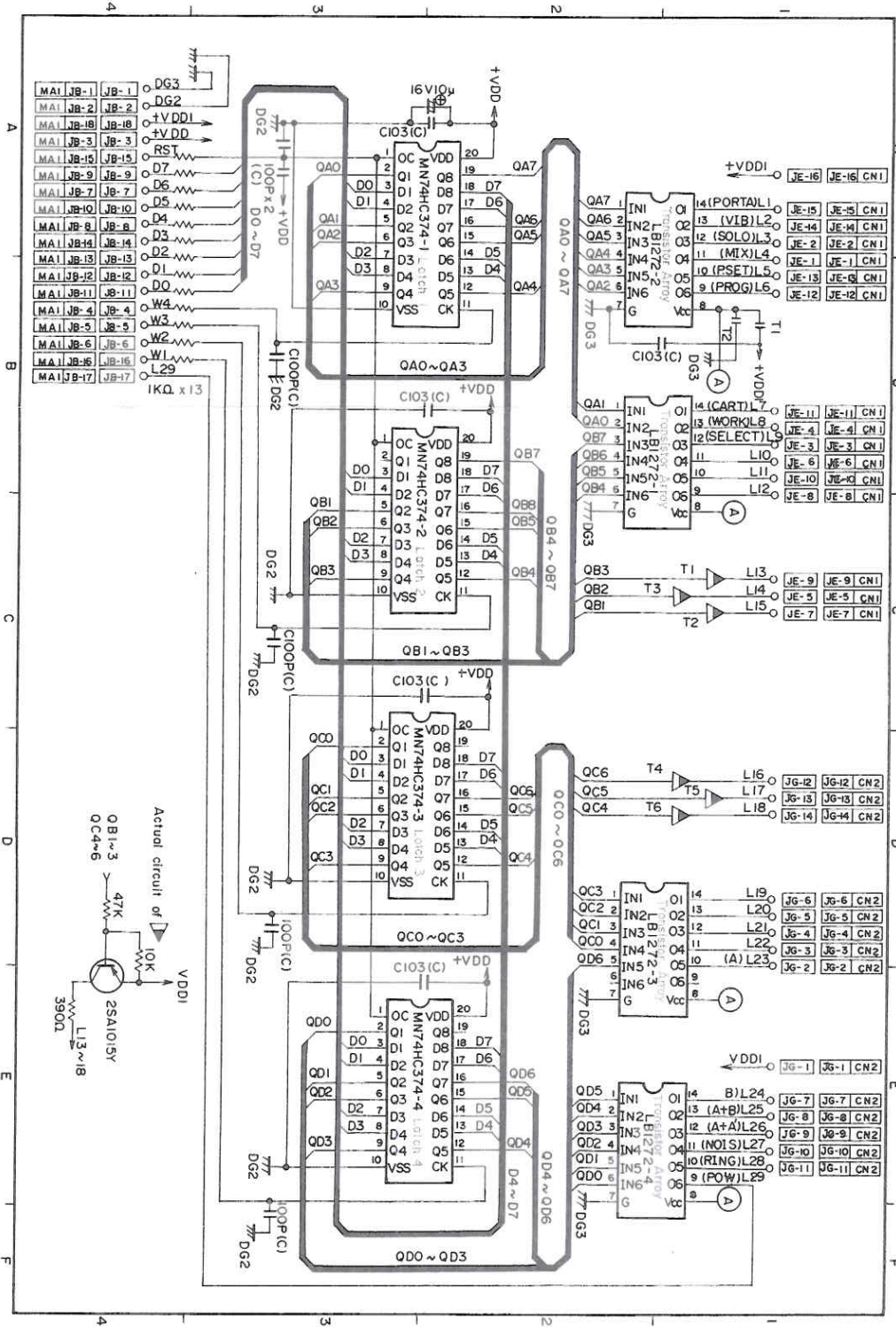
Gates with \* mark are driven by +VBR.  
Empty pins connections:



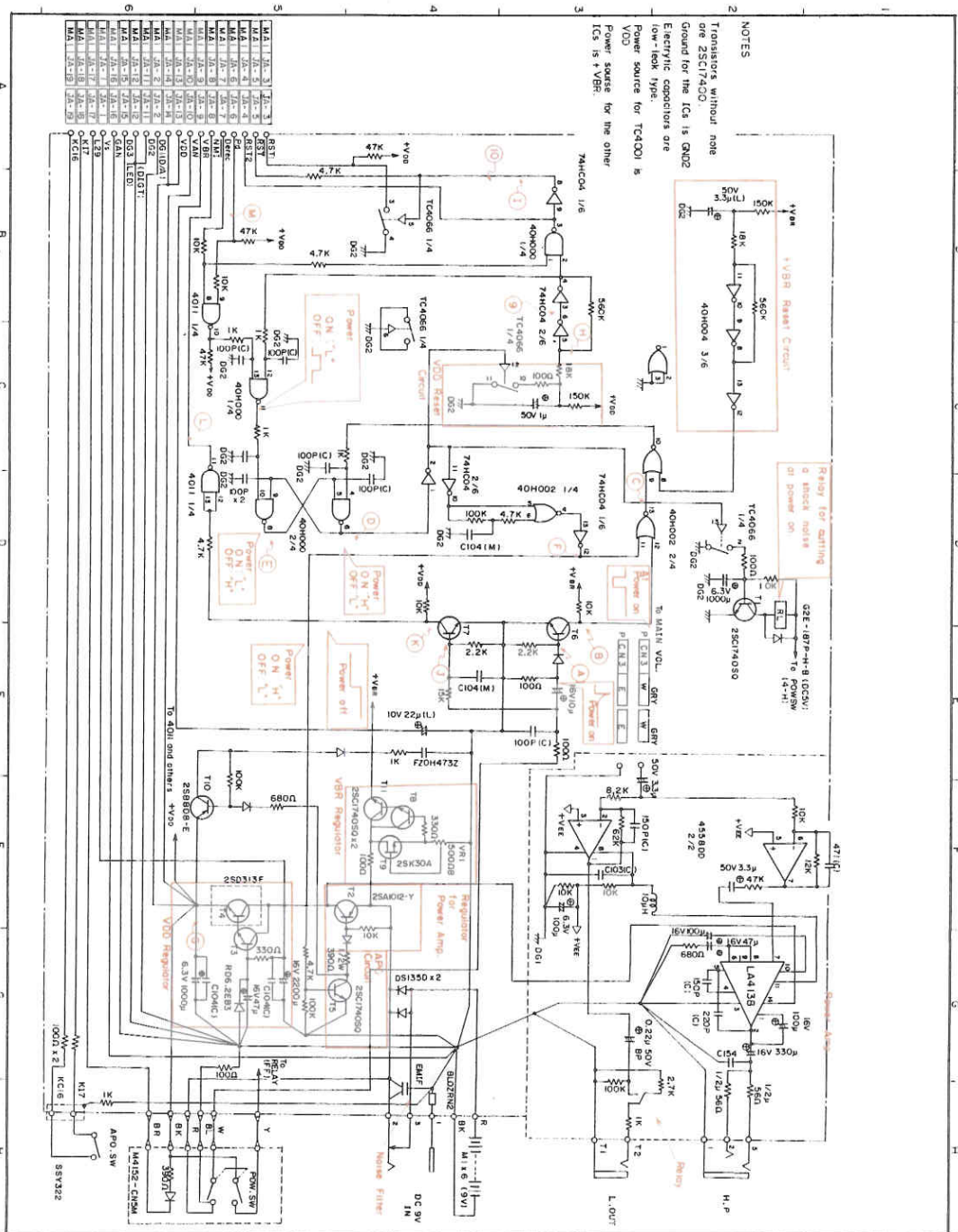
A B C D E F G H I J K  
1 2 3 4 5 6 7 8 9



1-2. PCB M4152-MA3M







NOTES

Transistors without note or 25C174000 Ground for the ICs is GND2

Electricity capacitors are low-leak type.

Power source for TC4001 is VDD

Power source for the other ICs is +VBR.

Timing Chart for Power On/Off

Power Source

Base of T6

Collector of T6

40H002 pin 13

40H000 pin 6

40H000 pin 8

74HC04 pin 12

+VDD

74HC04 pin 5

74HC04 pin 9

Base of T7

Collector of T7

NMT

Fd

CPU performs Power off Transition

0.6ms

15~20ms

100~130ms

300~400ms

1ms

1.5ms

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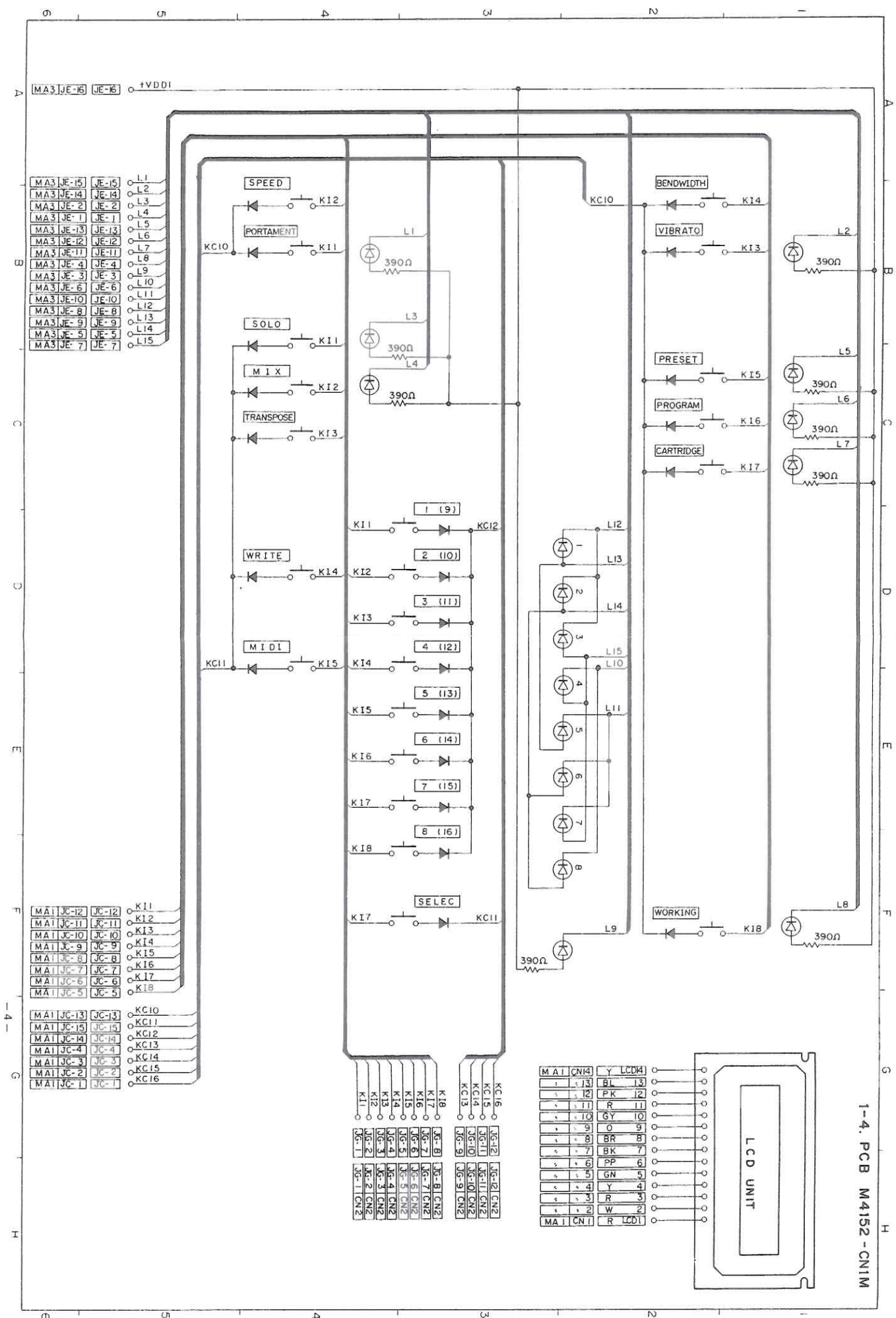
0.6ms

0.6ms

0.6ms

0.6ms

0.6ms



MA3 JE-15 JE-15  
 MA3 JE-14 JE-14  
 MA3 JE-2 JE-2  
 MA3 JE-1 JE-1  
 MA3 JE-13 JE-13  
 MA3 JE-12 JE-12  
 MA3 JE-11 JE-11  
 MA3 JE-4 JE-4  
 MA3 JE-3 JE-3  
 MA3 JE-6 JE-6  
 MA3 JE-10 JE-10  
 MA3 JE-8 JE-8  
 MA3 JE-9 JE-9  
 MA3 JE-5 JE-5  
 MA3 JE-7 JE-7

L1  
 L2  
 L3  
 L4  
 L5  
 L6  
 L7  
 L8  
 L9  
 L10  
 L11  
 L12  
 L13  
 L14  
 L15

MA1 JC-12 JC-12  
 MA1 JC-11 JC-11  
 MA1 JC-10 JC-10  
 MA1 JC-9 JC-9  
 MA1 JC-8 JC-8  
 MA1 JC-7 JC-7  
 MA1 JC-6 JC-6  
 MA1 JC-5 JC-5

MA1 JC-13 JC-13  
 MA1 JC-15 JC-15  
 MA1 JC-14 JC-14  
 MA1 JC-4 JC-4  
 MA1 JC-3 JC-3  
 MA1 JC-2 JC-2  
 MA1 JC-1 JC-1

1 (9)  
 2 (10)  
 3 (11)  
 4 (12)  
 5 (13)  
 6 (14)  
 7 (15)  
 8 (16)

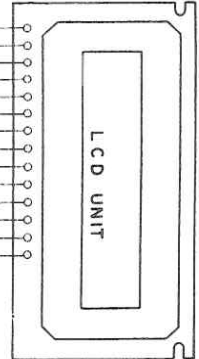
K11  
 K12  
 K13  
 K14  
 K15  
 K16  
 K17  
 K18

KC12  
 KC11  
 KC10  
 KC16  
 KC15  
 KC14  
 KC13

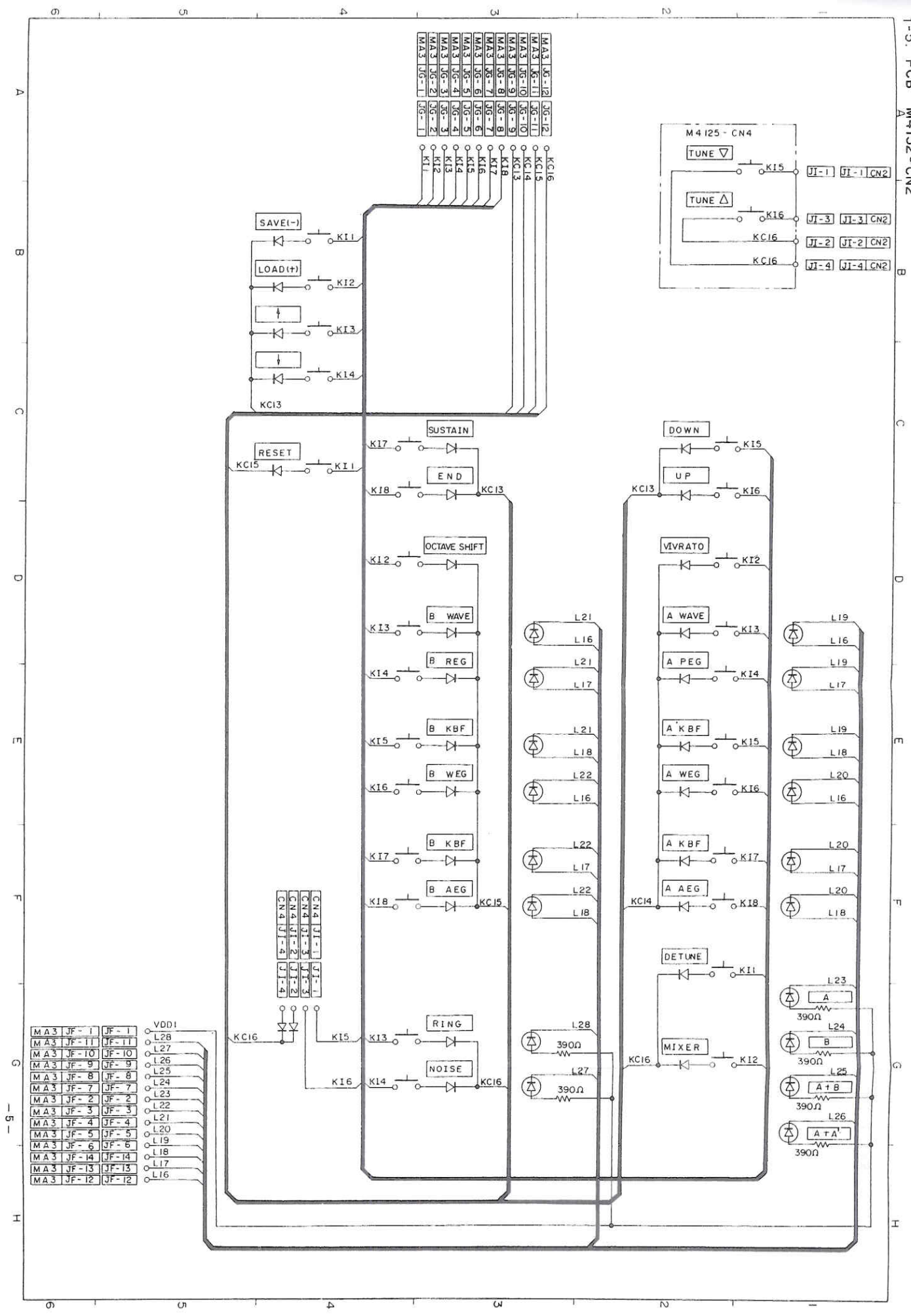
JE-12  
 JE-11  
 JE-10  
 JE-9  
 JE-8  
 JE-7  
 JE-6  
 JE-5  
 JE-4  
 JE-3  
 JE-2  
 JE-1

JG-12 CN2  
 JG-11 CN2  
 JG-10 CN2  
 JG-9 CN2  
 JG-8 CN2  
 JG-7 CN2  
 JG-6 CN2  
 JG-5 CN2  
 JG-4 CN2  
 JG-3 CN2  
 JG-2 CN2  
 JG-1 CN2

MA1 CN14 Y LCD4  
 13 BL 13  
 12 PK 12  
 11 R 11  
 10 GY 10  
 9 O 9  
 8 BR 8  
 7 BK 7  
 6 PP 6  
 5 GN 5  
 4 Y 4  
 3 R 3  
 2 W 2  
 MA1 CN1 R LCD1

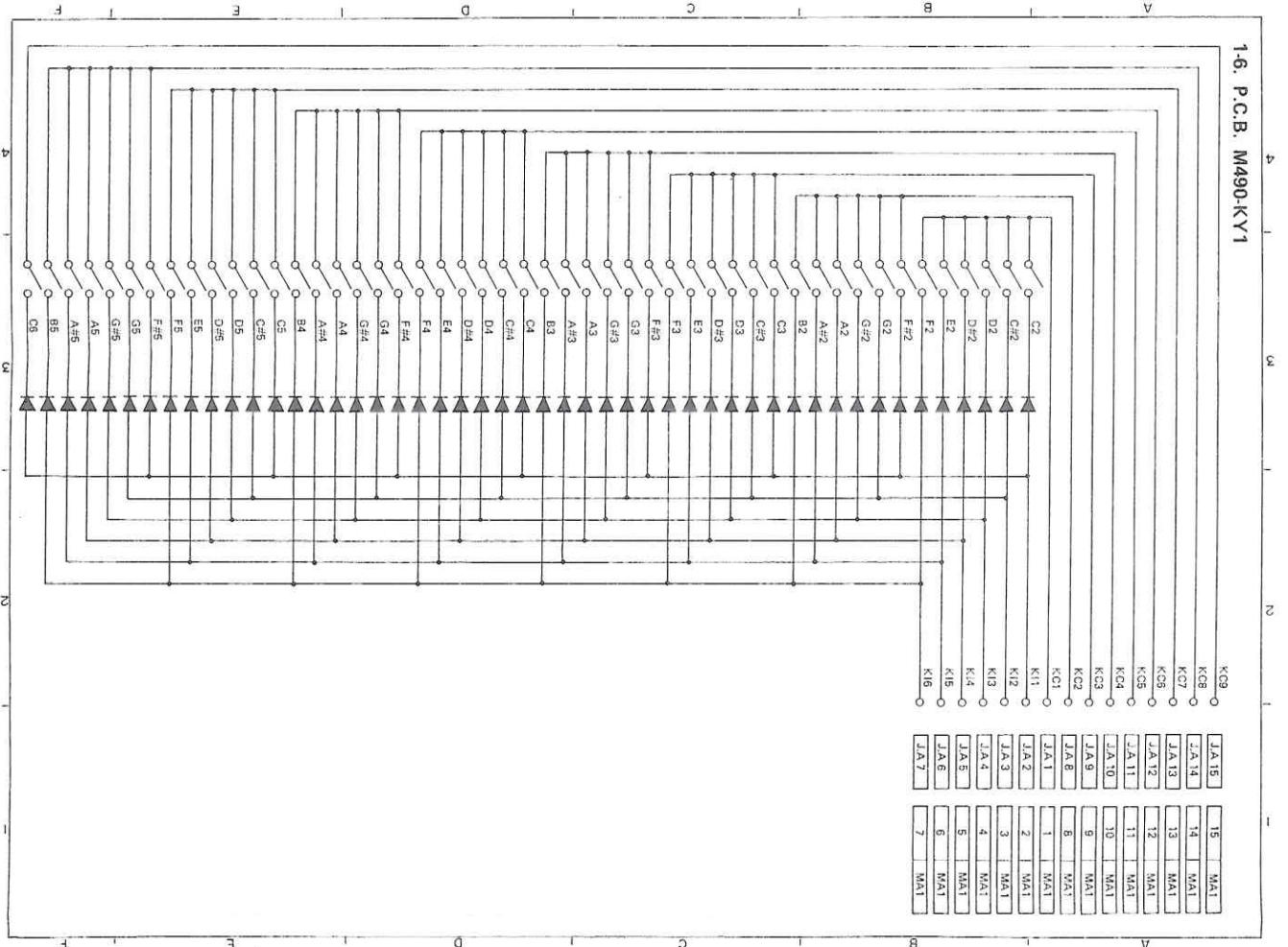


1-4. PCB M4152-CN1M

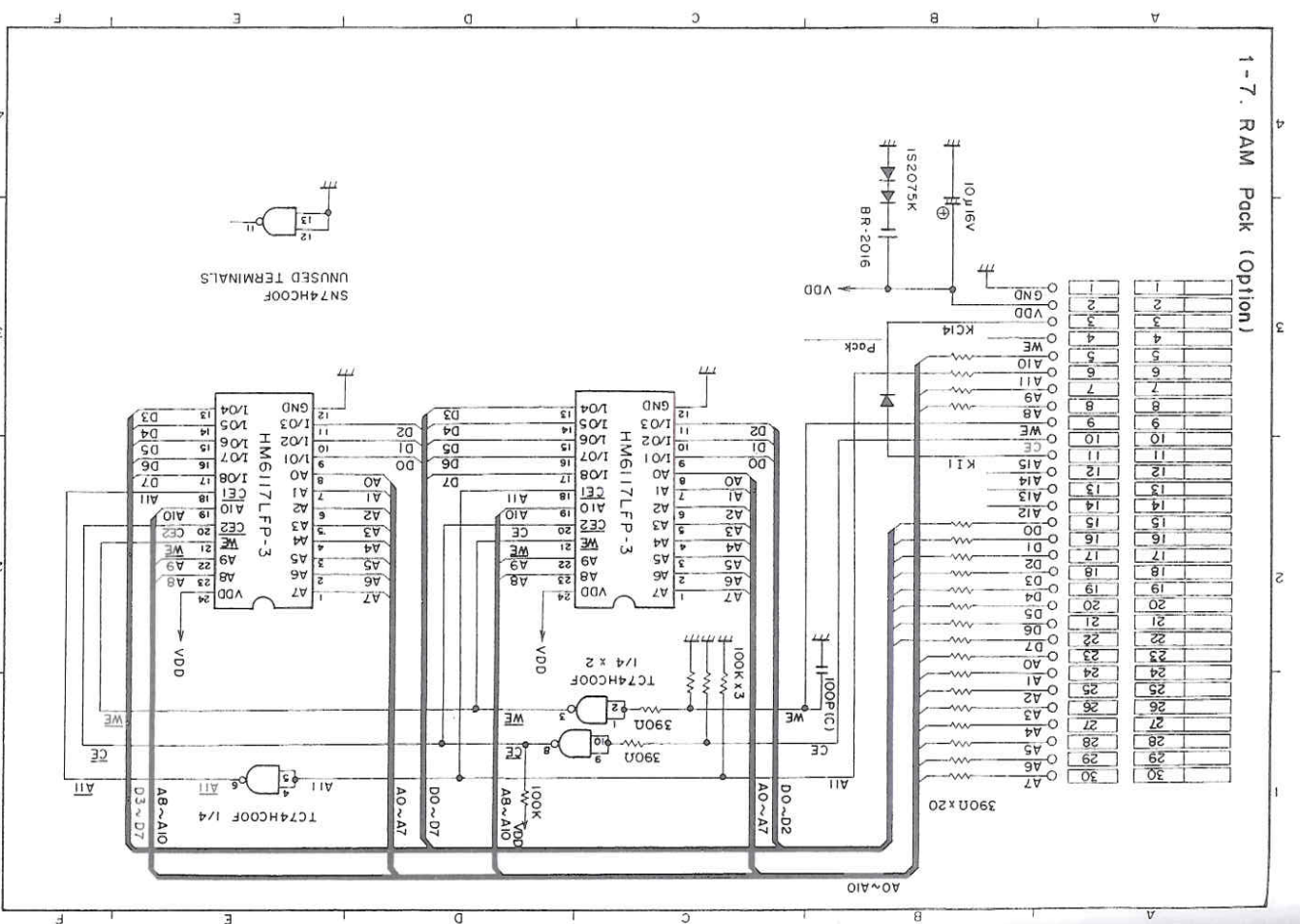




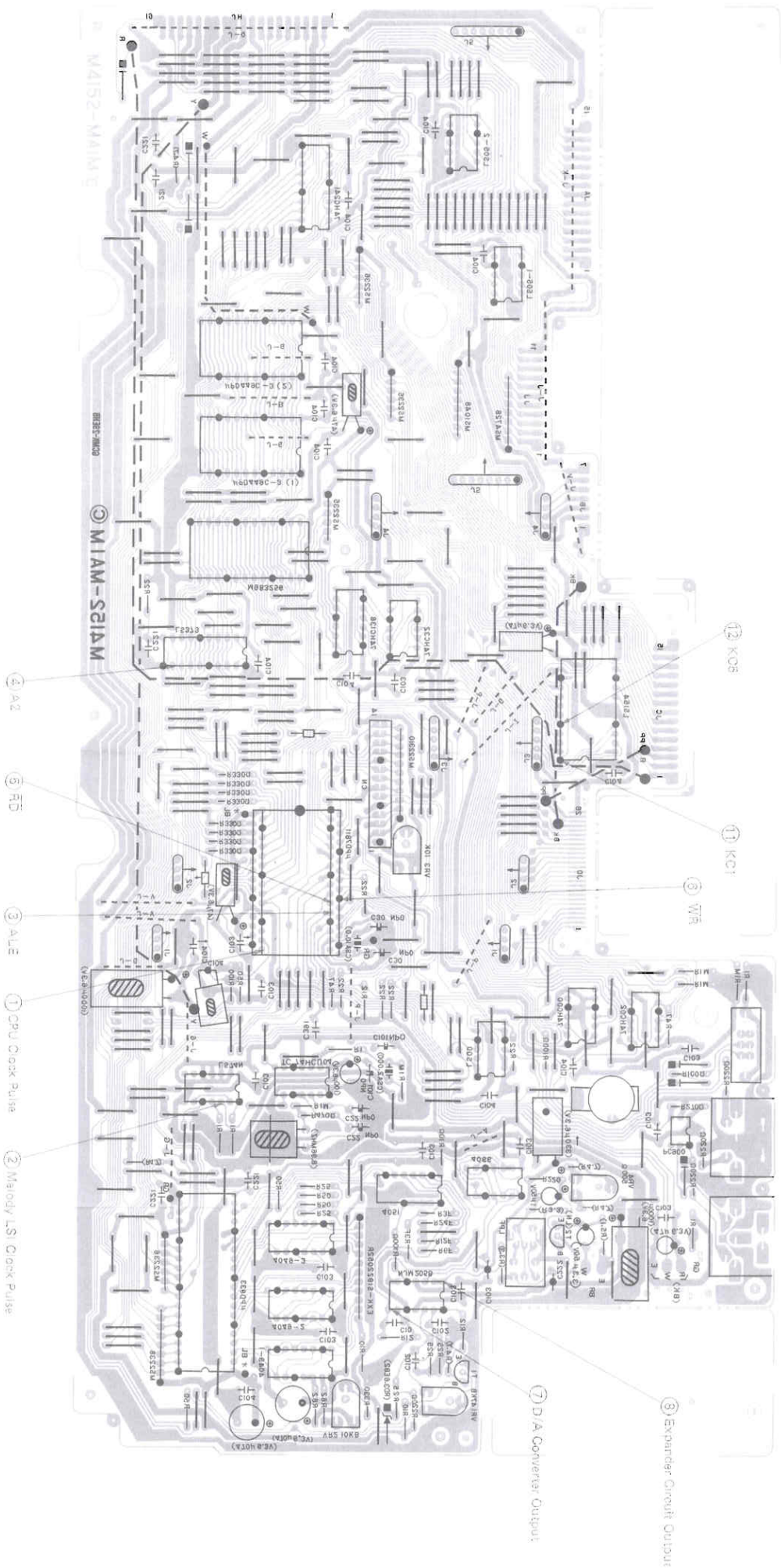
1-6. P.C.B. M490-KY1



1-7. RAM Pack (Option)



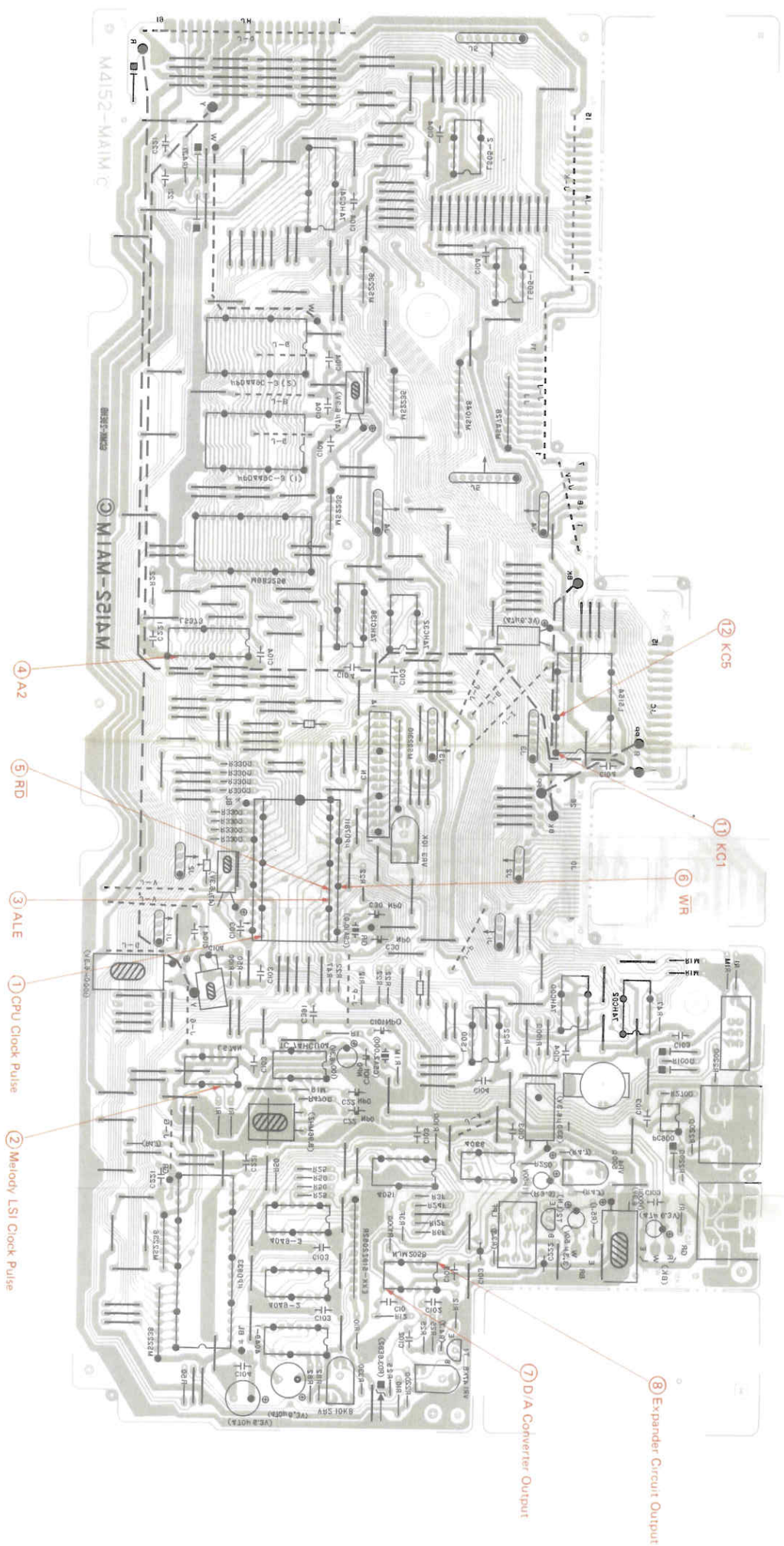
2. P.C.B. VIEW & MAJOR CHECKPOINTS  
 2-1. P.C.B. M4152-MA1M



- ① A12
- ② Mandy LSI Clock Pulse
- ③ ALE
- ④ CPU Clock Pulse
- ⑤ RD
- ⑥ WR
- ⑦ D/A Converter Output
- ⑧ Expander Circuit Output
- ⑨ KCI
- ⑩ KOS



2. P.C.B. VIEW & MAJOR CHECKPOINTS  
 2-1. P.C.B. M4152-MA1M



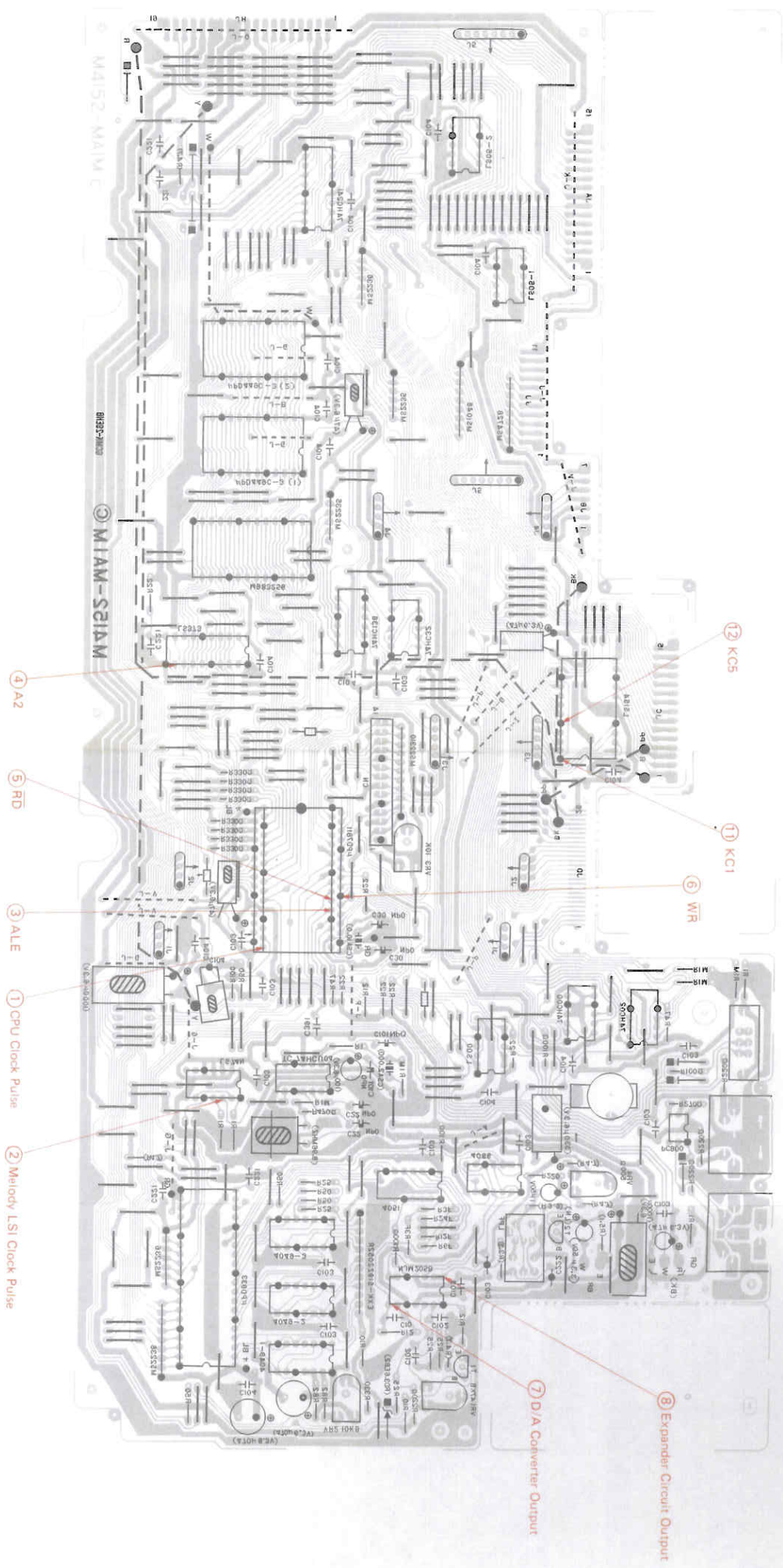
- ① CPU Clock Pulse
- ② Memory LSI Clock Pulse
- ③ ALE
- ④ A2
- ⑤ RD

- ⑥ W/R
- ⑦ KC1
- ⑧ KC5

- ⑦ D/A Converter Output
- ⑧ Expander Circuit Output



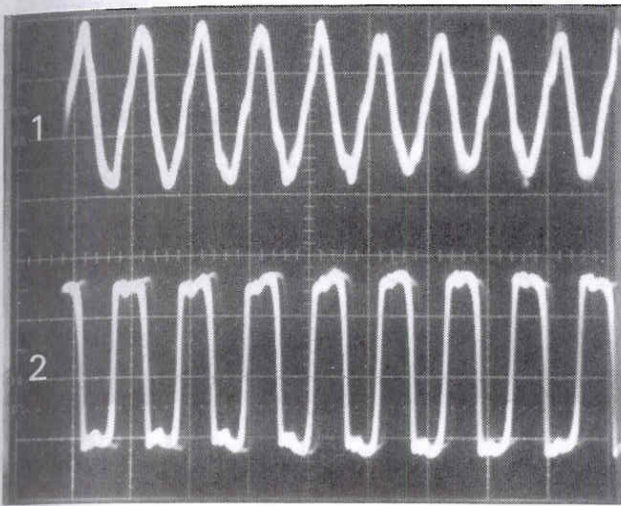
2. P.C.B. VIEW & MAJOR CHECKPOINTS  
 2-1. P.C.B. M4152-MA1M



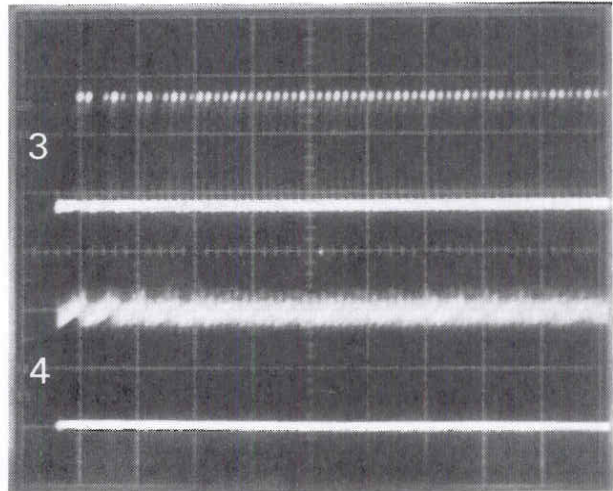




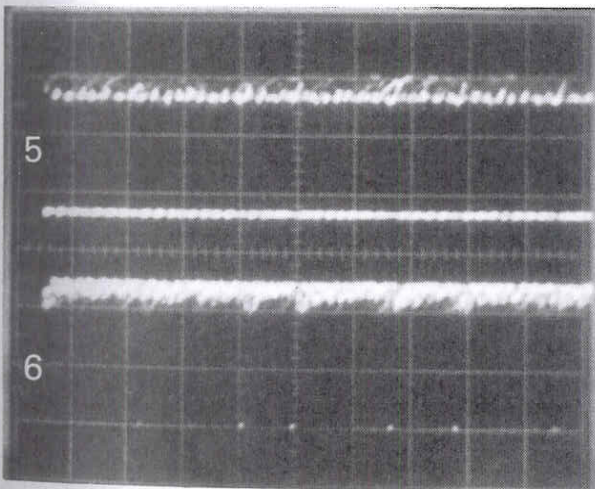
### 3. MAJOR WAVEFORMS



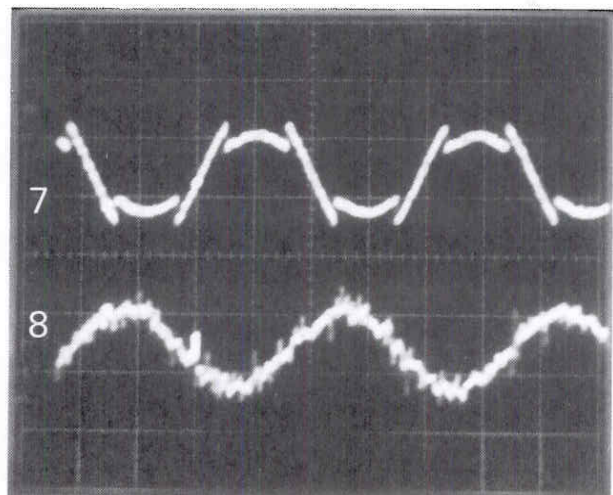
- ① CPU Clock Pulse ( $\mu$ PD7811 pin 31)  
2V/div., 0.1 $\mu$ s/div.
- ② Melody LSI Clock Pulse (74LS74 pin 3)  
2V/div., 0.1 $\mu$ s/div.



- ③ ALE ( $\mu$ PD7811 pin 46)  
2V/div., 2 $\mu$ s/div.
- ④ Address Bus A2 (74LS373 pin 9)  
2V/div., 2 $\mu$ s/div.

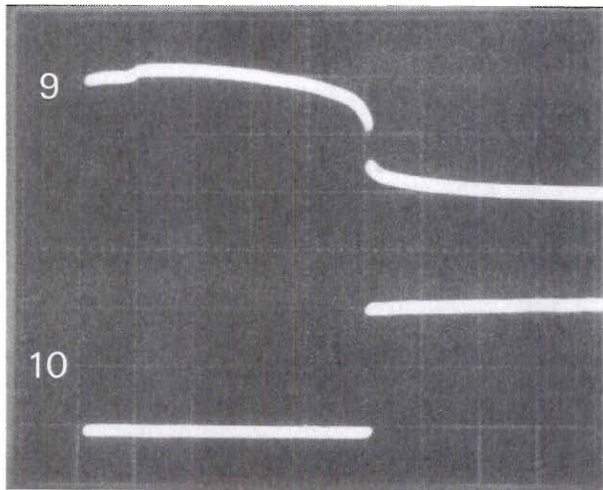


- ⑤  $\overline{RD}$  ( $\mu$ PD7811 pin 44)  
2V/div., 5 $\mu$ s/div.
- ⑥  $\overline{WR}$  ( $\mu$ PD7811 pin 45)  
2V/div., 5 $\mu$ s/div.

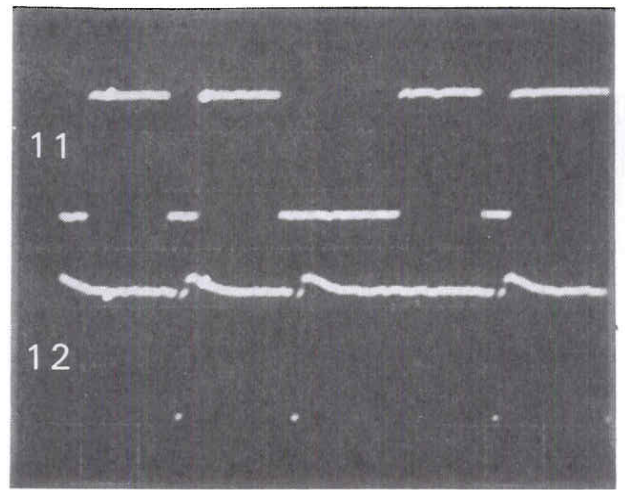


- ⑦ D/A Converter Output (2058 pin 7)  
Tone: Electric Piano, Key: A3  
0.1V/div., 1ms/div.
- ⑧ Expander Circuit Output (2058 pin 14)  
Tone: Electric Piano, Key: A3  
0.1V/div., 1ms/div.



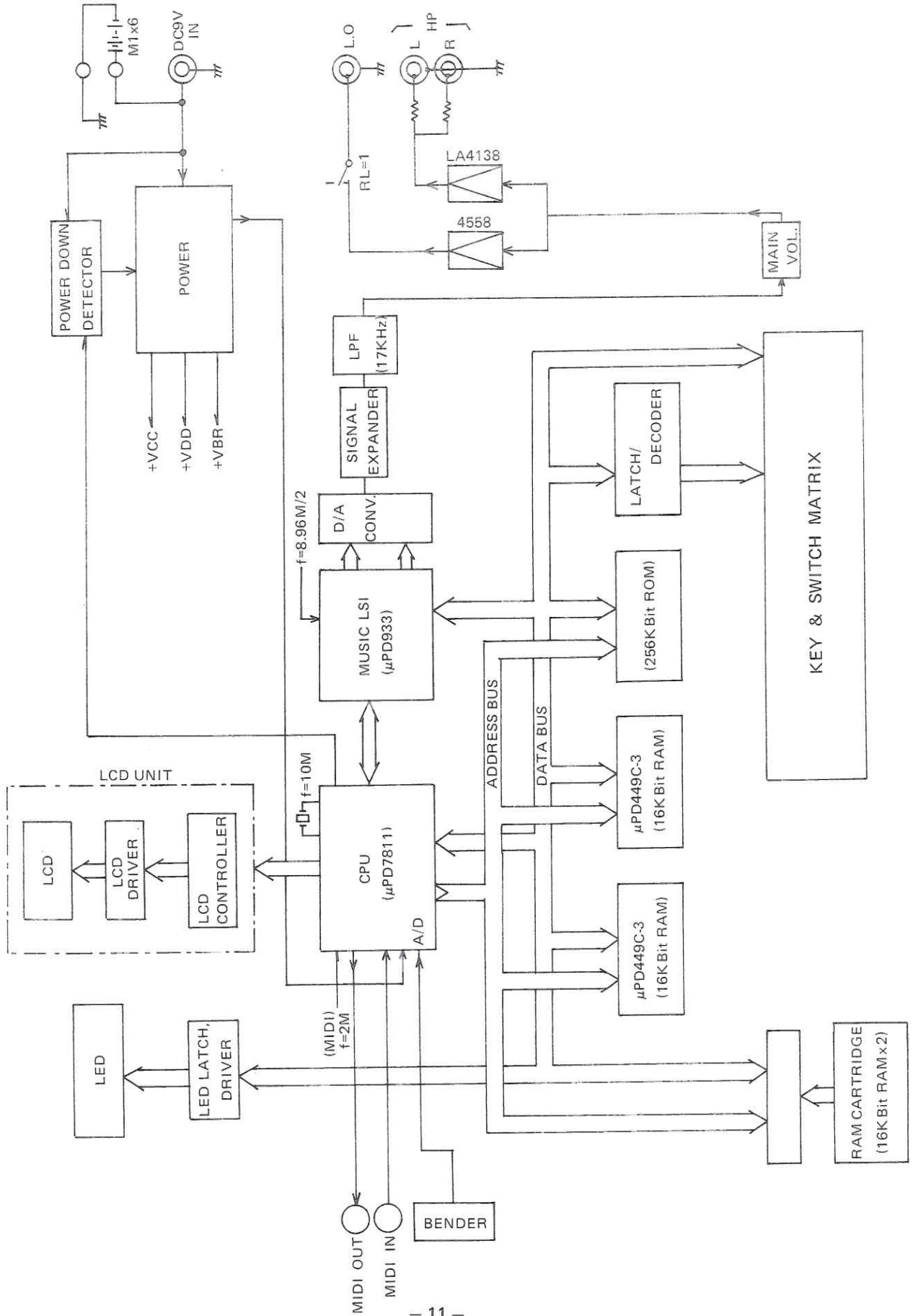


- ⑨ Reset Signal at Power ON  
(P.C.B. M4152-MA2M 74HC04 pin 3)  
2V/div., 20ms/div.
- ⑩ Reset Signal at Power ON  
(P.C.B. M4152-MA2M 74HC04 pin 8)  
2V/div., 20ms/div.



- ⑪ KC1  
(P.C.B. M4152-MA1M 74LS154 pin 1)  
2V/div., 1ms/div.
- ⑫ KC5  
(P.C.B. M4152-MA1M 74LS154 pin 5)  
2V/div., 1ms/div.

#### 4. BLOCK DIAGRAM



## 5. CPU ( $\mu$ PD7811)

The  $\mu$ PD7811 is an 8-bit microprocessor unit containing a 4096-byte ROM, a 256-byte RAM and an 8-bit A/D (analog to digital) converter.

The following are the pin functions of the CPU.

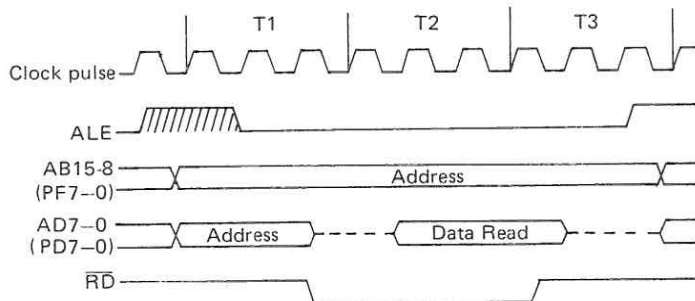
Pin No.	Signal	In/Out	Function
1 ~ 8	PA0~PA7	Out	Data bus for the LCD Controller.
9 ~ 12	PB0~PB3	Out	Primary signal for key common signals.
13	PB4	In	Melody LSI ( $\mu$ PD933G) sends "L" level pulse when it is prepared to receive data.
14	PB5	Out	Melody LSI chip select signal. When "L", the CPU selects the Music LSI.
15	PB6	Out	Melody LSI write enable signal. When "L", the CPU is able to write data into the Music LSI.
16	PB7	Out	NMI (Non Maskable Interrupt) signal output. When the CPU wishes to halt its operation, it output an "L" level signal from this terminal.
17	PC0	Out	MIDI (Music Instrument Digital Interface) signal output.
18	PC1	In	MIDI signal input.
19	PC2	In	MIDI clock pulse input.
20	PC3	Out	Power down detection signal output. When normal voltage is supplied, the terminal stays at "H" level. However when the power source drops, the terminal drops to "L" level.
22 ~ 24	PC5 ~ PC7	Out	LCD Unit control signals.
25	$\overline{\text{NMI}}$	In	Non Maskable Interrupt signal input. When the terminal receives "L" level, the CPU stops the operation. Receives "L" level signal at power off.
26	INT1	In	Music LSI's interrupt request signal input. Receives "H" level signal when the Music LSI requests an interruption. The CPU then halts the function.
28	RESET	In	Reset signal input. At power on, the terminal receives an "L" level pulse so that the CPU's internal circuits are initialized.
30, 31	X2, X1	In/Out	2MHz clock pulse inputs.
32	VSS	In	GND
33	AVSS	In	GND for the built-in A/D converter.
35	AN1	In	Pitch Bender input. A voltage level from the Pitch Bender is changed to a digital signal in the built-in A/D converter.
36	AN2	In	Power down detection terminal. When the power voltage is not sufficient, the CPU flashes the pilot lamp.



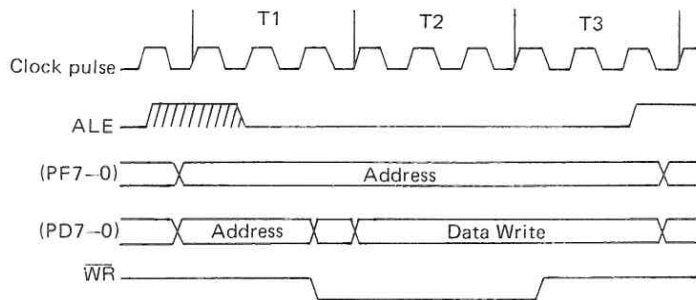
42	VREF	In	Reference voltage for the Pitch Bender.
43	AVCC	In	Power source for the built-in A/D converter.
44	$\overline{RD}$	Out	Read signal output. When "L", the CPU reads data from the memory devices.
45	$\overline{WR}$	Out	Write signal output. When "L", the CPU writes data into the memory devices.
46	ALE	Out	Address Latch Enable signal. When "H", the address of the memory devices is assigned.
47~50	PF0~PF3	Out	Address bus (A8~A11).
51~53	PF4~PF6	Out	Address bus (A12~A14) for the ROM.
54	PF7	Out	ROM chip select signal.
55~62	PD0~PD7	In/Out	8-bit data bus.
63, 64	VDD, VCC	In	+5V power source.

### Timing Chart of Data Read and Write

#### Data Read

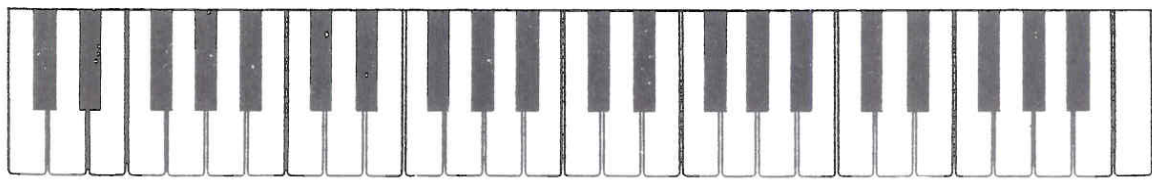
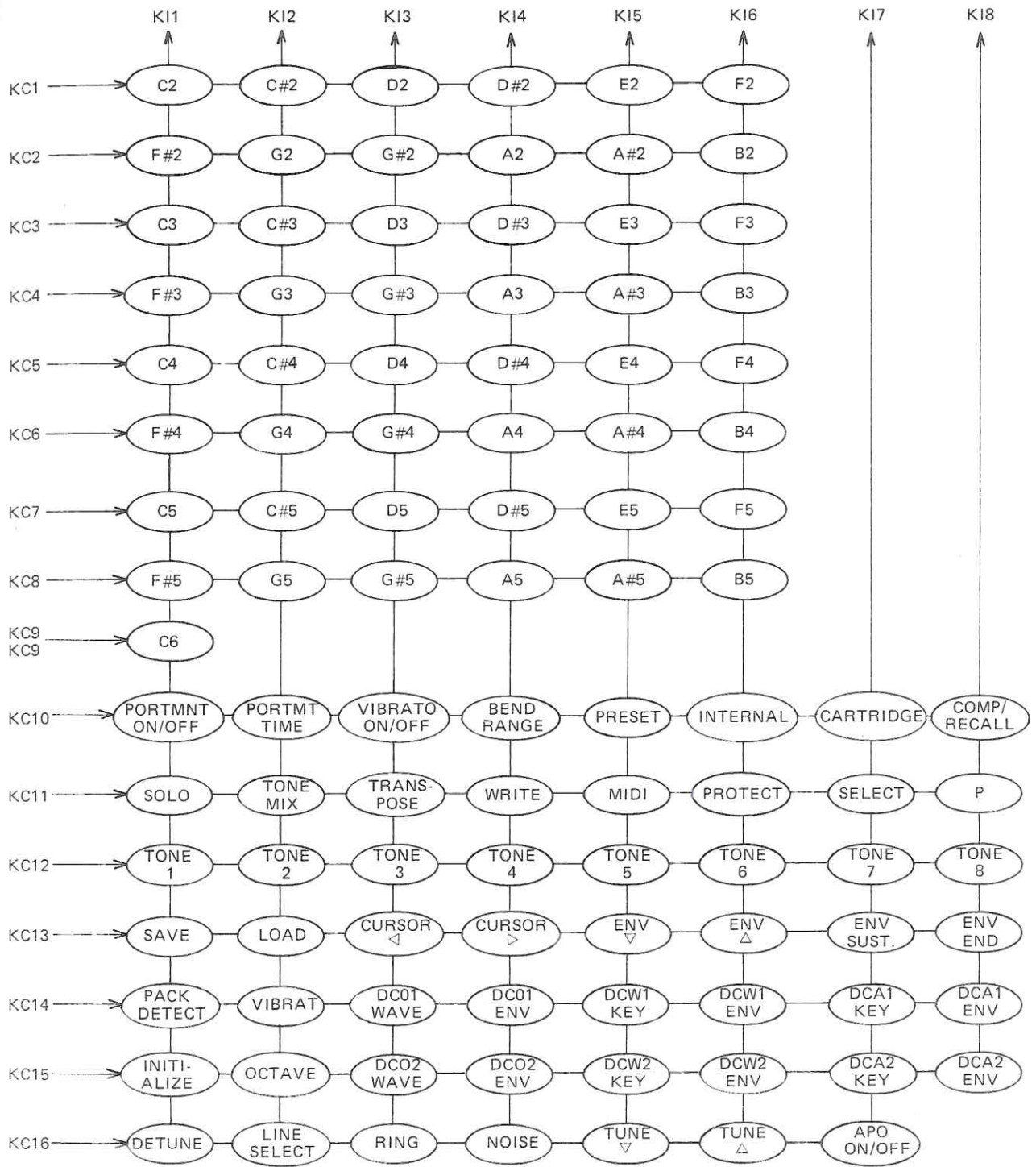


#### Data Write





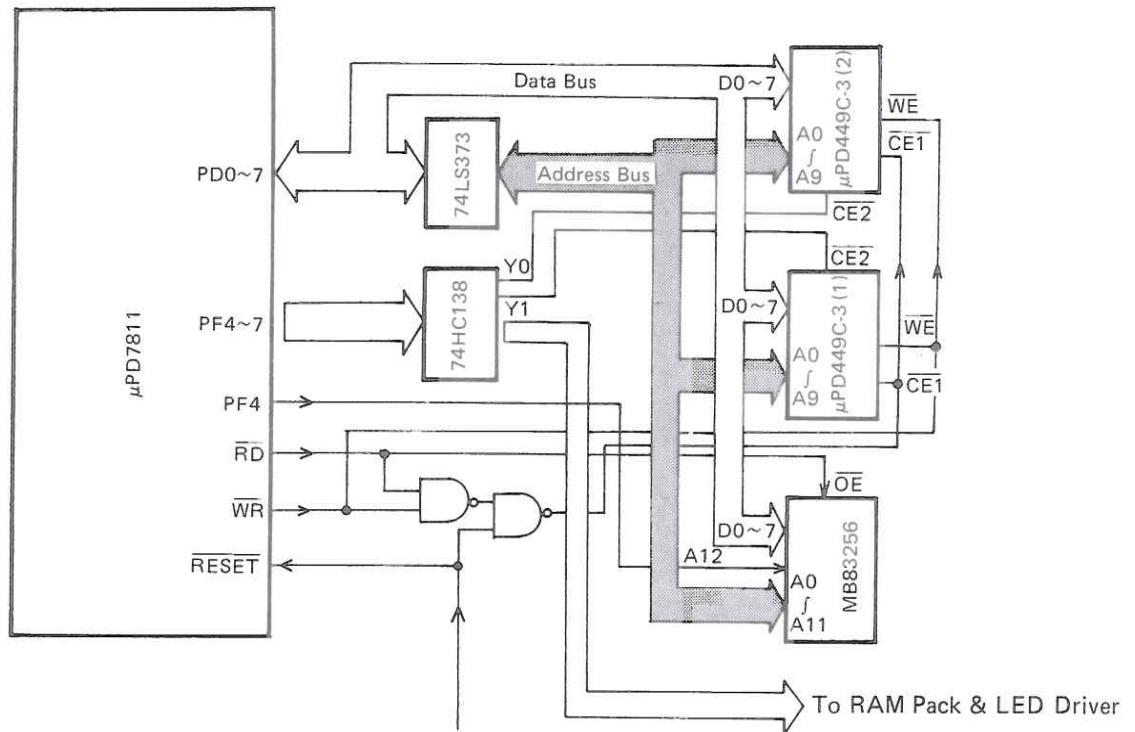




C1

C6

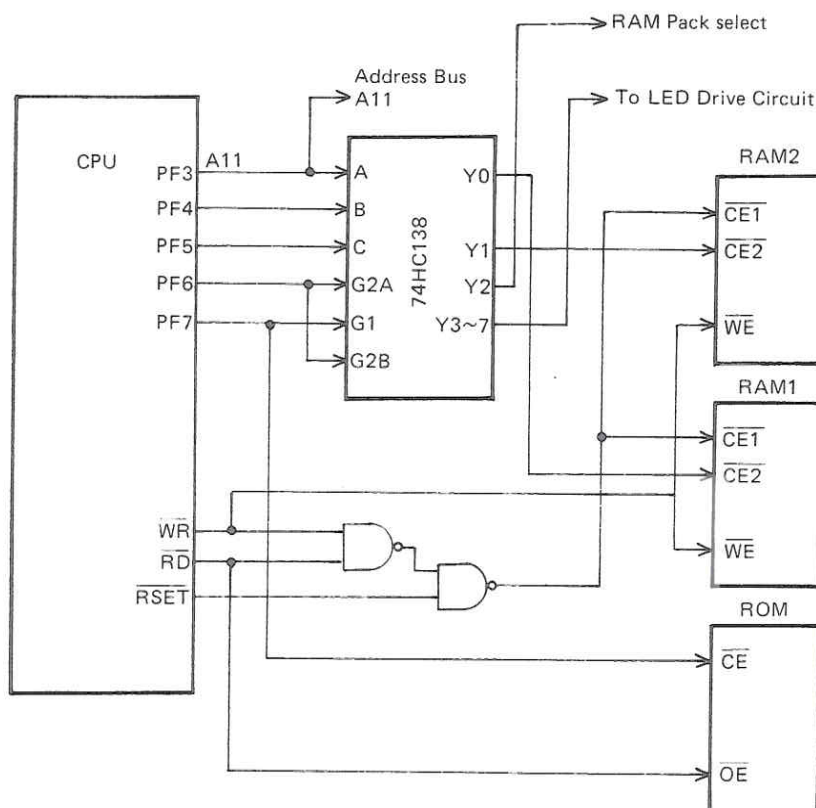
## 7. ROM & RAM ACCESS



CZ101 employs a 32K byte ROM and two 2K byte static RAMs.

The above is the block diagram of the ROM and RAM access circuit.

### 7-1. Chip Selection



'LS138, 'S138  
FUNCTION TABLE

ENABLE		SELECT			OUTPUTS							
G1	G2*	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	H	X	X	X	H	H	H	H	H	H	H	H
L	X	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	H	H	L	H	H	H	H	H
H	L	H	L	L	H	H	H	H	L	H	H	H
H	L	H	L	H	H	H	H	H	H	L	H	H
H	L	H	H	L	H	H	H	H	H	H	L	H
H	L	H	H	H	H	H	H	H	H	H	H	L

\*G2 = G2A + G2B

H = high level, L = low level, X = irrelevant



The RAMs are selected when both  $\overline{CE1}$  and  $\overline{CE2}$  terminals are "L" while the ROM is selected when  $\overline{CE}$  is "L".

The RAMs and the ROM are selected under the following conditions.

RAM1 Selection

$\overline{CE1}$  to be "L" . . . . . Either  $\overline{RD}$  or  $\overline{WR}$  : L,  $\overline{RESET}$ : H

$\overline{CE2}$  to be "L" . . . . . PF3:L, PF4:L, PF5:L

RAM2 Selection

$\overline{CE1}$  to be "L" . . . . . Either  $\overline{RD}$  or  $\overline{WR}$  : L,  $\overline{RESET}$ : H

$\overline{CE2}$  to be "L" . . . . . PF3:H, PF4:L, PF5:L

RAM Pack Selection . . . . . PF3:L, PF4:H, PF5:L

ROM Selection . . . . . PF7:L

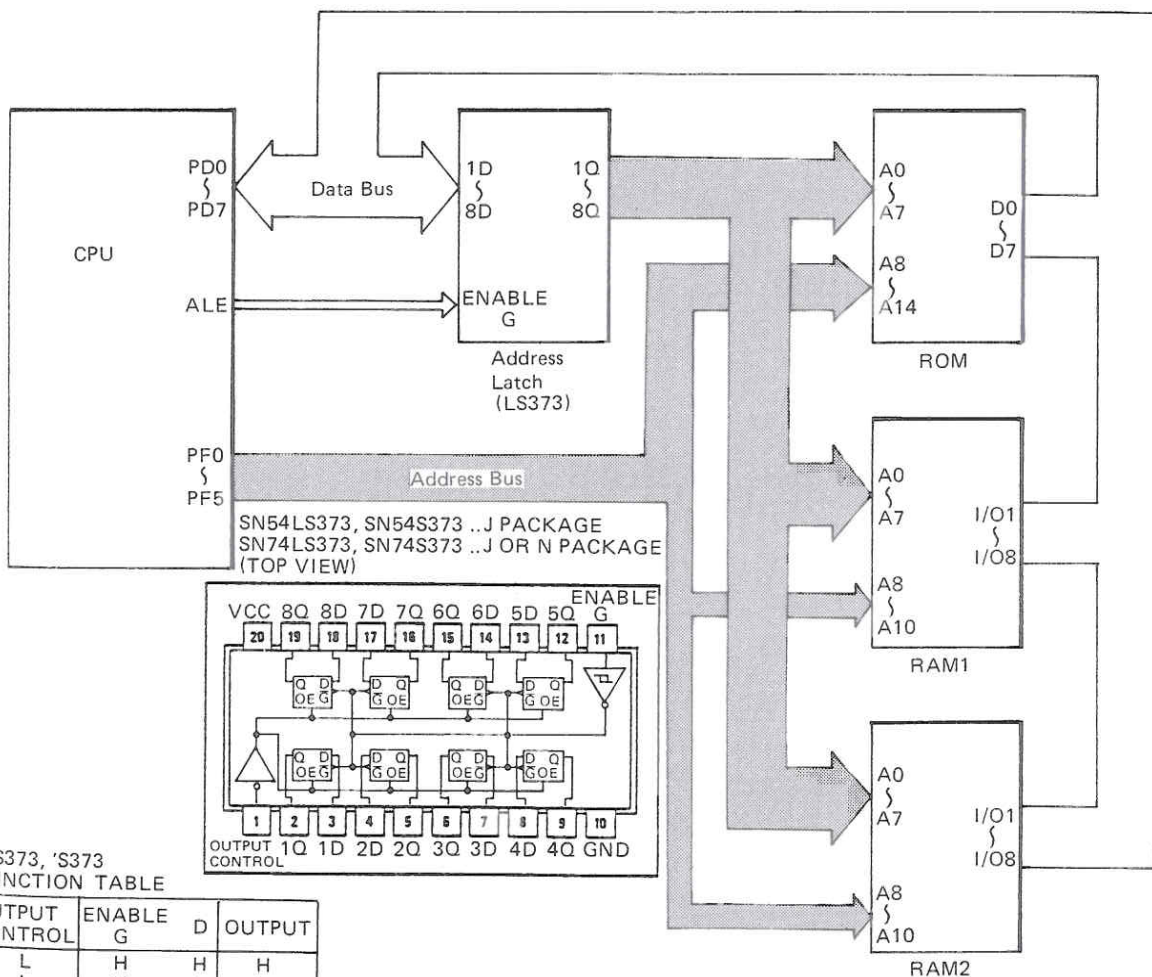
## 7-2. Addressing

The ROM and the RAM have address terminals A0 ~ A14 and A0 ~ A10 respectively.

The lower address signals A0 ~ A7 are provided from the data bus.

When signal ALE from the CPU is "H", data signals PD0 ~ PD7 are set in the Address Latch LS373 which becomes the lower address bus.

The upper address signals A8 ~ A14 are provided from the CPU.



'LS373, 'S373  
FUNCTION TABLE

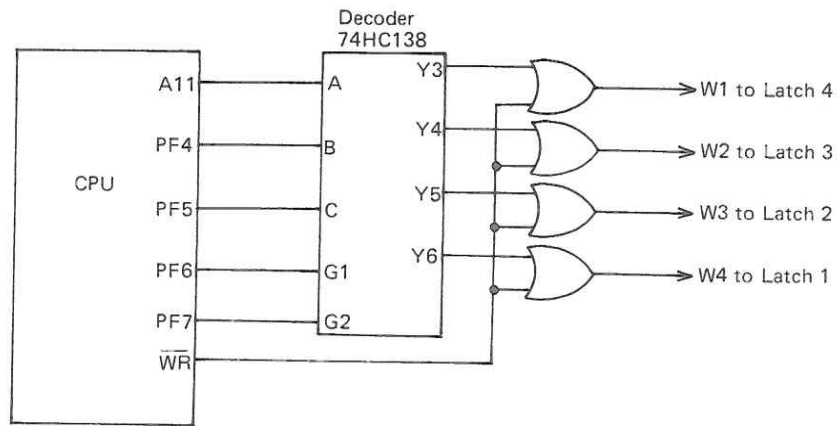
OUTPUT CONTROL	ENABLE G	D	OUTPUT
L	H	H	H
L	H	L	L
L	L	X	$Q_0$
H	X	X	Z



## 8. LED DRIVER

When an LED is to be lit, the CPU first selects a latch and then sends data to the latch through the data bus:

The latches are selected by signals PF4 ~ PF7 via decoder 74HC138.



The following tables show the function table of decoder 74HC138 and the voltage conditions for the Latch selections.

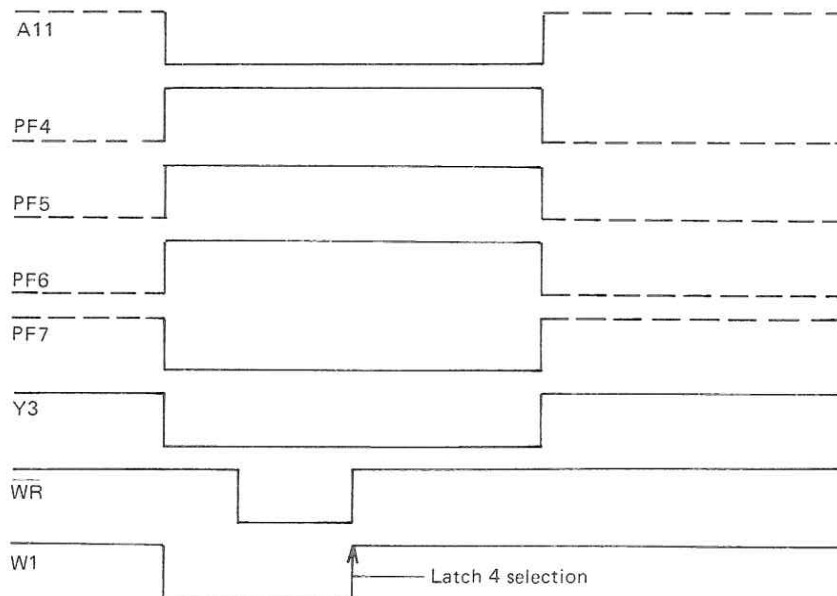
'LS138, 'S138  
FUNCTION TABLE

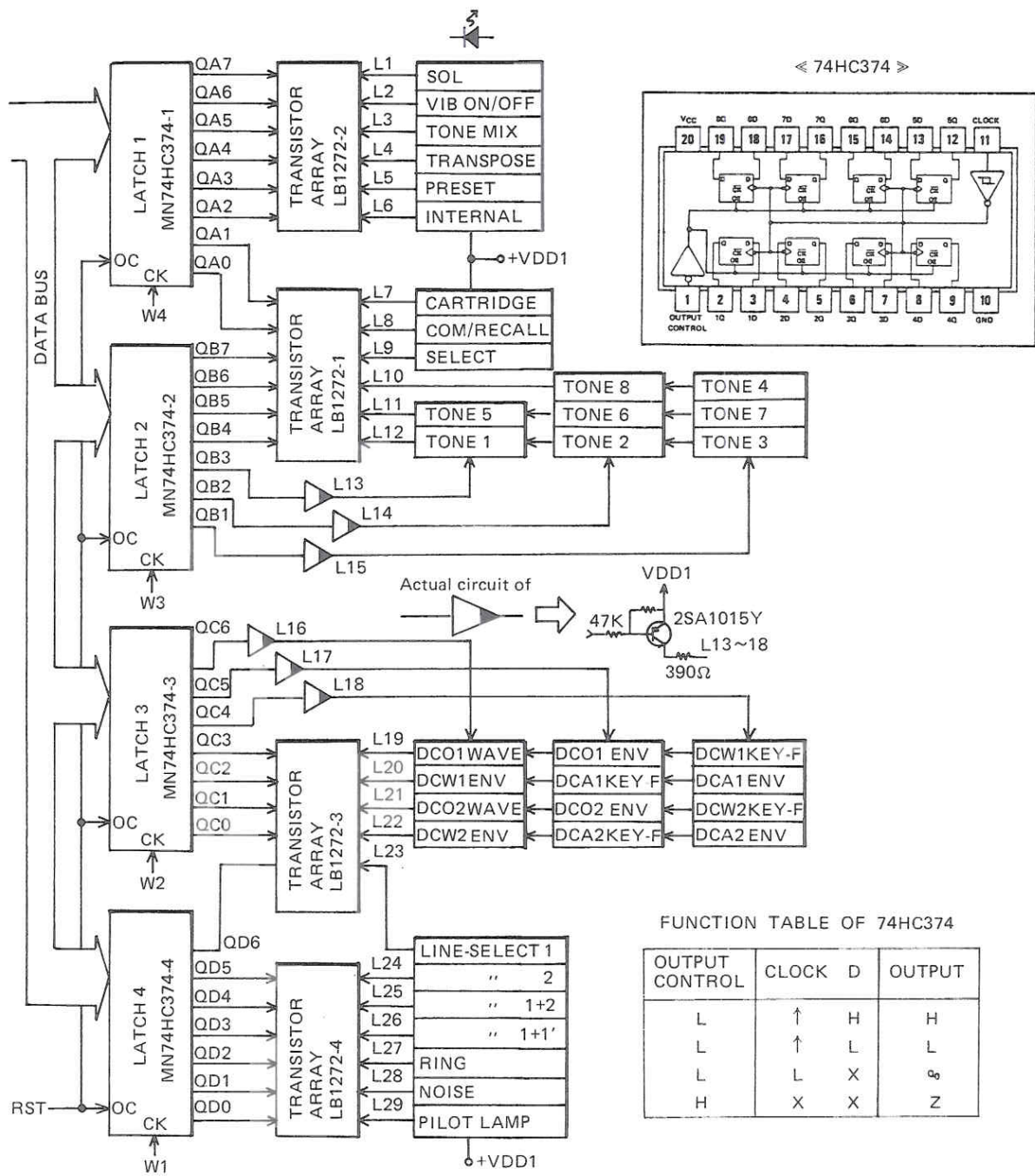
INPUTS			OUTPUTS									
ENABLE		SELECT			Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
G1	G2*	C	B	A								
X	H	X	X	X	H	H	H	H	H	H	H	H
L	X	X	X	X	H	H	H	H	H	H	H	H
H	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	H	H	L	H	H	H	H	H	H
H	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	H	H	H	H	L	H	H	H	H	H
H	L	H	L	L	H	H	H	L	H	H	H	H
H	L	H	L	H	H	H	H	L	H	H	H	H
H	L	H	H	L	H	H	H	H	L	H	H	H
H	L	H	H	H	H	H	H	H	L	H	H	H

\*G2 = G2A + G2B  
H = high level, L = low level, X = irrelevant

	A11	PF4	PF5	PF6	PF7	WR
Latch 1	H	H	L	H	L	L
Latch 2	L	L	H	H	L	L
Latch 3	H	L	H	H	L	L
Latch 4	L	H	H	H	L	L

Timing Chart for selecting Latch 4.





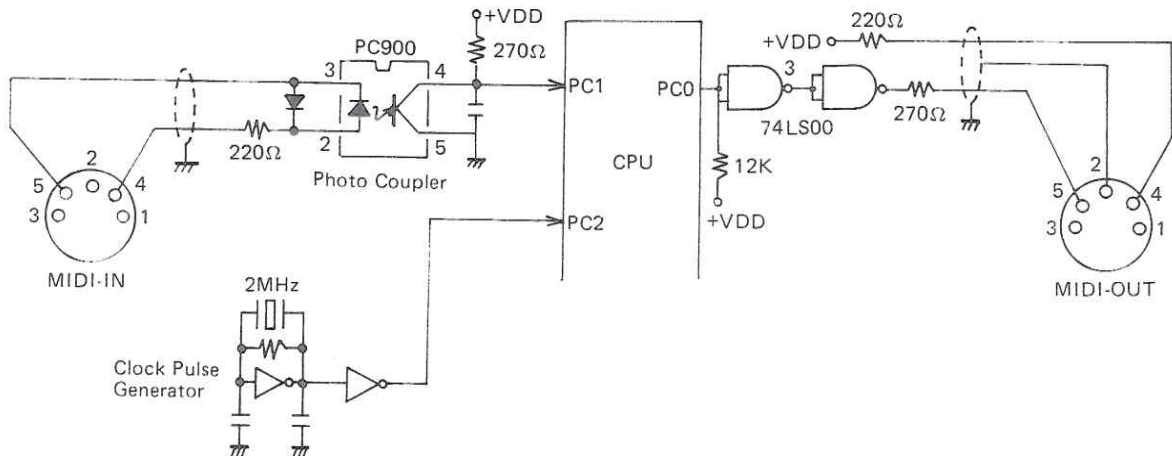
When the TONE 1 LED is to be lit, the CPU generates signal W3 from signals PF4, PF7, and A11 so that Latch 2 is able to set the data.

Then the CPU raises PB3 and PB4 of the data bus to "H" so that the QB4 and QB3 outputs of Latch 2 become "H". The QB3 output is inverted to "L" by inverter L13.

Thus the TONE 1 LED is lit as the current flows in the LED.

## 9. MIDI (Musical Instrument Digital Interface) CIRCUIT

MIDI is a world standard for transferring musical data between electronic musical instruments or between a personal computer and an electronic musical instrument.



Data from another musical instrument or a personal computer enters the CPU via photo coupler PC900. In the photo coupler, data is converted to light energy and from light energy to an electronic signal.

Since the CPU and the other musical instrument (or personal computer) are not connected electrically, electrical noise is eliminated.

The CPU outputs MIDI data from terminal PC0. The two NAND gates shape it to a square waveform.

## 10. MUSIC LSI ( $\mu$ PD993)

Upon receipt of 8-bit data from the CPU, the Music LSI generates a 12-bit digital music signal. The following table shows the pin functions of the LSI.

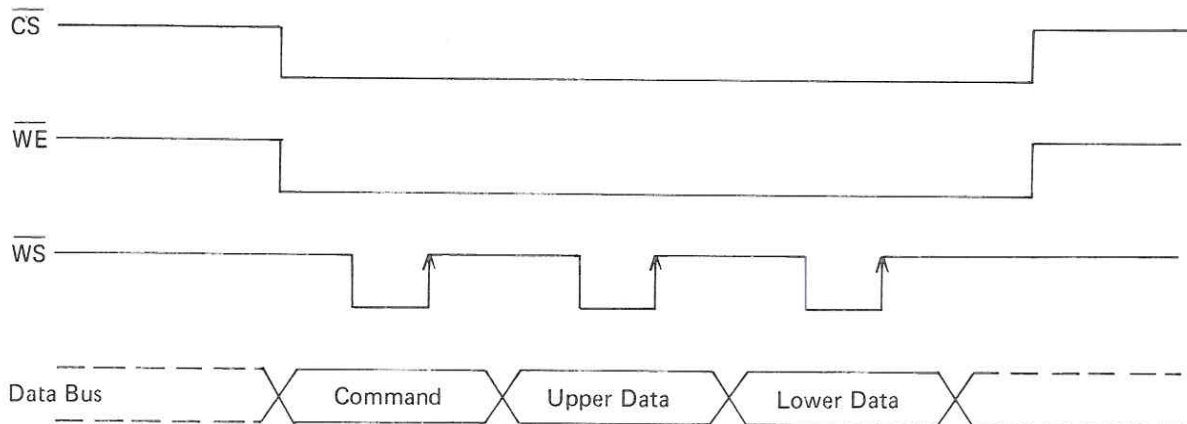
Pin No.	Signal	In/Out	Function
1 ~ 8	D7 ~ D0	In/Out	8-bit data bus.
9	$\overline{CS}$	In	Chip select terminal. When the CPU requests communication with the Music LSI, the CPU drops this terminal to "L".
10	$\overline{RD}$	In	CPU's read signal. When this terminal is at "L", the CPU reads data from the Music LSI.
11	$\overline{WE}$	In	CPU's write enable signal. At "L", the CPU writes data in the Music LSI.
12	$\overline{WS}$	In	Write strobe signal. When the terminal $\overline{WE}$ is "L", the Music LSI reads data at the rising edge of signal $\overline{WS}$ .



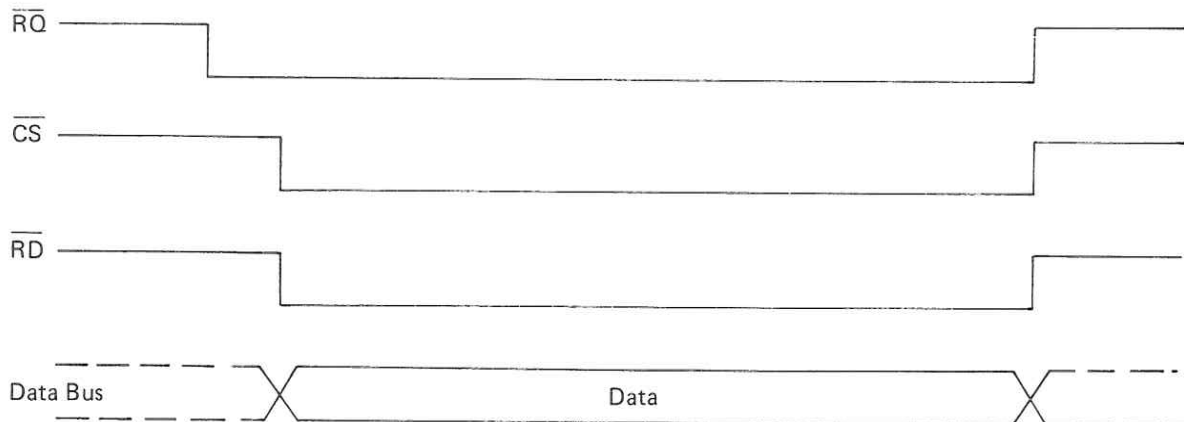
13	$\overline{RQ}$	Out	Interrupt request signal. When this terminal is "L", the CPU halts the functioning.
18	CLK	In	Clock pulse input. Receives approximately 4.5MHz oscillation signal.
20	GND	In	Ground
21	RST	In	Reset signal. When the power switch is turned on, this terminal rises to "H" level for a while. While the terminal is "H", the Music LSI is initialized.
25~27	DO1~DO3	Out	Waveform expansion signals. A waveform is generated by expanding a part of the signal. By the combinations of these signals, the expansion rate is determined.
28~39	DO4~DO15	Out	12-bit digital musci signal outputs.

Timing Chart of Data Transfer between the CPU and The Music LSI from the CPU to the Music LSI

From the CPU to the Music LSI

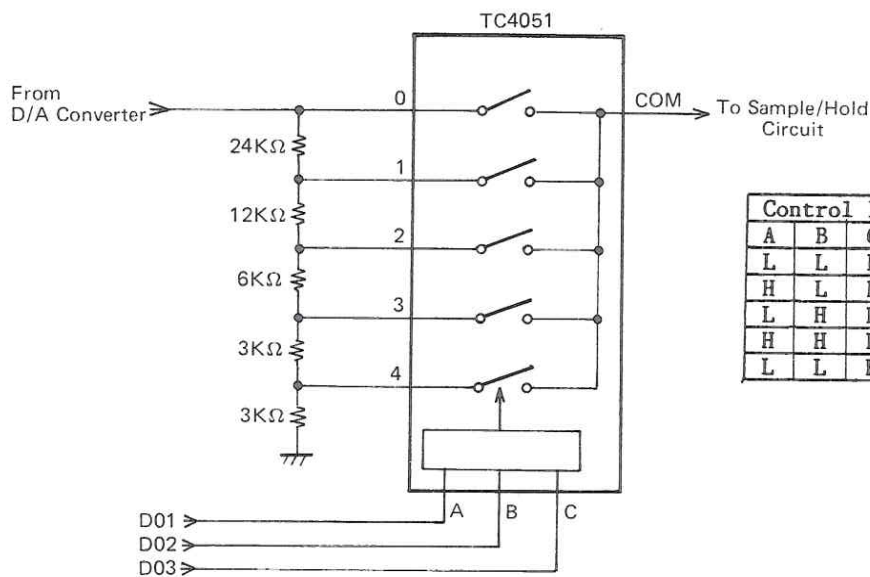
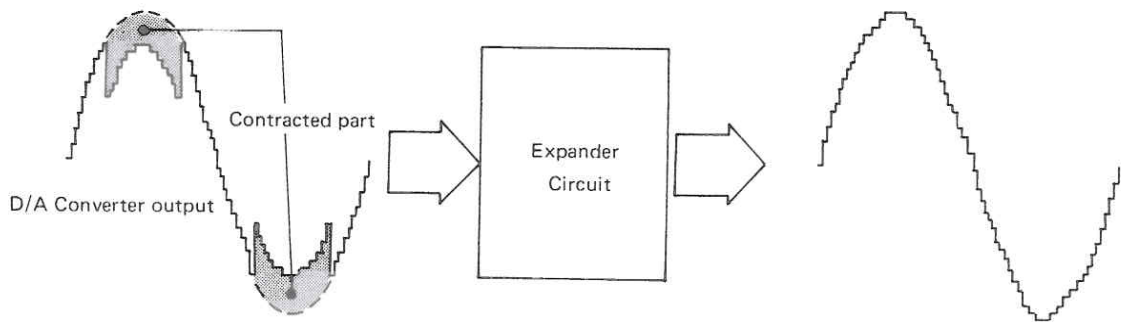


From the Music LSI to the CPU



## 11. EXPANDER CIRCUIT

In order to extend the dynamic range of the melody signal, a part of D/A converter output waveform is contracted and it is expanded by Expander circuit.

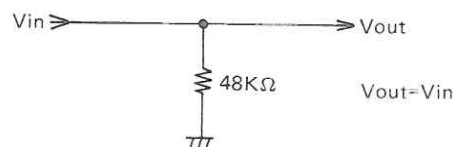


Control Input			"ON" Channel	Amplitude
A	B	C		
L	L	L	0	16
H	L	L	1	8
L	H	L	2	4
H	H	L	3	2
L	L	H	4	1

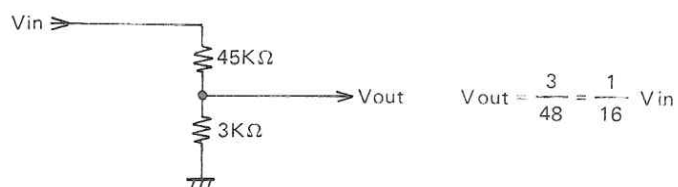
In accordance with the voltage levels of the signals DO1, DO2 and DO3, one of the output channels of TC4051 turns on.

By means of the resistors connected to each channel, the output voltage of the D/A converter block is varied.

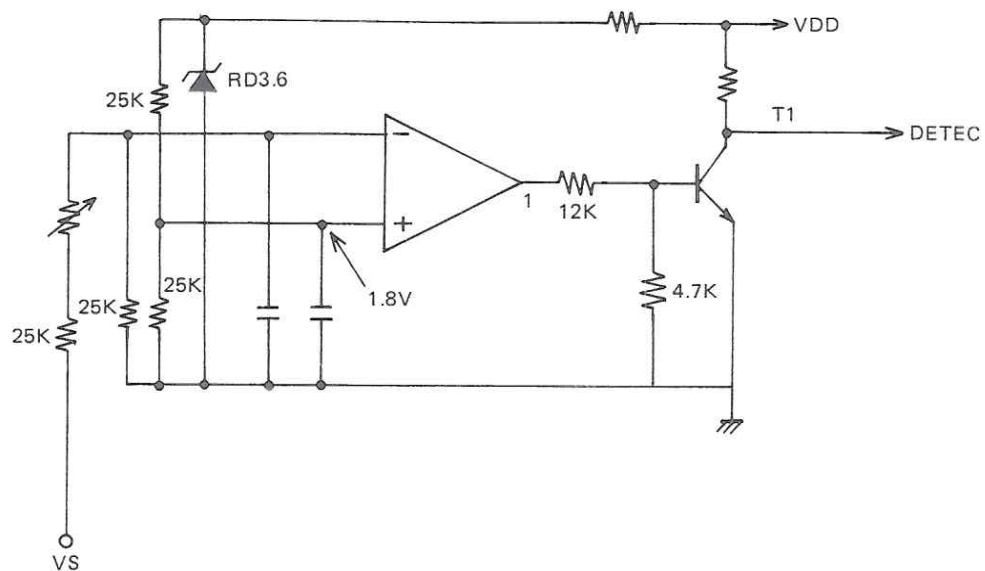
When the channel "0" is turned on.



When the channel "4" is turned on.



## 12. POWER DOWN DETECTOR



The OP amp is a comparator which compares the voltage levels of the positive and the negative inputs.

The positive terminal always stays at 1.8 volts.

When normal voltage is applied, the negative terminal voltage is higher than the positive terminal. The OP amp outputs "L" level from pin 1 causing transistor T1 to turn off. Signal DETEC stays at "H" level.

If the power source drops lower than 6.3 volts, the negative terminal of the OP amp drops to less than 1.8 volts. The OP amp outputs "H" level. Transistor T1 turns on and signal DETEC drops to "L".

## 13. ADJUSTMENTS

### (1) +VBR Adjustment

At power off, adjust variable resistor VR1 on P.C.B. M4152-MA2M so that the emitter of T11 is 4.3V  $\pm$ 5%.

### (2) VBB Adjustment

When no sound is issued, adjust VR4 on P.C.B. M4512-MA1M so that the potential difference between pins 5 and 7 of the OP amp is a minimum.

### (3) Power Down Detector Adjustment

Apply 6.3 volts provided from a voltage regulator to the power jack and adjust VR1 on P.C.B. M4152-MA1M so that the pilot lamp shuts off.

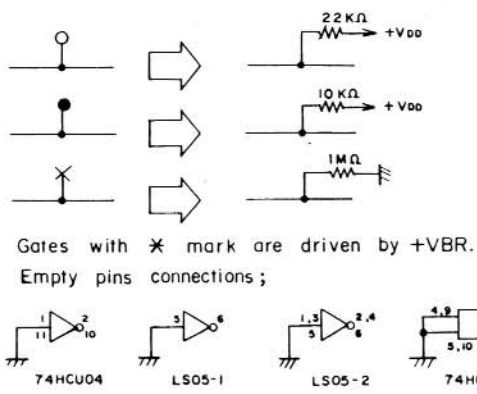
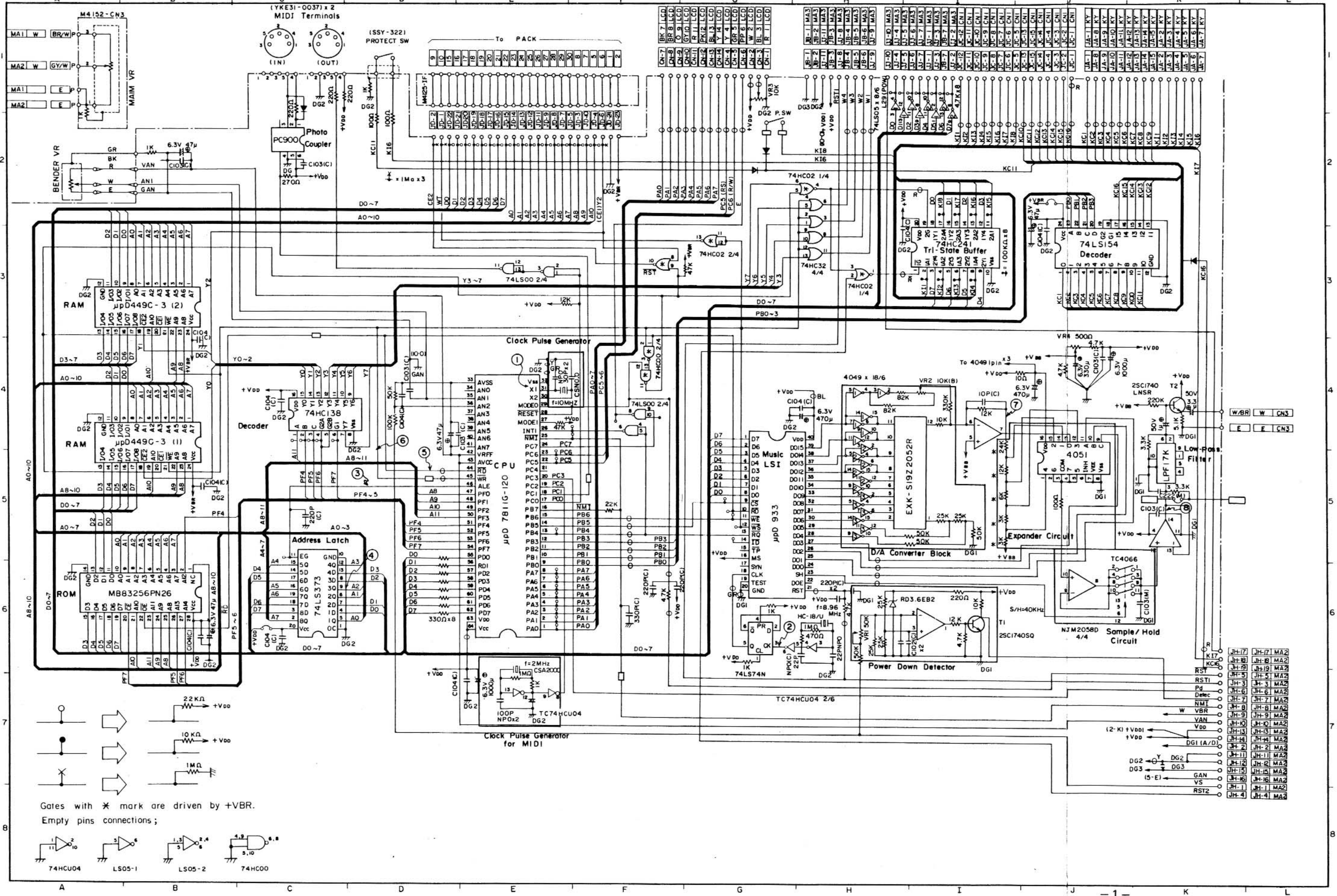


# **CASIO CZ 101 / 1000**

# **SERVICE MANUAL DIAGRAMS**

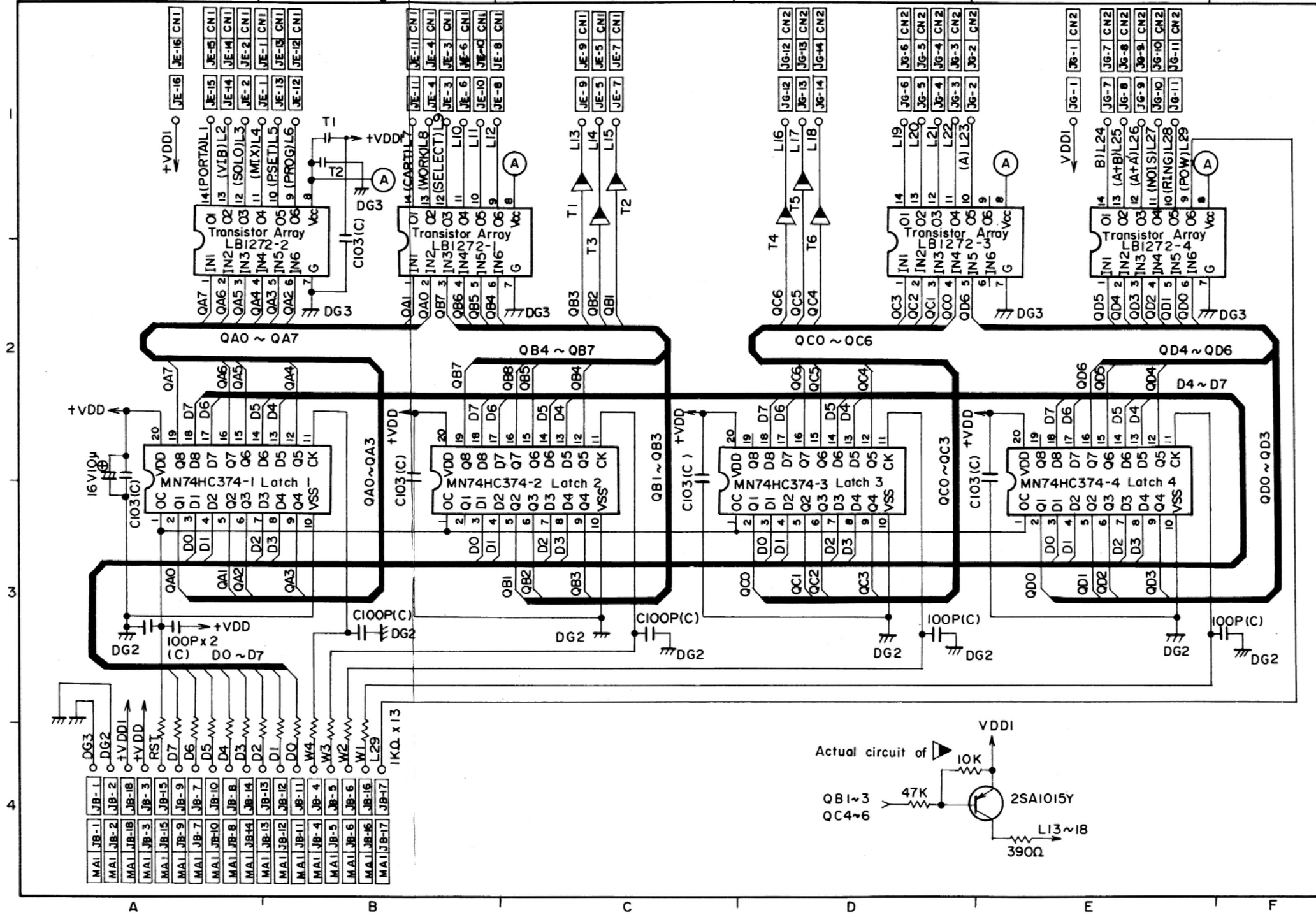
Document Size 420x297mm (A3) - Print at 65% Horizontal on A4 Printer

1. SCHEMATIC DIAGRAM  
1-1. PCBs M4152-MA1M, CN3M



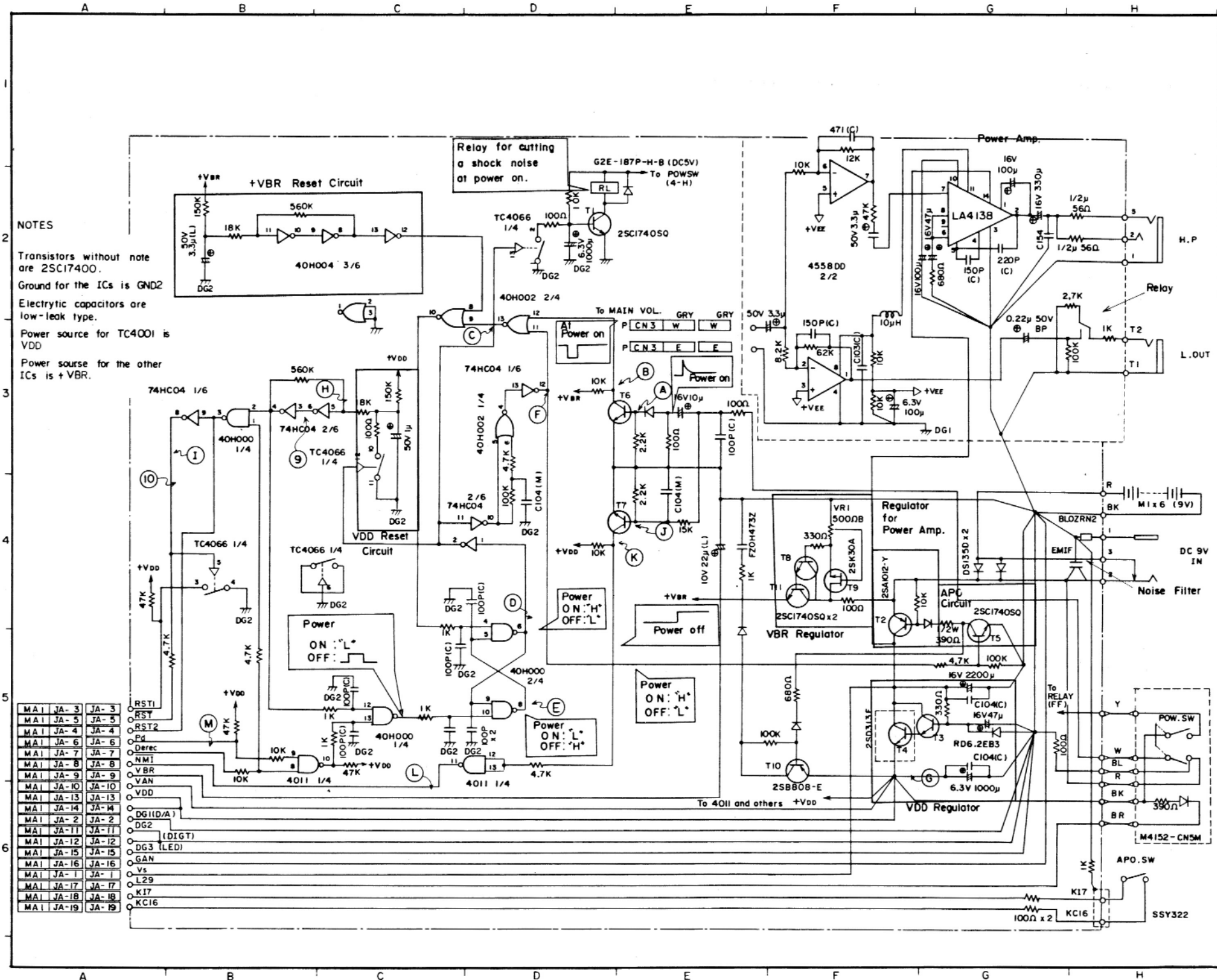
JH-17	JH-17	MA2
JH-18	JH-18	MA2
JH-19	JH-19	MA2
RST1	JH-3	MA2
Pd	JH-6	MA2
Detec	JH-7	MA2
NMI	JH-8	MA2
VBR	JH-9	MA2
VAN	JH-10	MA2
VDD	JH-11	MA2
DG1 (A/D)	JH-12	MA2
DG2	JH-13	MA2
DG3	JH-14	MA2
(5-E)	JH-15	MA2
GAN	JH-16	MA2
VS	JH-1	MA2
RST2	JH-4	MA2

1-2. PCB M4152-MA3M

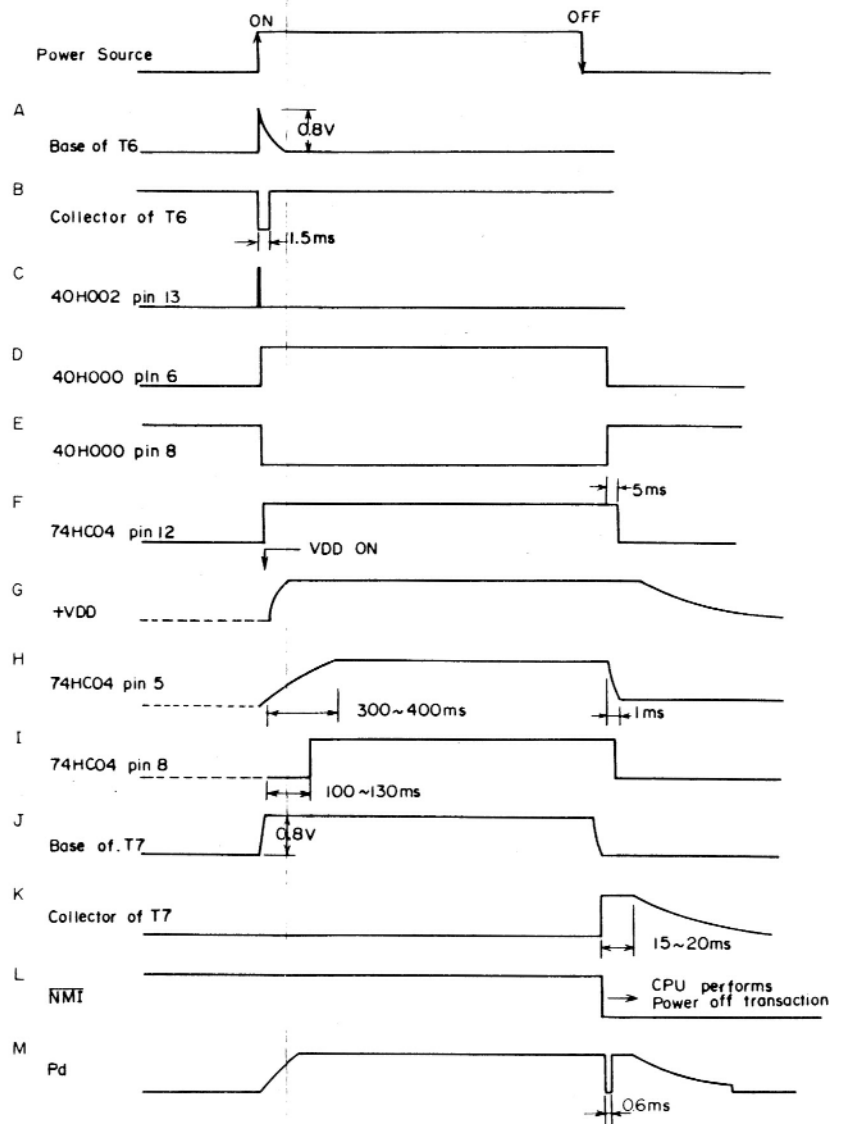




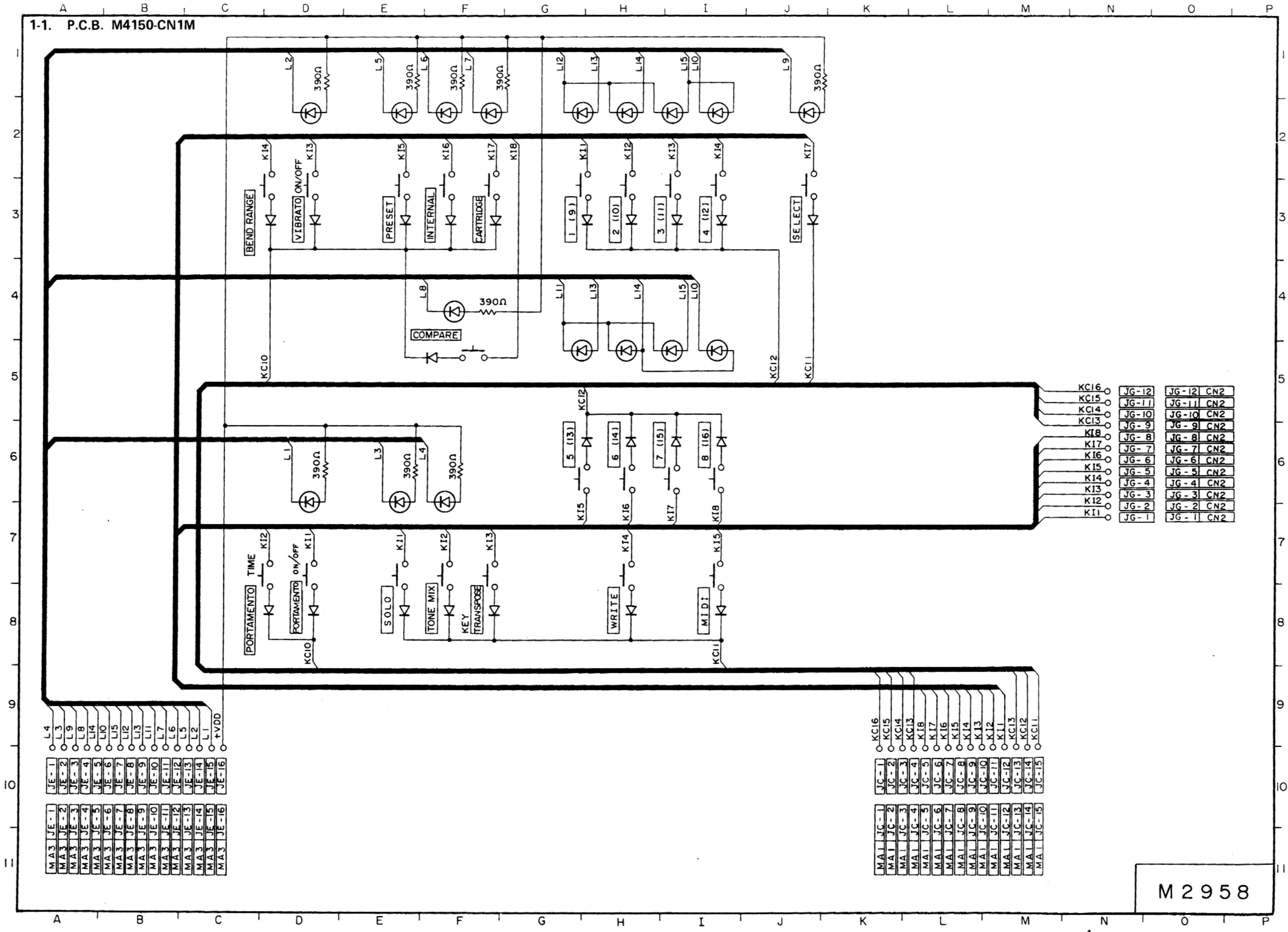
1-3. PCBs M4152-MA2M, CN5M



Timing Chart for Power On/Off



1-1. P.C.B. M4150-CN1M

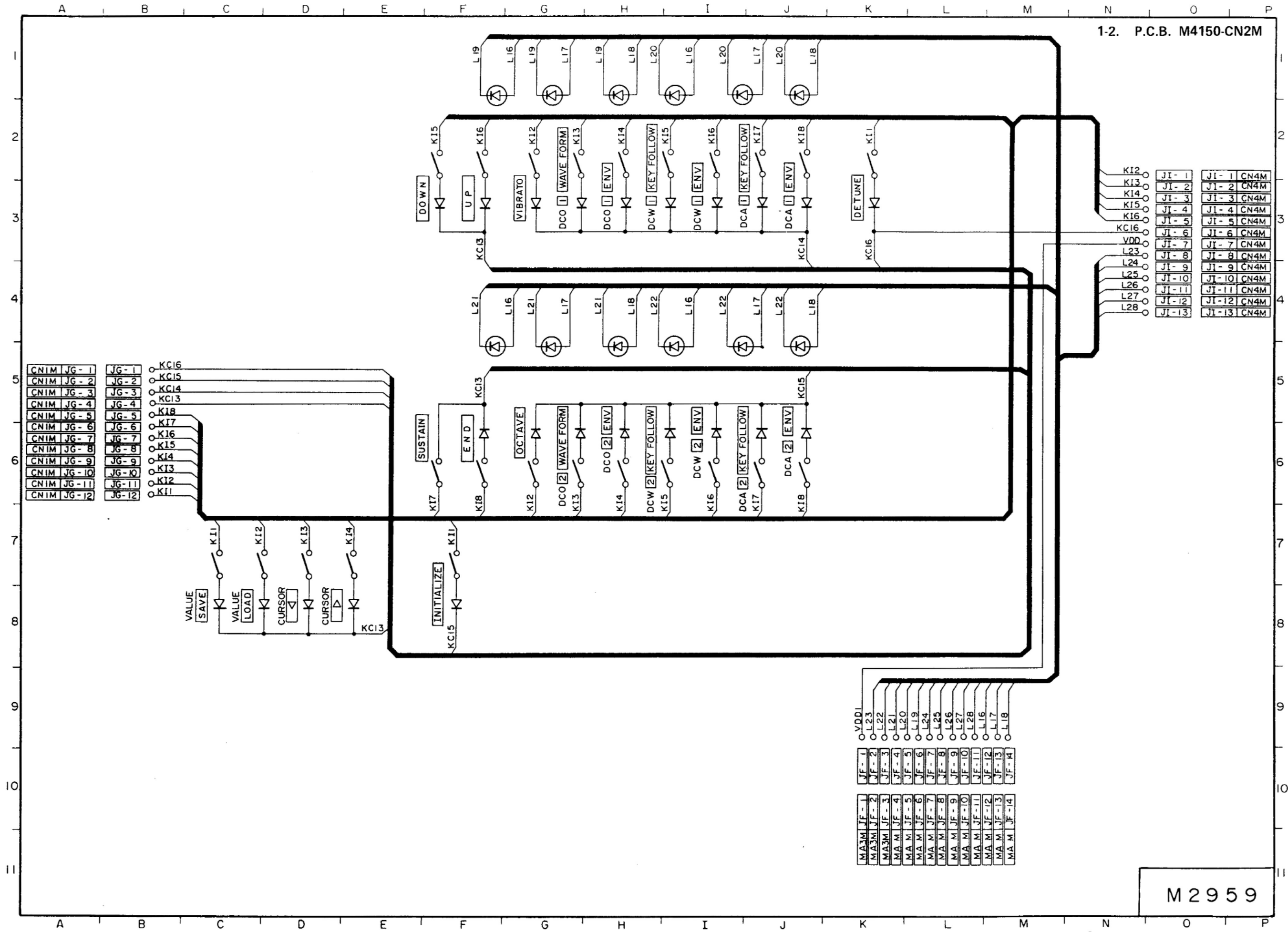


- L4
- L3
- L9
- L8
- L4
- L10
- L15
- L12
- L13
- L11
- L7
- L6
- L2
- L1
- +VDD
- JE-1
- JE-2
- JE-3
- JE-4
- JE-5
- JE-6
- JE-7
- JE-8
- JE-9
- JE-10
- JE-11
- JE-12
- JE-13
- JE-14
- JE-15
- JE-16
- MA3 JE-1
- MA3 JE-2
- MA3 JE-3
- MA3 JE-4
- MA3 JE-5
- MA3 JE-6
- MA3 JE-7
- MA3 JE-8
- MA3 JE-9
- MA3 JE-10
- MA3 JE-11
- MA3 JE-12
- MA3 JE-13
- MA3 JE-14
- MA3 JE-15
- MA3 JE-16

- KC16
- KC15
- KC14
- KC13
- K18
- K17
- K16
- K15
- K14
- K13
- K12
- K11
- KC13
- KC12
- KC11
- JC-1
- JC-2
- JC-3
- JC-4
- JC-5
- JC-6
- JC-7
- JC-8
- JC-9
- JC-10
- JC-11
- JC-12
- JC-13
- JC-14
- JC-15
- MA1 JC-1
- MA1 JC-2
- MA1 JC-3
- MA1 JC-4
- MA1 JC-5
- MA1 JC-6
- MA1 JC-7
- MA1 JC-8
- MA1 JC-9
- MA1 JC-10
- MA1 JC-11
- MA1 JC-12
- MA1 JC-13
- MA1 JC-14
- MA1 JC-15

- KC16
- KC15
- KC14
- KC13
- K18
- K17
- K16
- K15
- K14
- K13
- K12
- K11
- JG-12
- JG-11
- JG-10
- JG-9
- JG-8
- JG-7
- JG-6
- JG-5
- JG-4
- JG-3
- JG-2
- JG-1
- JG-12 CN2
- JG-11 CN2
- JG-10 CN2
- JG-9 CN2
- JG-8 CN2
- JG-7 CN2
- JG-6 CN2
- JG-5 CN2
- JG-4 CN2
- JG-3 CN2
- JG-2 CN2
- JG-1 CN2

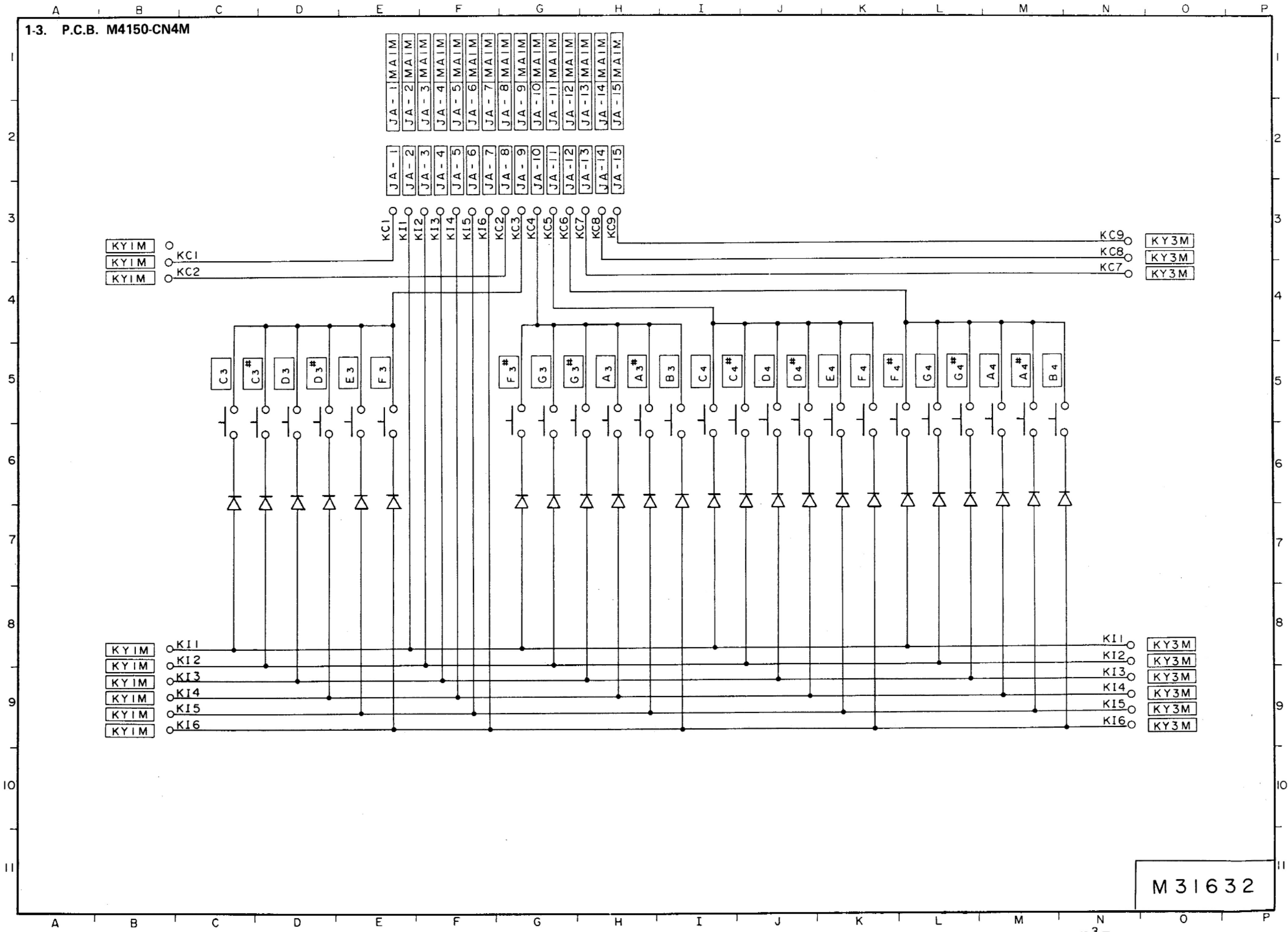
M2958



M2959



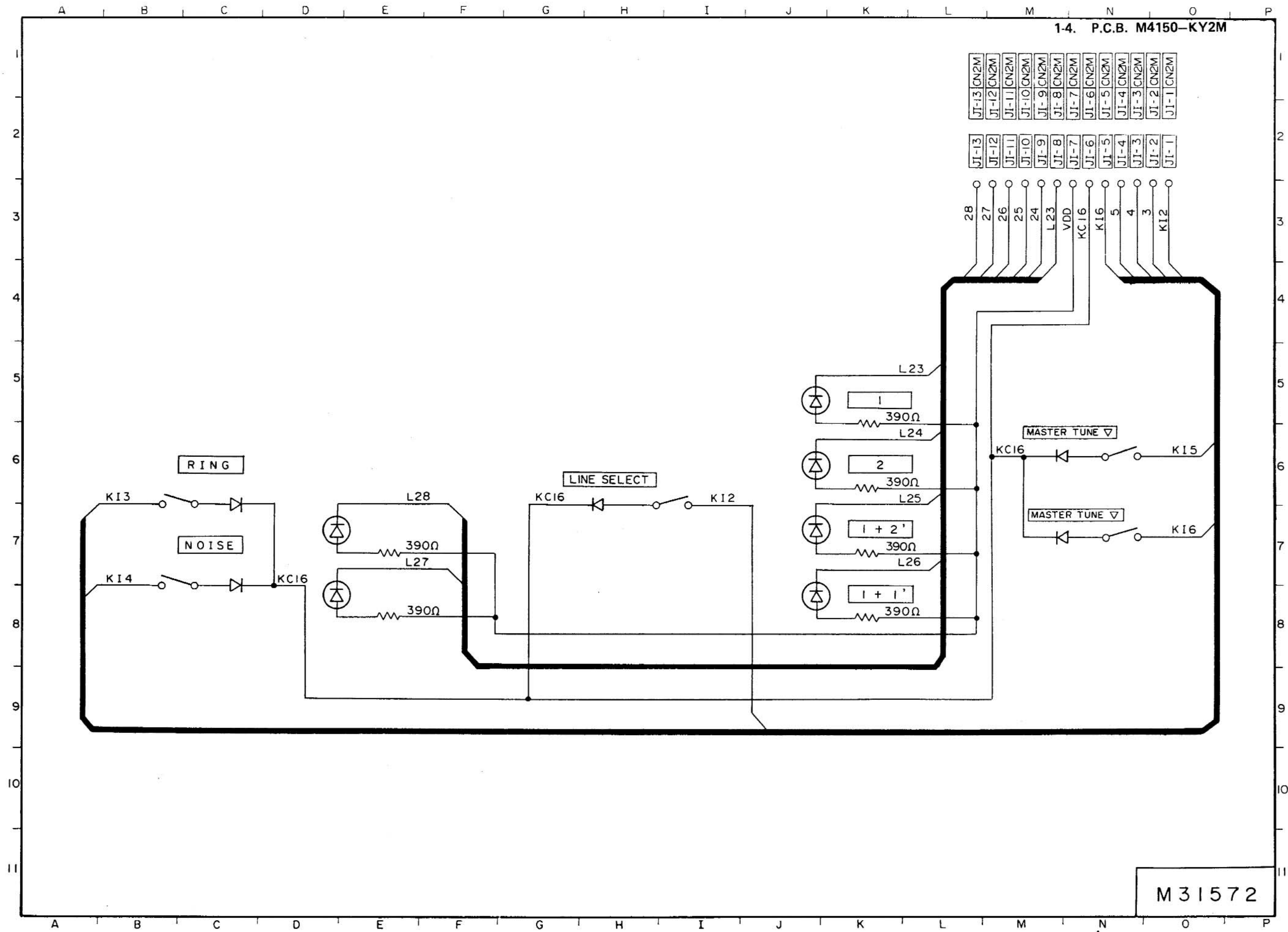
1-3. P.C.B. M4150-CN4M



M 31632

J1-13	CN2M
J1-12	CN2M
J1-11	CN2M
J1-10	CN2M
J1-9	CN2M
J1-8	CN2M
J1-7	CN2M
J1-6	CN2M
J1-5	CN2M
J1-4	CN2M
J1-3	CN2M
J1-2	CN2M
J1-1	CN2M

J1-13	
J1-12	
J1-11	
J1-10	
J1-9	
J1-8	
J1-7	
J1-6	
J1-5	
J1-4	
J1-3	
J1-2	
J1-1	



M31572

# PARTS LIST

MPL-035

CZ-101

(MX-152)

- Note:**
1. Prices and specifications are subject to change without notice.
  2. For spare parts order/supply procedures, see the "GUIDEBOOK for Spare Parts Supply", a separate publication.



CZ-101 (MX-152)

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price J.F. Yen (¥) (FOB: JAPAN)	R A N K
	<b>1) MA1M-P.C.B. ASS'Y</b>						
	2001 4776	LSI	HM6117LP-3	2			A
☆	2001 7481	"	HM613256P-N26	1			A
☆	2002 0903	"	μPD7811G-120	1			A
☆	2002 0971	"	μPD933D	1			A
	2100 3255	MOS IC	TC4049BP	3			A
	2100 3549	"	TC4066BP	1			A
	2100 4029	C MOS IC	TC4051BP	1			A
☆	2100 4472	"	TC74HCU04P	1			A
	2111 2101	Bipolar IC	SN74LS00N	1			A
	2111 2178	"	SN74LS74AN	1			A
	2111 2615	"	SN74LS05N	2			A
	2111 5428	"	SN74LS373N	1			A
☆	2111 6025	C MOS IC	SN74HC00N (=MN74HC00N)	1			A
☆	2111 6068	"	SN74HC138N (=MN74H138N)	1			A
☆	2111 6076	"	SN74HC241N (=MN74H241N)	1			A
☆	2111 6084	"	SN74HC02N (=MN74HC02N)	1			A
☆	2111 6092	"	SN74HC32N (=MN74HC32N)	1			A
☆	2120 8906	Monolithic IC	NJM2058D	1			A
	2184 1014	Bipolar IC	HD74LS154P	1			A
	2220 9027	Transistor	2SC1740A	1	10		A
	2220 9035	"	2SC1740LNSR	1	10		A
	2301 0097	Diode	1S2473	6	10		C
☆	2301 3362	Zener diode	RD3.6EB2	1	10		B
	2400 5062	Photo-coupler	PC900	1	10		B
	2520 1442	Ceramic oscillator	CAS10.0MT	1			B
☆	2520 1485	"	CSA2.00MK	1			B
☆	2520 3194	Crystal oscillator	HC-18/U-8960KHz	1			B
	2600 7313	Carbon film resistor	R-25-10K-J	2	10		C
	2600 9715	"	R-25-100K-J	1	10		C
	2601 0918	"	R-25-330K-J	1	10		C
	2600 2516	"	R-25-100-J	3	10		C
	2600 3717	"	R-25-330-J	8	10		C
	2600 4918	"	R-25-1K-J	5	10		C
	2601 2112	"	R-25-1M-J	5	10		C
	2600 8115	"	R-25-22K-J	6	10		C

Note: ☆ - New parts  
 Q'ty - Q'ty used per unit  
 \* - Minimum order or supply quantity

Rank A: Essential  
 B: Stock recommended  
 C: Others  
 X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price J.F. Yen (¥) (FOB: JAPAN)	R A N K
	2601 0519	Carbon film resistor	R-25-220K-J	1	10		C
	2600 3318	"	R-25-220-J	4	10		C
	2600 6112	"	R-25-3.3K-J	2	10		C
	2600 8913	"	R-25-47K-J	2	10		C
	2600 7518	"	R-25-12K-J	3	10		C
	2600 3512	"	R-25-270-J	1	10		C
	2600 6511	"	R-25-4.7K-J	5	10		C
	2600 4110	"	R-25-470-J	1	10		C
	2600 9511	"	R-25-82K-J	2	10		C
	2601 6231	"	R-25-25K-J	5	10		C
	2601 5111	"	R-25-50K-J	5	10		C
	2601 2911	"	R-25-10-J	1	10		C
	2614 0749	"	R-25-5.1K-J-T24-T	1	10		C
☆	2700 7376	Metal film resistor	CRB25FW3K-T24-T	2	10		C
☆	2700 7384	"	CRB25FX6K-T24-T	1	10		C
☆	2700 7392	"	CRB25FW12K-T24-T	1	10		C
☆	2700 7406	"	CRB25FW24K-T24-T	1	10		C
☆	2720 3604	Module resistor	MS1048F	1	10		C
☆	2720 3663	"	MS2235F	2	10		C
☆	2720 3671	"	MS2236F	2	10		C
☆	2720 3680	"	MS2238F	1	10		C
☆	2720 3698	"	MS22310F	1	10		C
☆	2720 3701	"	MS4728F	1	10		C
	2760 2169	Trimmer VR	V8K4-11B50K	1	10		B
	2760 2177	"	V8K4-11B10K	2	10		B
	2760 2185	"	V8K4-11B500	1	10		B
	2804 4925	Electrolytic capacitor	50RE1	1	10		C
	2804 9374	"	6.3RE100	1	10		C
	2804 9358	"	6.3RE47	4	10		C
	2804 5581	"	6.3RE330	1	10		C
	2804 5620	"	6.3RE470	2	10		C
	2804 5662	"	6.3RE1000	2	10		C
	2804 5026	"	50RE3R3	1	10		C
	2818 0110	Ceramic capacitor	HE50SJYB102K	2	10		C
	2818 0055	"	HE40SJYB221K	5	10		C
	2818 0195	"	HE40SJYB391K	1	10		C
	2818 2040	"	HE70SJYF103Z	12	10		C
	2818 3062	"	HE50SJCH330J	2	10		C
	2818 3054	"	HE80SJCH101J	2	10		C

Note: ☆ — New parts  
Q'ty — Quantity used per unit  
\* — Minimum order or supply quantity

Rank A: Essential  
B: Stock recommended  
C: Others  
X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price J.F. Yen (¥) (FOB: JAPAN)	R A N K
	2818 3097	Ceramic capacitor	HE40SJCH220J	2	10		C
	2819 0255	"	HE40SJSL100F	1	10		C
	2819 5044	"	RT-DSKC85TKYF104ZT	13	10		C
☆	2830 3262	Mylar capacitor	50F2D472J-T	1	10		B
	2830 5885	"	50F2D104K-T	1	10		B
☆	2830 5982	"	50F2D103J-T	1	10		B
	3020 2147	Ferrite beads	BL02RN2-R62	3	10		B
	3060 6035	Ladder network	EXK-S19Z2052R	1			A
☆ 1	3420 2338	Slide switch	SSY322	1			B
2	3500 7491	P.C.B. connector	IL-G-14P-S3T2-E	1			X
☆ 3	3512 4381	Din connector	YKE31-0037	2			C
☆ 4	3730 7254	Parallel wire M152A	2468-4-110	1			X
☆ 5	3730 7262	" M152B	2468-4-185	1			X
☆ 6	3730 7271	" M152C	2468-6-40	1	10		X
☆ 7	3730 7289	" M152D	2468-5-60	1	10		X
☆ 8	3730 7297	" M152E	2468-8-135	1	10		X
☆	3841 0636	Low pass filter	LPF-V20	1			C
9	6324 1260	P button spring G164	A32598A-1	1	10		C
10	6328 1500	Insulation sheet G49	A44686-1	1	10		X
☆ 11	6911 5350	Earth terminal	M41990-1	1	10		X
☆ 12	4307 2870	Blank P.C.B. (M4152-MA1M)	M1623-1	1			X
<b>2) MA2M-P.C.B. ASS'Y</b>							
	2100 3298	MOS IC	TC4011BP	1			A
	2100 3549	"	TC4066BP	1			A
	2100 3786	C MOS IC	TC40H004P	1			A
	2100 3867	"	TC40H002P	1			A
	2100 3875	MOS IC	TC40H000P	1			A
☆	2111 6041	C MOS IC	SN74HC04N(=MN74HC04)	1			A
	2120 8329	Linear IC	LA4138	1			A
	2121 0013	OP amp	NJM4558DD	1			A
	2200 8145	Transistor	2SA1012Y	1	10		A
	2210 5299	"	2SB808F	1	10		A
☆	2230 3856	"	2SD313F	1	10		A
	2220 9027	"	2SC1740	7	10		A
	2240 5110	FET	2SK30ATMGR	1	10		A
	2301 0097	Diode	1S2473	5	10		C
	2301 3029	"	DS135D	2	10		C

Note ☆ — New parts  
Q'ty — Quantity used per unit  
\* — Minimum order or supply quantity

Rank A: Essential  
B: Stock recommended  
C: Others  
X: No stock recommended



Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price J.F. Yen (¥) (FOB: JAPAN)	R A N K
☆	2310 4628	Zener diode	RD6.2EB3	1	10		B
☆	2520 3186	EMI filter	DSS710D223S12-22	1			B
	2600 7313	Carbon film resistor	R-25-10K-J	9	10		C
	2600 9715	"	R-25-100K-J	4	10		C
	2600 7712	"	R-25-15K-J	1	10		C
	2600 7917	"	R-25-18K-J	2	10		C
	2600 2516	"	R-25-100-J	8	10		C
	2600 3717	"	R-25-330-J	2	10		C
	2600 4918	"	R-25-1K-J	7	10		C
	2600 5710	"	R-25-2.2K-J	2	10		C
	2600 8913	"	R-25-47K-J	4	10		C
	2600 7119	"	R-25-8.2K-J	1	10		C
	2600 7518	"	R-25-12K-J	1	10		C
	2601 0110	"	R-25-150K-J	2	10		C
	2601 1515	"	R-25-560K-J	2	10		C
	2600 6511	"	R-25-4.7K-J	5	10		C
	2600 5914	"	R-25-2.7K-J	1	10		C
	2600 4519	"	R-25-680-J	2	10		C
	2601 6541	"	R-25-62K-J	1	10		C
	2620 1918	"	R-50X-56-J	2	10		C
	2620 3911	"	R-50X-390-J	1	10		C
	2760 2134	Trimmer VR	V8K4-11B500K	1	10		B
☆	2801 6522	Super capacitor	FZOH473Z	1	10		C
☆	2804 4801	Electrolytic capacitor	16RE2200	1	10		C
☆	2804 5824	"	6.3RE2-1000	2	10		C
☆	2805 6435	"	SMC16VB-330 (M)	1	10		C
☆	2804 7363	"	10RB (LL) 22-T2-T	1	10		C
☆	2804 7371	"	50RB (LL) 3R3-T2-T	1	10		C
	2804 5026	"	50RE3R3	2	10		C
	2804 5051	"	16RE10	1	10		C
	2804 4933	"	16RE100	2	10		C
	2804 9374	"	6.3RE100	1	10		C
	2805 2120	"	16RE47-F	2	10		C
☆	2807 0918	"	50RNBBPR22-T2-T	1	10		C
	2804 4925	"	50RE-1	1	10		C
	2818 0080	Ceramic capacitor	HE40SJYB471K	1	10		C
	2818 0195	"	HE40SJYB391K	2	10		C
	2818 2040	"	HE70SJYF103Z	4	10		C

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Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price J.F. Yen (¥) (FOB: JAPAN)	R A N K
	2819 0107	Ceramic capacitor	HE70SJSJL221K	1	10		C
	2819 0280	"	HE60SJSJL151K	2	10		C
	2818 6053	"	HE50SJSJL101K	7	10		C
☆	2819 5044	"	RT-DSKC85TKYF104ZT	5	10		C
	2830 5885	Mylar capacitor	50F2D104K	2	10		C
☆	2830 5974	"	50F2D154K	1	10		C
☆	2830 5991	"	50F2D102K-T	1	10		C
	3020 2147	Ferrite beads	BL02RN2-R62	1			C
☆	3120 1152	Relay	G2E-187P-H-B	1			B
☆ 13	3420 2338	Slide switch	SSY322	1	10		B
☆ 14	3512 3245	Power jack	HEC0470-01-270	1			B
☆ 15	3612 0584	Jack	YKB21-5012	1			B
☆ 16	3612 0592	"	YKB21-5002	1			B
☆ 17	3720 8701	EL wire M152G	SMLVGJ-19-85	1			X
☆	3841 0628	Inductor	ELEMH100KA	1	10		
☆ 18	6911 5360	Heat sink	M31486-1	1			X
☆ 19	4307 2860	Blank P.C.B. (M4152-MA2M)	M1622-1	1			X
<b>3) UPPER CASE UNIT</b>							
<b>A) MA3M-P.C.B. ASS'Y</b>							
☆	2111 6050	C MOS IC	SN74HC374N (=MN74HC374)	4			A
	2120 6083	Monolithic IC	LB1272	4			A
☆	2200 3721	Transistor	2SA933SQ	6	10		A
	2600 7313	Carbon film resistor	R-25-10K-J	5	10		C
	2600 3911	"	R-25-390-J	6	10		C
	2600 4918	"	R-25-1K-J	13	10		C
	2600 8913	"	R-25-47K-J	6	10		C
	2804 5051	Electrolytic capacitor	16RE10	1	10		C
	2818 2040	Ceramic capacitor	HE70SJYF103Z	5	10		C
	2818 6053	"	HE50SJSJL101K	6	10		C
☆ 20	3720 8654	EL wire M152B	SMLVGJ-11-120	1			X
☆ 21	3720 8728	"	SMLVGJ-7-110	1	10		X
☆ 22	4307 2800	Blank P.C.B. (M4152-MA3M)	M2914-1	1			X
<b>B) KY1M-P.C.B. ASS'Y</b>							
	2301 0097	Diode	1S2473	49	10		C
☆ 23	3720 8646	EL wire M152A	SMLVGJ-15-120	1			X
24	4307 1641	Blank P.C.B. (M490-KY1M)	M1450A-1	1			X

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<b>C) CN1M/CN4M-P.C.B. ASS'Y</b>							
	2301 0097	Diode	1S2473	22	10		C
	2600 3911	Carbon film resistor	R-25-390-J	9	10		C
☆ 25	3720 8662	EL wire M152C	SMLVGJ-15-123	1			X
☆ 26	3720 8671	" M152D	SMLVGJ-16-114	1			X
☆ 27	3720 8710	" M152H	SMLVGJ-4-37	1	10		X
☆ 28	4307 2830	Blank P.C.B. (M4152-CN4M)	M1609-2	1			X
☆ 29	4307 2850	" (M4152-CN1M)	M1609-1	1			X
<b>D) CN2M/IF-P.C.B. ASS'Y</b>							
	2301 0097	Diode	1S2473	29	10		C
	2600 3911	Carbon film resistor	R-25-390-J	6	10		C
30	3510 6481	P.C.B. connector	PS30PE-S4LT1-PN1	1			X
☆ 31	3720 8689	EL wire M152E	SMLVGJ-14-90	1			X
☆ 32	3720 8697	" M152F	SMLVGJ-12-49	1	10		X
33	6002 0248	PC joiner holder G545	P4260-1	1	10		X
☆ 34	4307 2810	Blank P.C.B. (M4152-IF)	M1621-4	1			X
☆ 35	4307 2840	" (M4152-CN2M)	M1621-1	1			X
<b>E) CN3M-P.C.B. ASS'Y</b>							
	2600 2516	Carbon film resistor	R-25-100-J	1	10		C
36	2770 6746	Variable resistor	S3018P605M-10KB	1			B
☆ 37	6911 5410	Shield wire sub ass'y	M41975*1	1			X
☆ 38	6911 5420	"	M41975*2	1			X
☆ 39	4307 2880	Blank P.C.B. (M4152-CN3M)	M1621-2	1			X
<b>F) CN5M-P.C.B. ASS'Y</b>							
	2600 3911	Carbon film resistor	R-25-390-J	1	10		C
☆ 40	3480 5431	Push switch	SUZ12-M415201	1			B
☆ 41	6911 5380	Parallel wire M152	M41974-1	1	10		X
☆ 42	4307 2820	Blank P.C.B. (M4152-CN5M)	M1621-3	1			X
<b>G) BENDER ASS'Y</b>							
☆ 43	2770 6843	Variable resistor	VM10W520A-50KB	1			B
44	6900 5770	Felting seal D	M4382-1	1	10		X
☆ 45	6911 5240	Bender chassis A	M31487-1	1			X
☆ 46	6911 5250	" B	M41946-1	1	10		X

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☆ 47	6911 5260	Bender spring	M41949-1	1	10		C
☆ 48	6911 5270	Bender dial	M31488-1	1	10		C
☆ 49	6911 5390	Felting seal	M42037-1	1	10		X
☆ 50	6911 5430	Shield wire sub ass'y	M41975*3	1			X
<b>H) LCD UNIT</b>							
50A	3330 7544	LCD unit	LM-550L	1			
<b>I) KEYBOARD ASS'Y</b>							
51	6902 6150	Key 90A	M31055-1	4			C
52	6902 6160	" 90B	M31056-1	4			C
53	6902 6170	" 90C	M31057-1	4			C
54	6902 6180	" 90D	M31058-1	4			C
55	6902 6190	" 90E	M31059-1	4			C
56	6902 6200	" 90F	M31060-1	4			C
57	6902 6210	" 90G	M31061-1	4			C
58	6902 6220	" 90S	M31062-1	1			C
59	6910 0290	Black key	M3416-1	20			C
60	6902 6320	Key fixing plate 90B	M31066-1	1			C
61	6902 6340	" 90	M2688-1	1			C
62	6902 6332	Key fixing rubber B	M41255B-1	1			C
63	6902 6352	" A	M41254B-1	1			C
<b>J) UPPER CASE UNIT</b>							
64	6902 6641	Key contact rubber 90A	M31038A-1	3	10		B
65	6902 6651	" 90B	M31039A-1	1	10		B
☆ 66	6904 1271	Key top 98	M41821A-13	1	10		C
☆ 67	6910 1750	Felting seal V	M4669-1	1	10		X
☆ 68	6910 9130	Key stopper 84	M41641-1	1	10		X
☆ 69	6911 4971	VR knob 87	M31443A-2	1	10		C

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☆ 70	6911 5401	Strap holder	M41942A-1	2	10		C
☆ 71	6911 5030	Key contact rubber	152-1 M41943-1	3	10		B
☆ 72	6911 5040	"	152-2 M41944-1	6	10		B
☆ 73	6911 5050	"	152-7 M31483-1	2			B
☆ 74	6911 5060	"	152-22 M31527-1	1			B
☆ 75	6911 5080	Key top 152	M31478-2	15	10		C
☆ 76	6911 5090	" (1)	M31478-3	1	10		C
☆ 77	6911 5100	" (2)	M31478-4	1	10		C
☆ 78	6911 5110	" (3)	M31478-5	1	10		C
☆ 79	6911 5120	" (4)	M31478-6	1	10		C
☆ 80	6911 5130	" (5)	M31478-7	1	10		C
☆ 81	6911 5140	" (6)	M31478-8	1	10		C
☆ 82	6911 5150	" (7)	M31478-9	1	10		C
☆ 83	6911 5160	" (8)	M31478-10	1	10		C
☆ 84	6911 5170	" (SELECT)	M31478-11	1	10		C
☆ 85	6911 5180	" (△)	M31478-12	4	10		C
☆ 86	6911 5190	" (▷)	M31478-13	2	10		C
☆ 87	6911 5200	" (—)	M31478-14	4	10		C
☆ 88	6911 5210	"	M31478-15	15	10		C
☆ 89	6911 5220	Bass button	M3737-7	2	10		C
☆ 90	6911 5460	Shield plate C	M31537-1	1	10		X
☆ 91	6911 5470	" D	M31538-1	1	10		X
☆ 93	6911 5490	" KY49	M31550-1	1			X
☆ 94	6911 4880	Upper case sub ass'y	M2943*1	1			C
<b>4) LOWER CASE</b>							
☆ 95	6911 4731	Lower case sub ass'y	M2941A*1	1			C
<b>5) BATTERY COVER</b>							
☆ 96	6910 1161	Sponge D	M4630A-4	1	10		X
☆ 97	6911 4740	Battery cover sub ass'y	M31520*1	1			C

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