

SERVICE MANUAL & PARTS LIST (with price)

Digital Sampling Keyboard

FZ-1

APR. 1987



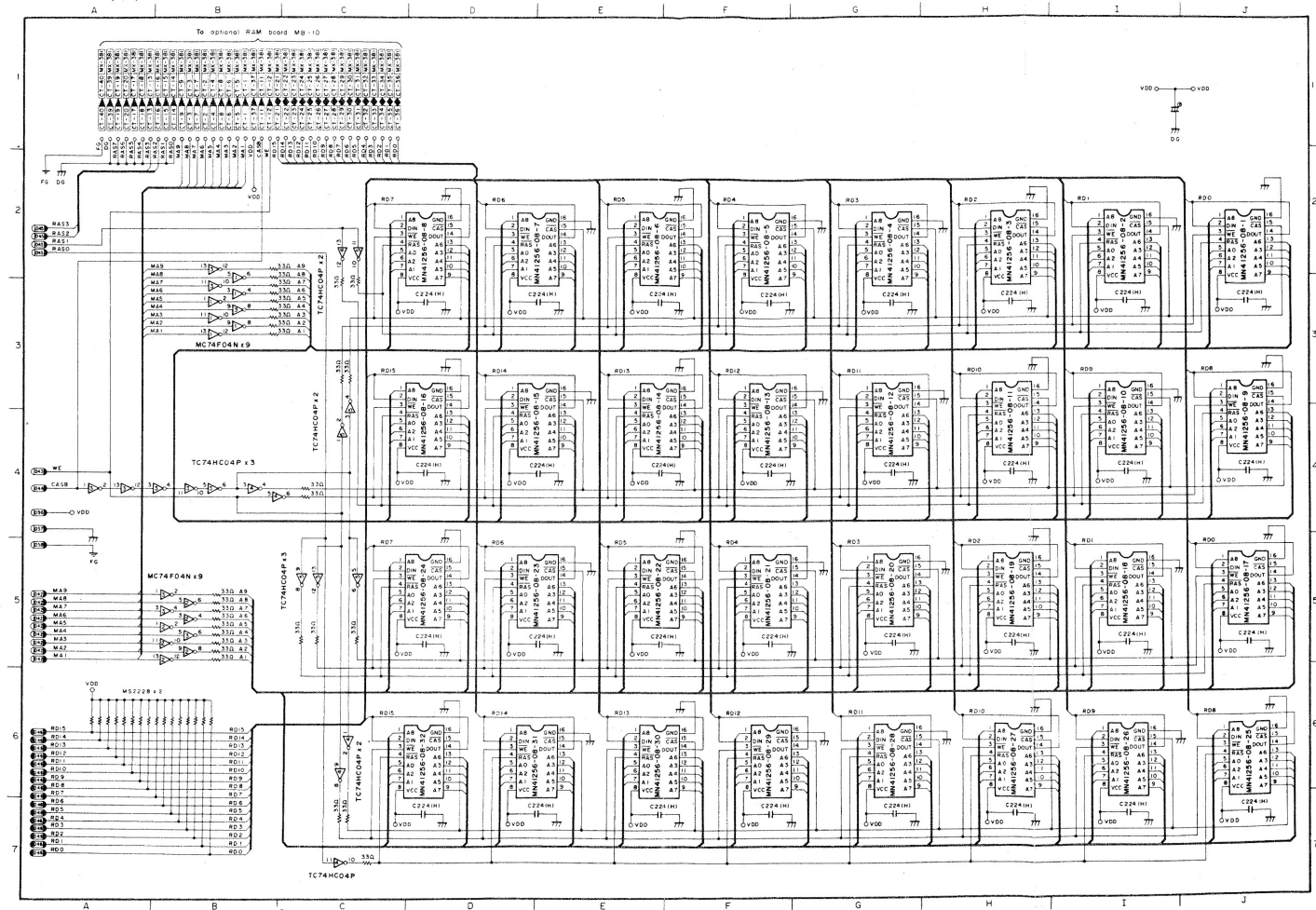
FZ-1

CASIO®

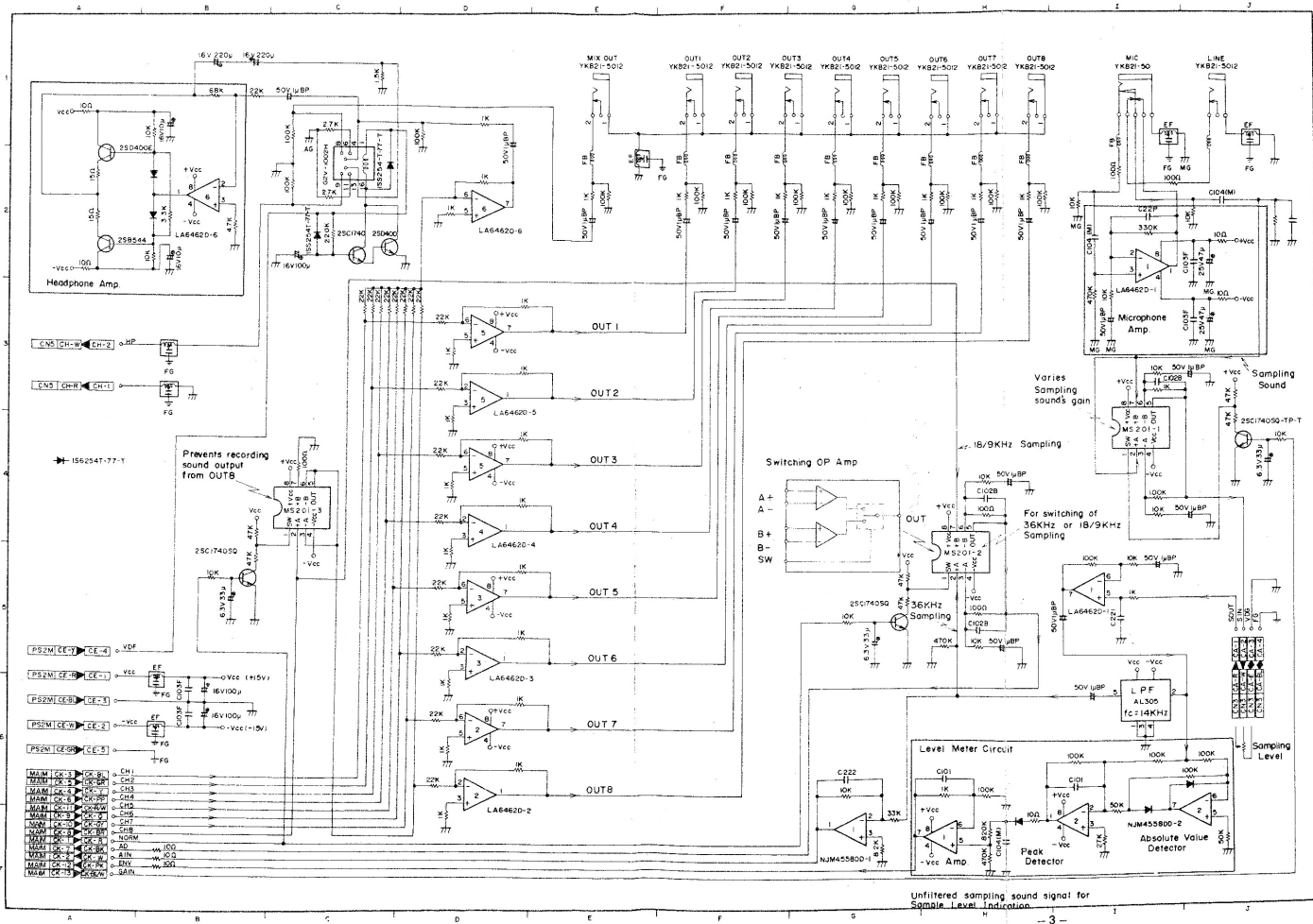
SELF DIAGNOSTIC PROGRAM

OUTLINE OF DIAGNOSTIC PROGRAM	47
SYSTEM ROM/RAM CHECK	47
I BUILT-IN PROGRAM	
1. BUILT-IN PROGRAM STARTING	48
2. FDD UNIT CHECK	49
3. FDD UNIT ADJUSTMENT	51
4. LCD UNIT CHECK	52
II DIAGNOSTIC FLOPPY	
1. STARTING OF DIAGNOSTIC PROGRAM	53
2. WAVE MEMORY RAM CHECK	54
3. SWITCH CHECK	55
4. KEYS, SENSORS, AND VR CHECK	56
5. MIDI CHECK	56
6. EXTERNAL PORT CHECK	57
7. FDD READ/WRITE AGING TEST	58
PARTS LIST	62

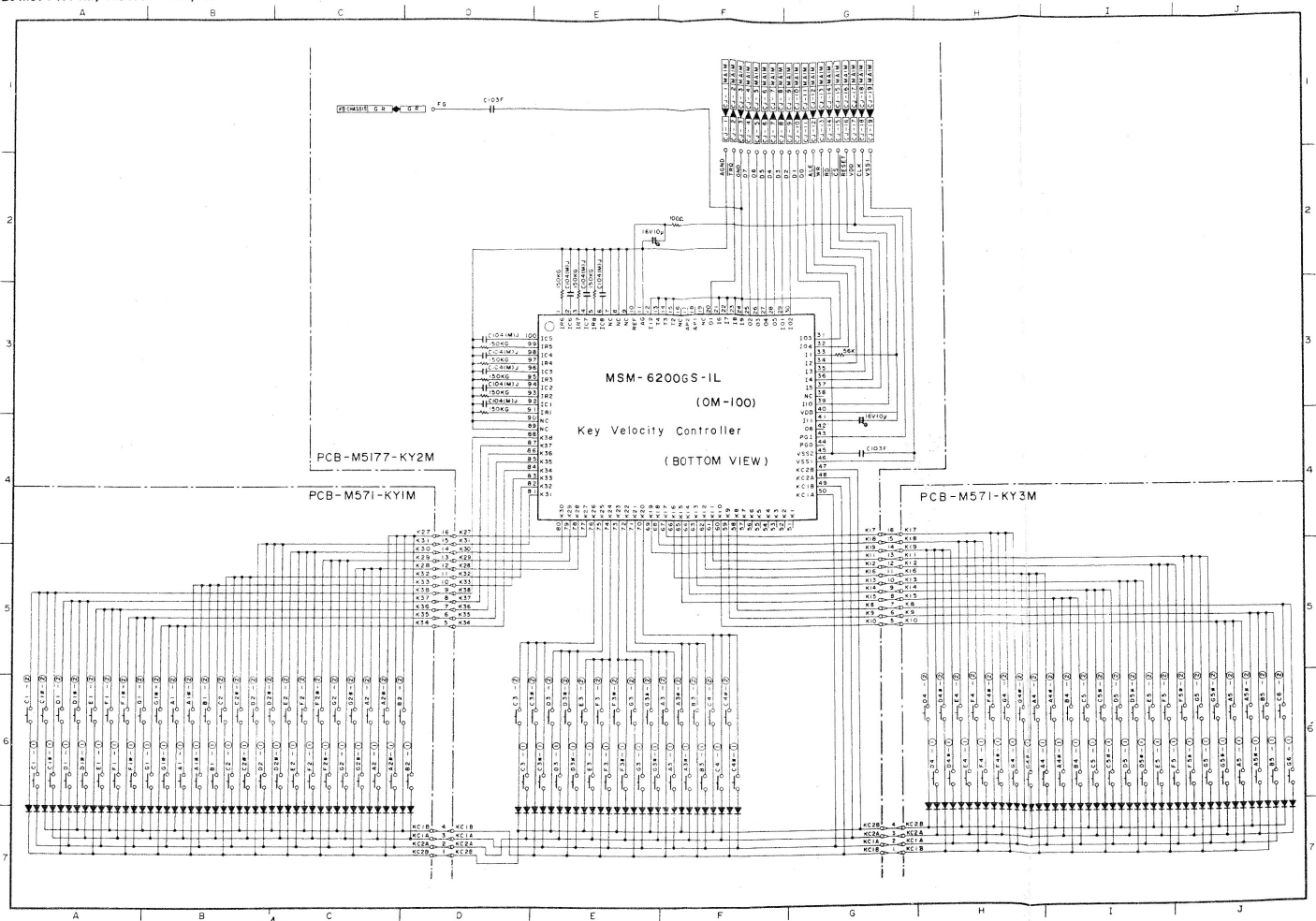
2. PCB M5336-MA1M (2/2)



3. PCB M5336-MA2M



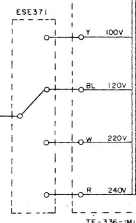
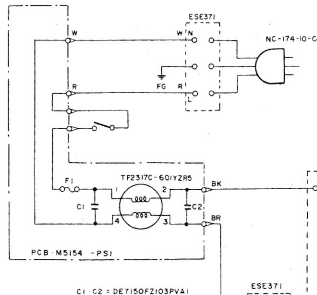
4. PCBs M571-KY1M, M5177-KY2M, M571-KY3M



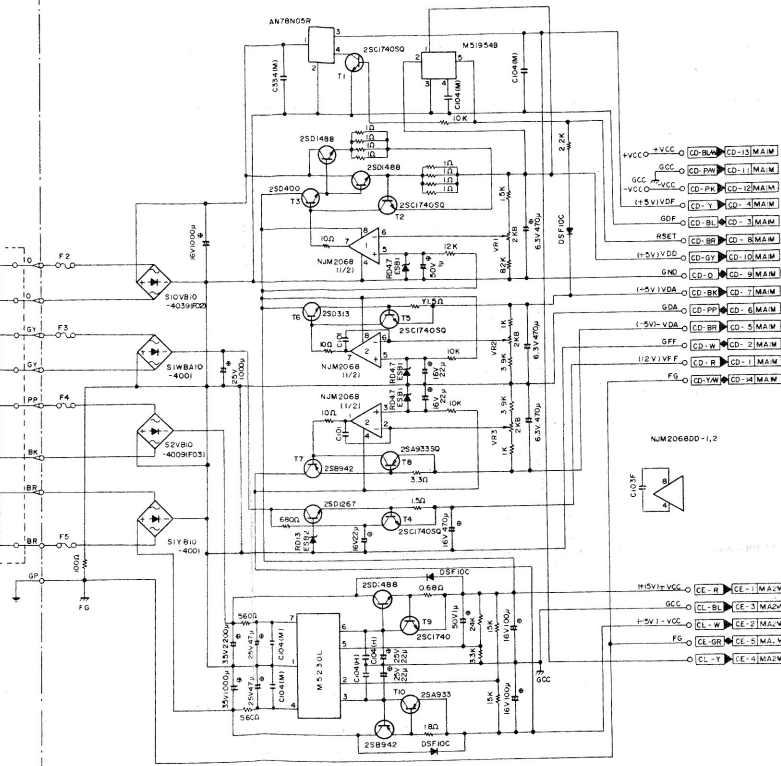


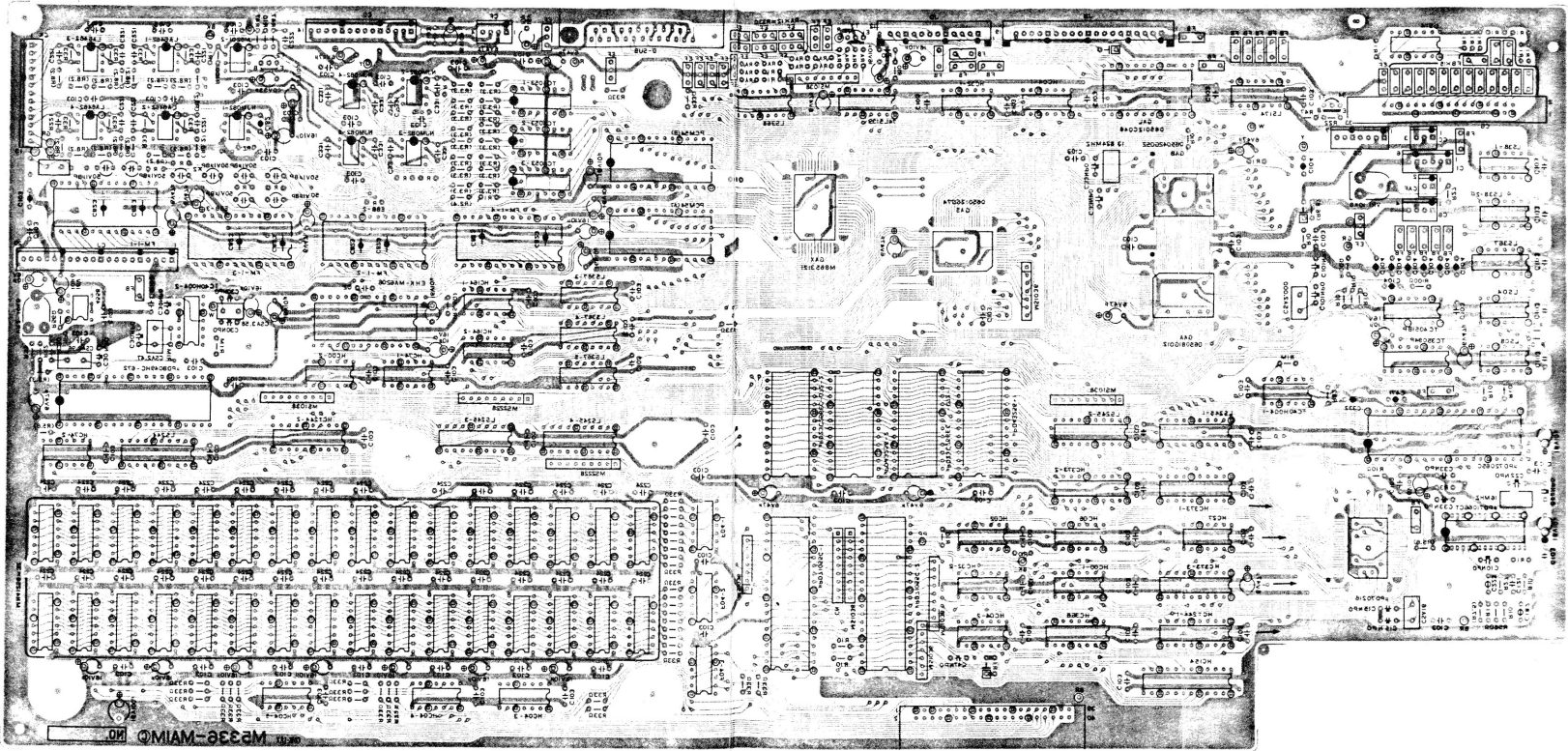


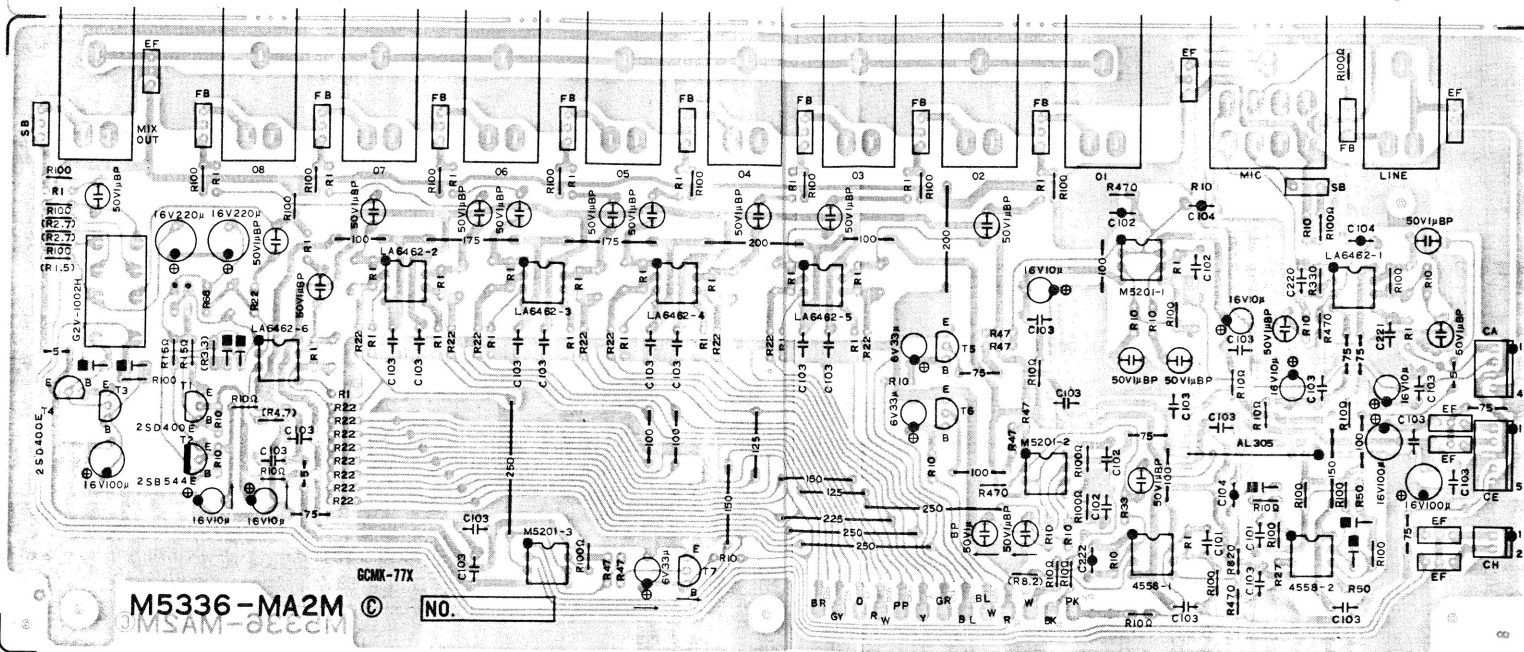
PCB - M5336 - PS2M



	A, H	E	F
F1	MT4-15A250V	—	Ⓢ T0.5A
F2	Ⓢ TSC4A125V	—	Ⓢ T 4A
F3	Ⓢ TSC1.6A125V	—	Ⓢ T1.6A
F4	Ⓢ TSC0.5A125V	—	Ⓢ T0.5A
F5	Ⓢ TSC0.5A125V	—	Ⓢ T0.5A





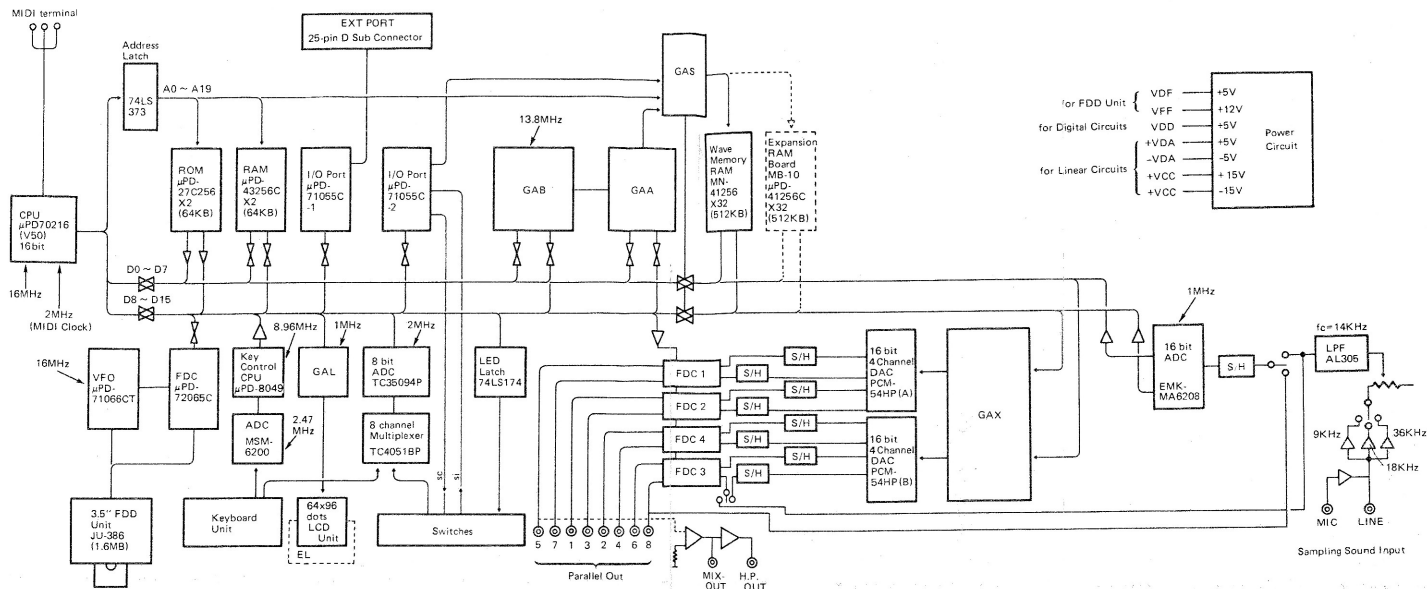


M5336-MA2M

GCMK-17X

NO.

1. BLOCK DIAGRAM



The FZ-1 is a 16-bit sampling keyboard whose sampling frequency is 36KHz and sampled sound is saved or loaded in a floppy disc.

CPU μ PD70216 is a 16-bit microprocessor and controls all the devices. System ROMs contain the FZ-1's system program whereas System RAMs are for the work area of the program.

Recorded sound's waveform is transformed in 16-bit $\times$ 512K steps digital data (1,024K steps when optional RAM board is equipped) by a 16-bit ADC (Analog to Digital Converter) EMK-MA6208 and stored in Wave Memory of 32 pieces of 256K-bit dynamic RAMs.

The gate arrays GAA and GAB are for accessing of Wave Memory RAMs.

When Playbacking, data from Wave Memory pass through gate array GAS which controls the Cross Fading.

The outputs of GAS are transformed in analog waveforms by two DACs PCM-54HP (A) and (B).

By means of time sharing, S/H (Sample and Hold) circuits separate the eight DAC outputs one by one and send them to FDCs which is a digital controlled filter and gain controller.

Together with Key Velocity Controller MSM6200, Key CPU μ PD8049 controls the key scanning. According to a key pressure strength, after touch detector in Keyboard unit output a voltage which is converted in a digital data in 8-bit ADC TC35094P and sent to the CPU. TC35094P also converts analog inputs from Pitch Bender, Modulator, Data Entry, and sampling sound level into digital data.

Gate array GAL is an interface between CPU and 64 $\times$ 96 dots graphic LCD Unit.

μ PD71055Cs are I/O Ports and performs switch scanning, upper address designation of Wave Memory RAMs, and interface between the CPU and External device.

μ PD72065 and μ PD71066CT control the FDD (Floppy Disc Drive) JU-386.

2. CPU (μ PD70216)

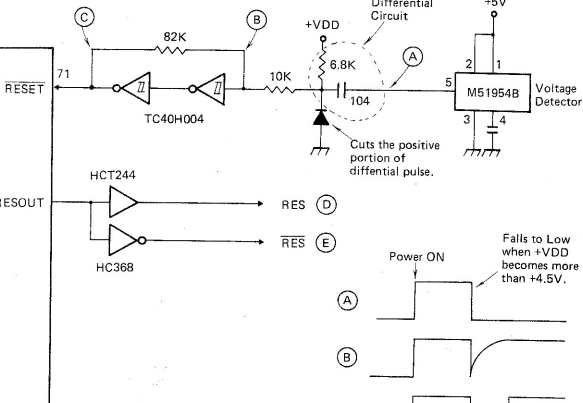
μ PD70216 is a 16-bit C-MOS LSI and controls all the peripheral devices.

The following is pin functions of the CPU.

Pin No.	Terminal	In/Out	Function
78~80, 1	A19 (PS3) ~ A16 (PS0)	Out	Upper address bus
3 ~ 10	AD15 (A15)~AD8 (A8)	In/Out	Upper address or data bus
13	GND	—	Ground (0V) source
14 ~ 21	AD7 ~ AD0	In/Out	Lower address or data bus
31	DMARQ3 (RXD)	In	MIDI data input
32	DMAAK3 (TXD)	Out	MIDI data output
33	VDD	—	VDD (+5V) source
37	INT2	In	Interrupt from gate array GAS
40	INT5	In	Interrupt from I/O Port
41	INT6	In	Key entry interrupt
44	TCLK	In	2MHz clock pulse for built-in timer
45	TOUT2	Out	Built-in timer output
50	ASTB	Out	Address latch enable signal. When High, signal AD0 ~ AD15 becomes address bus.
51	UBE	Out	Upper Bass Enable. When Low, upper address signals (AD8 ~ AD15) become data bus.
52, 54	GND	—	Ground (0V) source
55, 56	X2, X1	In	16MHz clock pulse inputs
57	CLK OUT	Out	8MHz (a half of 16MHz) clock pulse for gate array GAS
58	BUF EN	Out	Data bus buffer enable signal. When Low, Bidirectional Bus Buffers LS245's become functional.
59	BUF R/W	Out	Data bus read/write signal. When High, data is transferred from CPU to other devices whereas the data transfer direction is from devices to CPU when this terminal is Low.
61	IO WR	Out	I/O devices write signal. When Low, CPU is able to write data in the I/O devices.
62	M WR	Out	Memory devices write signal. When Low, CPU is able to write data in the memory devices.
64	IO RD	Out	I/O devices read signal. When Low, CPU is able to read data from the I/O devices.
65	M RD	Out	Memory device read signal. When Low, CPU is able to read data from the memory devices.
70	READY	In	Receiving High level signal from this terminal, CPU acknowledges that gate array GAS is not busy.

Pin No.	Terminal	In/Out	Function
71	RESET	In	At Power ON, the terminal receives a Low level pulse which resets the CPU.
72	VDD	—	+5V source
74	RES OUT	Out	Power ON reset signal for I/O devices
77	REF RQ	Out	Refresh request signal. Falls to Low level when CPU requests Dynamic RAMs to refresh.

3. CPU RESET CIRCUIT



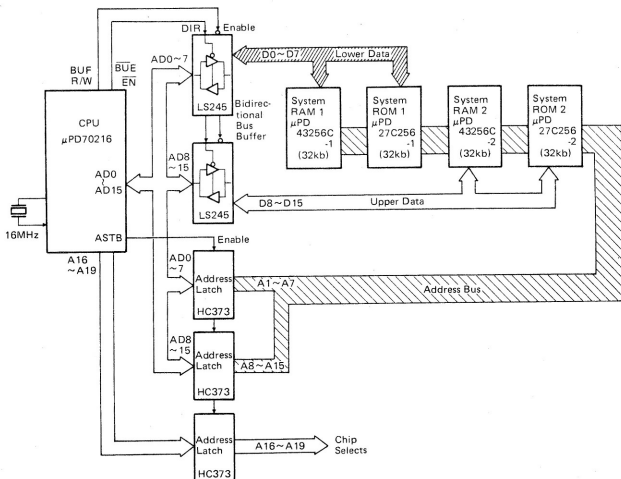
Circuit Operation

- (1) When power switch is turned on, +VDD rises toward +5V.
- (2) Voltage Detector M51954B outputs High level voltage from pin 5 (A) while +VDD is less than +4.5 volts.
- (3) When +VDD becomes higher than +4.5 volts, pin 5 of M51954B (A) falls to Low.
- (4) At the falling edge of pin 5, a differential pulse is generated in the differential circuit (B).
- (5) The differential pulse is shaped in a square pulse by the two inverters (C).
- (6) CPU initialize the internal circuits at the falling edge of Reset signal (C).
- (7) After the initialization of the internal circuits, CPU resets all the devices by signal RES OUT (D and E).

4. SYSTEM ROM/RAM

4-1. System ROM/RAM Access

System ROMs contain the FZ-1's system program whereas System RAMs are for the work area of the program.



Signals AD0 ~ AD15 function as either data bus or address bus.

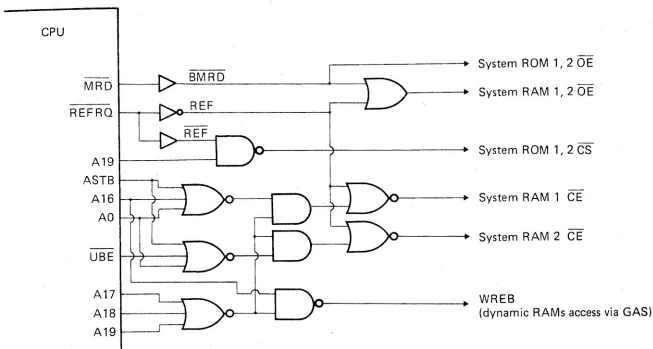
When the bus carries an address, CPU raises signal ASTB so that Address Latches (HC373s) are able to take in the signals and send them to the address terminals of the ROMs and the RAMs.

LS245 is a bidirectional buffer which determines the direction of data flow by signal BUF R/W of the CPU.

Signal BUF R/W	Data Flow
High	CPU ← --- ROM/RAM
Low	CPU --- → ROM/RAM

Since the data bus is 16-bit and data terminals of the ROMs and RAMs are 8-bit, the data is divided in half and stored in each ROM or RAM.

4-2. System ROM/RAM Chip Selection

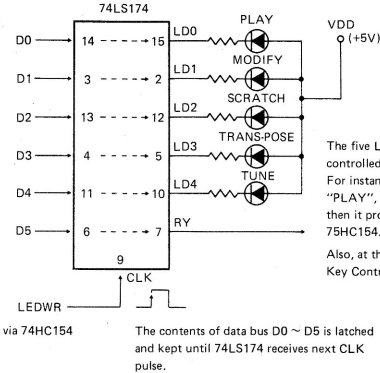


System ROMs and RAMs are designated when both $\overline{\text{OE}}$ and $\overline{\text{CE}}$ terminals are Low level.

When CPU falls $\overline{\text{MRD}}$ terminal, $\overline{\text{CE}}$ of System ROM 1, 2 and $\overline{\text{OE}}$ and $\overline{\text{CE}}$ of System RAM 1, 2 falls Low level selecting the System RAMs. At this time, if signal A19 rises to High, $\overline{\text{CS}}$ of System ROM 1, 2 become Low level and the ROMs are selected.

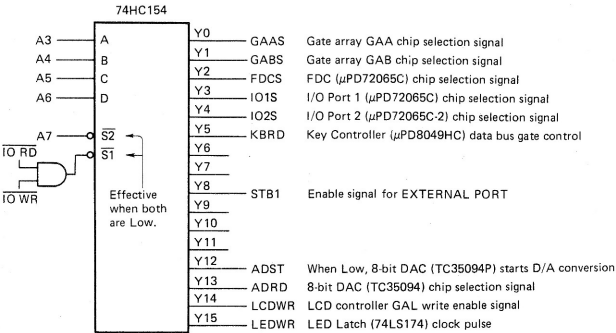
While CPU is generating refresh signals for the dynamic RAMs (Wave Memory RAMs), signal $\overline{\text{REF RQ}}$ falls to Low level raising $\overline{\text{OE}}$ and $\overline{\text{CE}}$ of System RAMs so that System RAM 1 and 2 cannot be designated.

5. LED LATCH (74LS174)



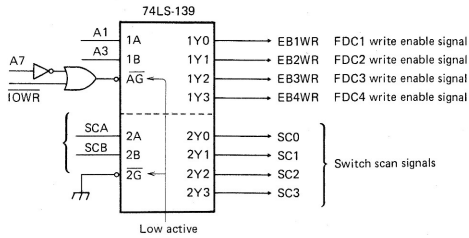
6. CHIP SELECTOR

By the combinations of signals A3 ~ A6, one of the outputs falls to Low level and becomes a chip selection signal.



7. DECODER (74LS139)

By the combination of signals A1, A3, SCA, and SCB, Decoder outputs write enable signal of the FDCs and switch scan signals.

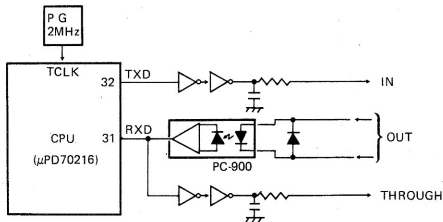


Switch Matrix

	SI0	SI1	SI2	SI3	SI4	SI5	SI6	SI7
SC0	0	1	2	3	4	5	6	7
SC1	8	9	YES	NO				
SC2	UP	DOWN	RIGHT	LEFT	ENTER	ESCAPE	DISPLAY	
SC3	PLAY	MODIFY	SCRATCH	TRANSPOSE	TUNE			

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
To I/O Port 2

8. MIDI CIRCUITS



9. I/O PORT 1 (μ PD71055-1)

I/O Port 1 controls External Port, FDC (Floppy Disc Controller), gate arrays GAA and GAB.

Pin No.	Terminal	Signal	In/Out	Function
1	PO3	IF3	In/Out	Data bus for External Port
2	PO2	IF2	In/Out	
3	PO1	IF1	In/Out	
4	PO0	IF0	In/Out	
5	$\overline{RD}$	BIO $\overline{RD}$	In	Read signal. CPU falls this terminal Low when it reads data from I/O Port 1
6	$\overline{CS}$	$\overline{IOIS}$	In	Chip select signal from CPU. I/O Port 1 is designated when this terminal is Low.
7	GND	GND	—	Ground (0V) source
8	A1	A2	In	Address signals
9	A0	A1	In	
10	P27	OB $\overline{F}$	Out	Control signals for External Port
11	P26	ACKE	In	
12	P25	IB $\overline{F}$	Out	
13	P24	—	In	
14	P20	ACKO	Out	
15	P21	STBO	Out	
16	P22	IFOUT	Out	
17	P23	IF INT	Out	Interrupt signal to CPU when using External Port
18	P10	GAAR	In	Gate array GAA ready signal
19	P11	GABR	In	Gate array GAB ready signal
20	P12	LCR	In	Gate array GAL ready signal
21	P13	ADR	In	8-bit DAC (TC35094P) ready signal. Receives High level signal when the DAC is ready to receive data.
22	P14	CONT	Out	Control signal for Key Controller
23	P15	SYNC	In	Interrupt signal from FDC
24	P16	IF IN	In	Control signal from External Port
25	P17	FD INT	In	Interrupt signal from FDC. When FDC require new data, this terminal receives High level signal.
26	VDD	VDD	—	VDD (+5V) source
27~34	D7 ~ D0	D7 ~ D0	In/Out	Data bus between CPU
35	RESET	RES	In	Power ON reset signal
36	WR	BIO WR	In	Falls to Low when CPU output data via this I/O Port
37	PO7	IF7	In/Out	Data bus for External Port
38	PO6	IF6	In/Out	
39	PO5	IF5	In/Out	
40	PO4	IF4	In/Out	

10. I/O PORT 2 (μ PE71055-2)

I/O Port 2 performs switch scanning, gain control of sample sound, gate array GAS controlling and FDC controlling.

Pin No.	Terminal	Signal	In/Out	Function
40	PO4	ADS2	Out	8-bit DAC input selection signals. By the combinations of these signals, input of 8-bit DAC is varied.
1	PO3	ADS1	Out	
2	PO2	ADS0	Out	
3	PO1	SCB	Out	Switch scanning signals
4	PO0	SCA	Out	
5	$\overline{RD}$	BIO $\overline{RD}$	In	Read signal from CPU. CPU falls this terminal Low when it reads data from I/O Port 2.
6	$\overline{CS}$	IO2S	In	I/O Port 2 chip select signal.
7	GND	GND	—	Ground (0V) source
8	A1	A2	In	Address bus
9	A0	A1	In	
10~17	P27 ~ P23	SI7~SI3	In	Switch input signals
18~23	P10 ~ P15	16B~21B	Out	Upper 6 bits of Wave Memory RAM address
24	P16	GAIN	Out	Gain control signal for sampling sounds. Normally High level and falls to Low when sampling level is set at L .
25	P17	NORM	Out	Sampling frequency switching signal. High level when sampling frequency is 36KHz and Low when 18KHz or 9KHz.
26	VDD	VDD	—	VDD (+5V) source
27~34	D7 ~ D0	D7~D0	In/Out	Data bus between I/O Port 2 and CPU
35	RESET	RES	In	Power ON reset signal (High active)
36	$\overline{WR}$	BIO $\overline{WR}$	In	Write signal. CPU falls this terminal when it sends data via I/O Port 2.
37	PO7	INUSE	Out	Being Low, this signal selects the FDD Unit and lights the FDD BUSY lamp.
38	PO6	$\overline{MO\ ON}$	Out	FDD Unit's motor drive signal.
39	PO5	TC	Out	High level when data transfer to FDC is completed

11. WAVE MEMORY RAM (HN41256)

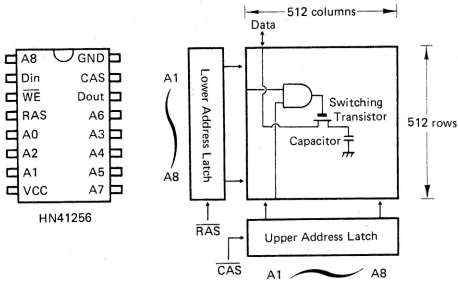
11-1. Dynamic RAM

Hitherto, static RAMs have been employed in Casiotone as memory devices. Static RAMs use six transistors per one bit and turning these transistors on or off, digital signals of High or Low levels are stored. Since stored data are kept as long as power sources are provided, controlling of static RAMs are made simple but, as the cost per one bit is rather high, static RAMs are unsuitable for a large memory area.

The FZ-1 employs dynamic RAM HN41256s whose capacity is 256K bit for storing sample sound data.

Dynamic RAM contains capacitors which store digital data by being charged or discharged. Since a capacitor does not hold the electric charge for a long time, the stored data must be rewritten periodically. This rewriting is called **refresh**. Also, due to reducing number of pin terminals, addressing is made twice for rows and columns.

As the access of a dynamic RAM is thus complicated, the control circuits become intricate.



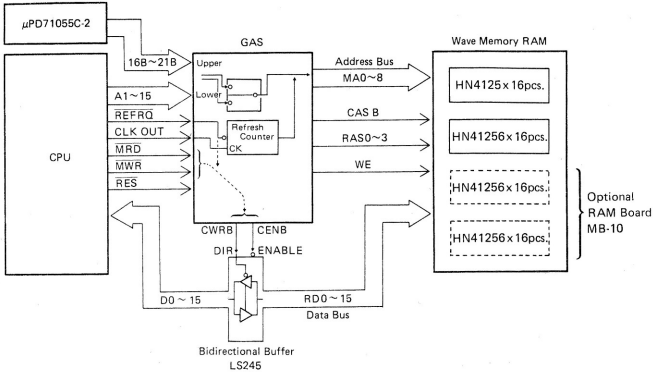
Addressing is made by selecting a column (upper address) first, then a row (lower address). The address signals A1 ~ A8 are put into the upper or lower address latches when enable signals $\overline{\text{CAS}}$ (Column Address Strobe) or $\overline{\text{RAS}}$ (Row Address Strobe) fall to Low level.

Since dynamic RAMs do not have CE (Chip Enable) or OE (Out Enable) terminals, chip selection is made when $\overline{\text{RAS}}$ terminal falls and stored data emerges while $\overline{\text{CAS}}$ is Low.

Via a refresh counter in gate array GAS, CPU designates all the addresses periodically for re-charging the capacitors in dynamic RAM.

11-2. Wave Memory RAM Access

Wave Memory RAMs are controlled by CPU via gate array GAS.



Address bus A1 ~ A15 from CPU and 16B ~ 21B from I/O Port 2 are separated in upper and lower addresses in gate array GAS. The upper and lower addresses are output alternately from MA0 ~ MA8 terminals of GAS.

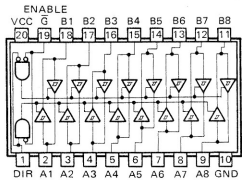
Wave Memory RAMs discriminate MA0 ~ MA8 as upper or lower addresses by signals RAS0 ~ RAS3 or CAS which are generated in GAS.

In order to recharge the memory cell capacitors of Wave Memory RAMs, CPU periodically send signal REF RQ to GAS.

By REF RQ and 8MHz clock pulse of CLK OUT, refresh counter in GAS starts counting and designates all the addresses of Wave Memory RAMs in turn.

The direction of data flow between CPU and Wave Memory RAMs is controlled by signal MRD and MWR and the bidirectional buffer.

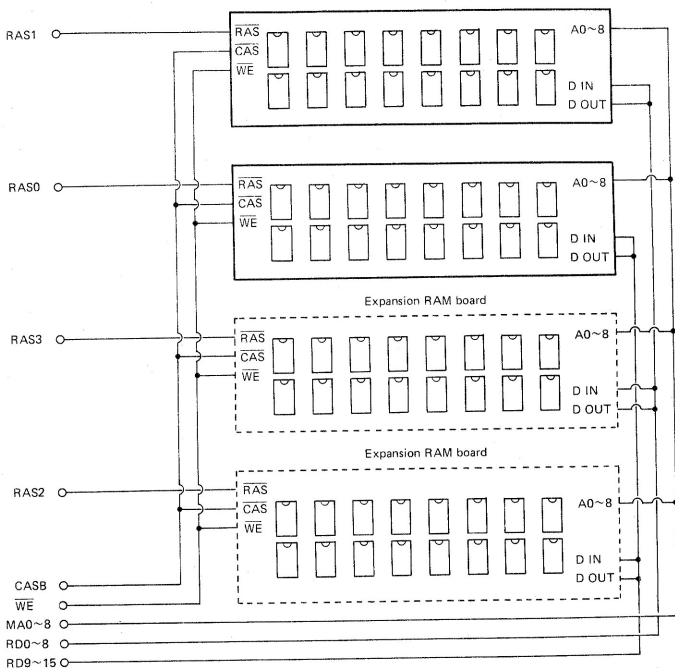
The followings are logic diagram and truth table of bidirectional buffer LS245.



FUNCTION TABLE		
ENABLE G	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

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

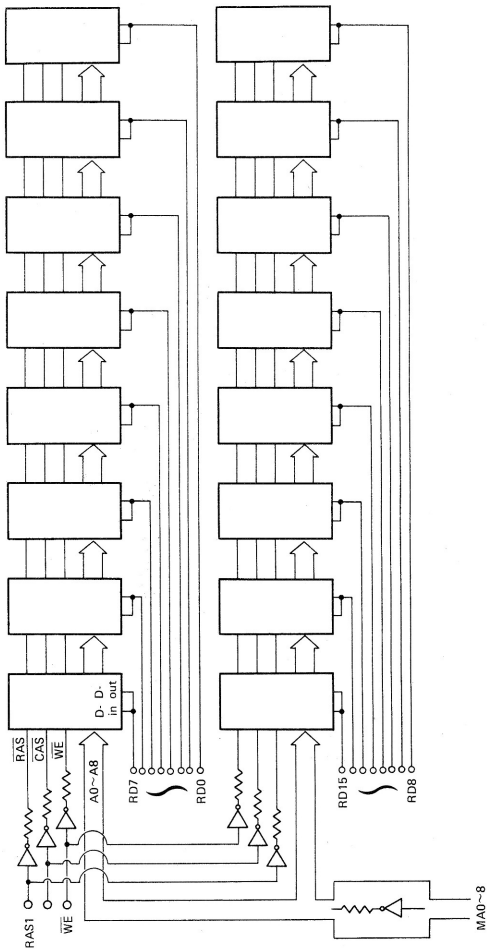
The FZ-1 is equipped with 32 pieces of 256K-bit dynamic RAMs (total capacity of 1 megabyte) for storing sound data and the capacity is doubled when optional RAM board is equipped.



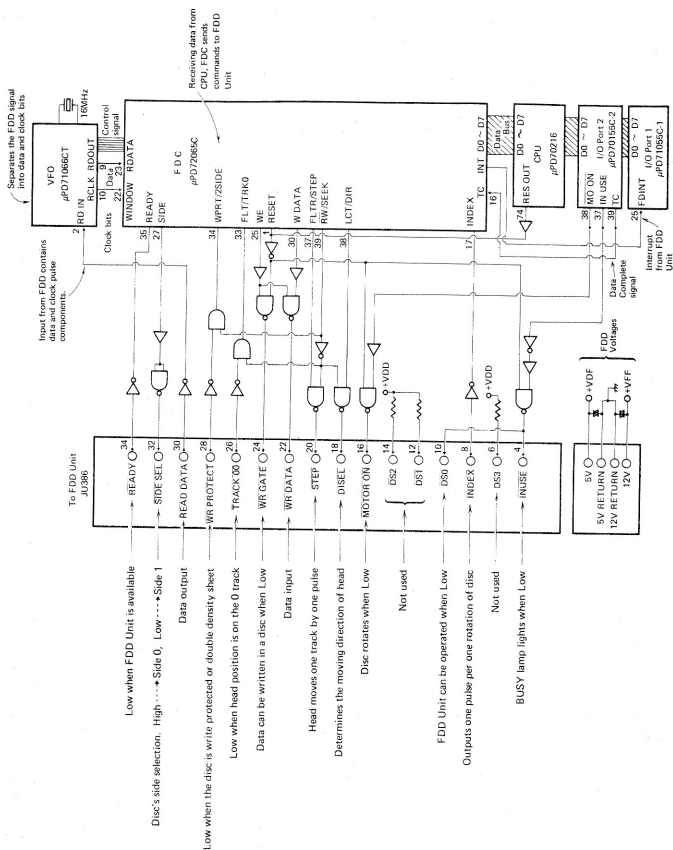
On the above block diagram, one block (circuit in) consists of 16 RAMs and outputs of the RAMs become 16-bit data bus (refer to the next page).

Signals RAS0 ~ RAS3 assign row addresses in each block whereas column address strobe signal CAS B is common to all the RAMs.

Circuit Diagram in 1 Block



12. FDD (Floppy Disc Drive) INTERFACE



13. FDC (Floppy Disc Controller) μ PD72065C

Receiving data from CPU, the FDC sends commands such as read data, write data, seek, etc. to the FDD Unit.

Pin Functions of FDC

Pin No.	Terminal	In/Out	Function
1	RESET	In	Power ON reset signal (High active)
2	$\overline{RD}$	In	Receives Low level signal when CPU reads data from FDC
3	$\overline{WR}$	In	Receives Low level signal when CPU writes data in FDC
4	$\overline{CS}$	In	While Low, data transfer between FDC and CPU is possible
5	A0	In	FDC contains two registers. Status register stores commands whereas data register keeps data. When this terminal is Low, the status register is assigned while High level selects data register.
6 ~ 13	DB0 ~ DB7	In/Out	Data bus
14, 15	$\overline{DRQ}$, $\overline{DACK}$		Not used
16	TC	In	Data transfer complete signal
17	INDEX	In	Receives a signal from FDD Unit when read/write head is at the starting position
18	INT	Out	Interrupt signal to CPU
19	ϕ	In	4MHz clock pulse from VFO
20	GND	—	Ground (0V) source
21	WCLK	In	Timing clock signal for reading or writing data in a disc
22	WINDOW	In	Disc's clock bit which is separated in VFO
23	R DATA	In	Disc's data which is separated from clock bit in VFO
24	SYNC	Out	FDC outputs High level when it is reading data from FDD Unit
25	WE	Out	Write command to FDD Unit
26	MFM	Out	Mode selection signal to VFO. Outputs High level at MFM mode (data writing mode for double density disc) and Low at FM mode (data writing mode for single density disc)
27	SIDE	Out	As FDD Unit has two driving heads (Head 0 for top side of disc and Head 1 for bottom side of disc), this terminal selects either head. When Low, Head 0 is selected and Head 1 is assigned when this terminal is High.
28, 29	US1, US0	—	Not used
30	W DATA	Out	Data output for FDD Unit
31, 32	PS1, PS0	—	Not used

Pin No.	Terminal	In/Out	Function
33	FLT/TRK 0	In	Fault/Track 0 discrimination signal. In accordance with voltage level of $\overline{RW/SEEK}$ terminal (pin 39), this terminal discriminates FDD error or driving head's Track 0 position. If this terminal receives a signal from FDD Unit when terminal $\overline{RW/SEEK}$ is Low, FDC discriminates that the FDD Unit is malfunctioning. When there is an input at this terminal while $\overline{RW/SEEK}$ is High, FDC acknowledges that the driving head in FDD Unit is at track 0 position.
34	WPRT/2 SIDE	In	Write Protect/2-sided disc discrimination terminal. If this terminal receives a signal from FDD Unit while terminal $\overline{RW/SEEK}$ is Low, FDC discriminates that loaded disc is write protected. If there is an input at this terminal while $\overline{RW/SEEK}$ is High, FDC acknowledges that loaded disc is 2-sided sheet.
35	READY	In	FDC acknowledges that FDD Unit is available when the terminal receives an input
36	HOLD	—	Not used
37	FLTR/STEP	Out	FDC outputs FDD error release signal when $\overline{RW/SEEK}$ terminal is Low. The output from this terminal becomes seek pulse (a signal which moves the driving head) while $\overline{RW/SEEK}$ is High.
38	LCT/DIR	Out	While $\overline{RW/SEEK}$ is Low, the output from this terminal acknowledges FDD Unit that the driving head is designated over track 43. When $\overline{RW/SEEK}$ is High, the voltage level of this terminal determines the moving direction of the driving head. High ——— To outward Low ——— To inward
39	$\overline{WR/SEEK}$	Out	Discrimination terminal of Read/Write or Seek. High ——— Read or Write Low ——— Seek (moving the driving head)
40	VDD	—	VDD (+5V) source

14. VFO (Voltage-controlled Frequency Oscillator) μ PD71066CT

In order to synchronize the data read timing, data is written in a floppy disc together with timing clock bits.

When the written data is read from the disc, the clock bits and data enter to VFO. The VFO separates the clock bits from the data.

Pin No.	Terminal	In/Out	Function															
1	AOSR	—	Connected to external resistor for the built-in Analog One Shot circuit															
2	RD IN	In	Data input from FDD Unit															
3	MIN/CTD	In	Disc size selection terminal Low level — 3.5 or 5 inch disc High level — 8 inch disc Connected to GND (Low) as FZ-1 uses 3.5" disc.															
4	R GATE	In	Together with terminal FDC SW2 (pin 28), this terminal discriminates that data reading is allowed or prohibited. <table><tr><td>FDC SW2</td><td>R GATE</td><td>Data Reading</td></tr><tr><td>High</td><td>High</td><td>Possible</td></tr><tr><td>High</td><td>Low</td><td>Prohibited</td></tr><tr><td>Low</td><td>High</td><td>Prohibited</td></tr><tr><td>Low</td><td>Low</td><td>Possible</td></tr></table>	FDC SW2	R GATE	Data Reading	High	High	Possible	High	Low	Prohibited	Low	High	Prohibited	Low	Low	Possible
FDC SW2	R GATE	Data Reading																
High	High	Possible																
High	Low	Prohibited																
Low	High	Prohibited																
Low	Low	Possible																
5	MFM/FM	In	Together with terminal FDC SW2, input voltage of this terminal selects the disc's density.															
6	SYNC SW	—	Not used															
7	SYNC	In	Built-in PLL's gain change signal															
8	GND	—	Ground (0V) source															
9	RD OUT	Out	Data output which is synchronized with read clock signal R CLK															
10	R CLK	Out	Read clock signal which is separated from floppy disc data															
11	FDC CLK	Out	Primary clock pulse for FDC															
12	W CLK	Out	Writing clock pulse for FDC															
13, 14	X1, X2	In	16MHz clock pulse inputs															
15	A GND	—	GND (0V) for built-in linear circuits															
16~18		—	Not used															
19	TCC	—	Built-in timer's time constant is determined by capacitor and resistor connected to this terminal															
20	RESET	In	Power ON reset signal input (Low active)															
21	CVC	—	Connected to a external capacitor for the built-in VCO (Voltage Controlled Oscillator)															
22	FDD SW	—	Not used															
23	VCO IN	—	Input from external low-pass filter for the built-in VCO															
24, 28	FDC SW1, FDC SW2	—	FDC type selection terminal. Both terminals are opened (internally High level as this LSI contains pull-up resistor) to select μ PD72065C as FDC.															
25	VDD	—	VDD (+5V) source															
26, 27	LPF2, LPF1	Out	VCO signal output to the external low-pass filter															

Pin No.	Terminal	In/Out	Function
29	AOSC	—	Connected to external capacitor for the built-in Analog One Shot circuit
30	AVDD	—	+5V source for the built-in linear circuits

15. FDD (Floppy Disc Drive) UNIT JU-386/384

JU-386/384 is a 3.5 inch double density micro floppy disc drive unit featuring 1.6 Megabyte maximum capacity.

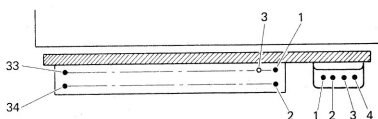
Signal functions of FDD Unit's connector

Terminal Pin No.	Signal	In/Out	Function
4	IN USE	In	Low level of this terminal lights the "BUSY" lamp of the FDD Unit
6	DB3	In	Not used
8	INDEX	Out	Outputs a Low level signal per one rotation of a floppy disc
10	DS0	In	Drive 0 selection signal. Connected to IN USE terminal.
12, 14	DS1, DS2	In	Drive 1 and 2 selection terminals. As JU-386 drives only one disc, these terminals are not used.
16	MOTOR ON	In	Motor rotates if this terminal becomes Low while a floppy disc is loaded
18	DI SEL	In	Driving head's moving direction select signal input. High ---- To outward Low ---- To inward
20	STEP	In	Driving head seeks one track in the direction selected by DI SEL terminal. Head moves at the rising edge of this signal.
22	WR DATA	In	Write data timing signal input. Writes data at the falling edge of this terminal.
24	WR GATE	In	Data can be written in a floppy disc while this terminal is Low.
26	TRACK 00	In	Falls to Low when track 00 is detected
28	WR PROTECT	Out	Falls to Low when the loaded disc is write protected or double density sheet
30	READ DATA	Out	Outputs data written on the floppy disc
32	SIDE SEL	In	Driving head's side selection terminal. High ---- Side 0 (Top) Low ---- Side 1 (Bottom)
34	READY	Out	Falls to Low if the following conditions are satisfied. (1) All the voltages are supplied (2) Floppy disc's rotation is over 84 percent of the normal rotation speed (3) A floppy disc is loaded (4) DI SEL terminal is Low (5) Driving head is on track 00 at Power ON

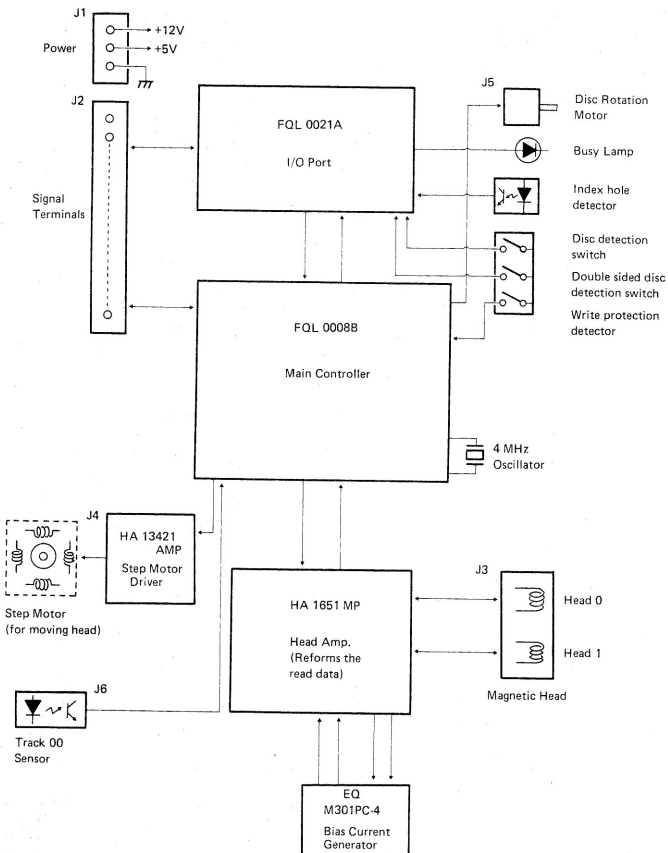
Power Supply Connector

Pin No.	Terminal	Purpose
1	+5V	+5V for FDD Unit circuits
2	5V RETURN	GND for FDD Unit circuits
3	+12V	+12V for FDD Unit motor
4	12V RETURN	GND for FDD Unit motor

Pin arrangements of the connectors

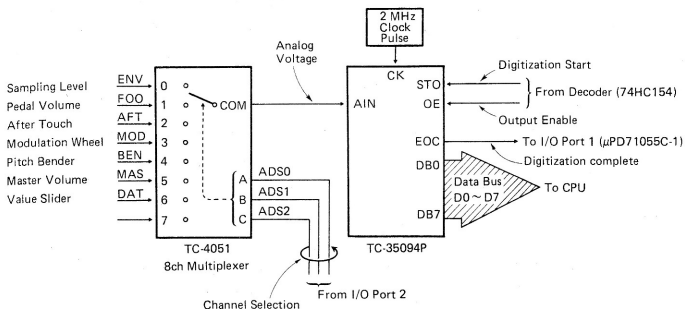


FDD Unit JU-386 Block Diagram



16. 8-BIT ADC (TC-35094)

The AC (Analog to Digital Converter) varies the voltage levels from Pitch Bender, Modulation Wheel, Pedal Volume Control etc. into digital values.



As one ADC receives inputs from several devices, an 8-channel multiplexer selects one input. Input channel is assigned by voltage combinations of terminal A, B, and C and outputs from terminal COM.

A	B	C	ON Channel	Input Signal
Low	Low	Low	0	From Sampling Level
High	Low	Low	1	From Pedal Volume Control
Low	High	Low	2	From After Touch Detector
High	High	Low	3	From Modulation Wheel
Low	Low	High	4	From Pitch Bender
High	Low	High	5	From Master Volume Control
Low	High	High	6	From VALUE Slider
High	High	High	7	Not used

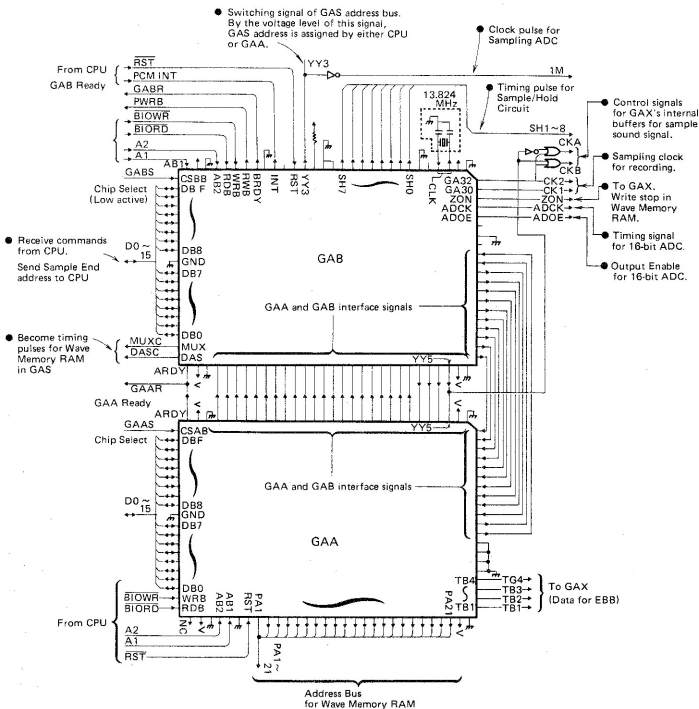
When terminal STO rises to High level, the DAC digitizes the input voltage from terminal A IN and if the digitization is completed, it provides High level signal to I/O Port 1 from terminal EOC. The digitized data are output to CPU via data bus DB0 ~ DB7 when terminal OE is High.

17. GAA & GAB

Receiving commands from CPU data bus, gate arrays GAA and GAB access the address (start address, end address, loop start address, loop end address etc. . .) of the Memory RAM via gate array GAS for recording and playback of sample sounds.

By means of varying the reading speed of Memory RAM data, those gate arrays vary the pitch of the sounds.

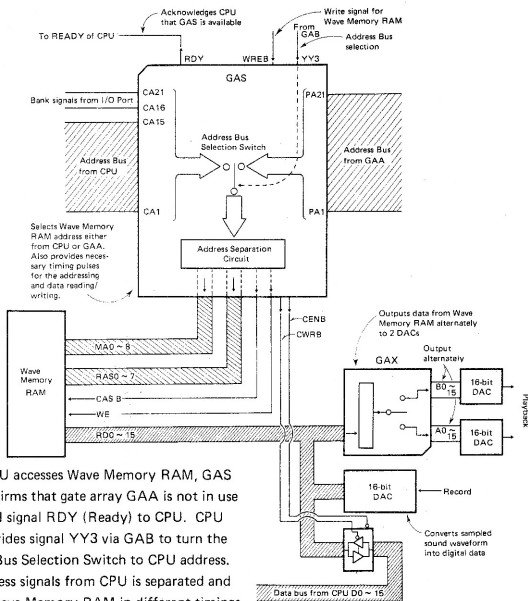
GAA and GAB also provide timing pulses for Sample/Hold Circuit.



18. GATE ARRAYS GAS & GAX

GAS selects Wave Memory RAM address either from CPU or GAA by turning Address Bus Selection Switch.

Also GAS provides necessary timing signals for the addressing.



When CPU accesses Wave Memory RAM, GAS first confirms that gate array GAA is not in use then send signal RDY (Ready) to CPU. CPU then provides signal YY3 via GAB to turn the Address Bus Selection Switch to CPU address. The address signals from CPU is separated and sent to Wave Memory RAM in different timings. Providing signals CENB and CWRW to the bidirectional buffer, GAS controls the direction of data flow.

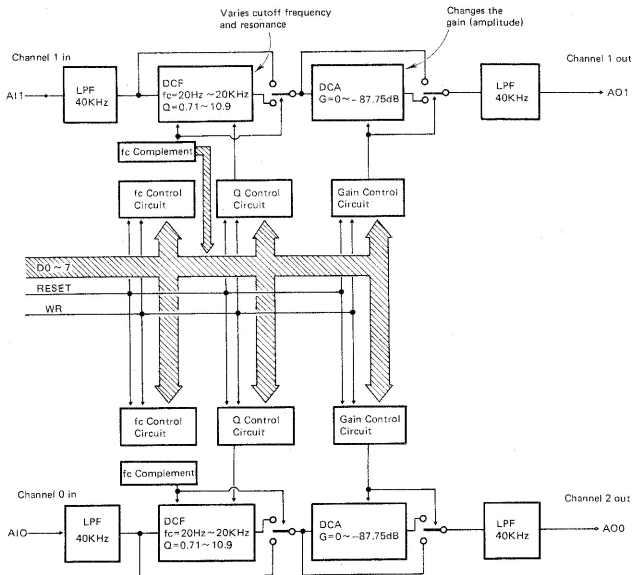
When sampling a sound, gate array GAA assigns Wave Memory RAM address.

Sampled sound is digitized in the 16-bit ADC (Analog to Digital Converter) and stored in the assigned address in Wave Memory RAM.

For playback the stored sound, GAA assigns Wave Memory RAM address and sends data from the Wave Memory RAM into gate array GAX.

GAX eliminates a harmonic noise contained in data signals and sends the noise free data to two 16-bit DACs (Digital to Analog Converters) alternately.

19. DCF (MB87186)

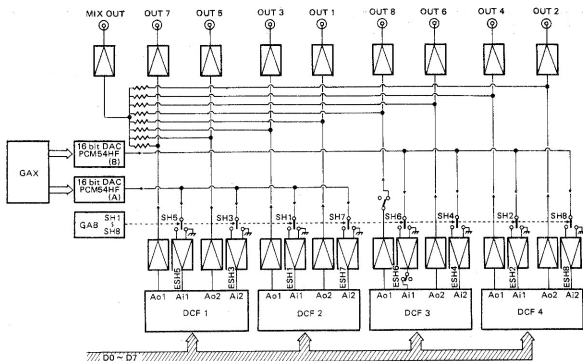


Block Diagram of MB87186

MB87186 contains two each of DCF (Digital Controlled Filter) and DCA (Digital Controlled Amplifier) which vary cutoff frequency, resonance, and amplitude of sound signals.

Pin No.	Terminal	In/Out	Function
1 ~ 8	D0 ~ D7	In	Digital data for cutoff frequency, resonance, and amplitude values
9	$\overline{WR}$	In	Data write signal (Low active)
10	$\overline{CE}$	In	Chip enable signal (Low active). Connected to the ground.
11	CHS	In	Channel selection signal. High level designates channel 1 while channel 2 is selected by being Low of this terminal.
12	F/A	In	Filter/Amp switching signal. When this terminal is High, signals of data bus become DCF control data and being Low makes them amplitude control data.
13	FC/Q	In	Cutoff frequency/Resonance selection signal. When terminal F/A (pin 12) and this terminal are High level, input data determines cutoff frequency in DCF. If this terminal is High while F/A is Low, upper 2 bits of the data bus become gain control data in DCA. While both F/A and FC/Q are Low, all the 8 bits of the data bus determines the amplitude value in DCA.
14	DG	—	Digital ground
15~7	—	—	Not used
18	OSC 1	In	3.58MHz clock pulse. Data are written in at the rising edge () of this clock pulse.
19	$\overline{RESET}$	In	Being Low of this terminal sets values of VCF and VCA as follows. Cutoff Frequency : 20 Hz Resonance : 0.71 Gain : $-\infty$ dB
20	VSS	—	-5V source
21	AI2	In	Source sound signal input for channel 2
22	$\overline{PD}$	In	Power down control terminal (not used in FZ-1)
23	AO2	Out	Filtered and amplified sound output of channel 2
24	AG	—	Ground source for the internal linear circuit
25	AO1	Out	Filtered and amplified sound output of channel 1
26	$\overline{TC}$	In	Not used (Connected to +5V)
27	AI1	In	Source sound signal input for channel 1
28	VDD	—	+5V source

20. PLAYBACK CIRCUIT



Receiving data from CPU, FDCs set cutoff frequency, resonance, and amplitude values.

Sampled sound data stored in Wave Memory RAM enter 16-bit DACs PCM54HF (A) and (B) alternately via gate array GAX.

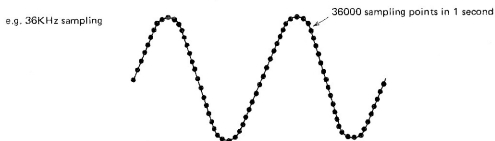
Since single output of a 16-bit DAC is 4-channel multiplex signal (four kinds of sounds are combined by time sharing), signals SH1 ~ SH8 from gate array GAB separate the multichannel signal into single sound signals.

Each sound is filtered and gain-controlled in a DCF and output to a parallel line out terminal via two op amps.

MIX OUT terminal outputs all the sound signals from OUT 1 to OUT 8 terminals.

SAMPLING

The FZ-1 is able to select three sampling frequencies 36KHz, 18KHz, and 9KHz and also be able to choose the recording gain of HIGH or LOW.



Playbacking a sound, double higher frequency of the maximum frequency of recording sound is necessary. Namely, if the maximum frequency of a recording sound is 5KHz, it is necessary to sample the sound with at least 10KHz sampling frequency.

Because a noise may be generated when the recording sound's frequency exceeds a half of the sampling frequency, FZ-1 passes the recording sound through a low-pass filter whose cutoff frequency is a half of the sampling frequency.

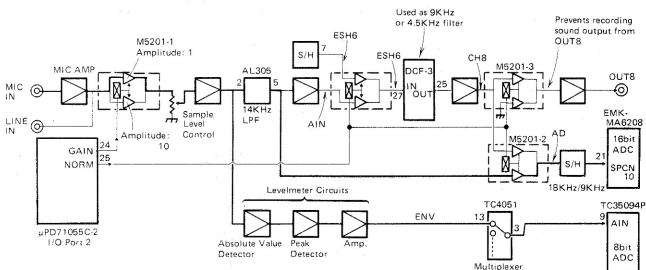
Sampling frequency : 36KHz ---- Cutoff frequency of low-pass filter: 18 KHz

Sampling frequency : 18KHz ---- Cutoff frequency of low-pass filter: 9 KHz

Sampling frequency : 9KHz ---- Cutoff frequency of low-pass filter: 4.5 KHz

(1) Signal flow of 36 KHz sampling

Gain: LOW



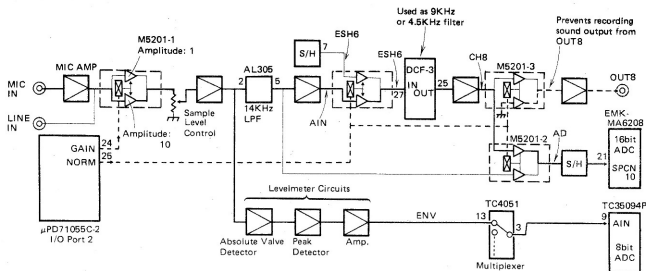
When recording a sound from MIC input, the input signal is amplified by the MIC Amp and if the input is from LINE IN, it directly enters a switching op amp M5201. M5201 contains two op amps whose amplitudes are 1 and 10.

Depends on the Sampling Level setting, the recording sound passes either one of the op amps. This switching of the op amps is made by the signal GAIN from I/O Port 2's pin 24.

After passing Sample Level Control VR and one op amp, the signal enters 14KHz low-pass filter. Although the cutoff frequency of the filter is 14KHz, it shuts the signal over 18KHz since the slope of the cutoff frequency response is gentle.

For displaying the sampling level on the LCD, the unfiltered sound signal passes Absolute Volume Detector which detects the mean value of the sound volume, Peak Detector that extracts the maximum sound level, and an amplifier. After then, the sound level signal passes Multiplexer TC4051, digitized in 8-bit ADC, and sent to the CPU as sound level data.

(2) Signal flow of 18KHz or 9KHz sampling (Sampling Gain: HIGH)



After passing 14KHz LPF and an amplifier, the recording sound signal enters a switching op amp M5201-2 in MA1M PC Board.

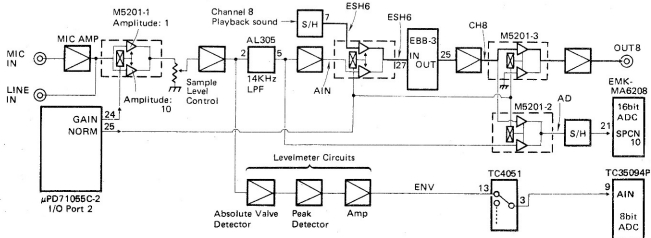
By signal NORM, the switching op amp sends the sound signal to DCF 3.

Although DCFs are normally used for filtering playback sounds, channel 1 of DCF 3 is also utilized to filter recording sounds.

Depends on the sampling frequency setting, CPU sends 9KHz or 4.5KHz cutoff data to DCF3. 9KHz or 4.5KHz filtered sound is provided to 16-bit ADC via an amplifier, M5201-2 in MA2M PCB, and S/H circuit.

Since channel 1 output of DCF 3 is connected to OUT 8 output jack, signal NORM also cuts the sound signal off in M5201-3 to prevent outputting the recording sound from OUT 8.

(3) Playback from OUT 8



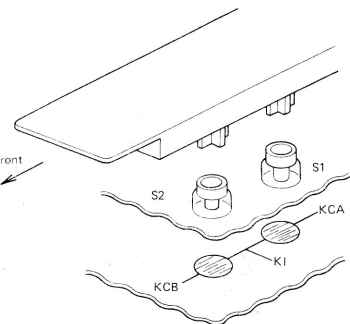
After recording of a sample sound, signal NORM turns switching op amp M5201-3 on so that OUT 8 is able to output playback sounds.

21. KEYBOARD

FZ-1 varies the sound volume in accordance with the key touch speed and depression strength.

21-1. Key Velocity Detection

Each key has two key contact switches S1 and S2.



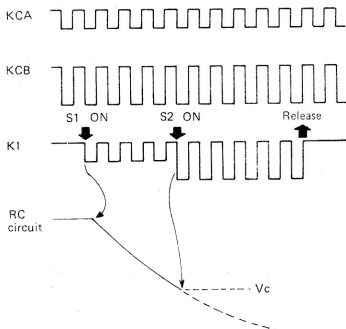
When a key is hit, S1 turns on first, then S2.

The interval time between turning on of S1 and S2 varies according to the touch speed of the key.

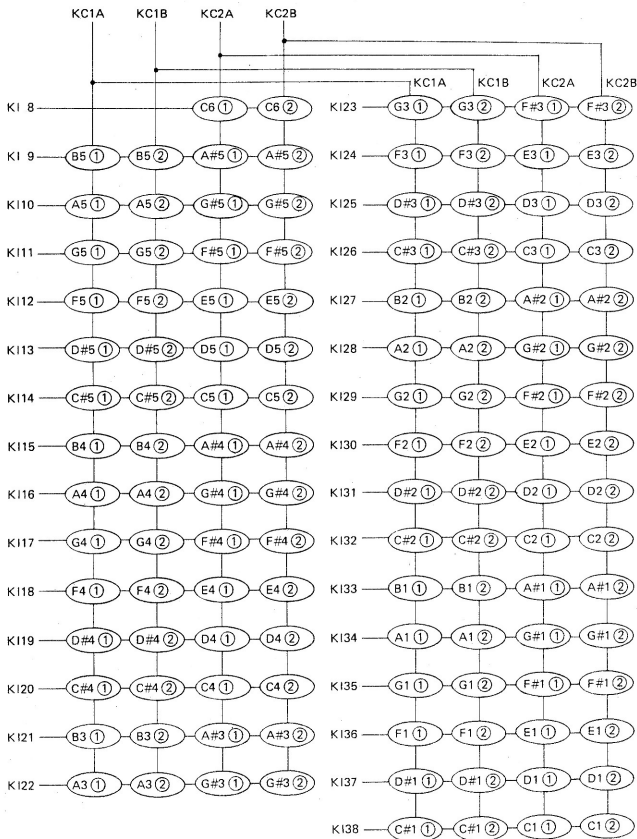
LSI MSM 6200 detects the time interval and determines the key touch speed.

Some RC (resistor and capacitor) integrating circuits are connected to the MSM6200 and when switch S1 turns on, the RC circuit starts to discharge. The discharging stops when S2 turns on.

The MSM 6200 also contains an ADC (Analog to Digital Converter) and changes the voltage V_c of the RC circuits into a 5-bit digital signal which is sent to the CPU as key entry and hitting speed data.



21-2. Key Matrix



21-3. Pin Functions of Velocity Controller (MSM6200)

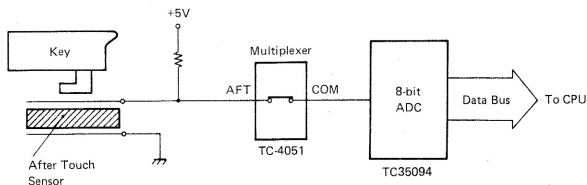
Pin No.	Terminal Name	In/Out	Function
1 ~ 6	IR6 ~ IC8	In/Out	External RC discharging circuit inputs and outputs.
10	REF		Reference voltage (+5V).
11	AG		Analog ground.
20	O1	Out	Interrupt request signal output. When LOW, MSM6200 interrupts the CPU.
25~28 29~32	O2 ~ O5 IO1 ~ IO4	Out In/Out	Upper 4-bit data bus. Lower 4-bit data bus. O2 O3 O4 O5 IO1 IO2 IO3 IO4 MSB LSB
34	I 2	In	ALE (Address Latch Enable) signal input. When HGIH, address in MSM6200 is assigned.
35	I 3	In	WR signal input. When LOW, data or address can be written in MSM6200.
36	I 4	In	RD signal input. When LOW, CPU reads data from MSM6200.
37	I 5	In	CS (chip select) signal input. When LOW, communications between the CPU and MSM6200 is possible.
39	I 10	In	Reset signal input. LOW: Active. At power on, receives a reset signal to initialize MSM6200's internal circuits.
40	VDD		+5 volt source.
43	PGI	In	Clock pulse (2.47 MHz) input.
45	VSS2		Ground (0 volt) source.
46	VSS1		+2.25 volt source.
47~50	KC2B ~ KC1A	Out	Key common signal outputs.
58~88	K8 ~ K38	In	Key input terminals.
91~100	IR1 ~ IC5	In/Out	External CR circuits inputs and outputs.

21-4. Pin Functions of Key Interface LSI (μ PD8049HC)

Pin No.	Terminal Name	In/Out	Function
1	T0	In	Clock pulse input for data read/write.
2	XTAL1	In	8.96 MH clock pulse input.
4	RESET	In	At power ON, the terminal stays LOW level for a while in order to initialize internal circuits.
6	INT	In	Interrupt signal input from MSM6200.
8	RD	Out	Read signal output. Key interface LSI reads data from MSM6200 when terminal is LOW.
10	WR	Out	Write signal output. Key interface LSI writes data or address in MSM6200 when terminal is LOW.
11	ALE	Out	ALE (Address Latch Enable) signal output. Address in MSM6200 is assigned when HIGH level.

Pin No.	Terminal Name	In/Out	Function
12~19	DB0 ~ DB7	In/Out	Data bus (D0 ~ D7) between MSM6200.
20	Vss		Ground (0V) source.
26	VDD		+5V source.
27~34	P10 ~ P17	Out	Data bus (D0 ~ D7) between CPU.
36	P25 (CNT49)	In	Control signal input from CPU.
37	P26 (INT49)	Out	Interrupt signal output to CPU.
38	P27 (WR49)	Out	Timing pulse output for data read/write.
39	T1 (TST)	In	Test signal input. Key Interface LSI does selfcheck of internal RAM/ROM at LOW.
40	VCC		+5V source.

21-5. After Touch Detection Circuit

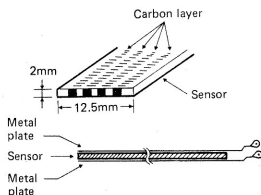


In accordance with the key pressure, the voltage level of signal AFT is varied.

When CPU detects the after touch strength, it passes signal AFT through Multiplexer.

Voltage value from the after touch sensor is digitized in 8-bit ADC and sent to CPU.

Note: Construction of after touch sensor

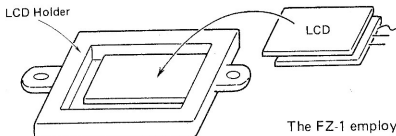


After touch sensor is a sheet of silicon rubber in which carbon particles are inlaid.

While no force is applied, the resistance between the both sides is infinity. However, when it is pressed hard, the density of the carbon becomes high causing its resistance to be as small as 10 ~ 30 ohms.

The silicon rubber is put between two thin metal plates.

22. LCD UNIT



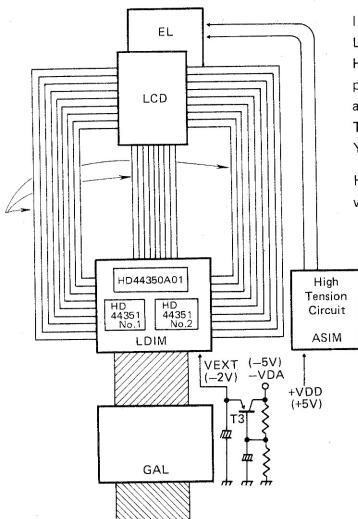
The FZ-1 employs 64 x 96 dots graphic LCD.

Gate array GAL converts the CPU data language into LCD Drivers' data word.

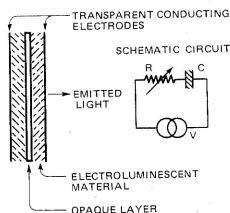
In the LCD Drive PCB, there are three control LSIs HD44350A01 and two HD44351s. HD44350A01 contains character generator and provides common signals X1 ~ X32, Z1 ~ Z16, and W1 ~ W16 for the LCD.

The two HD44351s generate LCD dot signals Y1 ~ Y80.

High Tension Circuit generates +90 to +100V voltage which is necessary for lighting EL.



EL (Electroluminescent panel)



Electroluminescence principle. Incident radiation arriving from left passes through transparent electrodes to act on photoconductor (shaded area).

23. POWER SUPPLY CIRCUIT

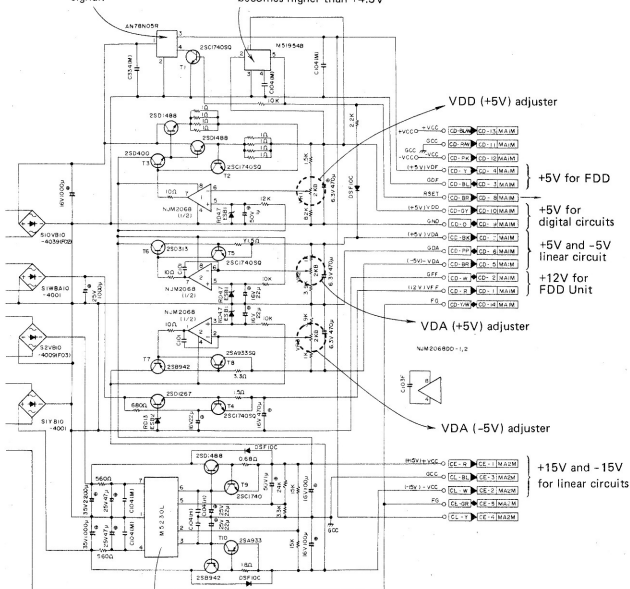
This block generates voltages VDD (+5V for digital circuits), -VDD (-5V for digital circuits), VDA (+5V for linear circuits), -VDA (-5V for linear circuits), +VCC (+15V for linear circuits), -VCC (-15V for linear circuits), VDF (+5V for FDD Unit), VFF (+12V for FDD Unit), and Power ON RESET signal.

Voltage Regulator.

Outputs +5V while T1 is OFF. T1 turns on when it receives RESET signal.

Voltage detector

Pin 5 falls to Low when pin 1 voltage (VDD) becomes higher than +4.5V



Tracking Regulator: Either one of pin 7 (input voltage for +15V) or pin 4 (input voltage for -15V) voltage falls, M5230L drops the other side's output voltage in order to balance +15V and -15V voltages.

SELF DIAGNOSTIC PROGRAM

OUTLINE OF DIAGNOSTIC PROGRAM

FZ-1's each device can be checked by the built-in program or diagnostic floppy disc.

Devices to be Checked	Checking Method	Program Area
SYSTEM ROM	64K byte check sum	Automatically checked at Power ON
SYSTEM RAM		Automatically checked at Power ON
FDC	Physical read/write of certain track or sector of a floppy disc	Built-in Program
LCD	All the dots and the characters are displayed	Built-in Program
WAVE MEMORY RAM	Indicates a faulty RAM number	Diagnostic Floppy Disc
Switches LEDs Pedal Switch	By pressing the switches in order, functions of the switches and LEDs are checked.	Diagnostic Floppy Disc
Keys	Hit key's number, velocity, after touch values are indicated.	Diagnostic Floppy Disc
Pitch Bender Modulator Volume Pedal Main Volume	Indicates each device's set value.	Diagnostic Floppy Disc

* Head cleaning and alignments (Cat's eye, burst, read level etc.) can be performed at FDC checking

SYSTEM ROM/RAM CHECK



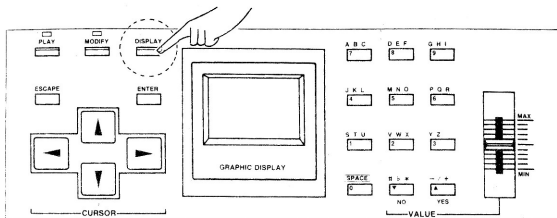
When System ROM and RAM function properly, the LCD indicates the figure shown on the left a few seconds after Power ON.

If System ROM or RAM is faulty, the LCD indicates so.

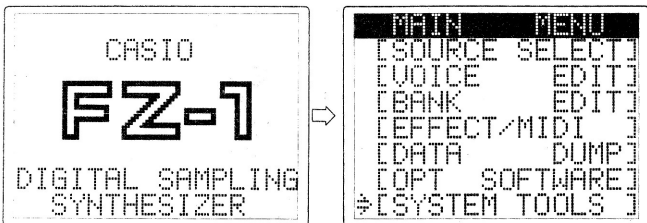
I BUILT-IN PROGRAM

1. BUILT-IN PROGRAM STARTING

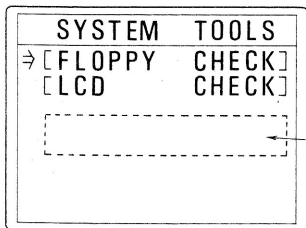
- (1) Turn the power switch ON while pressing **DISPLAY** button.



- (2) On the MAIN MENU, [SYSTEM TOOLS] is added.



- (3) Moving down the cursor ($\Rightarrow$) by $\blacktriangledown$ button, Select [SYSTEM TOOLS] then hit **ENTER** button.



- (4) Now, either FDD Unit or LCD can be checked.

System ROM's version number will be shown here.

2. FDD UNIT CHECK

- (1) Select [FLOPPY CHECK] in SYSTEM TOOLS menu then press **ENTER**.
- (2) Insert a floppy disc. (Do not use tone data disc or user's disc as the contents will be destroyed.)
- (3) Select Read check or Write check by moving the cursor.
- (4) Input logical value of checking sector, head, and track by ten key (**0 ~ 9**), **▲** **▼** buttons, or VALUE slider.

☆ Conversion calculation of logical sector and actual sector, head, and track.

$$\begin{cases} \text{Sector} = (\text{Logical Sector}) \% 8 + 1 & (1 \sim 8) \\ \text{Head} = (\text{Logical Sector}) \% 16 \div 8 & (0 \sim 1) \\ \text{Track} = (\text{Logical Sector}) \div 16 & (0 \sim 79) \end{cases}$$

%8 means the remainder of Logical Sector/8.

(%8 of Logical Sector 100 is 4 as $100/8$ is 12 (and) remainder 4.)

[Example] The last track and the last sector of the bottom side of a disc.

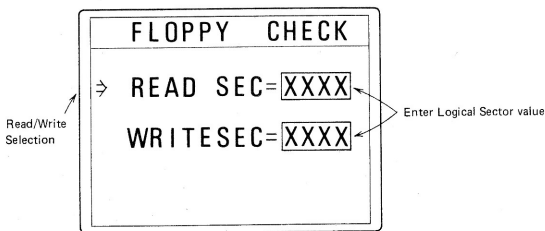
$$\text{Sector} : \frac{1279}{8} = 159 + \frac{7}{8} \text{ Remainder} \rightarrow 7 + 1 = \text{Sector } 8$$

$$\text{Head} : \frac{1279}{16} = 79 + \frac{15}{16} \text{ Remainder} \quad 15 \div 8 = 1.875 \rightarrow \text{Head } 1$$

(bottom side)

$$\text{Track} : \frac{1279}{16} = 79.9375 \rightarrow \text{Track } 79$$

Logical Sector : 1279



(5) After entering Logical Sector value, press **ENTER** button.

If the FDD Unit or FDC is multifunction, the LCD indicates the following messages.

DATA ERROR : FDC is functioning but data has been changed.
 FDC READ ERROR : FDC does not perform read operation properly.
 FDC WRITE ERROR : FDC does not perform write operation properly.
 DISC ERROR : FDD Unit does not output READY signal.

When FDC and FDD Unit function properly, the above messages will not be shown.

(6) Conversion Table of Logical Sector Value and Actual Sector, Track, Head

		Side 0 (Top)								Side 1 (Bottom)							
		0 Sector 8								0 Sector 8							
0	Logical Sector	0000	0001	0002	0003	0004	0005	0006	0007	0008	0009	0010	0011	0012	0013	0014	0015
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Logical Sector	0016	0017	0018	0019	0020	0021	0022	0023	0024	0025	0026	0027	0028	0029	0030	0031
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Logical Sector	0032	0033	0034	0035	0036	0037	0038	0039	0040	0041	0042	0043	0044	0045	0046	0047
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Logical Sector	0048	0049	0050	0051	0052	0053	0054	0055	0056	0057	0058	0059	0060	0061	0062	0063
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Logical Sector	0640	0641	0642	0643	0644	0645	0646	0647	0648	0649	0650	0651	0652	0653	0654	0655
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	2	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
79	Logical Sector	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279
	Sector	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	Head	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Track	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79

(7) FDD Unit's head can be cleaned by the following method.

- Insert a cleaning sheet.
- Enter Logical Sector Value "0000" then press **ENTER**.
- Enter Logical Sector Value "1271" then press **ENTER**.
The head 0 moves to the most inner position.
- Repeat the above procedure a few times.
- Head 1 (Bottom side) is cleaned by entering Logical Sector Values "0008" and "1279" a few times.

(8) Press **ESCAPE** button continuously for escaping from this check mode.

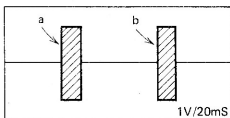
3. FDD UNIT ADJUSTMENT

- (1) Insert an alignment disc.
- (2) Set Logical Sector Value of 0640 (for side 0) or 0648 (for side 1) in "READ SEC" of FLOPPY CHECK Menu.
- (3) Perform Cat's Eye, Burst adjustments, and Azimuth confirmation.

Oscilloscope settings

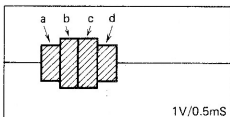
	RANGE	Trigger	Checkpoints
Channel 1	AC	+ or 	Check pin T1
Channel 2	AC	- or 	Check pin T2
External Channel	DC	+ or 	Check pin IX

Cat's eye waveform
Sweep Time: 20mS
*Height of waves a and b should be same.



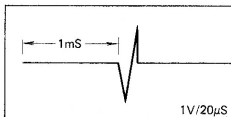
Cat's eye wave of "EPSON" alignment disc is square wave.

Azimuth waveform
Sweep Time: 0.5mS
*Confirm that height of a or d is lower than b or c.



- While reading an alignment disc, FZ-1's LCD indicates "FDC ERROR".
- After the alignments, perform the same procedures after seeking the head from track 0 to track 40, and from track 79 to track 40.

Burst waveform
Sweep Time: 20μS



(4) Zero Track Alignment

Oscilloscope settings

Channel	Range	Check points
Channel 1	DC	Check pin ZP
Channel 2	—	Not used
External Channel	DC	Check pin SP

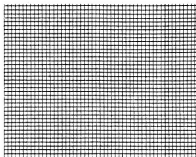
Logical Sector Value	Voltage Level of Oscilloscope Screen
0000	HIGH
0016	HIGH
0032	LOW

4. LCD UNIT CHECK

(1) Select [LCD CHECK] in SYSTEM TOOLS Menu then press **ENTER** button.

(2) The LCD indicates all the dots.

Make sure that there is no missing dot.



(3) By pressing any one of the buttons, the LCD indicates the following characters.

■	┐	□	×	÷	√	←	→	↑	↓	∞	∅	≠	≡	≤	≥
x	y	$\bar{x}$	$\bar{y}$	$\hat{x}$	$\hat{y}$	Δ	Π	Σ	Ω	Γ	∫	³	-	-	-
	!	"	#	\$	%	&	'	(	)	×	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	[	¥	]	^	-
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
p	q	r	s	t	u	v	w	x	y	z	{		}	~	IP

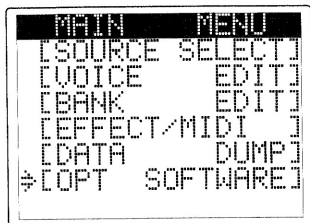
Confirm that all the characters are shown properly.

(4) The program finishes by hitting **ESCAPE** button.

II DIAGNOSTIC FLOPPY DISC

1. STARTING OF DIAGNOSTIC PROGRAM

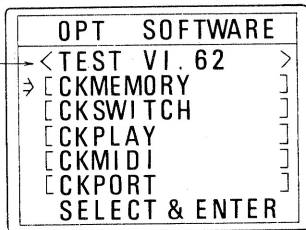
- (1) Turn the power switch on.
- (2) Insert the diagnostic disc.
- (3) In the Main Menu, select [OPT SOFTWARE] then press **ENTER**.



- (4) The LCD indicates OPT SOFTWARE Menu.

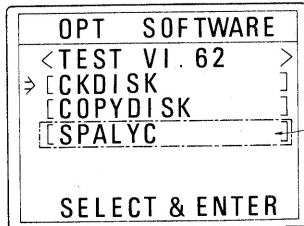
Version number of the diagnostic disc.

Check items can be selected by moving cursor by **▼** button then press **ENTER** button.



Page 1

- (5) Further pressing **▼** button from [CKPORT], the LCD shows the next page of OPT SOFTWARE Menu.



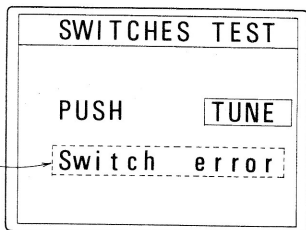
Page 2

cannot be used.

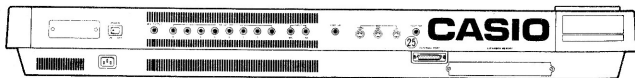
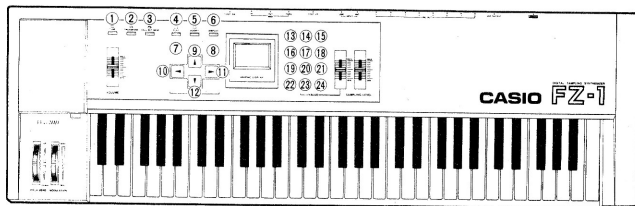
3. SWITCH CHECK

- (1) Select [CKSWITCH] in OPT SOFTWARE Menu.

Indicates only when the switch is faulty



- (2) Press all the buttons in order as indicated in the LCD.
- (3) After checking of all the switches, connect a pedal switch and press it.
- (4) If all the switches function properly, the LCD indicates "OK".
- (5) The FZ-1 can be escaped from the program by pressing [ESCAPE] button after all the switch checking is completed.
The program cannot be released if the checking is not completed.
- (6) Switch checking order



4. KEYS, SENSORS, AND VR CHECK

(1) Select [CK PLAY] in OPT SOFTWARE Menu then press **ENTER**.

[PLAY CHECK]	
Key Number	note code = * * *
Key velocity	touch = * * *
After touch value	after bar = 254
Pitch Bender value	bender = 127
Modulation wheel value	modu w = 000
Volume pedal value	foot vol = 254
Main volume valv	main vol = 254

(C2 ~ C7)
(0 ~ 127)
(254 ~ 0)
(0 ~ 254)
(0 ~ 254)
(0 ~ 254)
(0 ~ 254)

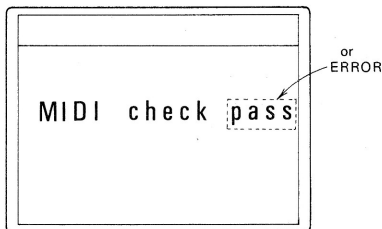
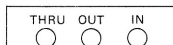
(2) Hitting each key or moving VRs, make sure that the corresponding value on the LCD varies.

* Also make sure that bender value is about 127 when Pitch Bender is at the center position.

(3) **ESCAPE** button finishes the program.

5. MIDI CHECK

(1) Connect MIDI IN and OUT terminals by a MIDI cable.



(2) Select [CK MIDI] in OPT SOFTWARE Menu then press **ENTER**.

(3) When the MIDI circuits are normal, the LCD indicates "MIDI check pass".

"MIDI check error" will be shown on the LCD if the MIDI circuit is faulty.

6. EXTERNAL PORT CHECK

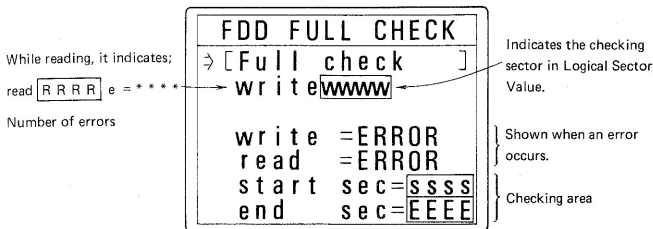
- (1) Connect a properly functioning FZ-1 and the FZ-1 which should be checked with a EXTERNAL PORT cable.
- (2) Select [CK PORT] in OPT SOFTWARE Menu and press **ENTER** button.

PORT DATA TEST	
⇒ [PORT	RECEIVE]
[PORT	SEND]

- (3) Select [PORT RECEIVE] on the test unit (The FZ-1 that should be checked) then press **ENTER**.
Assign [PORT SEND] on the other FZ-1 then hit **ENTER**.
- (4) The test unit indicates "executed OK" when External Circuit functions properly.
"PORT ERROR" or "TIME OUT" will be shown when External Circuit is malfunction.
- (5) Perform the same test by setting [PORT SEND] on the test unit and [PORT RECEIVE] on the other FZ-1.

7. FDD READ/WRITE AGING TEST

- (1) Select [CKDISC] in OPT SOFTWARE Menu and hit **ENTER** button.
- (2) Insert an empty floppy disc.



- (3) Moving the cursor at "start sec" by **▼** button, then enter the starting sector in Logical Sector Value.
- (4) Set the Logical Sector Value of end sector after selecting "end sec".
- (5) Move the cursor to [Full check] by **▲** button then press **ENTER**.
- (6) FDD Unit then repeats writing and reading data in the selected checking area and indicates "write = ERROR" or "read = ERROR" if an error occurs.
- (7) If an error occurs, perform the followings.
 - a. Head cleaning
 - b. Replace the disc if errors always occur in the same sector.
 - c. FDD Unit alignment (Cat's eye, Burst alignments)

PARTS LIST

FZ-1

- Notes:
1. Prices and specifications are subject to change without prior notice.
 2. As for spare parts order and supply, refer to the "GUIDEBOOK for Spare Parts Supply", published separately.
 3. The numbers in item column correspond to the same numbers in drawing.

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	1) M5336-MA1M PCB ASS'Y COMPLETE - 00076709					60280	
☆	2002 1322	LSI	μPD71055C	2		680	A
☆	2009 1365	LSI	μPD72065C	1		1,010	A
☆	2010 0105	LSI	μPD8049HC-672	1		620	A
☆	2010 1946	LSI	μPD43256C-12L	2		1,280	A
☆	2010 2016	LSI	EHK-MA6208	1		2,240	A
☆	2010 2023	LSI	MB653121	1		1,600	A
☆	2010 2037	LSI	PCM54HP	2		800	A
☆	2010 2044	LSI	μPD65012C-046	1		540	A
☆	2010 2051	LSI	μPD65012G-074	1		650	A
☆	2010 2058	LSI	μPD65042G-052	1		1,920	A
☆	2010 2065	LSI	μPD65081G-012	1		3,600	A
☆	2010 2072	LSI	μPD70216G	1		3,280	A
☆	2010 2079	LSI	μPD71066CT	1		890	A
☆	2010 2352	LSI	FM-1	4		1,920	A
☆	2010 2359	LSI	MN41256-08	32		320	A
☆	2010 3087	LSI	μPD27C256AD-12FZ-1	1		1,080	A
☆	2010 3094	LSI	μPD27C256AD-12FZ-2	1		1,080	A
	2100 3786	C-MOSIC	TC40H004P	2		72	A
	2100 4029	C-MOSIC	TC4051BP	1		173	A
	2100 4162	MOS-IC	TC74HC00P	2		120	A
	2100 4464	C-MOSIC	TC74HC04P	5		120	A
	2100 4669	MOS-IC	TC74HC02P	1		80	A
	2100 4677	MOS-IC	TC74HC08P	1		80	A
	2100 4685	MOS-IC	TC74HC74P	2		120	A
	2100 4740	C-MOSIC	TC74HC32P	2		73	A
	2100 5053	MOS-IC	TC74HC154P	1		150	A
	2100 5088	C-MOSIC	TC74HC373P	3		180	A
	2100 5096	C-MOSIC	TC74HC27P	1		55	A
☆	2105 0343	C-MOSIC	TC74HC368P	1		120	A
☆	2105 0490	C-MOSIC	TC74HCT244P	2		180	A
☆	2105 0511	C-MOSIC	TC35094P	1		290	A
☆	2105 0553	C-MOSIC	TC74HC164P	2		120	A
☆	2105 0595	C-MOSIC	μPD4053BC	3		88	A
	2110 3756	Bipolar IC	SN74LS04N	1		66	A
	2111 2143	Bipolar IC	SN74LS14N	1		386	A
	2111 2283	Bipolar IC	SN74LS08N	1		126	A
	2111 2496	Bipolar IC	SN74LS174N	1		154	A

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

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

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	2111 2640	Bipolar IC	SN74LS38N	2		72	A
	2111 2852	Bipolar IC	SN74LS244N	1		403	A
	2111 2879	Bipolar IC	SN74LS245N	4		522	A
	2111 5215	Bipolar IC	SN74LS367AN	4		180	A
	2111 5291	Bipolar IC	SN74LS139N	1		184	A
	2111 5789	Bipolar IC	SN74LS368AN	1		88	A
	2113 0091	Bipolar IC	MC74F04N	3		75	A
	2114 0021	Monolithic IC	LA6462D	4		54	A
☆	2114 0224	Monolithic IC	M5201P	1		88	A
	2116 0007	OP amp	NJM082D	5		120	A
	2121 0013	OP amp	NJM4558DD	1		78	A
	2520 1337	Ceramic oscillator	CSA3.58MG	1		100	A
	2520 1469	Ceramic oscillator	CSA2.000MK	1		140	A
	2590 0007	Ceramic oscillator	CSA2.47MG	1		90	A
☆	2590 0182	Crystal oscillator	NR-18-13.824MHZ	1		150	A
☆	2590 0189	Ceramic oscillator	CSA8.96MT	1		73	A
☆	2590 0196	Crystal oscillator	NR-18-16MHZ	1		150	A
☆	2590 0203	Ceramic oscillator	CSA16.00MX040	1		100	A
☆	2725 0077	Module resistor	MS2228-F	2	10	25	B
	2730 0021	Module resistor	MS1038F	5	10	40	B
	2730 0023	Module resistor	MS1036F	3	10	29	B
	2760 2177	Semi-fixed resistor	V8K4-11B10K	2	10	23	B
☆	2831 0105	Mylar capacitor	AMZF-823K50	8	20	6	C
	3020 2147	Ferrite beads	BL02RN2-R62	35	10	15	C
	3025 0042	EMI filter	DST306-51B222M	17	10	27	C
	3500 3240	Pin assembly 7P	IL-G-7P-S3T2-E	1		20	X
	3500 3258	Pin assembly 7P	IL-G-13P-S3T2-E	1		31	X
	3500 3355	Pin assembly 7P	IL-G-3P-S3T2-E	1	10	7	X
	3500 3371	Connector	IL-G-2P-S3T2-E	1	20	5	C
	3500 3401	Connector 4P	IL-G-4P-S3T2-E	2		13	C
	3500 7075	Plate connector	5229-19CPB	1		80	B
	3500 7491	Plate connector	IL-G-14P-S3T2-E	1		70	B
	3500 7505	Plate connector	IL-G-6P-S3T2-E	1		41	B
☆	3501 1078	D sub connector	DBLC-J25SAF-10L6	1		210	C
☆	3501 1085	Header	3431-6002SCSC	1		140	X
☆	3501 1092	Header	J3595-5002SC	1		150	X
	3511 0933	PCB connector	5229-12CPB	1		45	B
	3540 4023	Pin assembly 20P	B20P-SHF-1AA	1		37	X

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank

A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	+	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	2200 4409	Transistor	2SA933-SQ-TP-T	2	10	14	A
	2220 1387	Transistor	2SC1740SQ-TP-T	1	10	13	A
	2301 0241	Diode	1SS254T-77-T	3	20	5	C
	2606 0098	Carbon film resistor	R-20-7.5K-J-T24-T	1	20	3	C
☆	2606 0196	Carbon film resistor	R-20-2.4K-J-T24-T	1	20	3	C
☆	2606 0490	Carbon film resistor	R-20-5.6-J-T24-T	1	20	3	C
☆	2606 0497	Carbon film resistor	R-20-3K-G-T24-T	1	20	3	C
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	10	20	3	C
	2617 0044	Carbon film resistor	R-20-560-J-T24-T	1	20	3	C
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	17	20	3	C
	2617 0079	Carbon film resistor	R-20-3.3K-J-T24-T	17	20	3	C
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	18	20	3	C
	2617 0109	Carbon film resistor	R-20-33K-J-T24-T	9	20	3	C
	2617 0117	Carbon film resistor	R-20-47K-J-T24-T	3	20	3	C
	2617 0133	Carbon film resistor	R-20-82K-J-T24-T	1	20	3	C
	2617 0141	Carbon film resistor	R-20-100K-J-T24-T	1	20	3	C
	2617 0176	Carbon film resistor	R-20-1M-J-T24-T	3	20	3	C
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	1	20	3	C
	2617 0271	Carbon film resistor	R-20-5.6K-J-T24-T	2	20	3	C
	2617 0297	Carbon film resistor	R-20-22K-J-T24-T	2	20	3	C
	2617 0335	Carbon film resistor	R-20-56-J-T24-T	1	20	3	C
	2617 0408	Carbon film resistor	R-20-6.8K-J-T24-T	1	20	3	C
	2617 0459	Carbon film resistor	R-20-27K-T24-T	2	20	3	C
	2617 0505	Carbon film resistor	R-20-33-J-T24-T	49	20	3	C
	2617 0877	Carbon film resistor	R-20-8.2K-J-T24-T	16	20	3	C
	2800 9070	Electrolytic capacitor	6.3RE2-47-T14-T	1	20	14	C
☆	2801 7196	Electrolytic capacitor	10RE2-33-T2-T	2	20	13	C
	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	27	20	14	C
	2805 3169	Electrolytic capacitor	6.3RE2-47-T2-T	14	20	16	C
	2807 0276	Electrolytic capacitor	50RNB BP1-T2-T	8	10	33	C
	2807 1082	Electrolytic capacitor	16RE2-100-T2-T	1	10	27	C
	2813 0434	Semi-conductive capacitor	RT-B10TKYF224Z-T	31	10	20	B
☆	2813 0602	Ceramic capacitor	RT-HE40TKCH100F-T	1	20	7	C
☆	2813 0616	Semi-conductive capacitor	DD404SR182K25-T	1	20	6	C
	2818 0403	Ceramic capacitor	RT-HE60TKYB222K-T	1	10	3	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	83	10	3	C
	2818 2457	Ceramic capacitor	RT-HE50TKSL121J-T	1	10	5	C
	2818 3208	Ceramic capacitor	RT-HE50TKCH330J-T	4	10	4	C

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	2818 3224	Ceramic capacitor	RT-HE40TKCH150J-T	2	10	5	C
	2818 3241	Ceramic capacitor	RT-HE80TKCH101J-T	2	10	5	C
	2818 3275	Ceramic capacitor	RT-HE40TKCH220J-T	2	10	5	C
	2818 3283	Ceramic capacitor	RT-HE50TKCH300J-T	6	10	9	C
	2818 3321	Ceramic capacitor	RT-HE60TKCH470J-T	1	20	8	C
	2819 0450	Ceramic capacitor	RT-HE70TKSL221K-T	8	10	3	C
	2819 0531	Ceramic capacitor	RT-HE80TKSL331K-T	8	10	8	C
☆	2819 5079	Semi-conductive capacitor	DD405SR223K25-T	1	20	8	C
	2830 6229	Mylar capacitor	AMZV-104K50-T	8	10	13	C
	2830 6312	Mylar capacitor	AMZV-471K50-T	1	10	6	C
	2830 6550	Mylar capacitor	AMZV-182K50-T	1	10	11	C
☆	2831 0028	Mylar capacitor	AMZF-332K50	1	20	8	C
☆	4307 7250	Blank-PCB-M5336-MA1M	M11258-1	1		5,400	X
2) M5336-MA2M PCB ASS'Y							
	2114 0021	Monolithic IC	LA6462D	6		54	A
☆	2114 0224	Monolithic IC	M5201P	3		88	A
	2121 0013	OP amp	NJM4558DD	2		78	A
	2210 5213	Transistor	2S8544E	1	10	26	A
	2230 3546	Transistor	2SD400E	2		23	A
☆	3013 0175	SB coil	STB-060	2		88	B
	3020 2147	Ferrite beads	BL02RN2-R62	9	10	15	C
	3025 0042	EMI filter	DST306-51B222M	7	10	27	C
☆	3025 0161	Filter	AL305	1		80	B
	3121 6007	Relay	G2VN-1071C	1		300	B
	3500 3371	Connector 2P	IL-G-2P-S3T2-E	1	20	5	C
	3500 3401	Connector 4P	IL-G-4P-S3T2-E	1		13	C
	3500 7610	Pin assembly 5P	IL-G-5P-S3T2-E	1	10	27	X
☆	3501 1015	13P connector M336	IL-13P-40-M336	1		60	X
	3612 0789	Jack (Line out)	YKB21-5010	10	10	60	B
☆	3613 0154	Jack (Mic)	HLJ4406-01-3030	1		180	B
	5430 0107	Nut	YKV11-0095	11	20	9	X
☆	6909 3350	Jack plate 336D	M310004-1	1		130	X
	2220 1387	Transistor	2SC1740SQ-TP-T	4	10	23	A
	2301 0241	Diode	1SS254T-77-T	7	20	5	C
☆	2606 0014	Carbon film resistor	R-20-15-J-T24-T	2	20	3	C
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	5	20	3	C

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

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

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	31	20	3	C
	2617 0079	Carbon film resistor	R-20-3.3K-J-T24-T	1	20	3	C
	2617 0087	Carbon film resistor	R-20-4.7K-J-T24-T	1	20	3	C
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	14	20	3	C
	2617 0109	Carbon film resistor	R-20-33K-J-T24-T	1	20	3	C
	2617 0117	Carbon film resistor	R-20-47K-J-T24-T	6	20	3	C
	2617 0125	Carbon film resistor	R-20-68K-J-T24-T	1	20	3	C
	2617 0141	Carbon film resistor	R-20-100K-J-T24-T	20	20	3	C
	2617 0203	Carbon film resistor	R-20-470K-J-T24-T	4	20	3	C
	2617 0214	Carbon film resistor	R-20-2.7K-J-T24-T	2	20	3	C
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	10	20	3	C
	2617 0297	Carbon film resistor	R-20-22K-J-T24-T	17	20	3	C
	2617 0360	Carbon film resistor	R-20-1.5K-J-T24-T	1	20	3	C
☆	2617 0424	Carbon film resistor	R-20-820K-J-T24-T	1	20	3	C
	2617 0459	Carbon film resistor	R-20-27K-J-T24-T	1	20	3	C
☆	2617 0475	Carbon film resistor	R-20-50K-J-T24-T	2	20	3	C
	2617 0491	Carbon film resistor	R-20-330K-T24-T	1	20	3	C
	2617 0877	Carbon film resistor	R-20-8.2K-J-T24-T	1	20	3	C
	2800 9700	Electrolytic capacitor	6.3RE2-33-T14-T	1	20	14	C
☆	2801 7091	Electrolytic capacitor	6.3RE2-33-T2-T	2	20	13	C
	2805 3100	Electrolytic capacitor	16RE2-10-T14-T	2	20	14	C
	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	4	20	14	C
	2807 0276	Electrolytic capacitor	50RNBBP1-T2-T	17	10	33	C
	2807 0535	Electrolytic capacitor	50RNBBP1-T14-T	2	10	33	C
	2807 0985	Electrolytic capacitor	16RE2-220-T2-T	2	20	30	C
	2807 1082	Electrolytic capacitor	16RE2-100-T2-T	3	10	27	C
	2818 0365	Ceramic capacitor	RT-HE50TKYB102K-T	3	10	3	C
	2818 0390	Ceramic capacitor	RT-HE40TKYB221K-T	1	10	4	C
	2818 1132	Ceramic capacitor	RT-HE40TKSL220K-T	1	10	5	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	24	10	3	C
	2819 0557	Ceramic capacitor	RT-HE50TKSL101K-T	2	10	6	C
	2830 6229	Mylar capacitor	AMZV-104K50-T	3	10	13	C
	2830 6237	Mylar capacitor	AMZV-102K50-T	1	10	6	C
	2830 6339	Mylar capacitor	AMZV-222K50-T	1	10	6	C
☆	4307 7230	Blank PCB-M5336-MA2M	M11230-1	1		320	X

Note: ☆ — New parts

Q'ty — Quantity used per unit

• — Minimum order and supply quantity

Rank

A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
3) M5336-AS1M PCB ASS'Y							
	2110 3756	Bipolar IC	SN74LS04N	1		66	A
	2230 1241	Transistor	2SD400-F	1		23	A
	2400 5062	Photo coupler	PC900	1		210	A
☆	3013 0175	SB coil	STB-060	6	5	88	B
	3025 0042	EMI filter	DST306-51B222M	8	10	27	C
	3500 3991	Pin assembly	IL-G-2P-S3L2-E	1	10	6	X
☆	3501 1043	7P connector M336	IL-7P-40-M336	1		120	X
	3612 0541	DIN jack	TCS4650-01-1211	3		100	B
	3612 0789	Jack	YKB21-5010	2	5	60	B
	3841 1217	Transformer	EL-M172A	1		310	B
	2220 1387	Transistor	2SC1740SQ-TP-T	1	10	13	A
	2301 0241	Diode	1SS254T-77-T	1	20	5	C
	2617 0036	Carbon film resistor	R-20-220-J-T24-T	5	20	3	C
	2617 0087	Carbon film resistor	R-20-4.7K-J-T24-T	1	20	3	C
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	1	20	3	C
	2617 0231	Carbon film resistor	R-20-270-J-T24-T	2	20	3	C
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	1	20	3	C
	2617 0505	Carbon film resistor	R-20-33-J-T24-T	1	20	3	C
☆	2805 3207	Electrolytic capacitor	50RE2-4R7-T2-T	1	20	13	C
	2807 1015	Electrolytic capacitor	16RE2-47-T2-T	1	10	20	C
	2807 1104	Electrolytic capacitor	6.3RE2-100-T14-T	2	20	16	C
	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	2	10	3	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	2	10	7	C
	2830 6270	Mylar capacitor	AMZV-223K50-T	1	10	7	C
☆	4307 7240	Blank PCB M5336-AS1M	M21640-1	1		170	X
4) M5336-CN1M PCB ASS'Y							
	2301 0101	Diode	1S2473-T-77-T	12	20	8	C
	2320 9799	LED	LN266RPT-(TA)	5	10	36	B
	2614 0170	Carbon film resistor	R-20-330-J-T24-T	5	10	2	C
	3410 1728	Tact switch	EVO-QS205K	12	10	20	B
☆	3725 0882	PC joiner M336B	CUJ-UL-19-200	1		160	C
☆	3725 0896	PC joiner M336C	JPSS00-11-120	1	10	44	C
	6215 1340	Joiner holder E92	E41909-2	1	10	9	X
☆	4307 7260	Blank PCB M5336-CN1M	M11231-1	1		220	X

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	5) M5336-CN2M PCB ASS'Y						
	2301 0101	Diode	1S2473-T-77-T	12	20	8	C
	3410 1728	Tact switch	EVQ-QS205K	12	20	20	B
☆	4307 7270	Blank PCB M5336-CN2M	M11231-2	1		100	X
	6) M5336-CN3 PCB ASS'Y						
	2600 2516	Carbon film resistor	R-20-100-J	2	20	5	C
☆	2765 0336	VR	S3018N-10KB-L15	1		85	B
☆	2765 0343	VR	S3018N-50KB-L15	1		85	B
☆	3501 1050	3P connector M336A	IL-3P-60-M336	1	5	58	X
☆	3501 1057	4P connector M336B	IL-4P-26-M336	1		110	X
☆	4307 7600	Blank PCB M5336-CN3	M32567-1	1		63	X
	7) M5336-CN4 PCB ASS'Y						
	2600 2516	Carbon film resistor (P)	R-25-100-J	1	20	5	C
☆	2765 0343	VR	S3018N-50KB-L15	1		85	B
☆	3501 1064	4P connector M336B	IL-4P-25-M336	1	5	60	X
☆	4307 7610	Blank PCB M5336-CN4	M32567-2	1		41	X
	8) M5336-CN5M PCB ASS'Y						
	3020 2147	Ferrite beads	BL02RN2-R62	2	10	15	C
☆	3501 1036	2P connector M336A	IL-2P-90-M336	1	10	49	X
	3612 0789	Jack	YKB21-5010	1	5	60	B
☆	2607 5021	Carbon film resistor	ELR50X4.7-J-T34V-T	2	20	5	C
☆	4307 7280	Blank PCB M5336-CN5	M11231-3	1		24	X
	9) M5336-PS1 PCB ASS'Y						
	2818 2601	Ceramic capacitor	DE7150FZ103PVA1	2	5	58	C
	3020 2104	Noise filter	TF2317C-601Y2R5	1		114	C
☆	3501 0917	Plate connector	B2P3-VH	1	10	23	B
	3640 2357	Plate fuse clip	UF-0033#01	2	10	4	C
	3670 1161	Receptacle	NC-174	1		59	C
	6901 5580	Receptacle fixing plate	M4850-1	1	10	18	X
	3631 2017	Fuse	MT4-1.5A	1	10	57	B

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
	10) M5336PS2, 3 PCB ASS'Y						
☆	2114 0231	Monolithic IC	AN78M05R	1		120	A
☆	2114 0238	Monolithic IC	M5230L	1		110	A
☆	2114 0245	Monolithic IC	M51954BL	1		83	A
	2121 0072	Monolithic IC	NJM2068DD	1		80	A
	2230 1373	Transistor	2SD400E, F	1	10	34	A
	2230 3686	Transistor	2SD313E, F	1	10	48	A
☆	2251 0098	Transistor	2SB942Q, R	2		120	A
☆	2253 0077	Transistor	2SD1716Q, S	3		220	A
☆	2253 0084	Transistor	2SD1267Q, R	1		110	A
	2300 9200	Diode stack	S2VB10-4009 (F03)	1	10	95	B
☆	2390 0210	Diode	DSF10C-UB1-H	3	20	15	C
☆	2390 0217	Diode stack	S1WBA10-4001	1	5	63	B
☆	2390 0280	Diode stack	S10VB-4039 (F03)	1		290	B
☆	2390 0294	Diode stack	S1YB10-4001	1	5	65	B
☆	2605 0287	Metal film resistor	CRH100FH11-J-0.68	1		12	C
	2760 2207	Semi-fixed resistor	V8K4-11B2K	3	20	20	B
☆	2801 7224	Electrolytic capacitor	16RP2-10000	1		200	C
☆	2801 7231	Electrolytic capacitor	25RE2-1000	1	5	67	C
	2804 5816	Electrolytic capacitor	35RE2-2200	1		110	C
	2804 5859	Electrolytic capacitor	35RE2-1000	1	10	95	C
	2805 2201	Electrolytic capacitor	16RE2-470	1	10	37	C
☆	2831 0280	Mylar capacitor	AMZF-334K50	1		230	C
☆	3501 1022	14P connector M336A	1L-14P-60-M336	1		210	C
☆	3501 1029	5P connector	1L-5P-70-M336	1		110	C
	3640 2357	Plate fuse clip	UF-0033#01	8	10	4	C
	3631 0103	UL time lag fuse	UL-TSC-4A	1	10	38	B
	3631 0120	UL time lag fuse	UL-TSC-1.6A	1		44	B
	3631 0073	UL time lag fuse	UL-TSC 0.5A	2	10	35	B
☆	3719 0658	Parallel cable M336A	2468-3-216MM	3	20	28	X
	3750 1158	Heat sink	IC-1625-ST	3		75	X
☆	6909 3850	Heat sink L bracket	M32542-1	1		370	X
	2200 4409	Transistor	2SA933-SQ-TP-T	2	10	14	A
	2220 1387	Transistor	2SC1740SQ-TP-T	5	10	13	A
☆	2360 0378	Zener diode	RD13ESB2-T1-T	1	20	12	B
☆	2360 0385	Zener diode	RD4.7ESB1-T1-T	3	20	12	B
☆	2606 0315	Carbon film resistor	R-20-3.3-J-T24-T	1	20	3	C
☆	2606 0504	Carbon film resistor	R-20-24K-J-T24-T	1	20	3	C

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

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

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
☆	2606 0539	Carbon film resistor	R-20-1.8-J-T24-T	1	20	3	C
☆	2607 5084	Carbon film resistor	ELR50X-1-J-T34V-T	8	20	3	C
☆	2607 5091	Carbon film resistor	ELR50X-1.5-J-T34VT	2	20	3	C
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	1	20	3	C
	2617 0044	Carbon film resistor	R-20-560-J-T24-T	2	20	3	C
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	2	20	3	C
	2617 0061	Carbon film resistor	R-20-2.2K-J-T24-T	1	20	3	C
	2617 0079	Carbon film resistor	R-20-3.3K-J-T24-T	1	20	3	C
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	3	20	3	C
	2617 0238	Carbon film resistor	R-20-680-J-T24-T	1	20	3	C
	2617 0246	Carbon film resistor	R-20-12K-J-T24-T	1	20	3	C
	2617 0265	Carbon film resistor	R-20-10-J-T24-T	3	20	3	C
	2617 0289	Carbon film resistor	R-20-15K-J-T24-T	2	20	3	C
	2617 0360	Carbon film resistor	R-20-1.5K-J-T24-T	1	20	3	C
	2617 0378	Carbon film resistor	R-20-3.9K-J-T24-T	2	20	3	C
	2617 0877	Carbon film resistor	R-20-8.2K-J-T24-T	1	20	3	C
☆	2801 7203	Electrolytic capacitor	25RE2-22-T2-T	2	20	13	C
☆	2801 7210	Electrolytic capacitor	25RE2-47-T2-T	2	20	20	C
	2807 0993	Electrolytic capacitor	16RE2-22-T2-T	3	10	17	C
	2807 1023	Electrolytic capacitor	50RE2-1-T2-T	2	10	15	C
	2807 1040	Electrolytic capacitor	6.3RE2-470-T2-T	3	10	27	C
	2807 1082	Electrolytic capacitor	16RE2-100-T2-T	2	10	27	C
☆	2813 0623	Semi conductive capacitor	DD306F104Z12-T	2	20	9	C
	2818 0446	Ceramic capacitor	RT-HE40TKYB101K-T	2	10	3	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	2	10	3	C
	2830 6229	Mylar capacitor	AMZV-104K50-T	4	10	13	C
☆	4307 7290	Blank PCB M5336-PS2M	M11229-1	1		360	X
☆	4307 7300	Blank PCB M5336-PS3M	M11229-2	1		23	X
11) M5336-LD1M PCB ASS'Y							
	2001 8143	LSI	HD44351	2		960	A
	2001 8151	LSI	HD44350A01	1		880	A
☆	3725 0875	PC joiner M336D	CUJ-UL-12-200	1		110	C
☆	6002 0248	Joiner holder G545	P4260-1	1	20	16	X
	2301 0241	Diode	1SS254T-77-T	2	20	5	C
	2617 0095	Carbon film resistor	R-20-10K-J-T24-T	1	20	3	C
	2617 0289	Carbon film resistor	R-20-15K-J-T24-T	1	20	3	C
	2617 0378	Carbon film resistor	R-20-3.9K-J-T24-T	4	20	3	C

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
☆	2805 3100	Electrolytic capacitor	16RE2-10-T14-T	2	10	14	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	2	10	3	C
	2830 6229	Mylar capacitor	AMZV-104K50-T	5	10	13	C
	4307 7590	Blank PCB-M5336-LD1M	M21639-1	1		390	X
12) M5177-KEYBOARD PCB ASS'Y							
☆	2004 0815	LSI	MSM6200GS-1L	1		2,080	A
	2300 1241	Diode	1S2075K-TD-T	94	10	4	C
	2301 0241	Diode	1SS254T-77-T	28	20	5	C
	2606 0049	Carbon film resistor	R-20-100K-G-T24-T	8	20	3	C
☆	2617 0028	Carbon film resistor	R-20-100-J-T24-T	1	20	3	C
	2617 0052	Carbon film resistor	R-20-1K-J-T24-T	1	20	3	C
	2617 0301	Carbon film resistor	R-20-56K-J-T24-T	2	20	3	C
	2805 3100	Electrolytic capacitor	16RE2-10-T14-T	2	10	14	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	2	10	3	C
	2830 6665	Mylar capacitor	AMZV-104J50-T	8	10	24	C
	3501 1127	20P connector M336	SHF-20-18-M336	1		270	C
	3721 0032	PC joiner M71A	PCJ-UV-19-90	1		130	C
	3721 0041	PC joiner M71B	PCJ-JVU-16-22	2		50	C
	6215 1340	Joiner holder	E41909-2	1	10	9	X
	6901 3860	Sponge J	M4630-7	1	10	7	X
	6905 6980	Parallel wire M177KY	M42591-1	1	20	16	X
	4307 2421	Blank PCB-M571-KY1M	M2822A-1	1		560	X
	4307 2441	Blank PCB-M571-KY3M	M2823A-1	1		560	X
	4307 4290	Blank PCB-M5177-KY2M	M21246-1	1		410	X
13) UPPER CASE ASS'Y							
☆ 1	6909 3310	Key top set A	M32623*1	1		310	C
☆ 2	6909 3332	Key top 153B	M31624-139	4	10	35	C
☆ 3	6909 3340	Slide knob	M42716-3	3	20	23	C
☆ 17	6909 7600	LCD upper holder	M310056*1	1	5	63	C
☆ 4	6909 8890	Upper case sub ass'y	M32761*1	1		2,370	C
☆ 5	6909 8900	Insulation panel	M43349-1	1	10	29	C
☆ 6	6909 3370	Side board 336R	M11218-1	1		33	C
☆ 7	6909 3780	Console panel	M11217A-1	1		183	C
☆ 8	6909 3790	Display panel	M43168-1	1		320	C
☆ 9	3335 0567	LCD	LD-B8122J	1		710	A

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
☆10	6909 3390	Heat seal A	M32628-1	1		960	A
☆11	6909 3400	Heat seal B	M43226-1	1		590	A
☆12	6909 3410	Heat seal C	M43227-1	1		180	A
☆13	6909 3430	Insulation seal B	M43228-1	2	20	4	A
☆14	6909 3610	Insulation seal C	M43229-1	1	20	4	A
☆15	3301 0035	EL	EL-336	1		510	A
☆16	6909 3820	LCD lower holder	M310057*1	1	5	63	C
☆17	6909 8740	After touch detector	M32136*3	1		26	C
14) SIDE BOARD ASS'Y							
18	6904 0360	Bender stopper	M41740-1	4	20	8	X
☆19	6909 3830	Side board 336L	M11219-1	1		360	X
☆20	3501 1113	34P connector M336A	7934-34P-18-M336	1		130	C
☆21	3501 1120	4P connector M336C	IL-4P-50-M336	1		130	C
☆22	6909 3840	FDD cover	M32541-1	1		320	C
23	2770 6843	VR	VM10W520A-50KB	2		190	B
☆	3501 1148	6P connector M336A	IL-6P-30-M336	1	5	90	C
24	6904 0420	Bender spring	M41737-1	1	50	18	C
25	6904 6120	Bender shassis 153	M42128-1	2		50	X
☆26	6905 1930	Bender knob 153	M31620-2	2	5	77	C
27	6911 5250	Bender shassis B	M41946-1	2	10	16	X
15) KEYBOARD UNIT							
☆28	6903 7712	White key CF	M31269B-1	10		110	C
☆29	6903 7722	White key BE	M31271B-1	10		110	C
☆30	6903 7732	White key D	M31270B-1	5		110	C
☆31	6903 7742	White key G	M31272B-1	5		110	C
☆32	6903 7752	White key A	M31273B-1	5		110	C
☆33	6903 7762	White key S	M31274B-1	1		110	C
☆34	6903 7772	Black key	M31275B-1	25		90	C
☆35	6904 0551	Key stopper	M31279A-1	1		265	X
☆36	6907 4720	Upper case stopper	M32023-1	1		43	X
☆37	6909 6650	KB spring 336W (for white key)	M43283-1	36	20	4	C
☆38	6909 6660	KB spring 336B (for black key)	M43283-2	25	20	3	C
☆39	6909 6670	Weight 336W (for white key)	M43284-1	36	10	33	C
☆40	6909 6680	Weight 336B (for black key)	M43285-1	25	10	29	C
41	6903 7680	KB guide A	M31317-1	4		100	X
42	6903 7890	KB guide B	M31318-1	1			

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

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

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
43	6904 0580	Tape A	M31460-1	4	20	21	
☆44	6904 0590	Tape B	M31461-1	1	20	21	
☆48	6904 0600	Black key seal	M31462-1	5	20	14	
☆45	6909 6690	KB chassis	M11295-1	1		1,110	
☆46	6909 6700	Rubber switch K	M32684-1	4		153	B
☆47	6909 6710	Rubber switch L	M32685-1	1		131	B
16) LOWER CASE ASS'Y							
☆49	6821 2016	Guide B	S32415B-1	2		25	X
	6902 0900	PCB spacer 58	M41118-1	1	10	9	X
☆50	6909 3441	Lower case sub ass'y	M21680A*1	1		5,760	C
☆51	6909 3460	Heat sink 336A	M32543-1	1		750	X
☆52	6909 3470	Heat sink 336B	M32544-1	1		330	X
☆53	3501 1106	40P connector M336A	7930-40P-12-M336	1		530	C
☆54	6909 3600	Connector holder	M32627-1	1		120	C
55	3440 5255	Power switch	SDJIS	1		216	A
☆56	3501 1071	2P connector M336B	VHR-2P-45-M336	1	5	80	C
☆57	3012 0098	Transformer	TE-336-1M1	1		3,170	B
58	1012 0707	FDD unit ☆	JU-386 (JU-384)	1		21,600	A
17) OPTIONAL RAM BOARD MB-10							
☆	2010 2359	LSI	MN41256-08	32			A
	2100 4464	CMOS IC	TC74HC04P	3		120	A
☆	2113 0091	Bipolar IC	MC74F04N	4	5	75	A
	2730 0021	Module resistor	MS1038F	2	10	40	B
☆	5550 1408	PCB ejector	CBE-2P	2	5	88	X
	2617 0028	Carbon film resistor	R-20-100-J-T24-T	13	20	3	C
	2617 0505	Carbon film resistor	R-20-33-J-T24-T	30	20	3	C
	2805 3142	Electrolytic capacitor	16RE2-10-T2-T	4	20	14	C
	2807 1091	Electrolytic capacitor	6.3RE2-100-T2-T	1	20	18	C
☆	2813 0637	Semi-conductive capacitor	DD308F224Z12-T	32	20	12	C
	2818 2082	Ceramic capacitor	RT-HE70TKYF103Z-T	8	10	3	C
	2818 3208	Ceramic capacitor	RT-HE50TKCH330J-T	1	10	4	C
☆	4307 7440	Blank PCB-M381-MBM	M11262-1	1		1,470	X

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

☆ FDD unit cannot be supplied by deducting from the spare parts allowance.

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
18) FDD UNIT (Model: JU-386)							
1. Electronic parts							
IC1	0007 4569	LSI	HA13421AMP	1		750	A
IC2	0007 4570	LSI	FQL00210B4	1		650	A
IC3	0007 4571	LSI	FQL00310B4	1		1,550	A
IC4	0007 4572	LSI	HA16651MP	1		1,550	A
IC5	0007 4573	IC	M301PC-A	1		550	A
Q2	0007 4588	Transistor	3SK144R-TW	1		80	A
Q3, 7, 8 9, 10, 11 13, 14	0007 4589	Transistor	UN2213-TX	8	10	30	A
Q12	0007 4590	Transistor	UN2211-TX	1		60	C
Q15	0007 4591	Transistor	UN2111-TX	1	10	30	C
D1	0007 4585	Diode array	DAN202KT-96	1	10	40	C
D2	0007 4586	Diode	DAP202KT-96	1	10	40	C
D3	0007 4587	Chip diode	MA159-TX	1		80	C
C11, 15	0007 4550	Ceramic capacitor	R23E105ZF	2		90	C
C18, 19	0007 4551	Electrolytic capacitor	ECEA1CKS100	2	10	30	C
C1, 12	0007 4577	Chip capacitor	FCC00020B401	2	10	30	C
C2	0007 4578	Chip capacitor	FCC00010B438	1	20	20	C
C3	0007 4579	Chip capacitor	FCC00010B456	1	10	30	C
C4, 5	0007 4580	Chip capacitor	FCC00030B420	2	20	20	C
C6, 7	0007 4581	Chip capacitor	FCC00010B458	2	10	30	C
C8	0007 4582	Chip capacitor	FCC00010B436	1	20	20	C
C9	0007 4583	Chip capacitor	FCC00010B442	1	20	20	C
C10, 17	0007 4584	Chip capacitor	FCC00150B400	2		80	C
IR1	0007 4552	Block resistor	RGLD9X102J	1	10	45	C
R	0007 4553	Chip resistor	MCR18EZJ000	1	20	20	C
R4	0007 4554	Carbon film resistor	ERG1SJ271	1	20	20	C
R44	0007 4555	Chip resistor	MCR18EZHG822	1	20	20	C
R1, 2, 9	0007 4592	Chip resistor	MCR18EZJH822	3	20	20	C
R3, 17	0007 4593	Chip resistor	MCR18EZJH682	2	20	20	C
R7, 8	0007 4594	Chip resistor	MCR18EZJH391	2	20	20	C
R11, 13	0007 4595	Chip resistor	MCR18EZJH473	2	20	20	C
R12	0007 4596	Chip resistor	MCR18EZJH621	1	20	20	C
R15, 33 34, 36 41, 42	0007 4597	Chip resistor	MCR18EZJH391	6	20	20	C
R16, 18, 31	0007 4598	Chip resistor	MCR18EZHG393	3	20	20	C

Note: ☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
R19	0007 4599	Chip resistor	MCR18EZH682	1	20	20	C
R20	0007 4600	Chip resistor	MCR18EZH6153	1	20	20	C
R29	0007 4610	Chip resistor	MCR18EZHJ181	1	20	20	C
R30	0007 4602	Chip resistor	MCR18EZHJ331	1	20	20	C
R32	0007 4603	Chip resistor	MCR18EZHJ472	1	20	20	C
R37, 38, 39 40	0007 4604	Chip resistor	MCR18EZHJ103	4	20	20	C
R35	0007 4605	Chip resistor	MCR18EZHJ105	1	20	20	C
X1	0007 4574	Oscillator	EF0FC4004A4	1		80	C
VR1	0007 4575	Variable resistor	EVMUGA00B24	1		80	B
T	0007 4576	Inverter	JPW-02A	1	20	20	C
L1, 2	0007 4563	Choke coil	FNC00030B432	2		80	C
L3, 4	0007 4564	L.F. coil	FNC00030B424	2		80	C
L5	0007 4565	Choke coil	FNC00030B428	1		80	C
L6	0007 4566	Choke coil	BL01RN1A62T5	1	20	20	C
L7	0007 4567	Choke coil	SN-3-2002	1		200	C
L8	0007 4568	Choke coil	ELEBD330KA	1	10	30	C
CN1	0007 4556	Connector	FCN-725P034	1		200	C
CN2	0007 4557	Connector	171826-4	1		90	C
CN3	0007 4606	Connector	FJC00150B4	1		120	C
CN4	0007 4558	Connector	4PS2L225EFK	1	10	30	C
CN5	0007 4559	Connector	B09-DR-S	1	10	40	C
CN6	0007 4607	Connector	ILS4PS2T2EF	1	10	30	C
CN7	0007 4560	Connector	A202001801	1		80	C
CN8	0007 4561	Connector	A051001801	1	10	30	C
P1,2,3,4 5,6	0007 4562	Connector	A020000805	6	20	20	C
2. Mechanical parts							
1	0007 4608	Cover	YTF5E02050B3	1		180	C
2	0007 4609	Screw	XSB25 + 5FX	4	20	15	X
3	0007 4610	Front panel	YTF7K05590B3	1		180	C
4	0007 4611	Button	YTF6J01810B4	1	10	35	C
5	0007 4612	Lever	YTF4H01602B4	1	10	30	C
6	0007 4613	Lever	YTF4H01614B4	1	10	35	C
7	0007 4614	Screw	XSN2 + 5FX	2	20	15	X
8	0007 4615	FPC clamp	YTF2C03191B4	1	20	20	C
9	0007 4616	Holder ass'y	YTF7K06222B3	1		450	C
10	0007 4617	Spring	YTF4J01594B4	1	10	40	C

Note:

☆ — New parts

Q'ty — Quantity used per unit

* — Minimum order and supply quantity

Rank

A: Essential

B: Stock recommended

C: Others

X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
11	0007 4618	Screw	XSN25 + B5FX	1	20	15	X
12	0007 4619	Screw	XSN25 + 5FX	2	20	15	X
13	0007 4620	Cramp (END)	YTF2C02781B4	1	20	20	C
14	0007 4621	Cramp (L)	YTF2C02792B4	1	10	30	C
16	0007 4622	Shaft (Long)	YTF4H01470B4	1		80	C
17	0007 4623	Shaft (Short)	YTF4H01480B4	1		60	C
18	0007 4624	Screw	YTF1E00411B4	2	20	15	C
19	0007 4625	Spring	YTF4J00861B4	2	10	35	C
20	0007 4626	Screw	YTF4J02190B4	1	20	20	X
21	0007 4627	Stopper A	YTF1K00441B4	1	20	15	C
22	0007 4628	Lever ass'y	YTF7K01853B4	1		300	C
23	0007 4629	Lever	YTUF384EJT	1		150	C
24	0007 4630	Stopper F	YTF1K00530B4	1	20	15	C
25	0007 4631	Stopper C	YTF1K00391B4	2	20	15	C
26	0007 4632	Stopper E	YTF1K00510B4	1	20	15	C
27	0007 4633	Roller	YTF4S00800B4	1	10	45	C
28	0007 4634	Roller	YTF4S01680B4	1	10	35	C
29	0007 4635	Washer	YTF1K00121B4	1	20	15	X
30	0007 4636	Washer B	YTF1K00363B4	1	20	15	X
31	0007 4637	Washer C	YTF1K00370B4	2	20	15	X
32	0007 4638	Limiter	YTF3D04830B4	1	20	20	C
33	0007 4639	Disk detect ass'y	YTUF384DET	1		400	B
34	0007 4640	Sensor ass'y	YTUFS363TO	1		650	B
35	0007 4641	Step motor	YTFMD00653B4	1		2,700	A
36	0007 4642	Head ass'y	YTUF386HD	1		6,700	A
37	0007 4643	Steel belt ass'y	YTF7K01843B3	1		200	A
38	0007 4644	Screw	YTF1E00421B4	1	20	15	X
39	0007 4645	Screw	XYN2 + 3FN	1	20	15	X
40	0007 4646	Washer	LPW2-025	2	20	15	X
42	0007 4647	Bracket (R)	YTUF363BK-R3	1		100	C
43	0007 4648	Bracket (L)	YTUF363BK-L3	1		100	C
44	0007 4649	Collar	YTF2P03050B4	4	10	30	X
45	0007 4650	Spacer	YTF2P03460B4	4	10	30	X
46	0007 4651	Screw	XSB25 + 10FX	4	20	15	X
47	0007 4652	Insulation sheet	YTF2P03291B4	1	10	30	X
48	0007 4653	Control base ass'y	YTUF386PK-CN	1		4,150	X

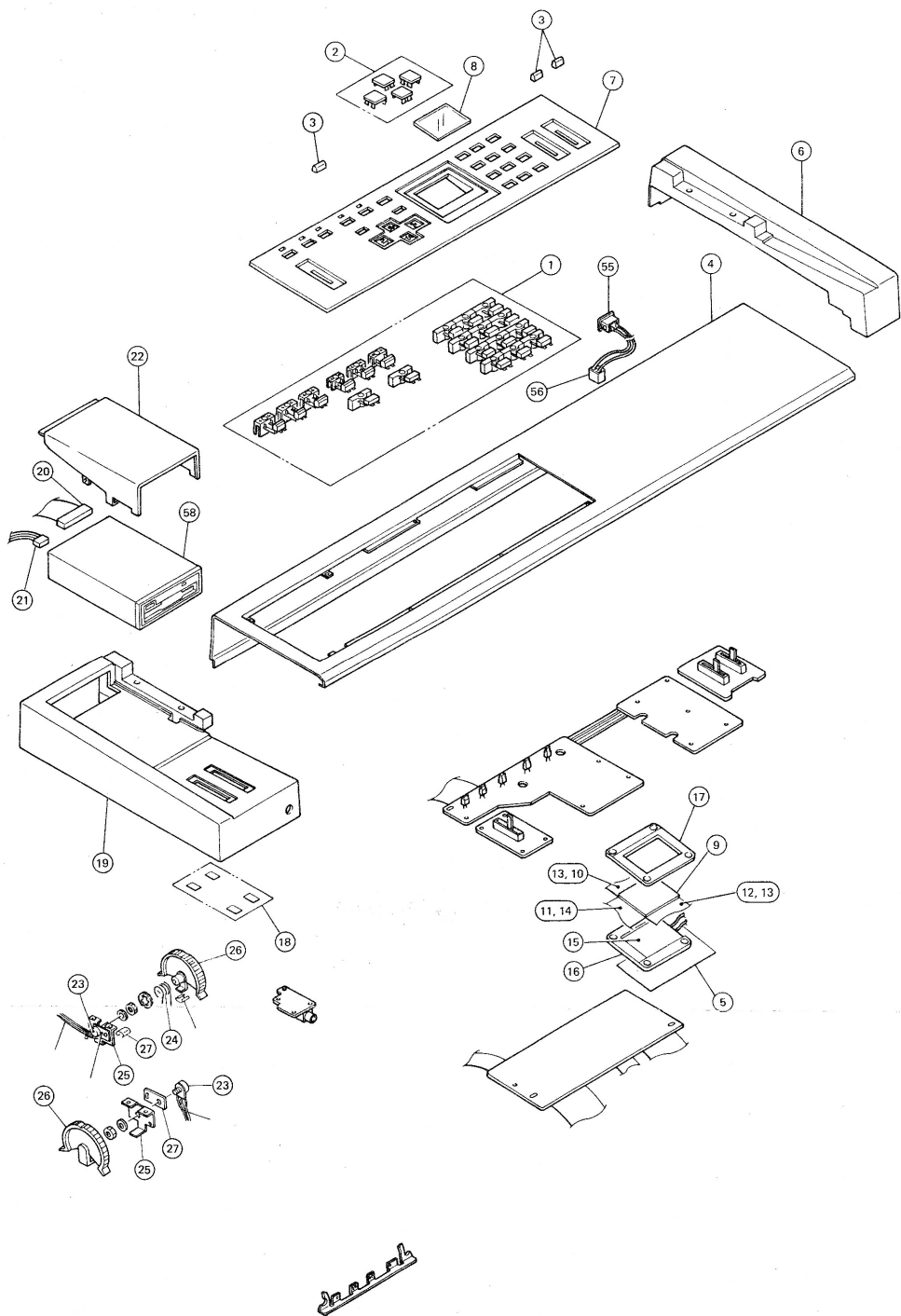
Note: ☆ — New parts
Q'ty — Quantity used per unit
* — Minimum order and supply quantity

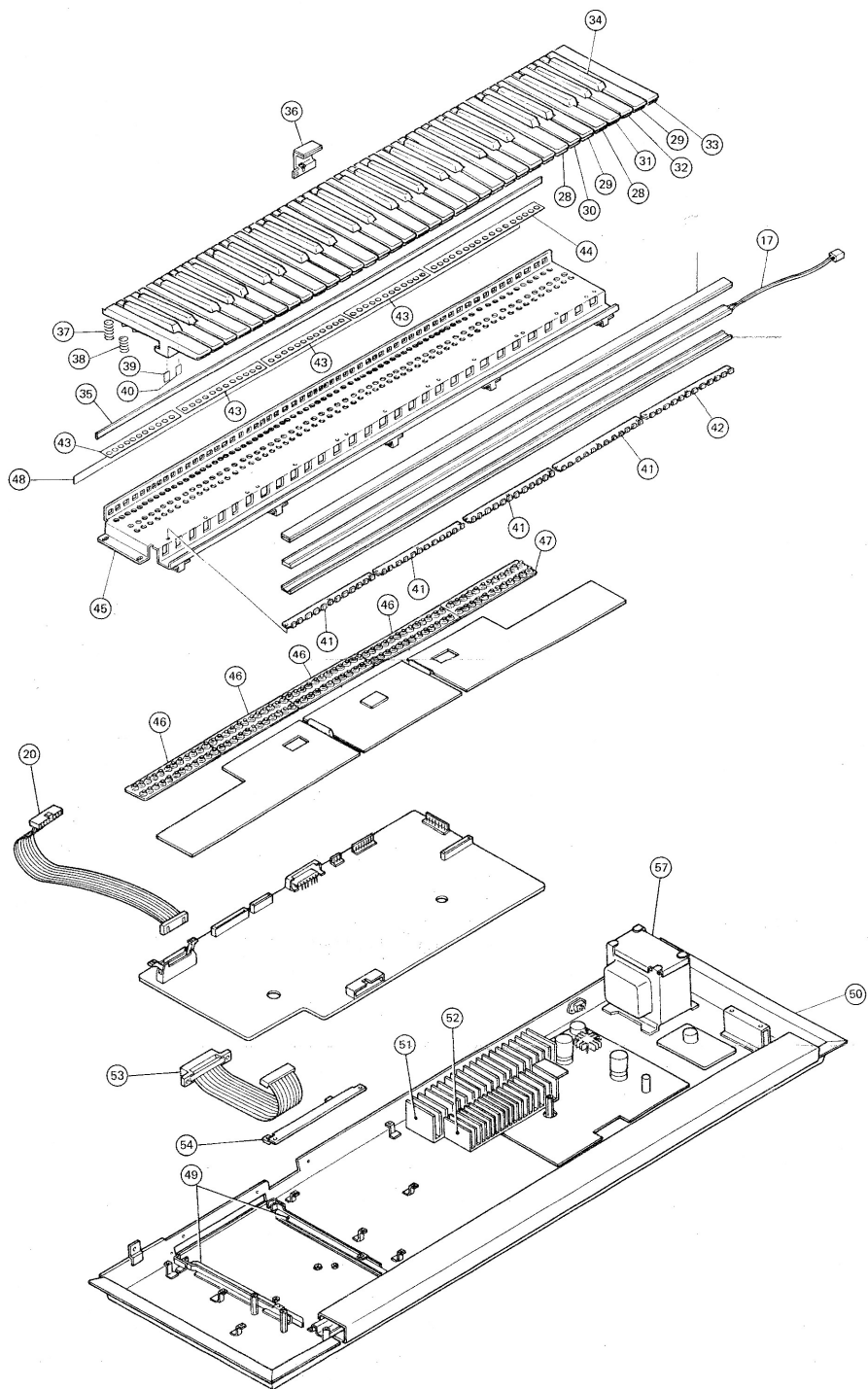
Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended

Item	Code No.	Part Name	Specification	Q'ty	*	Unit Price N.R. Yen (¥) (FOB: JAPAN)	Rank
52	0007 4654	Base D Motor ass'y	YTUF386DM	1		5,150	A
53	0007 4655	Screw	YTF1E00600B4	2	20	15	X
56	0007 4656	Screw	YTF1E00540B4	2	10	20	X
58	0007 4657	Micro switch	D22P-101	1		140	A
59	0007 4658	LED	LN28RP	1		60	B
60	0007 4659	Screw	YTF1E00550B4	1	10	15	X
61	0007 4660	Dumper	3B23KL99999	1		160	C
62	0007 4661	Dumper angle	YTF2T05691B4	1		60	C
63	0007 4662	Screw	XSB2 + 4FX	2	10	15	X
64	0007 4663	Screw	XYN25 + 3FX	1	10	15	X
65	0007 4664	Cramp (R)	YTF2C05740B3	1		120	C
66	0007 4665	Head hanger	YTF4A02680B4	1		100	C
67	0007 4666	Shaft	YTF4H02691B4	1	10	40	C
68	0007 4667	Hanger spring	YTF4J02700B4	1	20	20	C
69	0007 4668	E Ring	TE-3	3	20	20	X

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

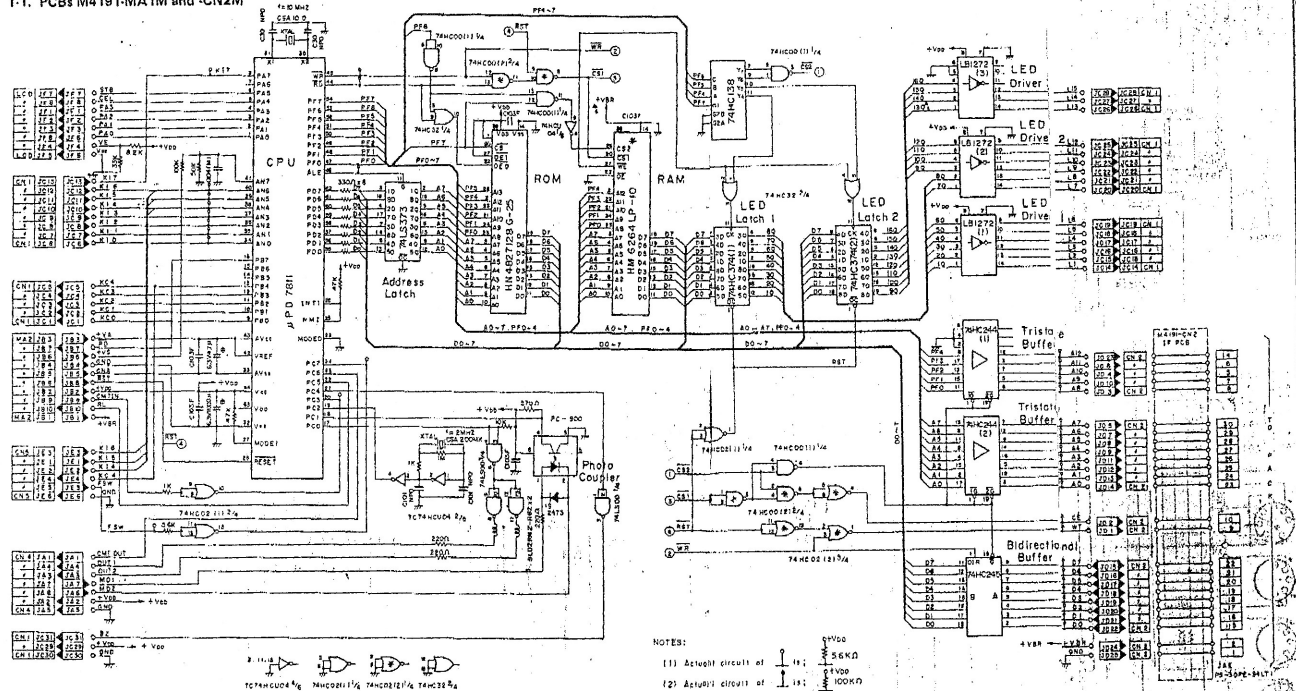
Rank A: Essential
B: Stock recommended
C: Others
X: No stock recommended





1. SCHEMATIC DIAGRAM

1.1. PCBs M4191-MA1M and -CN2M



NOTES:

- (1) Actual circuit is as shown.
- (2) Actual circuit is as shown.
- (3) Actual circuit is as shown.
- (4) Power source for * marked ICs is +VDD.
- (5) Allowance of * marked resistors is $\pm 1\%$.
- (6) 0.01 μ F capacitors should be put between +VDD and GND of gate ICs.