MKS-100 SERVICE NOTES

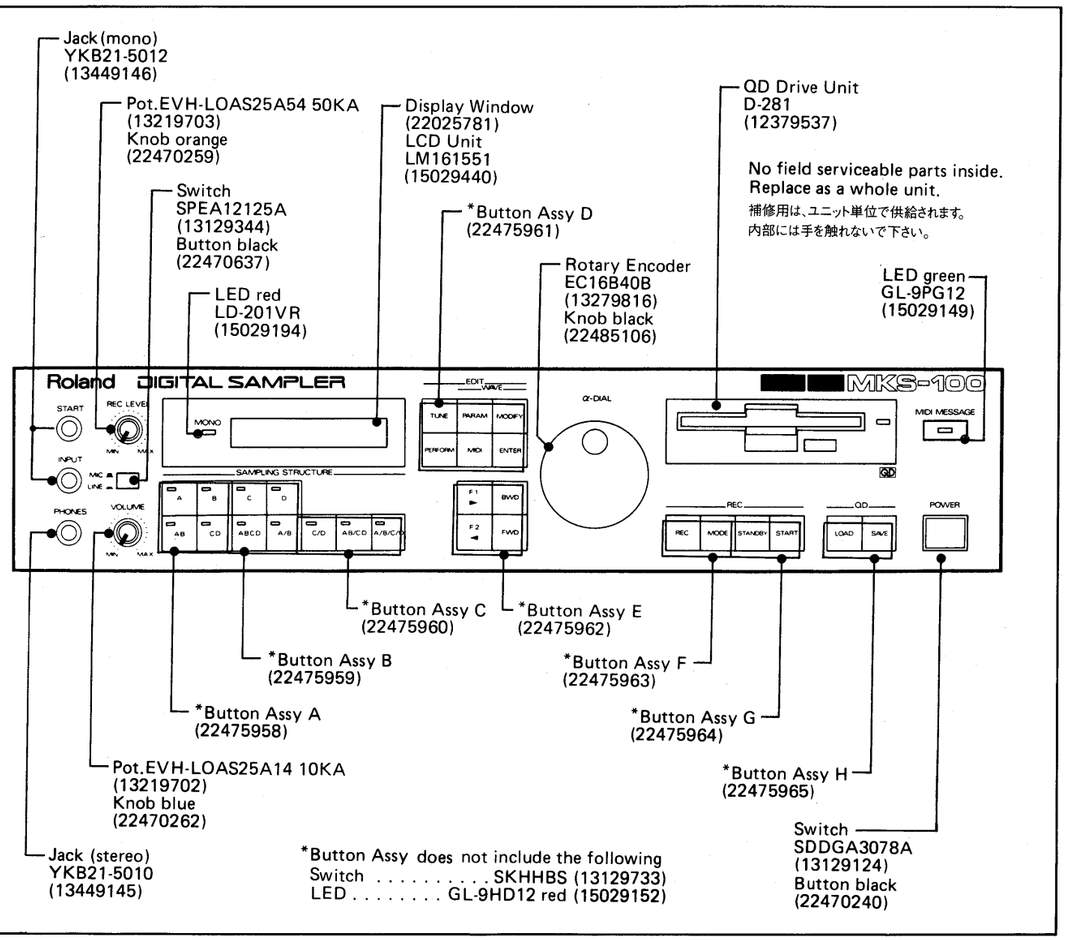
First Edition

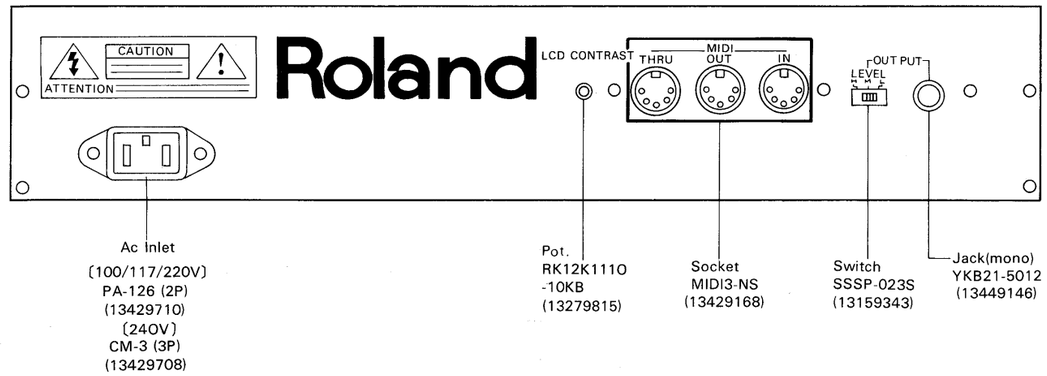
SPECIFICATIONS

QUICK DISK : Front Loading Type
1 Drive
Capacity 32k words/side

SAMPLING SYSTEM
Sampling Rate : 30kHz/15kHz
Data Format : 12 bits, Linear
D/A Converter : 16 bits
Sampling Time : 4 sec (A → B → C → D)
1 sec (A, B, C, D)
@30kHz sampling rate
8 sec (A → B → C → D)
2 sec (A, B, C, D)
@15kHz sampling rate
Wave Memory : 128k words
4 Tone banks (32k words) A, B, C, D
Key Mode : Whole/one split/three split
LFO Rate : 0.085Hz - 12Hz
Delay : 0 - 4.4 sec
TUNE
Master Tune : ±100 cents
Detune : ±50 cents
Bank Tune : ±50 cents
Loop Tune : ±50 cents

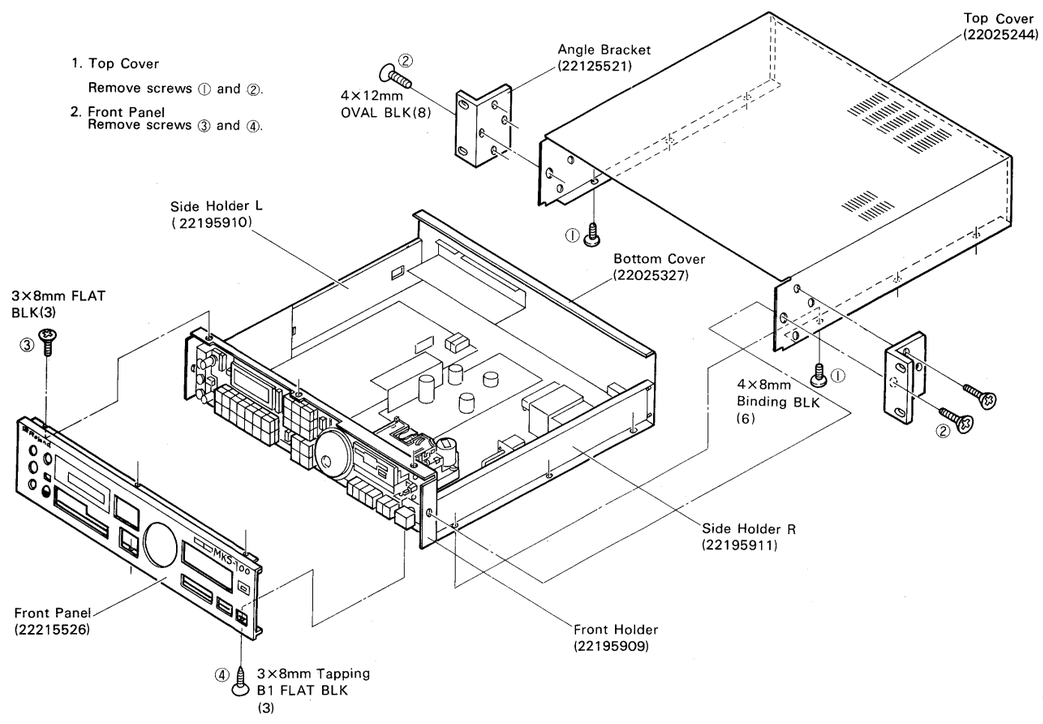
DELAY
Delay Time : 0 - 1.7 sec
AUTO BEND
ABEND Depth : 0 - −32 semitone
ARPEGGIO
ARP Rate : 0.8Hz - 20Hz
EXT-GATE-PLAY
TRG Gate Time : 0 - 12.7 sec
INPUT MIC : −50dBm
LINE : −20dBm
OUTPUT H : 0dB
M : −15dB
L : −30dB
Power Consumption : 19W
Dimensions : 483(W) x 410(D) x 90(H) mm
19-1/4 x 16-1/8 x 3-7/16 in.
Weight : 7 kg/15 lb. 7 oz.





DISASSEMBLING PROCEDURE

1. Top Cover
Remove screws ① and ②.
2. Front Panel
Remove screws ③ and ④.



PARTS LIST

CASING

22215526	Front Panel	ﾌﾛﾝﾄ･ﾊﾟﾈﾙ
22025244	Top Cover	ﾄｯﾌﾟ･ｶﾊﾞｰ
22025327	Bottom Cover (Chassis)	ﾎﾞﾄﾑ･ｶﾊﾞｰ
22025781	LCD Cover (Display Window)	ﾃﾞｨｽﾌﾟﾚｲ･ｶﾊﾞｰ
22195909	Front Holder	ﾌﾛﾝﾄ･ﾎﾙﾀﾞｰ
22195910	Side Holder Left	ｻｲﾄﾞ･ﾎﾙﾀﾞｰ 左
22195911	Side Holder Right	ｻｲﾄﾞ･ﾎﾙﾀﾞｰ 右
22195912	Jack Holder	ｼﾞｬｯｸ･ﾎﾙﾀﾞｰ
22195913	Output Holder	ｱｳﾄﾌﾟｯﾄ･ﾎﾙﾀﾞｰ
22195914	Power Switch Holder	電源ｽｲｯﾁ･ﾎﾙﾀﾞｰ
22195915	QD Holder	QDﾎﾙﾀﾞｰ
22125521	Angle Bracket	ﾗｯｸ･ｱﾝｸﾞﾙ
22355334	Base (Rubber Foot)	ｺﾞﾑ足

KNOB, BUTTON

22485106	Knob blk φ45	α-DIAL
22470259	Knob org	REC LEVEL
22470262	Knob blu	VOLUME
22470240	Button blk	POWER
22470637	Button blk	MIC/LINE
22475958	Button Assy A blk	A, B, AB, CD
22475959	Button Assy B blk	C, D, ABCD, A/B
22475960	Button Assy C blk	C/D, AB/CD, A/B/C/D
22475961	Button Assy D blk	TUNE, PARAM, MODIFY PERFORM, MIDI, ENTER
22475962	Button Assy E blk	F1 →, F2 ←, BWD, FWD
22475963	Button Assy F blk	REC, MODE
22475964	Button Assy G blk	STANDBY, START
22475965	Button Assy H blk	LOAD, SAVE
	Button Assemblies do not include Switch and LED.	
	ボタン・ユニットはスイッチおよびＬＥＤを含みません。	

AC CORD (DETACHABLE)

13439825	DC-320-J01	100V
13439812F0	UC-704-J01	117V
13439813F0	EC-210-J06	220V
23495110	5722 660 4606	240V England
13439814F0	SC-415-J06	240V Australian

JACK, SOCKET

13449145	YKB21-5010 (stereo)	PHONES
13449146	YKB21-5012 (mono)	OUTPUT, INPUT, START
13429168	MIDI3-NS triplet socket	MIDI IN/OUT/THRU
13429525	IS28B0BCT 28P IC socket	EPROM (Main Board)
13429710	PA-126 2P AC inlet	100/117/220V
13429708	CM-3 3P AC inlet	240V

SWITCH

13129124	SDDGA3078A	POWER
13129733	SKHHBS light touch	keypad
13159343	SSSP-023S (shorting)	OUTPUT LEVEL
13129344	SPEA12125A (non-shorting)	MIC/LINE

FUSE

(100/117V)		
12559343	GGS 630mA	(F1) pri.
12559335	GGS 1A	(F2,F3) sec.
12559400	UL-TSC-2A-N1	(F4) sec.
(220/240V)		
12559541	S504 200mA (or 12559507 CEE-200mAT)	(F1) pri.
12559542	S504 250mA (or 12559508 CEE-250mAT)	(F2,F3) sec.
12559550	S506 1.6A (or 12559521 CEE-1.6AT)	(F4) sec.

FUSE CLIP

12199550	H0446	Power Supply Board

TRANSFORMER

22455463U0	245-463U0	Power	100/117/220/240V
12449552	D32-45	EL inverter	

PLATE

22125195	212-195	Plate	Power Transformer (common to S-10, α juno and MC-500)

DISK DRIVE UNIT

12379537	D-281	2.8 inch quick disk drive unit No field serviceable parts inside. Replace by unit. 交換はユニット単位で行って下さい。 個別部品の補修用は用意されていません。

LCD UNIT

15029440	LM161551	with EL, PCB, and wirings No order accepted for attaching parts. Replace by a unit. 補修用は、ユニットで供給されます。 （基板、EL、ﾜｲﾔﾘﾝｸﾞを含む）

INDUCTOR

12449265	ELE-H102KA	1mH		
12449229	FK0B-160MH15			Line filter
13529105	DSS310-550223S			EMI filter
22445280	244-280 TFB-3		fc=6KHz	LC filter
22445281	244-281 TFB-3		fc=12.5KHz	LC filter
22445282	244-282 TFB-3		fc=13.5KHz	LC filter

CRYSTAL

12389760	HC-49/U	26.880MHz
12389756	HC-49/U	6.5MHz
12389754	CST 12.0MT2	

IC

〈Main Board〉

15179237F0	SAB8032A	CPU
15179798	MBM27C512-25	EPROM
15179334	TC5564PL-20	SRAM
15179362H0	HM50464P-12	64k × 4 DRAM
15179360	MB87013	QD drive interface adapter
15179361	MB89251A	USART
15229834	MB62H195	I/O gate array
15229840	RF5C36	sampler custom IC
15219171	EHK-MD6209	D/A converter
15159701	M54522	LED driver
15189111P0	IR9311	comparator
15189194	BA6993	comparator
15159124T0	TC4093BP	quad 2-input NAND schmitt-trigger
15159503	TC40H000P	quad 2-input NAND gate
15159505	TC40H004P	hex inverters
15159510	TC40H074P	dual D-type flip-flops
15169325X0	SN74LS273N	latch
15169514	74HC04P	hex inverters
15169534	74F02	quad 2-input NOR gates
15169546	74F00	quad 2-input NAND gates
15189193	M5238P	J-FET OP amp
15189186	μPC4570C	OP amp (low noise)
15219174	NJU 201AD	analog switch

〈Input Board〉

15219157	M5241L	VCA
15189171	M5218P	OP amp
15189186	μPC4570C	OP amp (low noise)

〈Output Board〉

15169514	74HC04P	hex inverters
15229706S0	PC910 (or 15229706 TLP552)	optoisolator

〈Switch Board 1〉

15169318	74LS138	3 to 8 line decoder/demultiplexer

〈Power Supply Board〉

15199117	M5230L	voltage regulator
15199143	SI-3052V	voltage regulator

TRANSISTOR

15119129	2SA1115-E
15119821	2SB1185-E
15129107	2SC945-Q
15129140	2SC2603-E
15129136	2SC2878A
15129836	2SD1762-E

RESISTOR ARRAY

13919320	RMLS 6-333J	33k × 6
13919303	RMLS 8-333J	33k × 8

DIODE

15019125	1SS133 (or 1519103 1S2473)	
15019208	1SR35-200A	200V 1A rectifier
15019245	1B4B41	100V 1A bridge rectifier
15019272	2B4B41-LC2	100V 2A bridge rectifier
150196120Z	05Z-5.1Z	zener

(LED)

15029149	GL-9PG12	green,package white	MIDI MESSAGE
15029152	GL-9HD12	red,package white	SAMPLING STRUCTURE
15029194	LD-201VR	red	MONO MODE

PCB ASSEMBLY

79366160 Main Board (PCB 22925330)
Can be substituted by S-10 Main Board with minor modification. See Main Board PCB layout section of this manual for details.
S-10のメイン基板で代用可能。メイン基板の頁の説明参照。

79366211 Power Supply Board 100/117V (PCB 22925332 1/2)
79366214 Power Supply Board 220/240V (PCB 22925332 1/2)
Two versions are the same except for fuses.
A different version with correct fuses may be supplied if line voltage is specified in the order sheet.
Also compatible with S-10 P.S. BD with minor modification. See P.S. board layout section for details.
電源基板はヒューズを除けば共通使用が可能です。
代用基板が供給された場合はヒューズ値に注意して下さい。
また、S-10の電源基板とも一部を除けば共通。基板図の頁参照。

79366110	Encoder Board	(PCB 22925332 2/2)
79366060	Switch Board 1	(PCB 22925405)
79366120	Input Board	(PCB 22925406 1/4)
79366180	Output Board	(PCB 22925406 2/4)
79366080	Switch Board 2	(PCB 22925406 3/4)
79366100	LED Board	(PCB 22925406 4/4)

POTENTIOMETER

13219702	EVH-L0AS25A14	10KA	VOLUME
13219703	EVH-L0AS25A54	50KA	REC LEVEL
13279815	RK12K1110-10KB		LCD CONTRAST

(Trimmer)

13299191	EVN-D3AA00B23	2KB	Power Supply Board VR1
13299577	EVM-39GA00B22	200B	Power Supply Board VR2

ROTARY ENCODER

13279816	EC16B40B	40 pulses/rotation	incremental	α-DIAL

WIRING ASSEMBLY

23495517	CC-M62-10P	L=280mm	QD Wiring

CAPACITOR

13659213M0	ECET25R472SW	4700μF 25V	electro
13659222M0	ECET35R222SW	2200μF 35V	electro
13619102N0	CS15E1A6R8K1S	6.8μF 10V	tantalum
13589328	ECQ-P1H392JZ3	0.0039μF	polypropylene
13529104	DE7150F472MVA1-KC	0.0047μF	line bypass

CONNECTOR

(straight type)

13439260	5267-03A	3P wafer assy	
13439261	5267-04A	4P wafer assy	
13439262	5267-05A	5P wafer assy	
13439263	5267-06A	6P wafer assy	
13439265	5267-08A	8P wafer assy	
13439269	5267-09A	9P wafer assy	
13439277	5267-14A	14P wafer assy	
13439334	CP-M60-10	10P wafer assy	Main Board CN12

(right angle type)

13439285	5268-03A	3P wafer assy	
13439286	5268-07A	7P wafer assy	

MISCELLANEOUS

12569149S0	CR2032-T12	Lithium Battery	
22465498	246-498	Heat Sink	Power Supply Board
22150401	215-401	Joint (to button)	
22140207	214-207	Connection Rod	
22150402	215-402	Joint (to switch)	
22220319	222-319	Button Frame	POWER switch
22195450	219-450	LED Holder	LED Board
22245460	224-460	LCD Dust Cover	
22245154	224-154	Encoder Mask	α-DIAL
22245155	224-155	Volume Mask	REC LEVEL,VOLUME

COMMERCIALLY AVAILABLE

(Accessories 出荷時附属品)

22375545	S9-S10-001	QD Sound Library (Drum set)
22375546	S9-S10-002	QD Sound Library (Strings/chorus)
22375547	S9-S10-003	QD Sound Library (Combination)
23430675S0	LP-25	Connection Cord (2.5m)
23485167	348-167	MIDI/SYNC Cable (1m)

(Options ｵﾌﾟｼｮﾝ)

--------	L-101 — 111	QD Sound Libraries
22375551	Roland QD-10	2.8 inch Quick Disk (10pcs)
--------	MSC-25	MIDI/SYNC Cable (2.5m)
--------	MSC-50	MIDI/SYNC Cable (5m)
--------	DP-2	Pedal Switch

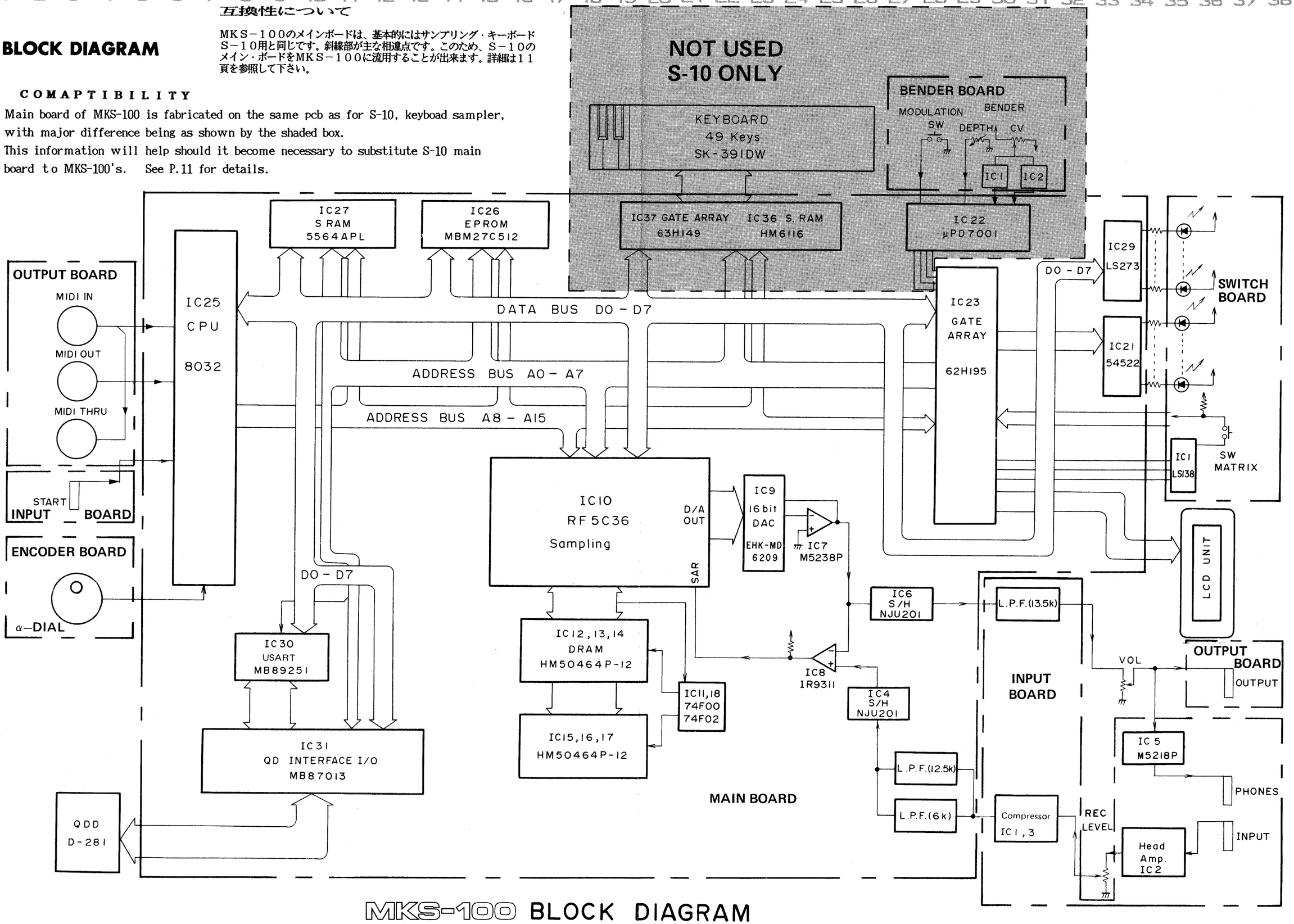
BLOCK DIAGRAM

互換性について

MKS－100のメインボードは、基本的にはサンプリング・キーボードS－10用と同じです。斜線部が主な相違点です。このため、S－10のメイン・ボードをMKS－100に流用することが出来ます。詳細は11頁を参照して下さい。

COMAPTIBILITY

Main board of MKS-100 is fabricated on the same pcb as for S-10, keyboad sampler, with major difference being as shown by the shaded box. This information will help should it become necessary to substitute S-10 main board to MKS-100's. See P.11 for details.



MKS-100 BLOCK DIAGRAM

CIRCUIT DESCRIPTIONS

1. CPU Main Board IC25 8032

Major Tasks of the CPU;

. LED lighting, LCD driving, IC27 (working RAM) reading/writing

. IC10 (Sampling IC) reading/writing

. MIDI transmitting/receiving

. Rotary encoder reading

回路解説

1.CPUメインボード IC25 8032A

ＣＰＵの主たる機能は次の通りです。

- ＬＥＤ点灯、ＬＣＤ躯動、ワーキングRAM ＩＣ２７への書込み／読み出し
- サンプリングＩＣ ＩＣ１０（ＲＦ５Ｃ３６）への書込み／読み出し
- ＭＩＤＩデータ送受信
- ロータリエンコーダーの読み込み

2. I/O Gate Array Main Board IC23 62H195

Most of addressing for I/O's and memories and some of the functions are done through I/O gate array IC23.

Shown below are the address map to be set by 62H195 and the block diagram of 62H195. (Fig. 1)

3. Sampling IC Main Board IC10 RF5C36

The Roland custom IC RF5C36 plays a key role in the sampling system. The process is illustrated mainly with the aid of photos, diagrams and charts.

NOTE (See Fig. 2)

The system clock for the sampling system is based on the Xtal connected across IC10 pins 70 and 71. Left under an unstable condition, X1 will sometimes cause TP7 (RAS) to be kept high. This problem will be found on ealier products. This can be solved by adding 10PF (C32) across main board IC10 pin 71 and the ground point.

2.I/Oゲートアレイ メインボード IC23 62H195

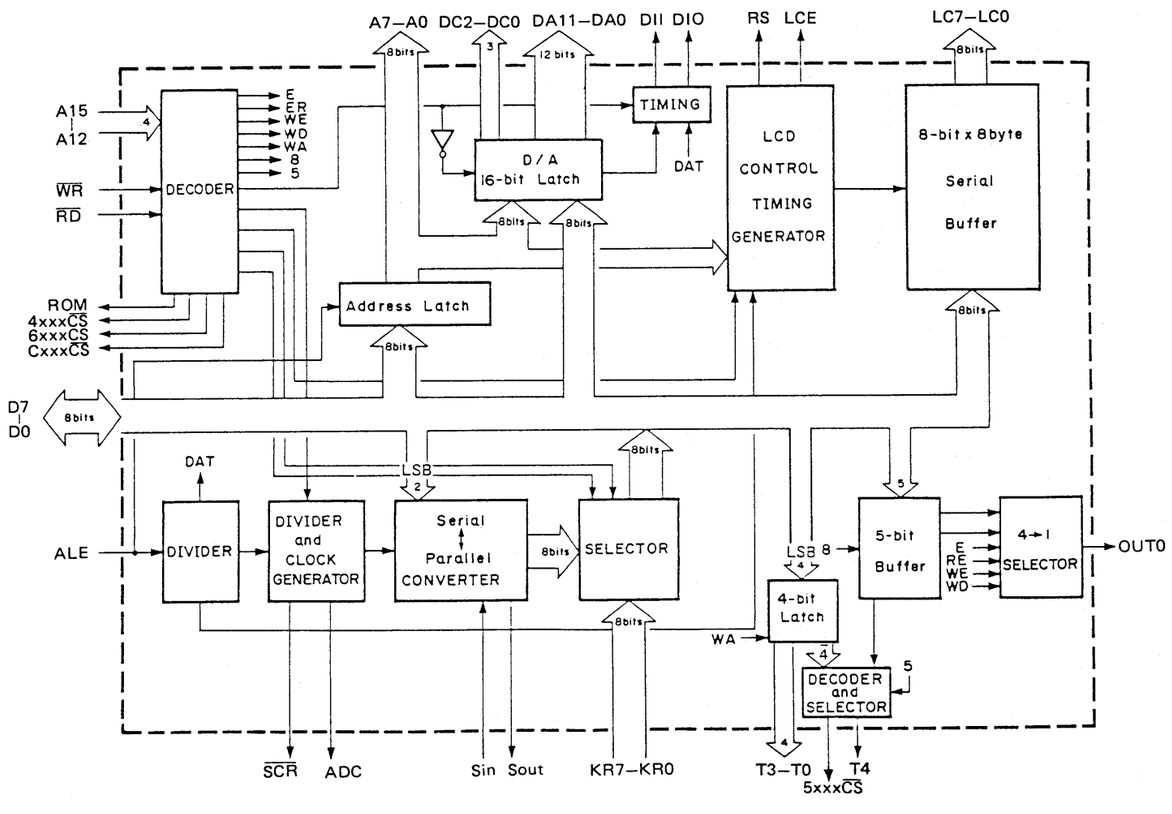
上記のＩ／Ｏおよびメモリのアドレスの設定や動作の全部または一部は、Ｉ／Ｏゲートアレイを通じて行なわれます。６２Ｈ１９５のブロックダイヤグラムおよびアドレスマップを下に示します。(Fig.1)

3.サンプリング IC10 RF5C36

サンプリングＩＣを中心とした音声データの流れの概略をブロック図、写真、チャート等を主体に説明します。

サンプリングシステムのシステムクロックは、ＩＣ１０ピン７０，７１間に接続されているＸ１に基づいて発生します。このＸtal回路が不安定な場合ＴＰ７（ＲＡＳ）がＨになったままとなります。初期製品では発振安定用コンデンサＣ３２ １０ＰＦがＩＣ１０ピン７１とグランド間に入っていないためこの様な現象を生じるものがあります。無い場合は取り付けて下さい。(Fig.2)

Fig. 1 (2. I/O Gate Array Main Board IC23 62H195)



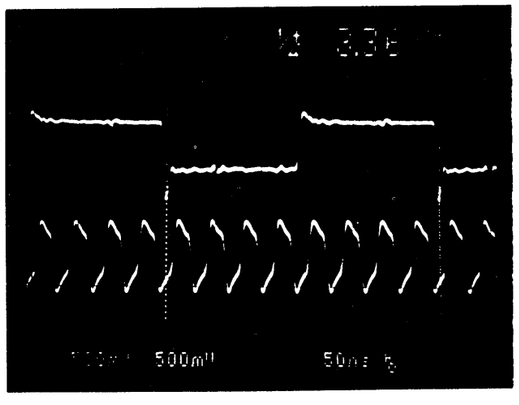
	PSEN	RD	WR
FFFF			
F000		IC10 RF5C36 CS	IC10 RF5C36 CS
E000			
D000	ROM AREA		IC29 LED LATCH PULSE
C000			
B000		SW SCAN SELECT	SW SCAN DATA
A000			IC21 LED DATA
9000			LCD DATA
8000	EPROM		
7000	MB27C512 -25	IC27 SRAM 5564APL CS	IC27 SRAM 5564APL CS
6000			
5000		IC31 MB87013 CS	IC31 MB87013 CS
4000			
3000			
2000			
1000			
0000			

Fig. 2 (3. Sampling IC Main board IC10 RF5C36)

Main board

TP7 RAS CLK →

IC10 Pin 71 →



3-1. Loading From QD
(See Fig. 3)

3-2. Sampling External Audio Input
IC3b of the output board can accommodate input signals between −50dBm and 0dBm. The compressor consisting of IC3a, 4, 5, Q7, etc. relieves the subsequent digital circuits from overload.

3-1. QDからのデータロード
(Fig.3参照)

3-2. 外部音声入力のサンプリング
アウトプットボードのIC3bの許容入力は −50 ～ 0dBm です。
次段のIC3a、4、5、Q7はコンプレッサであって、過大入力を抑制します。
メインボード上ではサンプリングクロックの設定に応じてL1、またはL2の出力が選ばれます。

Sampling Rate	IC4		OUTPUT
	Pin 8	Pin 9	
30kHz	L	H	L1
15kHz	H	L	L2

3-3. Reproducing Sampled Sound (See Fig. 5)
The sound data that the IC10 reads from DRAMs is in a 12 bit format. The IC10 processes this data with an ENVELOPE data to give a specific contour to the sound. The resulting is represented by an expanded 16 bit data and then applied to the DAC IC9. The DAC is configured to deliver each voice on every 8th low INH. The all DAC outputs are to be fed to one S/H circuit. The photo below shows where only one sound is being reproduced.

3-3. サンプルドデータの再生(Fig.5参照)
RF5C36はDRAMから読み出した12 bit dataに対して、ENVELOPEデータに基づいた演算をなし、16bitデータとしてDACへ出力します。
DACの出力はD−INHのタイミングで行なわれ、8ボイスが時分割で同一回路にサンプリング／ホールドされて行きます。下の写真はボイス出力が1つだけの場合を示します。

Fig. 3 (3-1. Loading From QD)

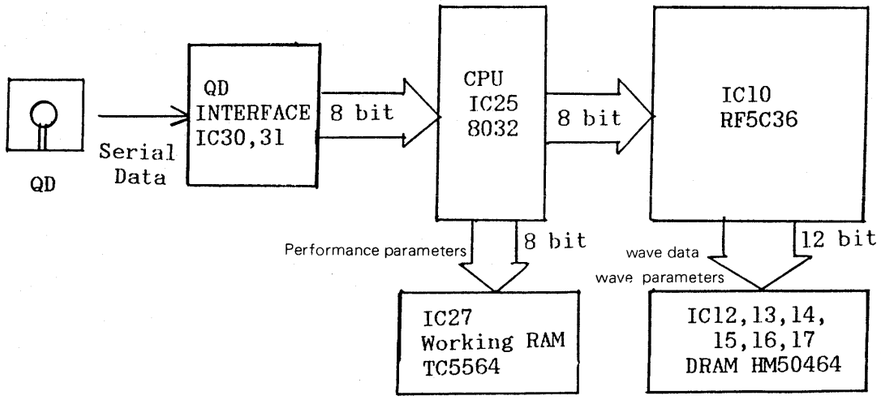
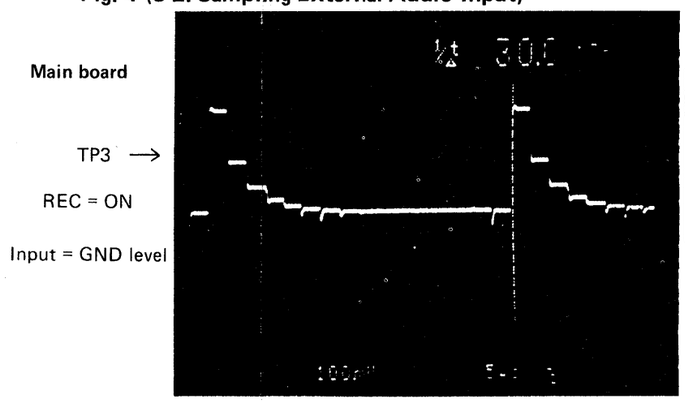


Fig. 4 (3-2. Sampling External Audio Input)



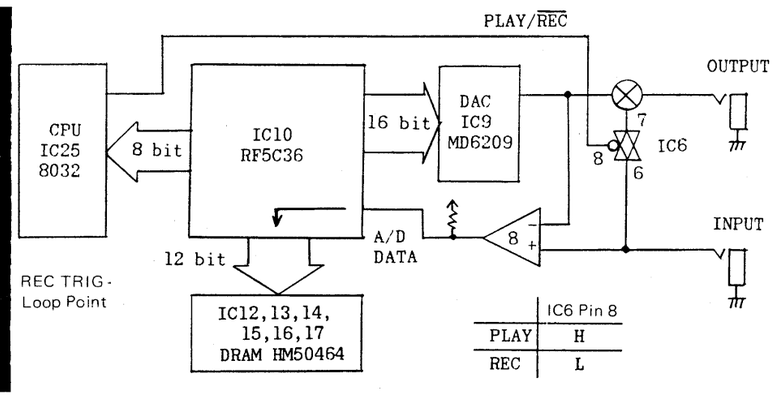
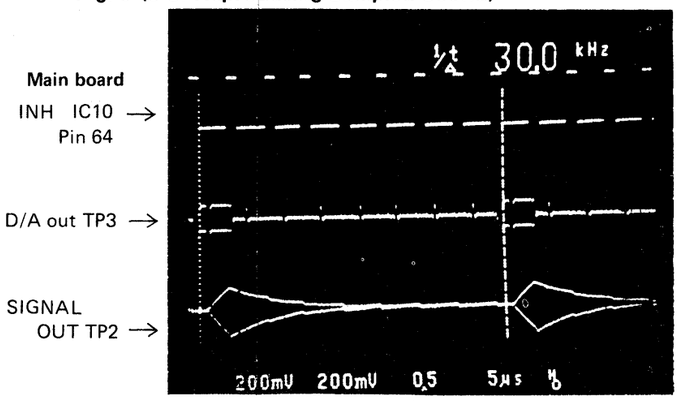
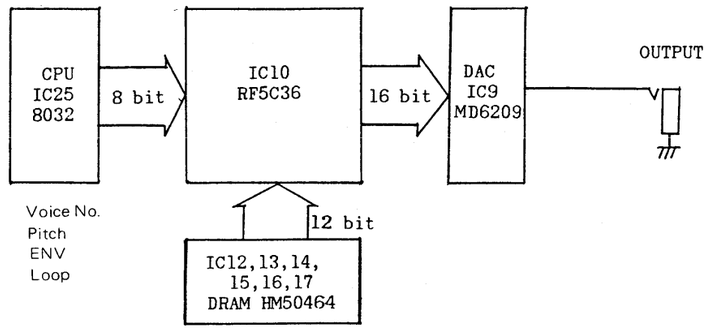


Fig. 5 (3-3. Reproducing Sampled Sound)





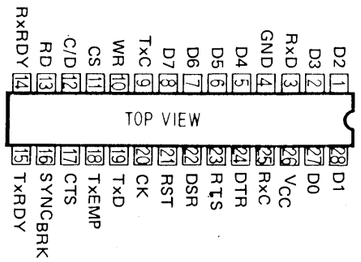
QUICK DISK SYSTEM

Data transfer between the CPU and the disk is accomplished through the QD interface consisting of IC USART and IC31 QD drive interface I/O.

クイックディスクシステム

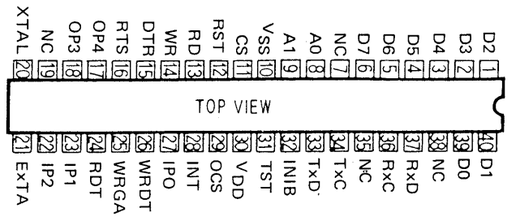
QDインターフェイスはメインボード上のIC30 USARTとIC31 QDドライブ・インターフェイスI/Oから成っています。

USART MB89251A



PIN NUMBER	PIN NAME	I/O	DESCRIPTION
3	RxD	I	(Receiver Data) This input is the data read from QD via IC31. QDから読み出されたデータ
25	RxC	I	(Receiver Clock) Controls the rate at which the data from QD is received. QDからの受信データと同期をとるための受信クロック
19	TxD	O	(Transmitter Data) This output is to be transmitted to QD. QDへの送信データ
9	TxC	I	(Trasmitter Clock) Controls the rate at which the data is to be transmitted to QD. QDへの送信データと同期をとるための送信クロック
10	$\overline{WR}$	I	(Write) A "low" on this input informs the MB89251A that the CPU is writing data or controls to the MB89251A. CPUからのWRITE信号。LOWで MB89251Aへの書き込み可能
11	$\overline{CS}$	I	(Chip Select) A "low" on this input selects the MB89251A. アドレスをデコードした信号。LOWでMB89251Aがセレクトされる
13	$\overline{RD}$	I	(Read) A "low" on this input informs the MB89251A that the CPU is reading data or controls from the MB89251A. CPUからのREAD信号。LOWでMB89251A から読み込み可能。
14	RxRDY	O	(Receiver Ready) Not used 未使用
15	TxRDY	O	(Transmitter Ready) Not used 未使用
16	SYNC BRK	I/O	(Sync Break) Not used 未使用
17	$\overline{CTS}$	I	(Clear to Send Data)´ Not used, Pulled low 未使用 LOW
18	TXEMP	O	(Transmitter Empty) Not used 未使用
20	CK	I	(Clock) A clock of 3.25MHz is used to generate internal device timing. 3.25MHz入力。
21	RST	I	(Reset) A "high" on this input forces the MB89251A into idle mode. HIGHでRESET。LOWで通常動作。
22	$\overline{DSR}$	I	(Data Set Ready) Used to confirm the position of the read/write head. Should be set to low only when the read/write head is positioning over a read/write sector. QDのヘッド位置を知るための入力。ヘッドが読み書き可能な位置にある時にLOWが入力されること。
23	$\overline{RTS}$	O	(Request to Send) Not used 未使用
24	$\overline{DTR}$	O	(Data Terminal Ready) A "low" on this ouptput is used when recording is performed on QD. To be inverted at IC31 output, pin 25 WRGA. QDに書き込む時にLOWを出力。DTR信号はIC31(MB87013)内部のインバータを通ってピン25のWRGAからQDドライブに加えられる
26	VCC	-	+5V
4	GND	-	

QD DRIVE INTERFACE ADAPTER MB87013



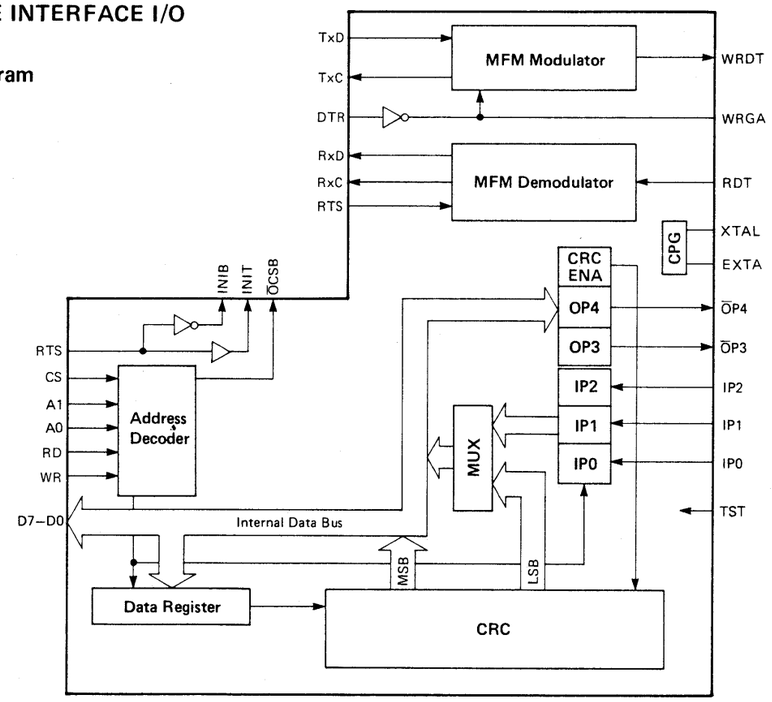
PIN NUMBER	PIN NAME	I/O	DESCRIPTION
1-6, 39,40	D7-D0	I/O	Data Bus: To be connected to the CPU data bus. データバス、CPUのデータバスに接続。
12	$\overline{RST}$	I	Reset: A low on this input resets the MB87013. リセット入力端子。LOWでMB87013はリセットされる。
13	$\overline{RD}$	I	Read: Can be used to enable data onto the data bus from MB87013. Active low. MB87013からデータを読み出す為の、アクティブ.ローのリードパルス入力端子。
14	$\overline{WR}$	I	Write: Used to write data into the MB87013 register. Active low. MB87013へデータを書き込む為の、アクティブ.ローのライトパルス入力端子。
11	$\overline{CS}$	I	Chip Select: Can be used in conjunction with a low RD, low WR, A0 and A1 to gain access to internal registers. チップ.セレクト入力端子。$\overline{RD}$、$\overline{WR}$、A0、A1と 組合せMB87013の内部レジスタへアクセスするとが出来る。

$\overline{CS}$	A1	A0	$\overline{RD}$	$\overline{WR}$	DATA BUS	$\overline{OCS}$
1	-	-	-	-	Hi-imp	1
0	0	0	0	1	Hi-imp	0
0	0	0	1	0	Data Register Write (MB89251A, MB87013)	0
0	0	1	0	1	Hi-imp	0
0	0	1	1	0	Hi-imp	0
0	1	0	0	1	CRC Register(MSB)Read	1
0	1	0	1	0	Data Register Write	1
0	1	1	0	1	Control Register Read CRC Register(LSB)Read	1
0	1	1	1	0	Control Register Write	1

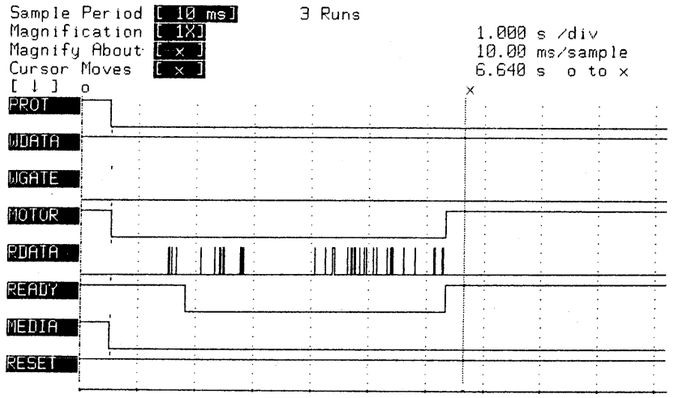
8 9	A0 A1	I	Address: Used to select internal register. 内部レジスタを選択するの用いられる。
28	INIT	O	Reset output: Inverted $\overline{RST}$. Active high. RSTを反転したアクティブHIGHのリセット信号端子。
32	$\overline{INIB}$	O	Low active reset output: Buffered $\overline{RST}$. RSTをバッファリングしたアクティLOWのリセット信号 出力。
29	$\overline{OCS}$	O	Chip Select: Used to select serial interface(MB89251A). シリアル.インターフェースMB89251AのCS信号。 ($\overline{OCS}$=CS+$\overline{A1}$)

33	TxD	I	Transmitter Data: To be re-transmitted to QD after modified frequency modulated. 送信データ入力端子。
34	TxC	O	Transmitter Clock: Controls the rate at which data is transmitted to QD drive. 送信同期クロック出力端子。
37	RxD	O	Receiver Data: Demodulated data read from QD. To be re-transmitted to IC30. 受信データ出力端子。
36	RxC	O	Receiver Clock: Controls the rate at which IC30 receives the data from QD via IC31. 受信同期クロック出力端子。
16	RTS	I	Gate: A low on this input enables transfer of data read from QD to IC30, through RxC and RxD. 受信データを、RxCとRxDに出力する時のゲート。LOWで受信データをMB89251などに転送できる。
15	$\overline{DTR}$	I	A low on this input causes MFM modulator to be initialized. MFMモジュレータのイニシャライズ信号入力端子。
26	WRDT	O	Data out: Signal from this output is to be recorded on QD. クイックディスクへのデータ出力端子。
24	RDT	I	Data In: Data read from QD is received through this port. クイックディスクからのリードデータ入力端子。
25	WRGA	O	A high from this output enables recording on QD. クイックディスクはWRGAがHIGHの時、ディスクに データ書き込み が出来る。この端子にはDTRの反転値が出力される。
27	IPO	I	Indicates the status of the WRITE PROTECT switch: With a disk inserted a high IPO represents"WRITE PROTECTED" ライトプロテクトSWをセンスするためのポート。QD が入っ状態で、HIGHならプロテクトされたQD。
23 22	IP1 IP2	I	Used to sense QD: Low=QD inserted, High=QD not inserted. QDの挿入、検出用ポート。 L=挿入、 H=未挿入
18	OP3	O	Used to turn on/off disk unit motor: Low=ON. モータのON・OFFビット。LOWでON
17	OP4	O	This output is connected to RTS. Low OP4 enables MB89251A to recieve data from QD. RTSをコントロール。LOWで受信可能。
20	XTAL		6.5MHz crystal input for internal oscillator. 水晶振動子の接続端子。6.5MHzの水晶接続。
21	EXAL		Not used 未使用
30	VDD		Main power supply: +5V +5V
10	VSS		Circuit GND potential GND
31	TST		Used for test purpose only: must be pulled up to VDD. テスト用端子です。通常VDDにプルアップ。

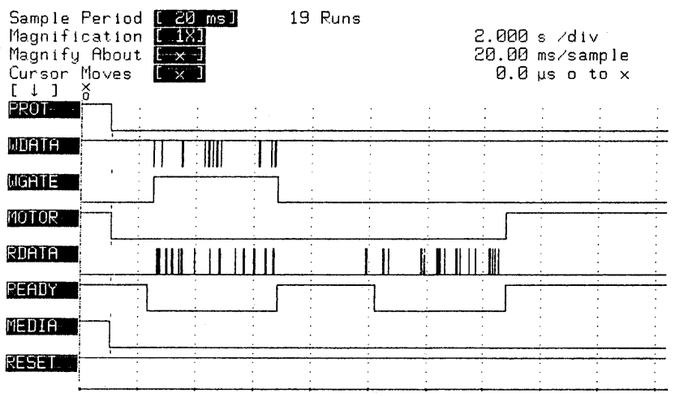
QD DRIVE INTERFACE I/O
MB87013
Block Diagram



READ TIMING DIAGRAM IN LOAD MODE



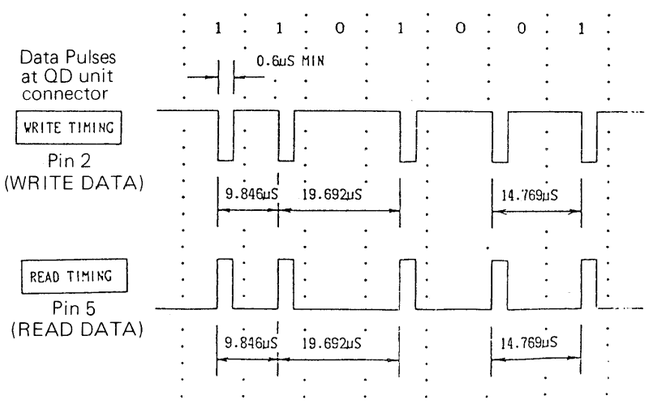
WRITE TIMING DIAGRAM IN SAVE MODE



These three diagrams represent waveforms on the drive unit connector (or Main Board CN12).
Note that the data pulses shown in the figure right are of ideal ones and cannot be observed as they drawn.

これら３枚のタイミングチャートは、ドライブユニットのコネクタ（又はメインボードCN12）上の波形です。
注
右図のデータパルスは理想波形であって、実際にはこの様なきれいなパルス波形とならない。

DATA PULSE TIMING



QD DRIVE UNIT PIN DESCRIPTION TABLE

PIN NUMBER	SIGNAL NAME	I/O	DESCRIPTION
1	$\overline{\text{WRITE PROTECT}}$	OUT	Indicates whether the recording on the inserted disk is inhibited or not. HIGH : inhibited LOW : not inhibited With a write protected disk inserted, the internal recording circuits are disabled. この信号は、挿入されたディスクが記録許可か禁止かを示します。 " HIGH " 記録禁止 " LOW " 記録許可 ライトプロテクトされたディスクが挿入された時ドライブ内部ではライト動作を禁止します。（記録禁止はA，B両面に可能）
2	$\overline{\text{WRITE DATA}}$	IN	External data input to be recorded. Recorded with high WRITE GATE, a high to low transition of a data reverses the current direction in the read/write head, which records a 1 bit data. この信号は、外部回路より供給される信号で、ディスク上に記録するデータです。"HIGH" から "LOW"レベルに変わるごとにリードライトヘッドに流れる電流を反転させデータビットを記録します。この記録は、WRITE GATE 信号が "HIGH" レベルの時行えます。
3	WRITE GATE	IN	High WRITE GATE enables recording. この信号が、"HIGH" レベルの時ディスク上にデータを記録出来ます。"LOW" レベルの時は記録できない。
4	$\overline{\text{MOTOR ON}}$	IN	Low MOTOR ON starts the motor. With High MOTOR ON, an internal MOTOR STOP can stop the motor. ドライブモーターの ON/OFF 制御信号です。この信号を "LOW" にするとモータが回転します。この信号を "HIGH" にした後、ドライブ内の MOTOR STOP 信号が入るとモーターは停止します。
5	READ DATA	OUT	Pulse-shaped analog signal read from the disk. Contains the unseparated clock and data pulses. このデータは、ディスクから読み出されたアナログ信号をパルスに波形整形したもので、クロックとデータを含んでいます。
6	$\overline{\text{READY}}$	OUT	Indicates that recording or reading may take place. この信号は、ディスクから読み出し許可、または記録許可を示します。
7	$\overline{\text{MEDIA SW}}$	OUT	Low state indicates that disk slot lid is closed with a disk inserted. High state represents open lid or closed lid without a disk. ディスクがセットされた状態で蓋をしめていれば "LOW" レベル、蓋が開いているか又はディスクを装着しないで蓋をしめた場合 "HIGH" レベルとなります。
8	$\overline{\text{RESET}}$	IN	Low for the predetermined period after POWER ON RESET, causing internal READY pulled low and resetting the internal flip-flop for the motor to defeat MOTOR ON. POWER ON RESET 時、一定時間 "LOW" レベルとなる信号で、この信号により（ドライブ内部の）READY 信号を "LOW" にすると共に MOTOR が起動しないように（ドライブ内部の）MOTOR ON用Ｆ／Ｆをリセットする。
9	VB		+ 5 V
10	GND		

Diagnostic Program

The diagnostic program incorporated in the MKS-100 checks the following electronic functions as well as the ROM Version number—without demanding disassembling.

NOTE

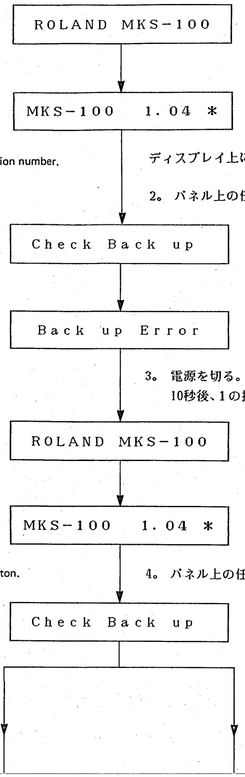
The diagnostic program stops whenever it detects a malfunction and won't go to the next test unless "IGNORE" command is applied externally. IGNORE command can be entered from the panel by pressing PERFORM and MIDI simultaneously.

The program proceeds in the order:

1. ROM (IC26 main board) version number identification
2. Memory backup (lithium battery)
3. S-RAM (IC27 main board)
4. D-RAMs (ICs 12–17 main board)
5. IC10 (factory test use only)
6. Switches andLEDs
7. Rotary encoder
8. QD drive
9. Output
10. MIDI

Entering Test Mode

1. While pressing PERFORM and MIDI turn the power on.



Display will show ROM Version number.

2. Press any panel button.

See NOTE 1.

3. Turn the power off.
   Wait 10 seconds.
   Repeat Step 1.

4. Press any of the panel button.

診断プログラム

MKS-100には診断プログラムが内蔵されているので、ROM IC26 のバージョンナンバーのみならず主要回路機能を、パネルを開けることなく点検することが出来ます。診断プログラムは次の順に進みます。

注.
異常を発見すると、プログラムは該当箇所、またはエラー・メッセージを表示したままで停止します。但し、PERFORMとMIDIボタンを同時に押すことにより、引続き次のテストを強行させることが出来ます。

1。 ROM(IC26)バージョン・ナンバー
2。 メモリ・バックアップ（バッテリ）
3。 S-RAM(IC27)
4。 D-RAM(IC12-17)
5。 IC10（工場検査専用）
6。 スイッチおよびLED
7。 ロータリ・エンコーダ
8。 QDドライブ
9。 ｱｳﾄﾌﾟｯﾄ
10。 MIDI

テストモード

1。 PERFORM と MIDIを押しながら電源を投入する。

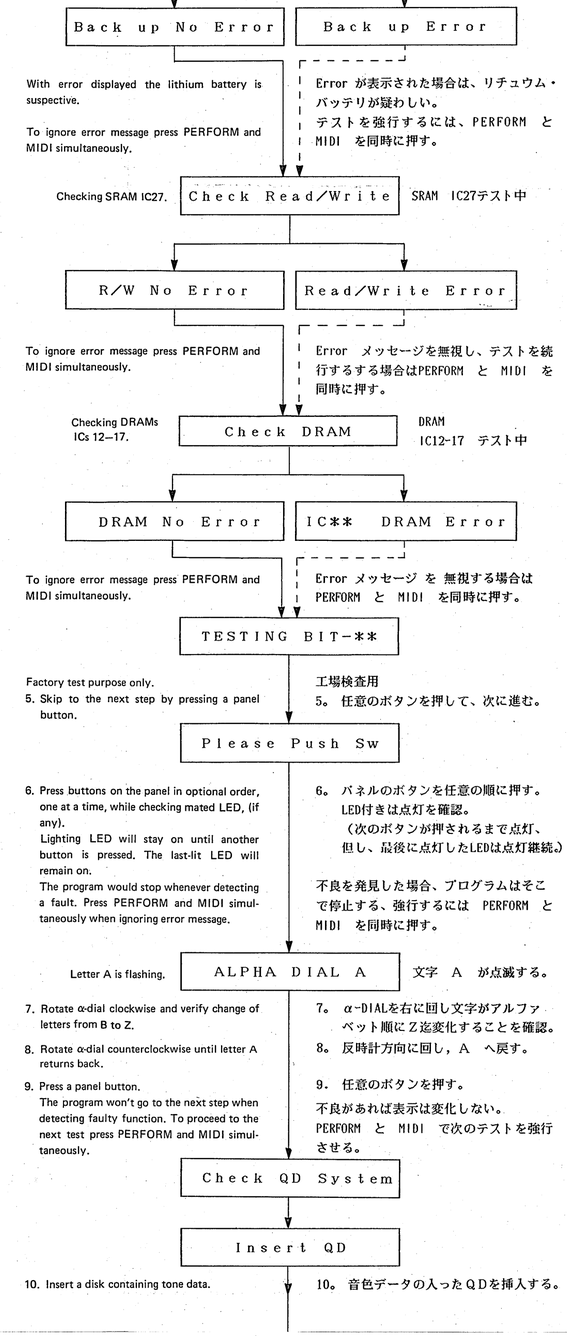
ディスプレイ上にROMバージョンを表示。

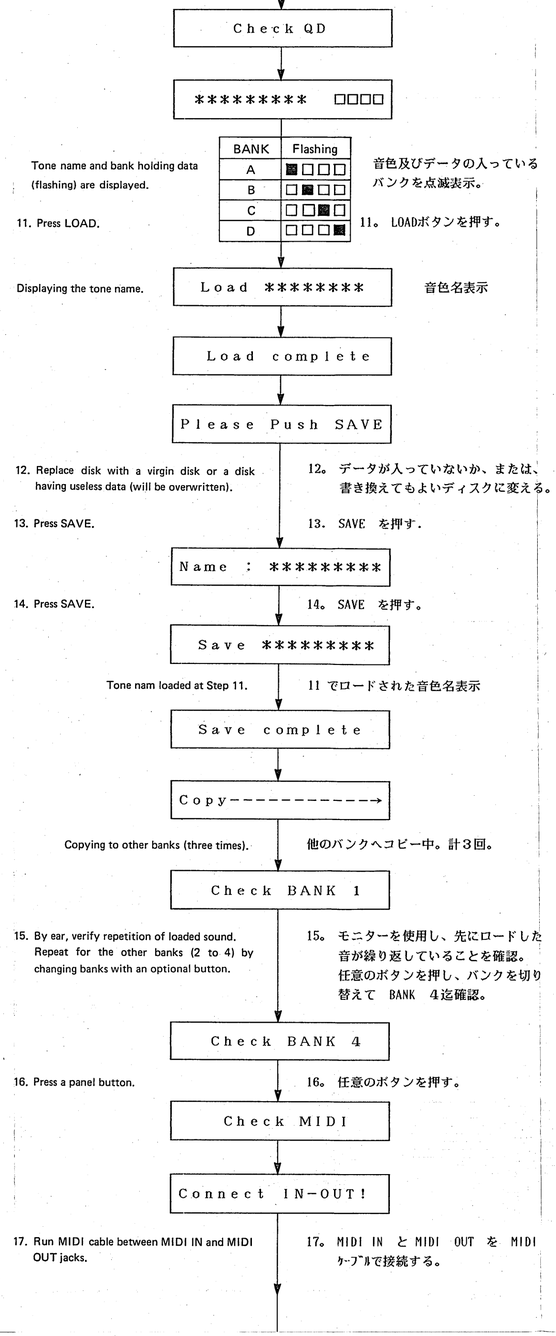
2。 パネル上の任意のボタンを押す。

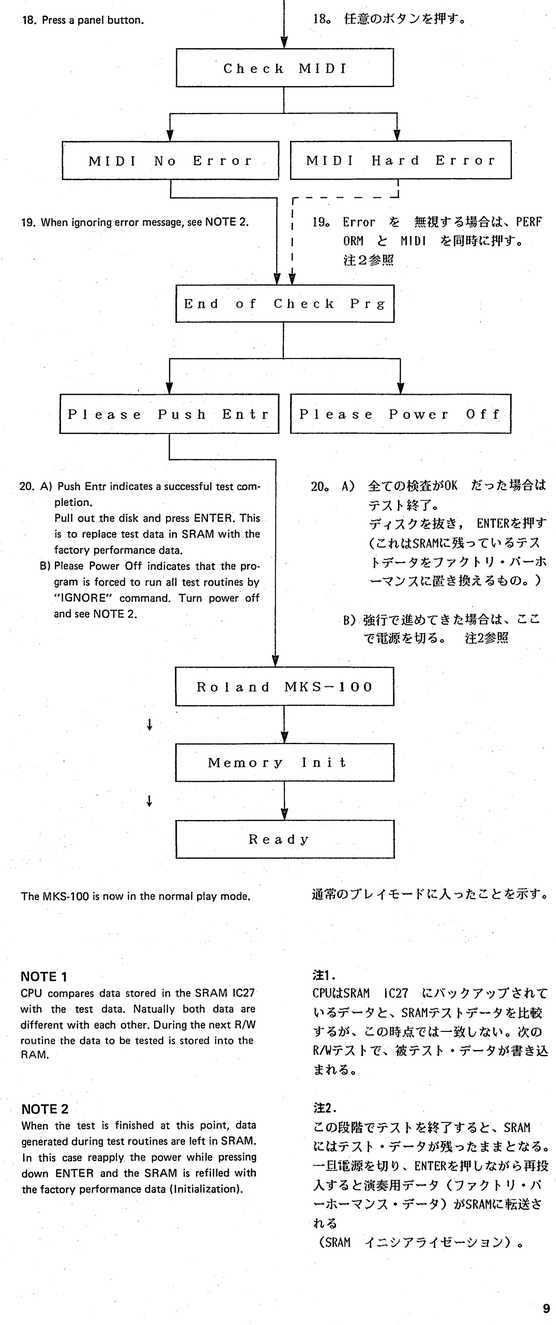
注1参照

3。 電源を切る。
   10秒後、1の操作を繰り返す。

4。 パネル上の任意のボタンを押す。







NOTE 1

CPU compares data stored in the SRAM IC27 with the test data. Natually both data are different with each other. During the next R/W routine the data to be tested is stored into the RAM.

NOTE 2

When the test is finished at this point, data generated during test routines are left in SRAM. In this case reapply the power while pressing down ENTER and the SRAM is refilled with the factory performance data (Initialization).

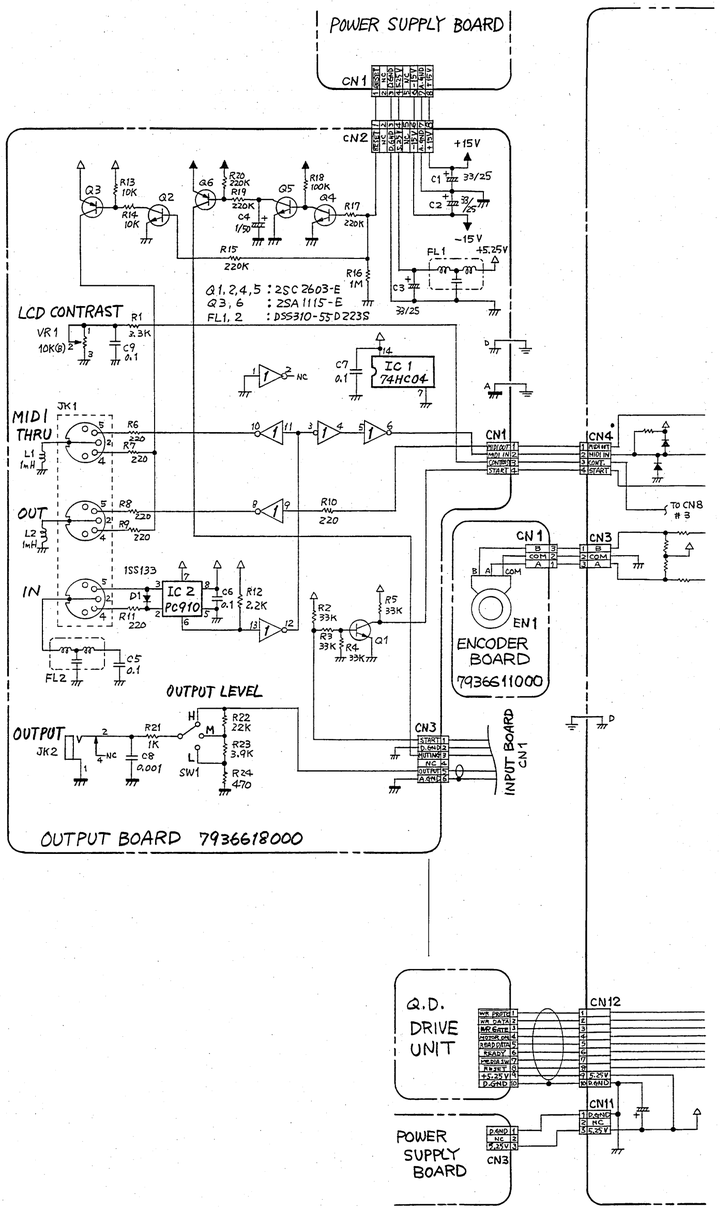
注1.

CPUはSRAM IC27 にバックアップされているデータと、SRAMテストデータを比較するが、この時点では一致しない。次のR/Wテストで、被テスト・データが書き込まれる。

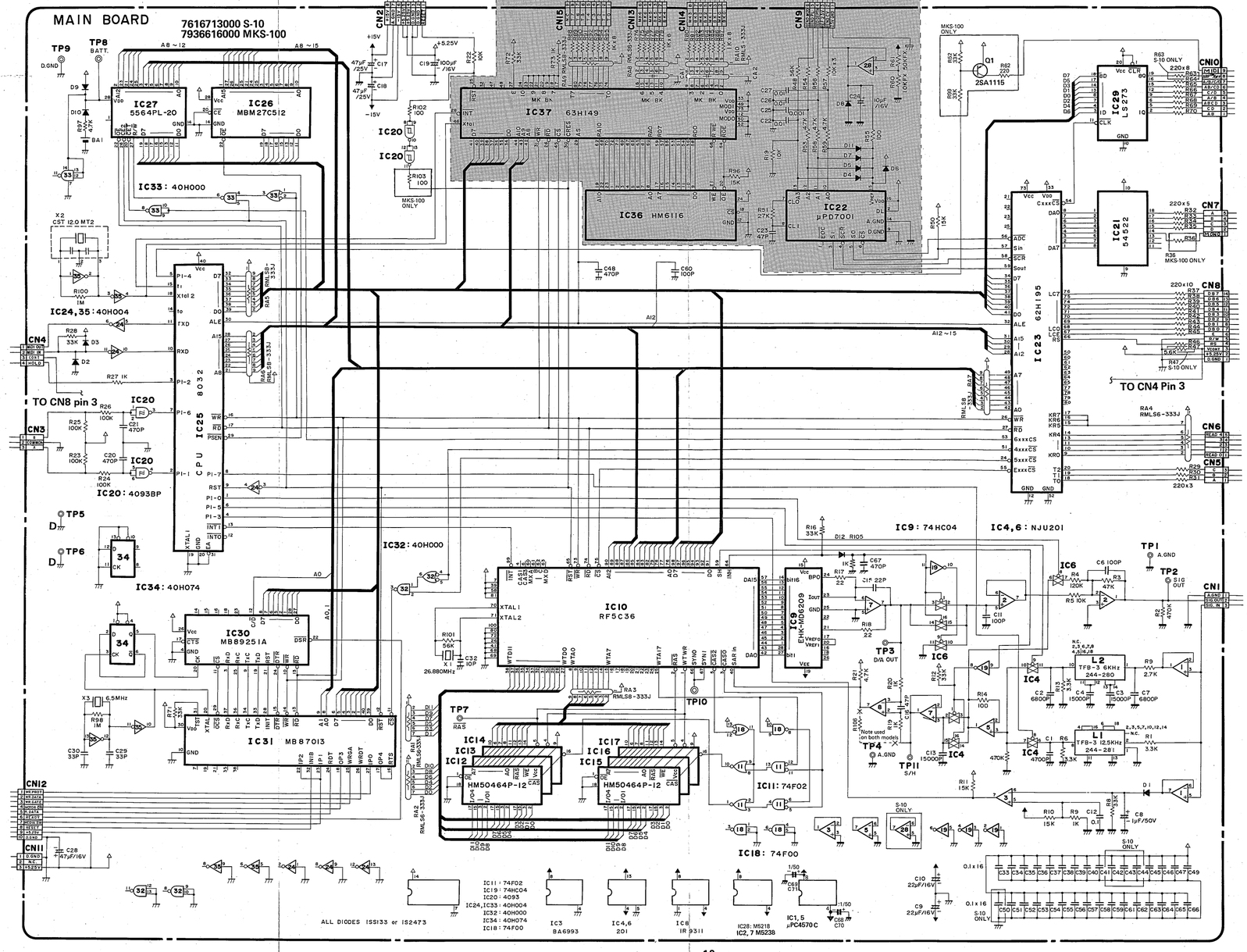
注2.

この段階でテストを終了すると、SRAMにはテスト・データが残ったままとなる。一旦電源を切り、ENTERを押しながら再投入すると演奏用データ（ファクトリ・バーホーマンス・データ）がSRAMに転送される
（SRAM イニシアライゼーション）。

CIRCUIT DIAGRAM

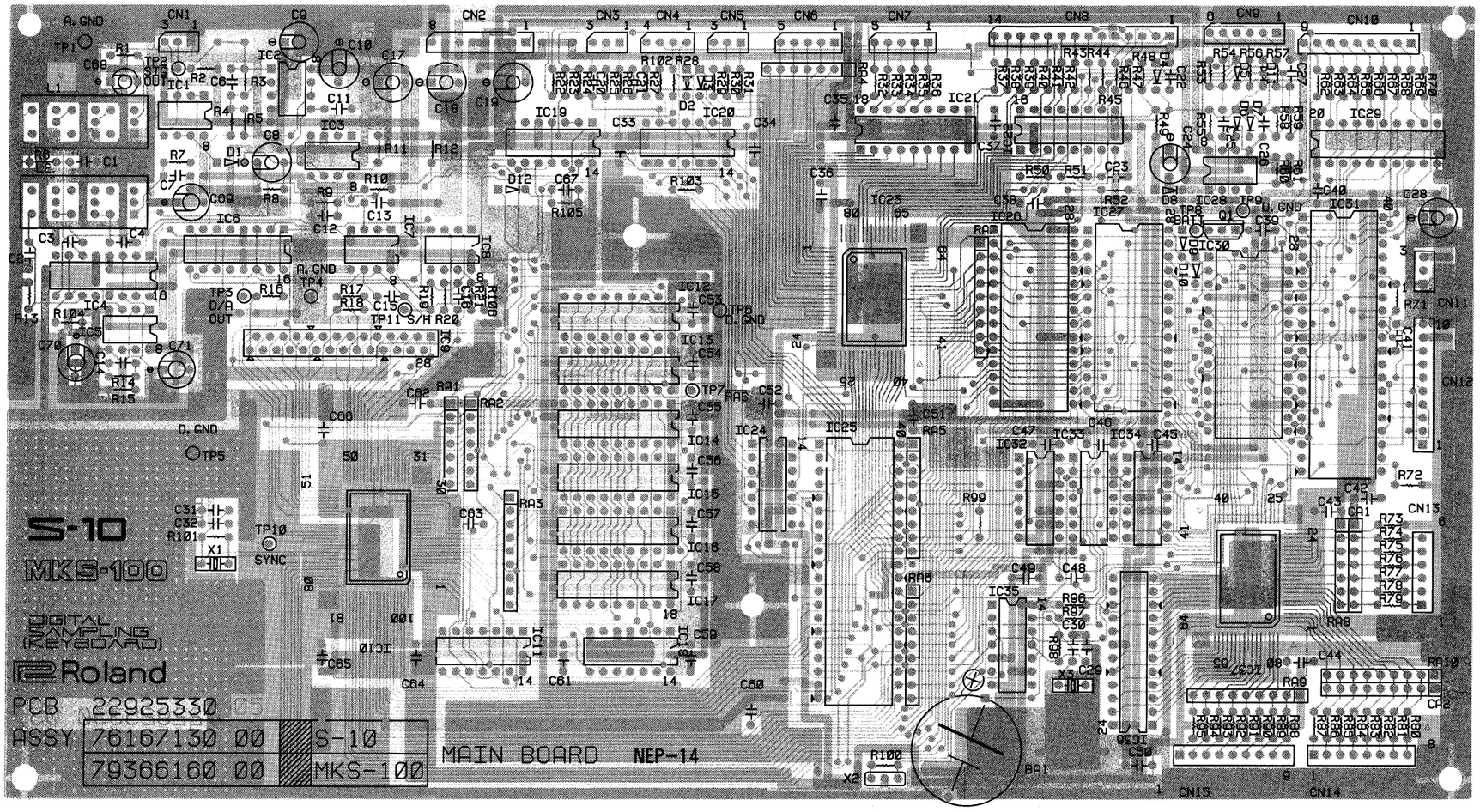


MAIN BOARD 7936616000



MAIN BOARD 7936616000 (pcb 22925330)

Replacement for IC1 and IC5 should be μPC4570C only.
IC1またはIC5を交換する場合は、μPC4570Cのみを使用のこと。



ADVARSEL!
Lithiumbatteri. Eksplosionsfare.
Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanual.

Lithium batteri må kun udskiftes med samme type og fabrikat.

ADVARSEL!
Lithiumbatteri. Fare for eksplotion.
Må bare skiftes av kvalifisert tekniker som beskrevet i servicemanualen.

Lithium batteri må kun utskiftes med samme type og fabrikat.

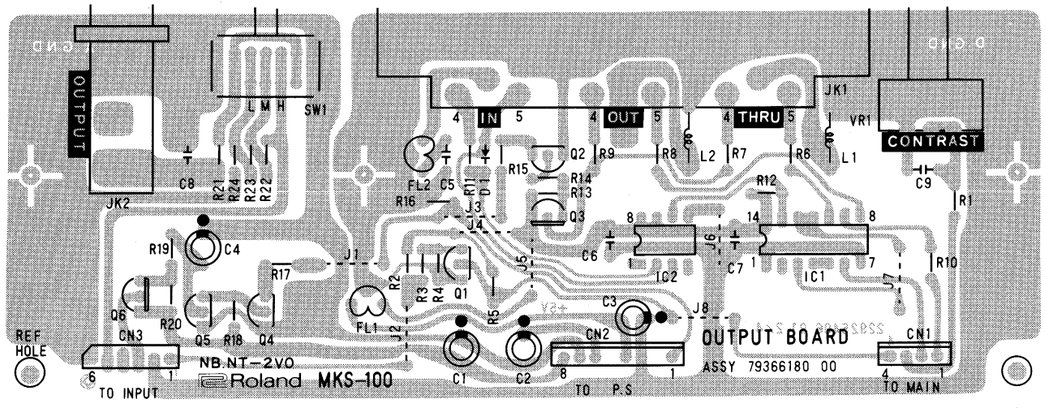
VARNING!
Lithiumbatteri. Explosionsrisk.
Får endast bytas av behörig servicetekniker.
Se instruktioner i servicemanualen.

Lithium batteri för endast ersättes med samme typ och fabrikat.

VAROITUS!
Lithiumpariston. Räjähdysvaara.
Pariston saa vaihtaa ainoastaan alan ammottimies.

Kun vaihat lithium pariston KÄYTÄ saman valmistajan samaa tyyppiä.

OUTPUT BOARD 79366180000 (pcb 2292540601 2/4)



Compatibility – Main Board –

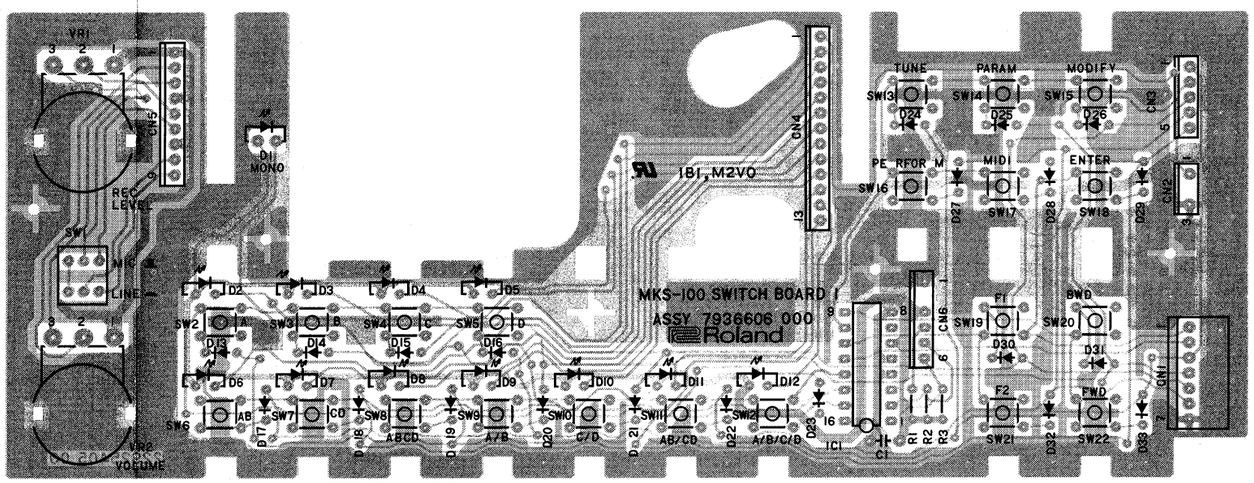
MKS-100 main board circuit is assembled on a PCB numbered 22925330 that is also employed on Roland keyboard sampler S-10. Having less components, MKS-100 mian board can be replaced by an S-10's with small component changes as shown below.
The reverse does not hold true . . . too may components to be changed.

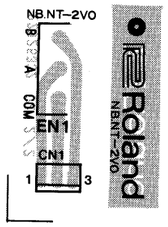
メインボードの互換性について

MKS-100とS-10は同じPCB(22925330)を使用しています。使用部品が一部異なるだけなので下表の通りわずかな変更でS-10の基板をMKS-100用に改造することが可能です。(MKS-100からS-10への変換は変更部品点数が多いため避けた方が賢明)

Required Modification On S-10 Main Board	
Add (追加) Q1 2SA1115 R36 220Ω (CN7 pin 1) R52 33K (Q1 base) R62 220Ω (Q1—CN10 pin 7) R99 33K (Q1 base) R103 100Ω (IC20 pin 11)	Remove (削除) R47 5.6K (CN8 pin 3) Replace (交換) IC26 with ROM P/N 15179798

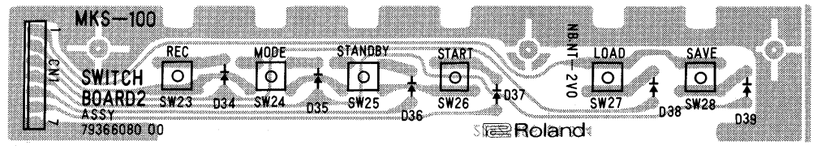
SWITCH BOARD 1
7936606000
(pcb 2292540500)



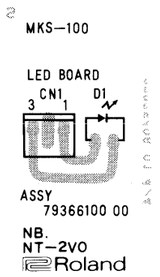


ENCODER BOARD
7936611000
(pcb 22925332 2/2)

SWITCH BOARD 2
7936608000
(pcb 2292540600 3/4)



LED BOARD
7936610000
(pcb 2292540600 4/4)



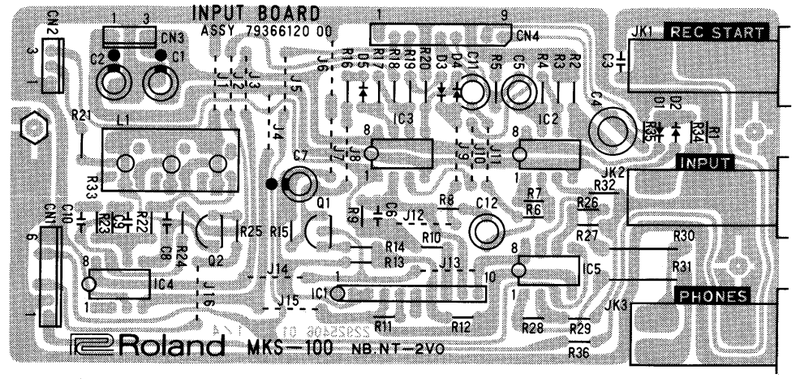
INPUT BOARD ICs 2–4

EFF SN	IC type used
700100–700149	NJM2068D-D
720150–720849	
730850–UP	μPC4570C

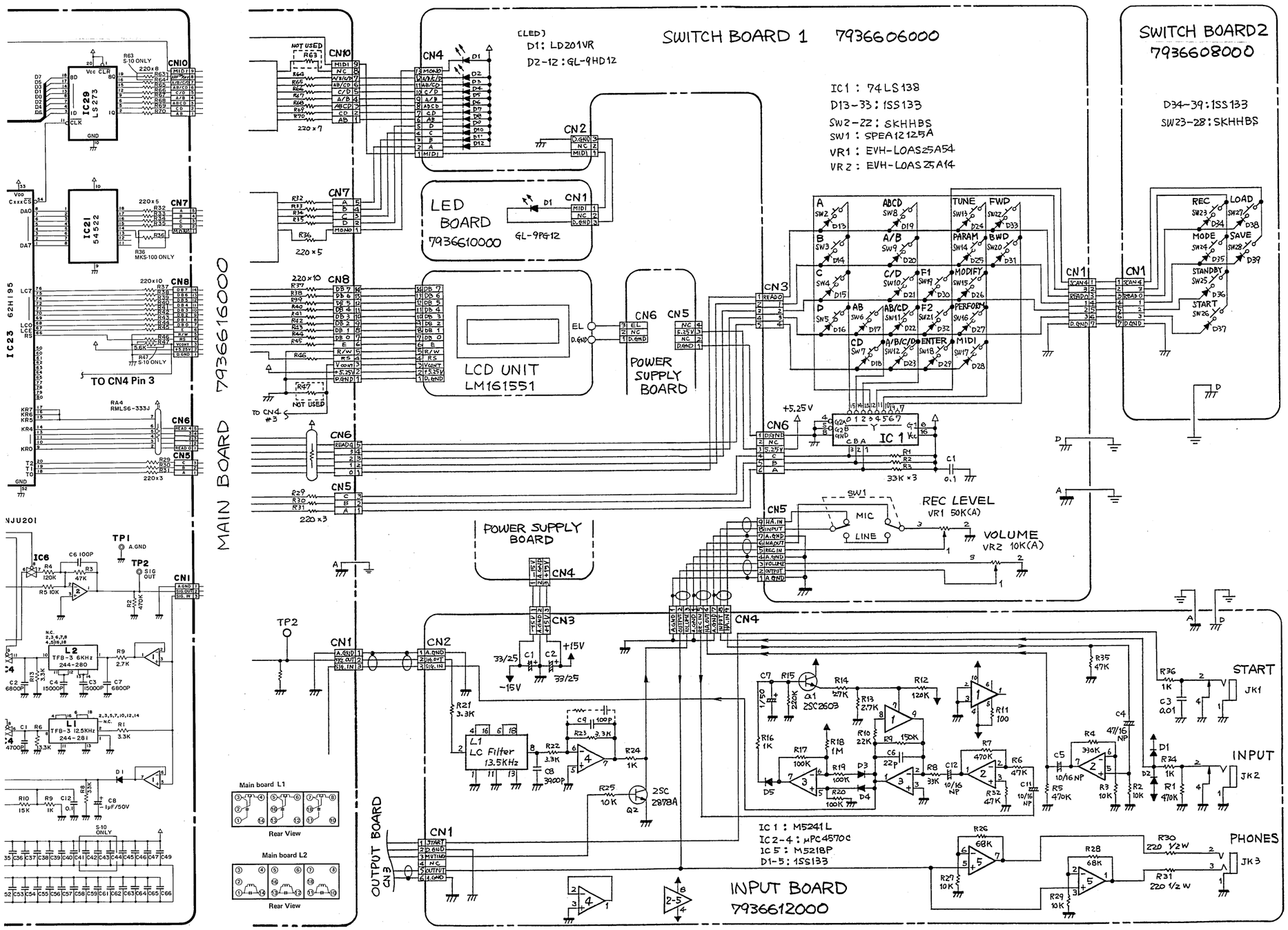
Replacement for ICs 2–4 should be μPC4570C only otherwise S/N ratio will become lowered.

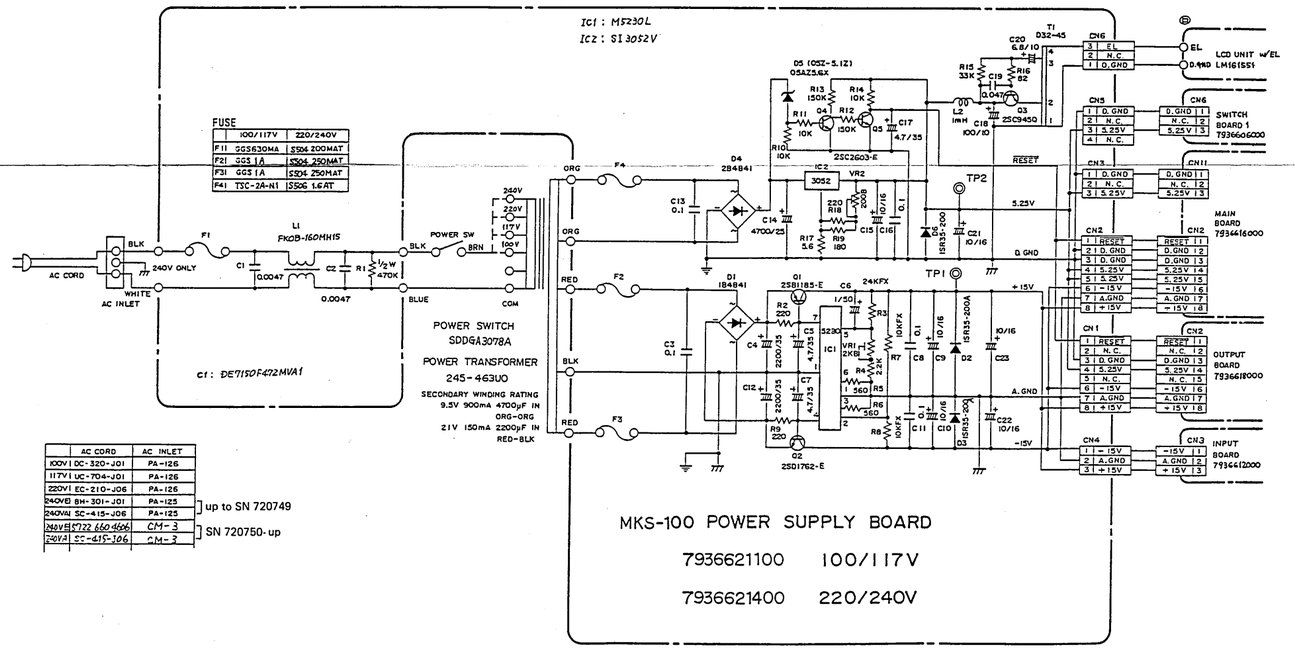
IC2-4を交換する場合は、μPC4570Cのみを使用。
(S/N比向上のため)

INPUT BOARD
7936612000
(pcb 22925406000 1/4)



CIRCUIT DIAGRAM





	AC CORD	AC INLET	
100V	DC-320-J01	PA-126	
117V	UC-704-J01	PA-126	
220V	EC-210-J06	PA-126	
240VB	BH-301-J01	PA-125	up to SN 720749
240VA	SC-415-J06	PA-125	
240V	ST22 660 4606	CM-3	SN 720750- up
240V2	EC-415-J06	CM-3	

Compatibility

Any voltage version of MKS-100 Power Supply Board can work with S-10 and vice verse, provided that the following modifications are done.

Replace on-board heat sink and wirings with one existing on a given product. Change fuses as necessary.

互換性について

MKS-100とS-10の電源基板は下記の変更を行なうことにより相互に使用可能となります。

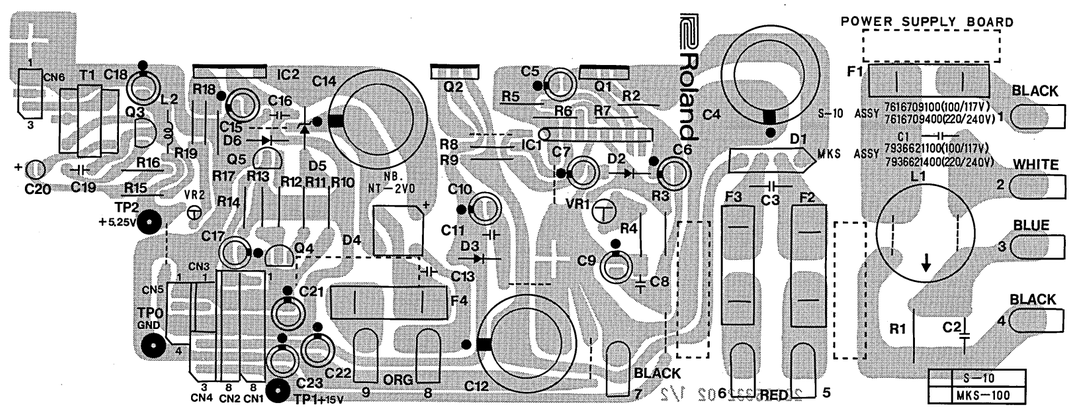
補修基板上のヒートシンクおよびワイヤリングを製品で使用中のものと取り換える。

電圧が異なってる場合はヒューズも交換する。

POWER SUPPLY BOARD

7936621100 (pcb 22925332 1/2) 100/117V

7936621400 (pcb 22925332 1/2) 220/240V

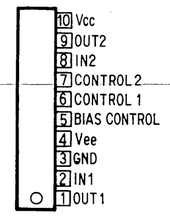


IC DATA

VCA

5241L

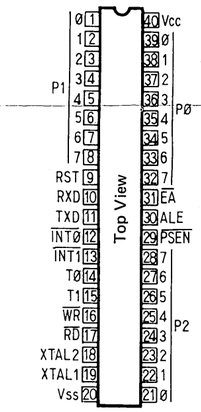
Top View



CPU

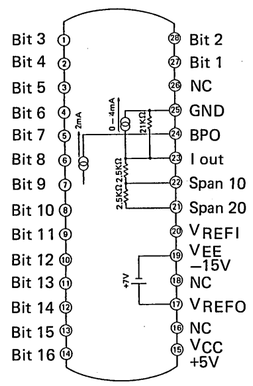
8032

Top View

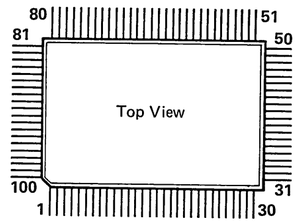


EHK-MD6209 D/A CONVERTER

Top View



RF5C36



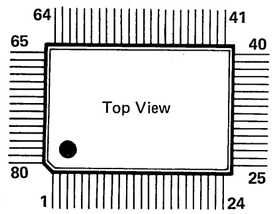
SAMPLER CUSTOM IC

PIN No	PIN NAME	I/O	PIN No	PIN NAME	I/O
1	WTWR	O	51	DA9	O
2	RAS	O	52	DA10	O
3	CAS0	O	53	DA11	O
4	CAS1	O	54	DA12	O
5	CAS2	O	55	DA13	O
6	CAS3	–	56	DA14	O
7	VCC	O	57	DA15	O
8	WTAO	O	58	VCC	–
9	WTA1	O	59	SH	O
10	WTA2	O	60	MXA	O
11	WTA3	O	61	MXB	O
12	WTA4	O	62	MXC	O
13	WTA5	O	63	MXD	O
14	WTA6	O	64	INH	O
15	WTA7	O	65	RST	I
16	WTA8	O (NC)	66	SYNO	O
17	WTA9	O (NC)	67	SYN1	I
18	WTA10	O (NC)	68	TEST2	I
19	WTA11	O (NC)	69	TEST1	I
20	WTA12	O (NC)	70	XTAL1	XIN
21	WTA13	O (NC)	71	XTAL2	XOUT
22	WTA14	O (NC)	72	TESTCK	I
23	WTA15	O (NC)	73	WR	I
24	WTA16	O (NC)	74	RD	I
25	WTA17	O	75	CS	I
26	GND	–	76	A0	I
27	WTD0	I/O	77	A1	I
28	WTD1	I/O	78	A2	I
29	WTD2	I/O	79	A3	I
30	WTD3	I/O	80	GND	–
31	WTD4	I/O	81	VCC	–
32	WTD5	I/O	82	A4	I
33	WTD6	I/O	83	A5	I
34	WTD7	I/O	84	A6	I
35	WTD8	I/O	85	A7	I
36	WTD9	I/O	86	A8	I
37	WTD10	I/O	87	A9	I
38	WTD11	I/O	88	A10	I
39	VCC	–	89	A11	I
40	SARin	I	90	A12	I
41	GND	–	91	DB0	I/O
42	DA0	O	92	DB1	I/O
43	DA1	O	93	DB2	I/O
44	DA2	O	94	DB3	I/O
45	DA3	O	95	DB4	I/O
46	DA4	O	96	DB5	I/O
47	DA5	O	97	DB6	I/O
48	DA6	O	98	DB7	I/O
49	DA7	O	99	INT	O
50	DA8	O	100	GND	–

* XIN, XOUT : crystal

* OUTPUT LOAD CONDITION : CL=100pF

MB62H195



I/O GATE ARREY

No	I/O	NAME	No	I/O	NAME	No	I/O	NAME	No	I/O	NAME
1	O	DA7	21	O	T3	41	I/O	D0	61	O	DI0
2	O	DA6	22	O	T4	42	O	A0	62	O	DC2
3	O	DA5	23	–	NC	43	O	A1	63	–	NC
4	O	DA4	24	O	5xxxCS	44	O	A2	64	O	DC1
5	O	DA3	25	O	LED	45	O	A3	65	O	DC0
6	O	DA2	26	I	WR	46	O	A4	66	O	RS
7	O	DA1	27	I	RD	47	O	A5	67	O	LCE
8	O	DA0	28	I	A12	48	O	A6	68	O	LCO
9	I	KR0	29	I	A13	49	O	A7	69	O	LC1
10	I	KR1	30	I	A14	50	O	ROM	70	O	LC2
11	I	KR2	31	I	A15	51	O	4xxxCS	71	O	LC3
12	–	GND	32	I	ALE	52	–	GND	72	O	LC4
13	I	KR3	33	–	VDD	53	O	6xxxCS	73	–	VCC
14	I	KR4	34	I/O	D7	54	O	CxxxCS	74	O	LC5
15	I	KR5	35	I/O	D6	55	O	OUTO	75	O	LC6
16	I	KR6	36	I/O	D5	56	O	ADC	76	O	LC7
17	I	KR7	37	I/O	D4	57	I	Sin	77	O	DA11
18	O	T0	38	I/O	D3	58	O	SCR	78	O	DA10
19	O	T1	39	I/O	D2	59	O	Sout	79	O	DA9
20	O	T2	40	I/O	D1	60	O	DI1	80	O	DA8

CHANGE INFORMATION 変更案内

Software Revisions (IC26 Main Board) ROMバージョンアップ

ROM Ver. No. EFF. SN	DESCRIPTION	改良点
Ver. 1.02 700115 | 700149	Quick repetition of a note results in clicks due to DC drift. Ver. 1.02 eliminates the problem by assigning different module to each NOTE ON.	同一音が連打されると、DC変動による異音を発生した、NOTE ON毎に異ったモジュールがアサインされる様にする。
Ver. 1.04 700100 | 700114 720150 |	Feeding GATE inputs equal to or more than the number of voices in EXT GATE PLAY mode silences the voices for the time set by TRG G-TIME. Ver. 1.04 cures this problem.	EXT GATEPLAY モードにおいて、ボイスの数以上のゲート入力が加わると、TRIG G-TIMEで設定された時間不鳴りとなった。

Hardware Improvements 回路

EFF SN 実施製番	MAIN BOARD			INPUT BOARD	OUTPUT BOARD	
	PCB No. (etched) PCB No.(パターン側)	D12, C67 R105	IC1 IC5	IC2, IC3, IC4	L1, L2	R12
700100-700149	22925330 02	*1 surface mounted on foil side 裏付	NJM2068D-D	NJM2068D-D	On 220V Version only (surface mounted)	10K
720150-720849	22925330 03				On all Versions (surface mounted)	*3 2.2K
730850-731649	22925330 04	Component side 部品側	*2 uPC4570C	*2 uPC4570C	On all Versions (component side)	
741650-UP	22925330 05					

*1 Add these parts between IC10 (INH) and IC6 (pins 1, 16) as shown below. This will fatten INH pulse and improve S/N ratio during ENV release.

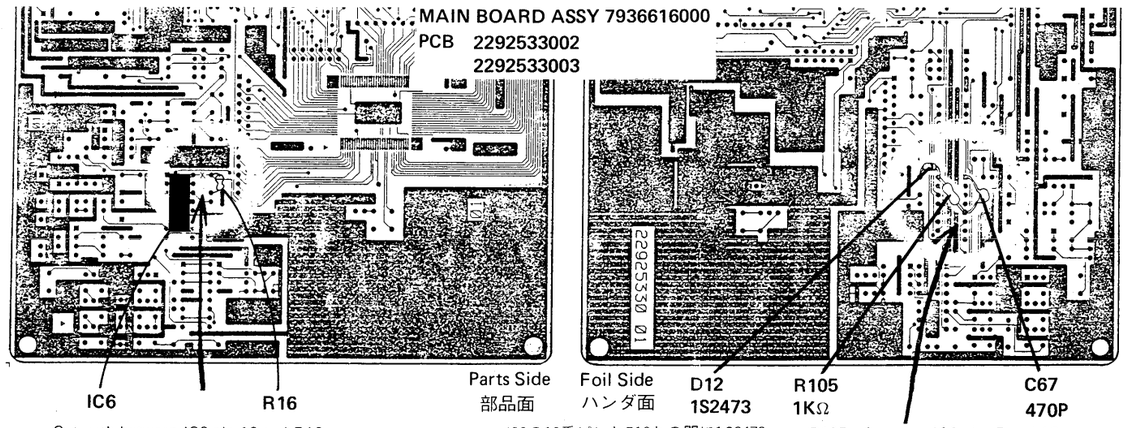
*2 To increase S/N ratio. Use μPC4570C only, when replacing. Also capacitor 1μ/50V (C68–C71) is connected to DC power source of these ICs (pins 4 and 8).

*3 To quicken response to MIDI IN.

*1 IC10のINHピンとIC6のピン1、16間に挿入、下図参照。INHのパルス巾を広げENVリリーズ時のノイズを軽減。

*2 SN比改良のため。補修用はμPC4570に限る。なお、これらICのピン4と8にもノイズ軽減のため、1μ/50Vを追加(C68-71)。

*3 MIDI入力に対する応答時間を縮めるため。



Cut path between IC6 pin 16 and R16
IC6の16番ピンとR16との間のパターンをカット

IC6の16番ピンとR16との間に1S2473
IC6の16番ピンと5番ピンとの間に1kΩ
IC6の1番ピンと5番ピンとの間に470PF

R105 : between IC6 pins 5 and 16
D12 : between IC6 pin 16 and R16
C67 : between IC6 pins 1 and 5

CHECKING AND ADJUSTING 点検および調整

NOTE
Running Diagnostic Programsdescribed on page 9 before any service will help fault isolation.

以下の項目、また修理、点検等を行う前に、９頁の「診断プログラム」や１７頁の「トラブルシューティング」も活用して下さい。

1. Power Supply

Instrument required . . .Digital voltmeter having 1mV resolution. Connect GND to TP-0 of power supply board.

Lithium Battery
With power off determine the voltage on TP-8 of main board. It must be more than 2.7V for positive memory backup.

+15V
Turn the switch on. Connect the meter to TP-1 of power supply board. Adjust VR1 of power supply board for a +15 ± 0.1V reading.

–15V
Verify that the voltage on the D3 anode is –15 ± 0.4V.

+5.25V
Connect the meter to TP-2 of power supply board. Adjust VR2 for +5.25 ± 0.005V reading.

1.電源

接続
測定器 ーー デジボル 分解能１ｍＶ以上
ＧＮＤを電源基板のＴＰ－０に接続する。

リチウムバッテリ
電源オフの状態で、メイン基板上のＴＰ－８の電圧を測定。
２．７Ｖ以上であること。

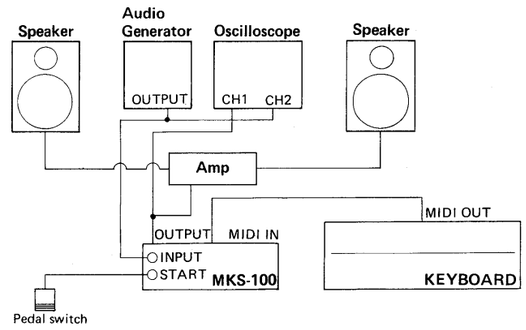
＋15V
電源をオンする。
電源基板のＴＰ－１にデジボルを接続。
ＶＲ１で ＋１５±０．１Ｖに調整する

－15V
Ｄ３アノードの電圧が、－１５±０．４Ｖ であることを確認する。

＋5.25V
電源基板のＴＰ－２にデジボルを接続する。
＋５．２５±０．００５ＶになるようＶＲ２を調整する。

2. REC

Setup



Controls
MKS-100
REC LEVEL . . . . . .MIN
INPUT LEVEL . . . . .LINE
OUTPUT LEVEL . . . .H
VOLUME . . . . . .MAX

SCOPE 0.1V/div
AG . . . . . .–20dB, 10KHz, sine

2-1. Level Meter

Press buttons in the order of A, REC and STAND-BY. Verify that the LCD shows the minimum level.

2. REC

接続

2-1. レベルメータ

ボタンをＡ，ＲＥＣ、ＳＴＡＮＢＹの順で押す。
ＬＣＤのレベル指示が最低のまま動かないことを確認する。

2-2. Output Level

Adjust REC LEVEL for 0.56 Vp-p ± 15% reading at OUTPUT jack.
Verify the level change at different OUTPUT LEVEL settings:

M . . . . . .0.092 Vp-p ± 15%
L . . . . . 0.010 Vp-p ± 15%

2-3. Input Level

Set AG output to –5dB.
Set INPUT LEVEL to MIC.
Verify the 0.56 Vp-p ± 15% at OUTPUT jack.
Leave the settings unchanged for the next step.

2-4. Filter

Press MODE and FWD. LCD will read.

SMP CLK = 30 kHz

The 10KHz, sine must be at OUTPUT jack.
Using α-dial set sampling clock to 15KHz and verify missing 10KHz signal.
Lower the input frequency to 1KHz and verify 1KHz at OUTPUT jack.

2-5. Start Jack

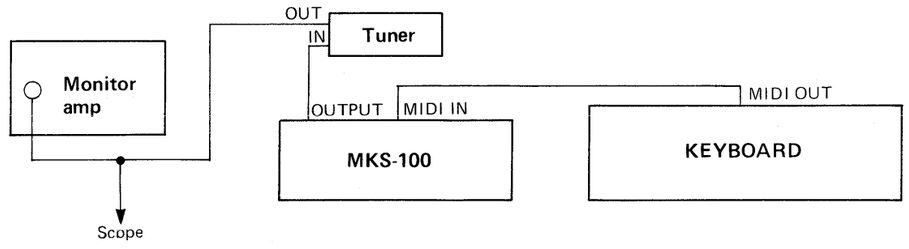
Set A.G. to –20dB, 10KHz, sine.
Start recording with the pedal.

2-6. REC Key

Press middle C (C4) and verify 10KHz signal at OUTPUT jack.
The output must be at 5KHz when C3 key is played.

3. TUNE

Setup



Record 442Hz sine into a QD. Load this QD.
Play A4 key (above middle C) and verify a 442Hz ± 1% output with the waveform as shown below.

2-2. アウトプット・レベル

ＯＵＴＰＵＴジャックにおけるレベルが　０．５６Ｖp-p ±１５%になるようＲＥＣ　ＬＥＶＥＬを調整する。
ＯＵＴＰＵＴ　ＬＥＶＥＬを切り替えた時の出力がは下記の値であること。

Ｍ　＝　０．０９２Ｖp-p±１５%
Ｌ　＝　０．０１０Ｖp-p±１５%

2-3. インプット・レベル

発振器の出力を　－５０ｄＢ に設定する。
ＩＮＰＵＴ　ＬＥＶＥＬ　を　ＭＩＣ に設定する。
ＯＵＴＰＵＴジャックからの出力は、０．５６Ｖp-p±１５%であること。
このままの状態で、２－４へ進む。

2-4. フィルタ

ＭＯＤＥ、次に　ＦＷＤ　を押す。ＬＣＤには、

SMP CLK = 30 kHz

が表示される。

ＯＵＴＰＵＴ　ジャックからは、１０ＫＨｚが出力される。
サンプリング・クロックを１５ＫＨｚに設定し１０ＫＨｚが出力されていないことを確認。
発振器を１ｋＨｚに設定する。１ｋＨｚのサイン波が出力されることを確認。

2-5. スタート・ジャック

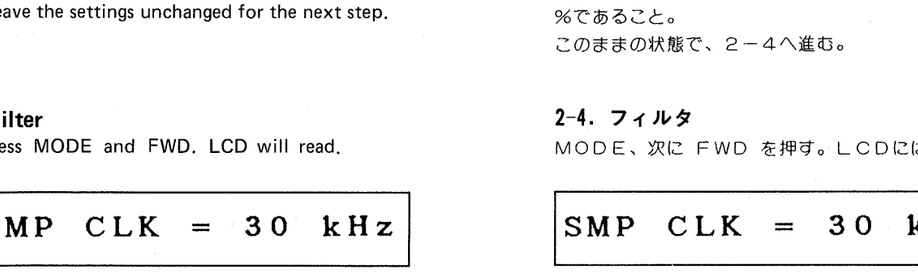
発振器を－２０ｄＢ，１０ＫＨｚ，サインに設定。
ペダルスィッチでレコーディングがスタートすることを確認。

2-6. REC KEY

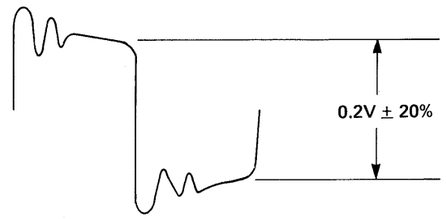
Ｃ４キー（中央Ｃ）を弾き、１０ＫＨｚのサイン波が出力されることを確認。
Ｃ３キーを弾く、出力は５ＫＨｚとなること。

3. チューン

接続



４４２Ｈｚの矩形波を録音してあるＱＤをロードする。
Ａ４（中央Ｃの上）キーを押す。出力は下図の様な波形でかつ４４２Ｈｚ±１%であることを確認。



4. ARPEGGIO

Press F2 then PERFORM. Turn Arpeggio on with α-dial. Press C, E and G keys and verify repetition of these signals on OUTPUT jack.

5. EXT Gate Play

Press PERFORM. Press FWD until display shows

Ext Gate Play

Press F1

– – – –

Set INPUT LEVEL to MIC and REC LEVEL to MIN.
Set AG to –50dB, 10kHz, sine.
Rotate α-dial to show a key note (C1 to G7).
Make sure that the note displayed becomes audible as REC LEVEL is turned clockwise.

6. NOISE LEVEL

Connect a noise meter to OUTPUT jack.

Set MKS-100 controls as follows:

OUTPUT LEVEL . . . . . H
INPUT LEVEL . . . . . LINE
VOLUME . . . . . MAX
REC LEVEL . . . . . MIN

Load the QD containing a 442Hz square wave.

Press buttons in the order of F1, REC MODE, FWD and FWD.
Press button F1, REC, MODE FWD and FWD in that order.
Using α-dial , select REC TRIG MANUAL.
Press START twice.
Verify S/N ratio of less than –85dB.
Press C4 key and verify S/N ratio of less than –80dB.

4. アルペジオ

ボタンＦ２、続けて　ＰＥＲＦＯＲＭ　を押す。
α-ＤＩＡＬ　で　ＡＲＰＥＧＧＩＯ　を　オン　にする。
Ｃ，Ｅ，Ｇのキーを押し、これらの音が順次繰り返されることを確認。

5. EXTゲート・プレイ

設定
発振器　-50dB，10KHz，sine
ＭＫＳ－１００
INPUT LEVEL -- MIC :　　REC LEVEL -- MIN

ＰＥＲＦＯＲＭを押す。下図の表示が出るまでＦＷＤを押す。

Ext Gate Play

Ｆ１を押す。

– – – –

が　表示される。
α-ＤＩＡＬでキーノート（Ｃ１－Ｇ７）を表示させる。
ＲＥＣ　ＬＥＶＥＬを右に回して行くと、表示されている音が出力されることを確認。

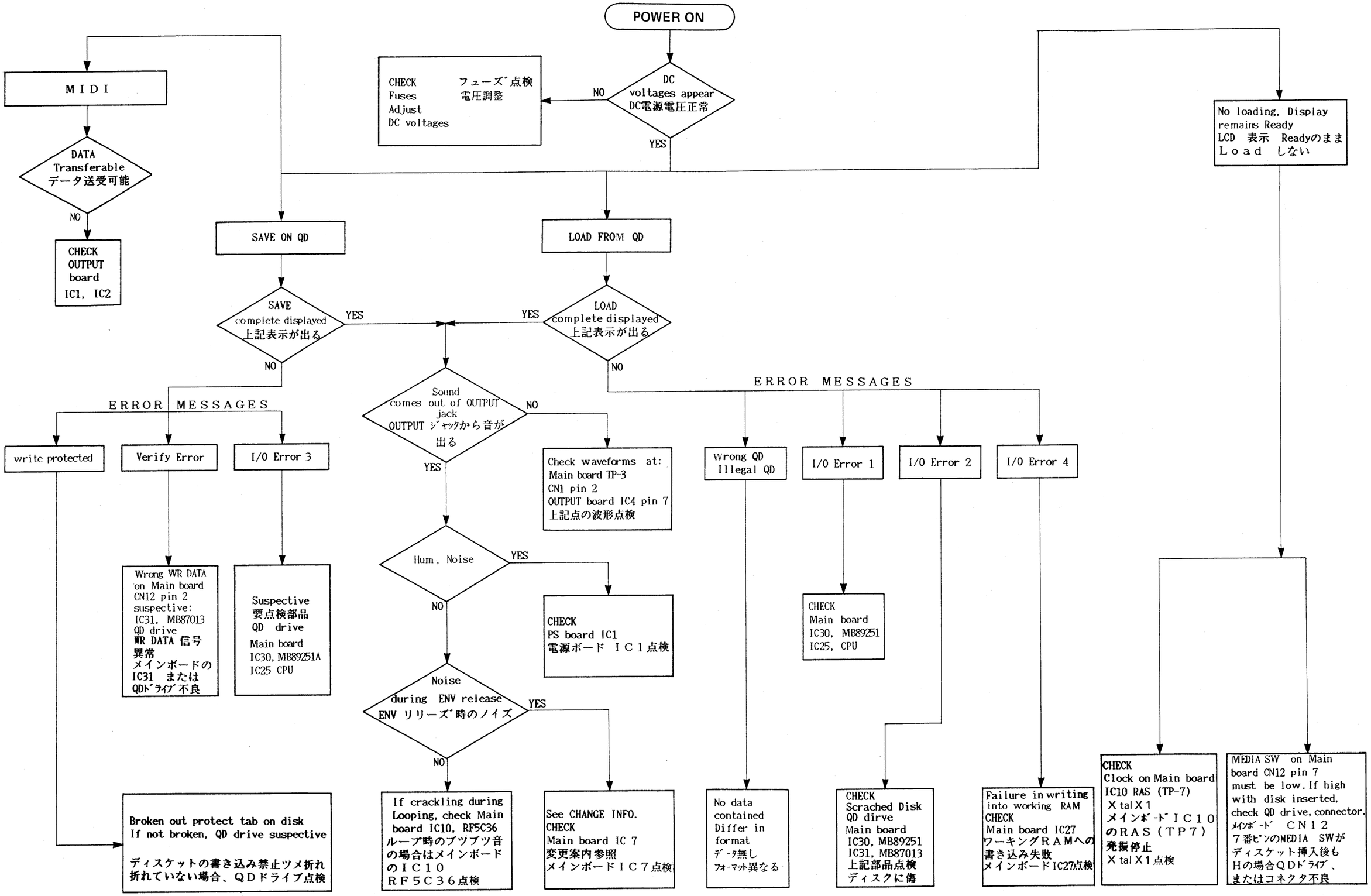
6. ノイズレベル

ノイズ・メータを　ＯＵＴＰＵＴ　ジャックに接続

設定
ＭＫＳ－１００
OUTPUT LEVEL ------- H
INPUT LEVEL -------- LINE
VOLUME ---------- MAX
REC LEVEL ---------- MIN

４４２Ｈｚの矩形波を録音してあるＱＤをロードする。
ボタン　Ｆ１，ＲＥＣ，ＭＯＤＥ、ＦＷＤ，　ＦＷＤを順番に押す。
α-ＤＩＡＬ　でＲＥＣ　ＴＲＩＧ　を　ＭＡＮＵＡＬに設定。
ＳＴＡＲＴを２回押す。
Ｓ／Ｎ比が　－８５ｄＢ以下であることを確認。
Ｃ４キーを押す。Ｓ／Ｎ比は－８０ｄＢ以下であること。

TROUBLESHOOTING　トラブルシューティング



MIDI IMPLEMENTATION

8-voice digital sampling module

1. TRANSMITTED DATA

Status	Second	Third	Description	
1011 nnnn	0000 0110	0vvv vvvv	Data Entry MSB	*1-1,2
1011 nnnn	0010 0110	0vvv vvvv	Data Entry LSB	*1-1,2
1011 nnnn	0110 0100	0vvv vvvv	RPC LSB	*1-1,2
1011 nnnn	0110 0101	0vvv vvvv	RPC MSB RPC # = 0, 1	*1-1,2
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 - 122	*1-1,3
1111 0000	... ...	1111 0111	System exclusive	*1-1,4

Notes :

*1-1 Transmitted if the corresponding function switch is ON.

*1-2 When BEND RANGE or MASTER TUNE is changed, RPC (Registered parameter control number) and its value are sent as follows.

BnH, 64H, pp, 65H, qq, 06H, mm, 26H, ll
pp,qq = RPC number LSB,MSB
mm,ll = parameter value MSB,LSB

RPC #	value MSB	value LSB	Description
0	0vvv vvvv	0000 0000	(Pitch bend sensitivity) BEND RANGE 0-12 semitone, 1 semitone step
1	0vvv vvvv	0vvv vvvv	(Master fine tuning) MASTER TUNE -99 - +99 cent, 1 cent step

*1-3 Program change number indicates the condition of the 'Sampling Structure'. (See Owner's manual)

*1-4 See section 3 (EXCLUSIVE COMMUNICATION).

2. RECOGNIZED RECEIVE DATA

Status	Second	Third	Description	
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF, velocity ignored	
1001 nnnn	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 24 - 103	*2-1
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 24 - 103 vvvvvvv = 1 - 127	*2-1
1011 nnnn	0000 0001	0vvv vvvv	Modulation depth	*2-2,3
1011 nnnn	0000 0110	0vvv vvvv	Data Entry MSB	*2-2,4
1011 nnnn	0010 0110	0vvv vvvv	Data Entry LSB	*2-2,4
1011 nnnn	0100 0000	0vvv vvvv	Hold1 OFF vvvvvvv = 0 - 63	*2-2
1011 nnnn	0100 0000	0vvv vvvv	Hold1 ON vvvvvvv = 64 - 127	*2-2
1011 nnnn	0110 0100	0vvv vvvv	RPC LSB	*2-2,4
1011 nnnn	0110 0101	0vvv vvvv	RPC MSB	*2-2,4
1100 nnnn	0ppp pppp		Program Change ppppppp = 0 - 127	*2-2,5
1110 nnnn	0vvv vvvv	0vvv vvvv	Pitch Bend Change	*2-2
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF	*2-6,7
1011 nnnn	0111 1100	0000 0000	OMNI OFF	*2-6
1011 nnnn	0111 1101	0000 0000	OMNI ON	*2-6
1011 nnnn	0111 1110	000m mmmm	MONO ON	*2-6
1011 nnnn	0111 1111	0000 0000	POLY ON	*2-6
1111 0000	... ...	1111 0111	System exclusive	*2-2,8

Notes :

*2-1 Note numbers outside the range 24 - 103 are ignored.

*2-2 Received if the corresponding function switch is ON.

*2-3 vvvvvvv = 0 : modulation OFF
vvvvvvv = 1 - 127 : modulation ON (Depth ignored.)

*2-4 RPC and value (Data Entry) are recognized as follows.

RPC #	value MSB	value LSB	Description
0	0vvv vvvv	0xxx xxxx	BEND RANGE (0-12 semitone, 1 semitone step) xxxxxxx is ignored.
1	0vvv vvvv	0vvv vvvv	MASTER TUNE (-99 - +99 cent, 1 cent step)

*2-5 Program number corresponds to the condition of the 'Sampling Structure'. (See Owner's manual)

*2-6 Mode Messages (123-127) are recognized also as ALL NOTES OFF. OMNI ON,OFF Messages are ignored.

MONO channel range 'mmmm' is recognized as follows.

1) 8-module mode (Normal, Velocity switch)

mmmm	True MONO channel range
0	8
1 - 8	1 - 8
9 - 127	8
Manual set	8

2) 4-module mode (Detune, Delay, Dual Tone, Velocity-Mix)

mmmm	True MONO channel range
0	4
1 - 4	1 - 4
5 - 127	4
Manual set	4

In MONO mode, channel of recognized each message is as follows.

	Control channel mode	
message	'BASIC'	'GLOBAL'
Note on/off	individual	individual
Control change	basic	global *
Mode message	basic	basic
Program change	basic	global *
Pitch bender	individual	individual
Exclusive	basic	basic

* Global channel is equal to "basic channel - 1".
And if basic channel is 1, global channel is 16.

*2-7 Ignored in MONO mode.

*2-8 See section 3 (EXCLUSIVE COMMUNICATION).

3. EXCLUSIVE COMMUNICATION

It is possible to communicate with exclusive messages, in NORMAL MODE and SAMPLE DATA DUMP MODE.

NORMAL MODE, in which it is possible to play and generate sound, is explained in section 4, 5.

SAMPLE DATA DUMP MODE has following 4 functions explained in section 6-9.
When 'F1' and 'MIDI' buttons are pressed, it becomes SAMPLE DATA DUMP MODE, and LCD shows "Sample Data Xmt". It means "ONE WAY SAMPLE DATA TRANSMIT".
Then 'FORWARD' button is pressed, LCD shows "Sample Data Xmt*". It means "HANDSHAKE SAMPLE DATA TRANSMIT".
Then 'FORWARD' button is pressed, LCD shows "Sample Data Rcv". It means "ONE WAY SAMPLE DATA RECEIVE".
Then 'FORWARD' button is pressed, LCD shows "Sample Data Rcv*". It means "HANDSHAKE SAMPLE DATA RECEIVE".
When 'BACKWARD' button is pressed, it changes reversely.

All exclusive communications are based on following structure (Roland Exclusive Format Type IV).

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0aaa aaaa	Command-ID #
[f 0bbb bbbb	Address MSB] [] depend on Command-ID
[g 0ccc cccc	Address]
[h 0ddd dddd	Address LSB]
[i 0eee eeee	Data]
[:	]
[j 0fff ffff	Checksum]
k 1111 0111	End of System Exclusive

Summed value of the all bytes between Command-ID and EOX must be 00H (7 bits). It is not include Command-ID and EOX.

4. EXCLUSIVE COMMUNICATIONS IN NORMAL MODE

4.1 Communication format

4.1.1 Request (One way) RQ1 11H
(Recognized only)

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0001 0001	Command-ID # (RQ1)	
f 0aaa aaaa	Address MSB	*4-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Size MSB	*4-2
j 0eee eeee	Size	
k 0fff ffff	Size LSB	
l 0ggg gggg	Checksum	
m 1111 0111	End of System Exclusive	

4.1.2 Data set (One way) DT1 12H
(Transmitted and recognized)

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0001 0010	Command-ID # (DT1)	
f 0aaa aaaa	Address MSB	*4-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Data	*4-3
:		
j 0eee eeee	Checksum	
k 1111 0111	End of System Exclusive	

Notes :

*4-1 If aaaaaaa - cccccc doesn't indicate the top address of the parameter, the message will be ignored.

*4-2 The data size is always ignored and regarded as the size of a parameter which is addressed by aaaaaaa - cccccc.

*4-3 Data of one parameter is sent at one time.
Data of only one parameter is recognized at one time.

5. Address mapping of parameters

Address of parameter

000000	Temporary wave parameter block-1		*5-1
0	0aaa aaaa	TONE NAME (ASCII) 9 bytes	*5-2
:			
9	0aaa aaaa	REC KEY 24 - 103	
0A	0aaa aaaa	BANK TUNE 14 - 64 - 114 (-50 - 0 - +50)	
0B	0aaa aaaa	LOOP TUNE 14 - 64 - 114 (-50 - 0 - +50)	
0C	0000 00aa	SCAN MODE 00 : FWD 01 : ALT 10 : BWD	
0D	0000 00aa	LOOP TYPE 00 : 1SHOT 01 : MAN 10 : AUTO	
0E	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd 0000 00ee	ST (start address) ee ddddcccc bbbbaaaa = 0 - NNNNNN	*5-3
13	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd 0000 00ee	END (end address) ee ddddcccc bbbbaaaa = 0 - MMMMMM	*5-3
18	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd 0000 00ee	LP (loop length) ee ddddcccc bbbbaaaa = 0 - MMMMMM	*5-3
1D	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd 0000 00ee	AEN (auto end address) ee ddddcccc bbbbaaaa = 4 - MMMMMM	*5-3,4
22	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd 0000 00ee	ALP (auto loop length) ee ddddcccc bbbbaaaa = 4 - MMMMMM	*5-3,4
27	0000 000a	KEY FOLLOW 0 : OFF 1 : ON	
28	0000 000a	PITCH BEND 0 : OFF 1 : ON	
29	0000 000a	VIBRATO 0 : OFF 1 : ON	
2A	0aaa aaaa	ENV V-SENS 0 - 127	
2B	0aaa aaaa	ENV RATE1 0 - 127	
2C	0aaa aaaa	ENV LEVEL1 0 - 127	
2D	0aaa aaaa	ENV RATE2 0 - 127	
2E	0aaa aaaa	ENV LEVEL2 0 - 127	
2F	0aaa aaaa	ENV RATE3 0 - 127	
30	0aaa aaaa	ENV LEVEL3 0 - 127	
31	0aaa aaaa	ENV RATE4 0 - 127	
32	0aaa aaaa	DYN RANGE 0 - 127	
33	0aaa aaaa	ABEND RATE 0 - 127	
34	0aaa aaaa	ABEND DPTH 0 - 127	
35	0aaa aaaa	SPT KEY#1 24 - 103	
36	0aaa aaaa	SPT KEY#2 24 - 103	*5-5
37	0aaa aaaa	SPT KEY#3 24 - 103	
000100	Temporary wave parameter block-2		
:			
37			
000200	Temporary wave parameter block-3		
:			
37			
000300	Temporary wave parameter block-4		
:			
37			
000800	Performance parameters		*5-6
0	0aaa aaaa	VIB RATE 0 - 127	
1	0aaa aaaa	M-VIB DPTH 0 - 127	
2	0aaa aaaa	D-VIB DPTH 0 - 127	
3	0aaa aaaa	D-VIB DLAY 0 - 127	
4	0000 000a	BEND MODE 0 : CONT 1 : CHRM	
5	0000 000a	ARP SYNC 0 : INT 1 : EXT	
6	0aaa aaaa	ARP RATE 0 - 127	
7	0000 00aa	ARP MODE 00 : UP 01 : DOWN 10 : U/D 11 : RND	
8	0000 00aa	ARP RANGE 00 : 1oct 01 : 2oct 10 : 3oct	
9	000a aaaa	ARP REPEAT 1 - 16	
A	0000 aaaa	ARP DECAY 1 - 10	
B	0aaa aaaa	V-MX THRSH 0 - 127	
C	0aaa aaaa	V-SW THRSH 0 - 127	
D	0000 000a	DTUN MOD 0 : FIX 1 : VELO	
E	0aaa aaaa	DTUN RANGE 0 - 127	
F	0000 000a	ABEND DES 0 : BOTH 1 : HALF	
10	0000 000a	BEND DEST 0 : BOTH 1 : HALF	
11	0aaa aaaa	DELAY TIME 0 - 127	
12	0aaa aaaa	DELAY LEVL 0 - 127	
13	0aaa aaaa	KEY OFFSET 52 - 64 - 76 (-12 - 0 - +12)	
14	0aaa aaaa	TRG G-TIME 0 - 127	
15	0aaa aaaa	TRIGGER KEY #1 23(OFF) - 103	
16	0aaa aaaa	TRIGGER KEY #2 23(OFF) - 103	
17	0aaa aaaa	TRIGGER KEY #3 23(OFF) - 103	
18	0aaa aaaa	TRIGGER KEY #4 23(OFF) - 103	
000900	Structure # of temporary wave parameter blocks		*5-7
0	0000 aaaa 0000 bbbb 0000 cccc 0000 dddd	aaaa : structure # of block-1 bbbb : structure # of block-2 cccc : structure # of block-3 dddd : structure # of block-4	
001000	0aaa aaaa	Write command switch	*5-8
001001	0000 000a	ARPEGGIO on/off 0 : OFF 1 : ON	*5-9
001002	0aaa aaaa	Sample dump mode switch	*5-10
001003	0000 00aa	Voice assign mode	*5-11

0 : MODE-0
1 : MODE-1
2 : MODE-2
3 : MODE-3

Notes :

*5-1 Temporary wave parameters
Transmitted when the parameter (except TONE NAME) is edited or 'Request data' is received.
When 'Data set' command is recognized, the corresponding parameter will be changed.
1-tone uses 1-temporary block, as following chart.
When layer mode (dual-tone, v-mix, v-switch) is selected, 2nd structure (whose LED is blinking) uses block-2,3.

sampling structure	block # (layer block #)
A	0 (2)
B	0 (2)
C	0 (2)
D	0 (2)
AB	0 (2)
CD	0 (2)
ABCD	0 -
A/B	0/1 (2/3)
C/D	0/1 (2/3)
AB/CD	0/1 -
A/B/C/D	0/1/2/3 -

*5-2 Transmitted only when 'Request data' is received.
If 2 or 4 blocks are used, the top block of them should be used for the communication.

*5-3 These value (NNNNNN, MMMMMM) depends on the sampling structure, as following chart.

structure	NNNNNN	MMMMMM
A	32763 (7FFBH)	32767 (7FFFH)
B	32763 (7FFBH)	32767 (7FFFH)
C	32763 (7FFBH)	32767 (7FFFH)
D	32763 (7FFBH)	32767 (7FFFH)
AB	65531 (FFFBH)	65536 (FFFFH)
CD	65531 (FFFBH)	65536 (FFFFH)
ABCD	131067 (1FFFBH)	131071 (1FFFFH)
A/B	32763 (7FFBH)	32767 (7FFFH)
C/D	32763 (7FFBH)	32767 (7FFFH)
AB/CD	65531 (FFFBH)	65536 (FFFFH)
A/B/C/D	32763 (7FFBH)	32767 (7FFFH)

And the address values must satisfy following conditions.
1: "[start address]+[loop length]" is equal to or less than "[end address]".
2: "[loop length]" is equal to or more than 4.

*5-4 Auto loop addresses are transmitted when it is displayed in edit mode. When Data set command is recognized, the parameter will be changed.

*5-5 If 2 or 4 blocks are used, the SPT KEY # of top block should be used for the communication.
Sampling structure A/B's or C/D's split point is SPT KEY#2.

*5-6 Performance parameters
Transmitted when the parameter (except TONE NAME) is edited or 'Request data' is received.
When Data set command (DT1) is recognized, the corresponding parameter will be changed.

*5-7 Structure # of temporary wave parameter
These can't be changed by Data set command (DT1).
Transmitted only when Request data command (RQ1) is received.
If the data of this address is requested to send, structure # of the temporary wave parameter block-n will be transmitted.
If the block would not be used, structure # is 0FH.

structure #	sampling structure
0	A
1	B
2	C
3	D
4	AB
5	CD
6	ABCD
0FH	Not used

*5-8 Write command switch
Transmitted when 'ENTER' button is pressed.
If any data would be written to this address, write the parameters in temporary area to wave parameter area of the banks on the condition of the sampling structure.
Request data command (RQ1) for this address is ignored.

*5-9 Arpeggio on/off switch
Transmitted when 'ARPEGGIO' button is pressed.
When Data set command (DT1) is recognized, arpeggio will turn to ON or OFF.
Request data command (RQ1) for this address is ignored.

*5-10 Sample dump mode switch
Transmitted when 'F1' and 'MIDI' button are pressed.
If any data is written to this address, the mode will change from NORMAL MODE to SAMPLE DATA DUMP MODE.
The transmitter should be wait more then 10msec for changing the mode.
Request data command (RQ1) for this address is ignored.

*5-11 Voice assign mode
Transmitted when the voice assign mode is changed with manual operation on the panel of MKS-100.
When Data set command (DT1) is recognized, the voice assign mode will be changed.
Request data command (RQ1) for this address is ignored.

The operation of changing voice assign mode is as follows.

Assign Mode-0 ... Pressing 'FWD', 'BWD' and 'MODE' button.
Assign Mode-1 ... Pressing 'FWD', 'BWD' and 'STANDBY' button.
Assign Mode-2 ... Pressing 'FWD', 'BWD' and 'START' button.
Assign Mode-3 ... Pressing 'F1' and 'F2' button in Assign Mode-1.

6. TRANSMITTED EXCLUSIVE MESSAGES IN SAMPLE DATA DUMP MODE

Sample data is determined by sampling structure.
It is transmitted in following order.

WAVE DATA - WAVE PARAMETER - PERFORMANCE PARAMETER

6.1 One way transfer

6.1.1 Data set DT1 12H

Transmitted when 'ENTER' button is pressed in 'Sample Data Xmt' mode.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #

d	0001 0000	Model-ID # (S-10, MKS-100)	
e	0001 0010	Command-ID # (DT1)	
f	0aaa aaaa	Address MSB	*6-1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*6-2
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

6.2 Handshaking communication

6.2.1 Want to send data WSD 40H

Transmitted when 'ENTER' button is pressed in 'Sample Data Xmt*' mode.

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0000	Command-ID # (WSD)	
f 0aaa aaaa	Address MSB	*6-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Size MSB	*6-3
j 0eee eeee	Size	
k 0fff ffff	Size LSB	
l 0ggg gggg	Checksum	
m 1111 0111	End of System Exclusive	

6.2.2 Request data RQD 41H

Transmitted when 'ENTER' button is pressed in 'Sample Data Rcv*' mode.

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0001	Command-ID # (RQD)	
f 0aaa aaaa	Address MSB	*6-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Size MSB	*6-3
j 0eee eeee	Size	
k 0fff ffff	Size LSB	
l 0ggg gggg	Checksum	
m 1111 0111	End of System Exclusive	

6.2.3 Data set DAT 42H

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0010	Command-ID # (DAT)	
f 0aaa aaaa	Address MSB	*6-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Data	*6-2
:		
j 0eee eeee	Checksum	
k 1111 0111	End of System Exclusive	

6.2.4 Acknowledge ACK 43H

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 0011	Command-ID # (ACK)
f 1111 0111	End of System Exclusive

6.2.5 End of data EOD 45H

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 0101	Command-ID # (EOD)
f 1111 0111	End of System Exclusive

6.2.6 Communication error ERR 4EH

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 1110	Command-ID # (ERR)
f 1111 0111	End of System Exclusive

6.2.7 Rejection RJC 4FH

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 1111	Command-ID # (RJC)
f 1111 0111	End of System Exclusive

Notes :

*6-1 Address is determined by sampling structure.

Address of first Data set command (DT1, DAT), Want to send data (WSD) or Request data (RQD) is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	020000	010000	010800
B	060000	:	:
C	0A0000	:	:
D	0E0000	:	:
AB	020000	:	:
CD	0A0000	:	:
ABCD	020000	:	:
A/B	020000	:	:
C/D	0A0000	:	:
AB/CD	020000	:	:
A/B/C/D	020000	010000	010800

*6-2 Number of data in one Data set command (DT1) is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	128	73	40
B	:	:	:
C	:	:	:
D	:	:	:
AB	:	:	:
CD	:	:	:
ABCD	:	73	:
A/B	:	146	:
C/D	:	:	:
AB/CD	:	:	:
A/B/C/D	128	146	40

*6-3 Size (MSB - LSB) is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	040000	000049	000028
B	:	:	:
C	:	:	:
D	040000	:	:
AB	080000	:	:
CD	080000	:	:
ABCD	100000	000049	:
A/B	080000	000112	:
C/D	080000	:	:
AB/CD	100000	000112	:
A/B/C/D	100000	000224	000028

7. RECOGNIZED EXCLUSIVE MESSAGES IN SAMPLE DATA DUMP MODE

Transmitted Sample data is determined by sampling structure.
It must be transmitted in following order.
WAVE DATA - WAVE PARAMETER - PERFORMANCE PARAMETER

*Following exclusive message is recognized only in SAMPLE DATA DUMP MODE.
When all sample data is received completely, sampling structure changes accordingly.

7.1 One way receive

7.1.1 Data set DT1 12H

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0001 0010	Command-ID # (DT1)	
f 0aaa aaaa	Address MSB	*7-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Data	*7-2
:		
j 0eee eeee	Checksum	
k 1111 0111	End of System Exclusive	

7.2 Handshaking communication

7.2.1 Want to send data WSD 40H

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0000	Command-ID # (WSD)	
f 0aaa aaaa	Address MSB	*7-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Size MSB	*7-3
j 0eee eeee	Size	
k 0fff ffff	Size LSB	
l 0ggg gggg	Checksum	
m 1111 0111	End of System Exclusive	

7.2.2 Request data RQD 41H

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0001	Command-ID # (RQD)	
f 0aaa aaaa	Address MSB	*7-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Size MSB	*7-3
j 0eee eeee	Size	
k 0fff ffff	Size LSB	
l 0ggg gggg	Checksum	
m 1111 0111	End of System Exclusive	

7.2.3 Data set DAT 42H

Byte	Description	
a 1111 0000	Exclusive status	
b 0100 0001	Roland ID #	
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d 0001 0000	Model-ID # (S-10, MKS-100)	
e 0100 0010	Command-ID # (DAT)	
f 0aaa aaaa	Address MSB	*7-1
g 0bbb bbbb	Address	
h 0ccc cccc	Address LSB	
i 0ddd dddd	Data	*7-2
:		
j 0eee eeee	Checksum	
k 1111 0111	End of System Exclusive	

7.2.4 Acknowledge ACK 43H

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 0011	Command-ID # (ACK)
f 1111 0111	End of System Exclusive

7.2.5 End of data EOD 45H

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 0101	Command-ID # (EOD)
f 1111 0111	End of System Exclusive

7.2.6 Communication error ERR 4EH

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 1110	Command-ID # (ERR)
f 1111 0111	End of System Exclusive

7.2.7 Rejection RJC 4FH

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Roland ID #
c 0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d 0001 0000	Model-ID # (S-10, MKS-100)
e 0100 1111	Command-ID # (RJC)
f 1111 0111	End of System Exclusive

Notes :

*7-1 Address of first Data set command (DT1, DAT), Want to send data (WSD) or Request data (RQD) is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	020000	010000	010800
B	060000	:	:
C	0A0000	:	:
D	0E0000	:	:
AB	020000	:	:
CD	0A0000	:	:
ABCD	020000	:	:
A/B	020000	:	:
C/D	0A0000	:	:
AB/CD	020000	:	:
A/B/C/D	020000	010000	010800

*7-2 Number of data in data set is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	2 - 244	73	40
B	:	:	:
C	:	:	:
D	:	:	:
AB	:	:	:
CD	:	:	:
ABCD	:	73	:
A/B	:	146	:
C/D	:	:	:
AB/CD	:	:	:
A/B/C/D	2 - 244	146	40

Number of data of WAVE DATA must be even.

*7-3 Size (MSB - LSB) is as follows.

structure	WAVE DATA	WAVE PARAMETER	PERFORMANCE PARAMETER
A	040000	000049	000028
B	:	:	:
C	:	:	:
D	040000	:	:
AB	080000	:	:
CD	080000	:	:
ABCD	100000	000049	:
A/B	080000	000112	:
C/D	080000	:	:
AB/CD	100000	000112	:
A/B/C/D	100000	000224	000028

8. Address mapping of SAMPLE DATA

Address

```
010000  ;       Wave parameter of block-1

010000  ; 0aaa aaaa ; TONE NAME

          9  ; 0000 aaaa ; SAMPLING STRUCTURE
          A  ; 0000 aaaa ; DESTINATION BANK
          B  ; 0000 abcd ;
                           a  BENDER          0 : OFF
                                              1 : ON

                           b  KEY FOLLOW      0 : OFF
                                              1 : ON

                           c  VIBRATO         0 : OFF
                                              1 : ON

                           d  SAMPLING RATE   0 : 30 kHz
                                              1 : 15 kHz

          C  ; 0000 aabb ;
                           aa LOOP MODE       00 : 1SHOT
                                              01 : MAN
                                              10 : AUTO

                           bb SCAN MODE       00 : FORWARD
                                              01 : ALTERNATE
                                              10 : BACKWARD

          D  ; 0000 aaaa ;
          E  ; 0000 bbbb ;
                           bbbb aaaa  REC KEY NUMBER

          F  ; 0000 0000 ; dummy
          10 ; 0000 0000 ; dummy
          11 ; 0000 aaaa ;
          12 ; 0000 bbbb ;
          13 ; 0000 cccc ;
          14 ; 0000 dddd ;
          15 ; 0000 eeee ;
          16 ; 0000 ffff ;
          17 ; 0000 gggg ;
          18 ; 0000 hhhh ;
          19 ; 0000 iiii ;
          1A ; 0000 jjjj ;
          1B ; 0000 kkkk ;
          1C ; 0000 llll ;
          1D ; 0000 mmmm ;
          1E ; 0000 nnnn ;
          1F ; 0000 oooo ;
          20 ; 0000 pppp ;
          21 ; 0000 qqqq ;
          22 ; 0000 rrrr ;
          23 ; 0000 ssss ;
          24 ; 0000 tttt ;
          25 ; 0000 uuvv ;
          26 ; 0000 ww00 ;
          27 ; 0000 0000 ; dummy
          28 ; 0000 xxyy ;
                           ww bbbbaaaa ddddcccc  START ADDRESS
                           uu ffffeeee hhhhgggg  MANUAL LOOP LENGTH
                           vv jjjjiiii llllkkkk  MANUAL END ADDRESS
                           xx nnnnmmmm ppppoooo  AUTO LOOP LENGTH
                           yy rrrrqqqq ttttssss  AUTO END ADDRESS

          29 ; 0000 aaaa ;
          2A ; 0000 bbbb ;
                           bbbbaaaa  BANK TUNE
          2B ; 0000 aaaa ;
          2C ; 0000 bbbb ;
                           bbbbaaaa  LOOP TUNE
          2D ; 0000 aaaa ;
          2E ; 0000 bbbb ;
                           bbbbaaaa  VELOCITY SENSE
          2F ; 0000 aaaa ;
          30 ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE RATE-1
          31 ; 0000 aaaa ;
          32 ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE RATE-2
          33 ; 0000 aaaa ;
          34 ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE RATE-3
          35 ; 0000 aaaa ;
          36 ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE RATE-4
          37 ; 0000 aaaa ;
          38 ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE LEVEL-1
          39 ; 0000 aaaa ;
          3A ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE LEVEL-2
          3B ; 0000 aaaa ;
          3C ; 0000 bbbb ;
                           bbbbaaaa  ENVELOPE LEVEL-3
          3D ; 0000 aaaa ;
          3E ; 0000 bbbb ;
                           bbbbaaaa  KEY SPLIT POINT-1
          3F ; 0000 aaaa ;
          40 ; 0000 bbbb ;
                           bbbbaaaa  KEY SPLIT POINT-2
          41 ; 0000 aaaa ;
          42 ; 0000 bbbb ;
                           bbbbaaaa  KEY SPLIT POINT-3
          43 ; 0000 aaaa ;
          44 ; 0000 bbbb ;
                           bbbbaaaa  DYNAMIC SENS
          45 ; 0000 aaaa ;
          46 ; 0000 bbbb ;
                           bbbbaaaa  AUTO BEND RATE
          47 ; 0000 aaaa ;
          48 ; 0000 bbbb ;
                           bbbbaaaa  AUTO BEND DEPTH

010049  ;
   :    ;       Wave parameter of block-2
010111  ;

010112  ;
   :    ;       Wave parameter of block-3
01015A  ;

01015B  ;
   :    ;       Wave parameter of block-4
010224  ;

010800  ;       Performance parameter

          0  ; 0000 aaaa ;
          1  ; 0000 bbbb ;
                           bbbbaaaa  EXTERNAL TRIGGER KEY NUMBER-1
          2  ; 0000 aaaa ;
          3  ; 0000 bbbb ;
                           bbbbaaaa  EXTERNAL TRIGGER KEY NUMBER-2
          4  ; 0000 aaaa ;
          5  ; 0000 bbbb ;
                           bbbbaaaa  EXTERNAL TRIGGER KEY NUMBER-3
          6  ; 0000 aaaa ;
          7  ; 0000 bbbb ;
                           bbbbaaaa  EXTERNAL TRIGGER KEY NUMBER-4
          8  ; 0000 aaaa ;
          9  ; 0000 bbbb ;
                           bbbbaaaa  EXTERNAL TRIGGER TRIGGER TIME
          A  ; 0000 aaaa ;
          B  ; 0000 bbbb ;
                           bbbbaaaa  ARPEGGIO RATE
          C  ; 0000 aa00 ; ARPEGGIO SYNC     00 : INTERNAL CLOCK
                                              01 : EXTERNAL CLOCK
          D  ; 0000 aabb ;
                           aa ARPEGGIO MODE       00 : UP
                                                  01 : DOWN
                                                  10 : UP/DOWN
                                                  11 : RANDOM
                           bb ARPEGGIO RANGE      00 : 1 OCTAVE
                                                  01 : 2 OCTAVE
                                                  10 : 3 OCTAVE
          E  ; 0000 aaaa ;
          F  ; 0000 bbbb ;
                           bbbbaaaa  ARPEGGIO REPEAT TIME
          10 ; 0000 aaaa ;
          11 ; 0000 bbbb ;
                           bbbbaaaa  ARPEGGIO DECAY RATIO
          12 ; 0000 aaaa ;
          13 ; 0000 bbbb ;
                           bbbbaaaa  VIBRATO RATE
          14 ; 0000 aaaa ;
          15 ; 0000 bbbb ;
                           bbbbaaaa  MANUAL VIBRATO DEPTH
          16 ; 0000 aaaa ;
          17 ; 0000 bbbb ;
                           bbbbaaaa  DELAY VIBRATO DEPTH
          18 ; 0000 aaaa ;
          19 ; 0000 bbbb ;
                           bbbbaaaa  DELAY VIBRATO TIME
          1A ; 0000 aaaa ;
          1B ; 0000 bbbb ;
                           bbbbaaaa  DELAY TIME OF DELAY MODE
          1C ; 0000 aaaa ;
          1D ; 0000 bbbb ;
                           bbbbaaaa  DELAY LEVEL OF DELAY MODE
          1E ; 0000 aaaa ;
          1F ; 0000 bbbb ;
                           bbbbaaaa  DELAY KEY OFFSET OF DELAY MODE
          20 ; 0000 aaaa ;
          21 ; 0000 bbbb ;
                           bbbbaaaa  DETUNE RANGE OF DETUNE MODE
          22 ; 0000 aaaa ;
          23 ; 0000 bbbb ;
                           bbbbaaaa  THRESHOLD LEVEL
                                      OF VELOCITY MIX MODE
          24 ; 0000 aaaa ;
          25 ; 0000 bbbb ;
                           bbbbaaaa  THRESHOLD LEVEL
                                      OF VELOCITY SWITCH MODE
```

```
      26  ; 0000 abcd ;
                        a  AUTO BEND DESTINATION OF DETUNE MODE
                                        0 : BOTH
                                        1 : HALF

                        b  BEND DESTINATION OF  DETUNE MODE
                                        0 : BOTH
                                        1 : HALF

                        c  BENDER MODE   0 : CONTINUOUS
                                        1 : CHROMATIC

                        d  DETUNE MODE   0 : FIX
                                        1 : VELOCITY

      27  ; 0000 0000 ; dummy

  020000  ;       Wave data of bank-1

       0  ; 0aaa aaaa ;
       1  ; 0bbb bb00 ;
                        aaaa aaabbbbb  Wave data
                                        (12 bit 2's complement)
          :     :
  057F7F  ;
  060000  ;
          :     :       Wave data of bank-2
  097F7F  ;
  0A0000  ;
          :     :       Wave data of bank-3
  0D7F7F  ;
  0E0000  ;
          :     :       Wave data of bank-4
  127F7F  ;
```

9. Sequence of communication

9.1 When one way data set of WAVE DATA is transmitted

```
this unit                message                objective unit
---------       --------------------            --------------

        DT1(WAVE DATA) ------------------>
            * time interval about 20 ms
        DT1(WAVE DATA) ------------------>
                       :
                       :
        DT1(WAVE DATA) ------------------>
        DT1(WAVE PARAMETER) ------------->
      { DT1(WAVE PARAMETER) -------------> }
        DT1(PERFORMANCE PARAMETER) ------>
```

9.2 When one way data set of WAVE DATA is received

```
this unit                message                objective unit
---------       --------------------            --------------

        <------------------ DT1(WAVE DATA)
           * wait time more than 20 ms
        <------------------ DT1(WAVE DATA)
                       :
        <------------------ DT1(WAVE DATA)
        <------------- DT1(WAVE PARAMETER)
      [ <------------- DT1(WAVE PARAMETER) ]
        <------ DT1(PERFORMANCE PARAMETER)
```

9.3 When want to send data is received

```
this unit                message                objective unit
---------       --------------------            --------------

        <------------------ WSD(WAVE DATA)
        ACK ------------------------------>
        <------------------ DAT(WAVE DATA)
        ACK ------------------------------>
                       :
        <------------------ DAT(WAVE DATA)
        ACK ------------------------------>
        <------------------------------ EOD
        ACK ------------------------------>
        <------------- WSD(WAVE PARAMETER)
        ACK ------------------------------>
        <------------- DAT(WAVE PARAMETER)
        ACK ------------------------------>
      { <------------- DAT(WAVE PARAMETER) }
      [ ACK ----------------------------> ]
        <------------------------------ EOD
        ACK ------------------------------>
        <------ WSF(PERFORMANCE PARAMETER)
        ACK ------------------------------>
        <------ DAT(PERFORMANCE PARAMETER)
        ACK ------------------------------>
        <------------------------------ EOD
        ACK ------------------------------>
```

9.4 When request data is received

```
this unit                message                objective unit
---------       --------------------            --------------

        <------------------ RQD(WAVE DATA)
        DAT(WAVE DATA) ------------------>
        <------------------------------ ACK
                       :
        DAT(WAVE DATA) ------------------>
        <------------------------------ ACK
        EOD ------------------------------>
        <------------------------------ ACK
        <------------- RQD(WAVE PARAMETER)
        DAT(WAVE PARAMETER) ------------->
        <------------------------------ ACK
      { DAT(WAVE PARAMETER) -------------> }
      { <------------------------------ ACK }
        EOD ------------------------------>
        <------------------------------ ACK
        <------ RQD(PERFORMANCE PARAMETER)
        DAT(PERFORMANCE PARAMETER) ------>
        <------------------------------ ACK
        EOD ------------------------------>
        <------------------------------ ACK
```

Notes :

*When it receives ERR, it sends same data set again.

*When a transmitting MKS-100 receives any illegal command (ie. a note on etc.), it ignores and waits for legal command.

*When a receiving MKS-100 receives any illegal command (ie. a note on etc.), it ignores and waits for legal command.

*It sends RJC and stops sample dump sequence immediately, when sampling structure button is pressed.

*It stops the sequence immediately when it receives RJC.

8-voice digitai sampling module

MODEL MKS-100 MIDI Implementation Chart

Date: Oct. 18 1986
Version: 1.00

Function.....		Transmitted	Recognized	Remarks
Basic	Default	1-16	1-16	Memorized
Channel	Changed	1-16	1-16	
Mode	Default	×	Mode 3, 4	Memorized
	Messages	×	Poly, Mono	Omni on, off ignored
	Altered	**********		
Note		×	24-103	Depends on Key Range
Number	True voice	**********	24-103	
Velocity	Note ON	×	○ v=1-127	
	Note OFF	×	×	
After	Key's	×	×	
Touch	Ch's	×	×	
Pitch Bender		×	*1 0-12 semi-tone	9 bit resolution
Control Change	1	×	*1	Modulation
	64	×	*1	Hold 1
	100,101	*1, *2 (0, 1)	*1, *2 (0, 1)	RPC LSB, MSB
	6,38	*1, *2	*1, *2	Data Entry MSB, LSB
Prog Change		*1 0-122	*1 0-127	
	True #	**********	0-127	
System Exclusive		*1	*1	
System	Song Pos	×	×	
	Song Sel	×	×	
Common	Tune	×	×	
System	Clock	×	×	
Real Time	Commands	×	×	
Aux	Local ON/OFF	×	×	
	All Notes OFF	×	○ (123-127)	
Mes-	Active Sense	×	○	
sages	Reset	×	×	
Notes		*1 Can be set to ○ or × manually, and memorized. RPC=Registered parameter control number. RPC #0 : Pitch bend sensitivity RPC #1 : Master fine tuning Parameter values are given by Data Entry.		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No