

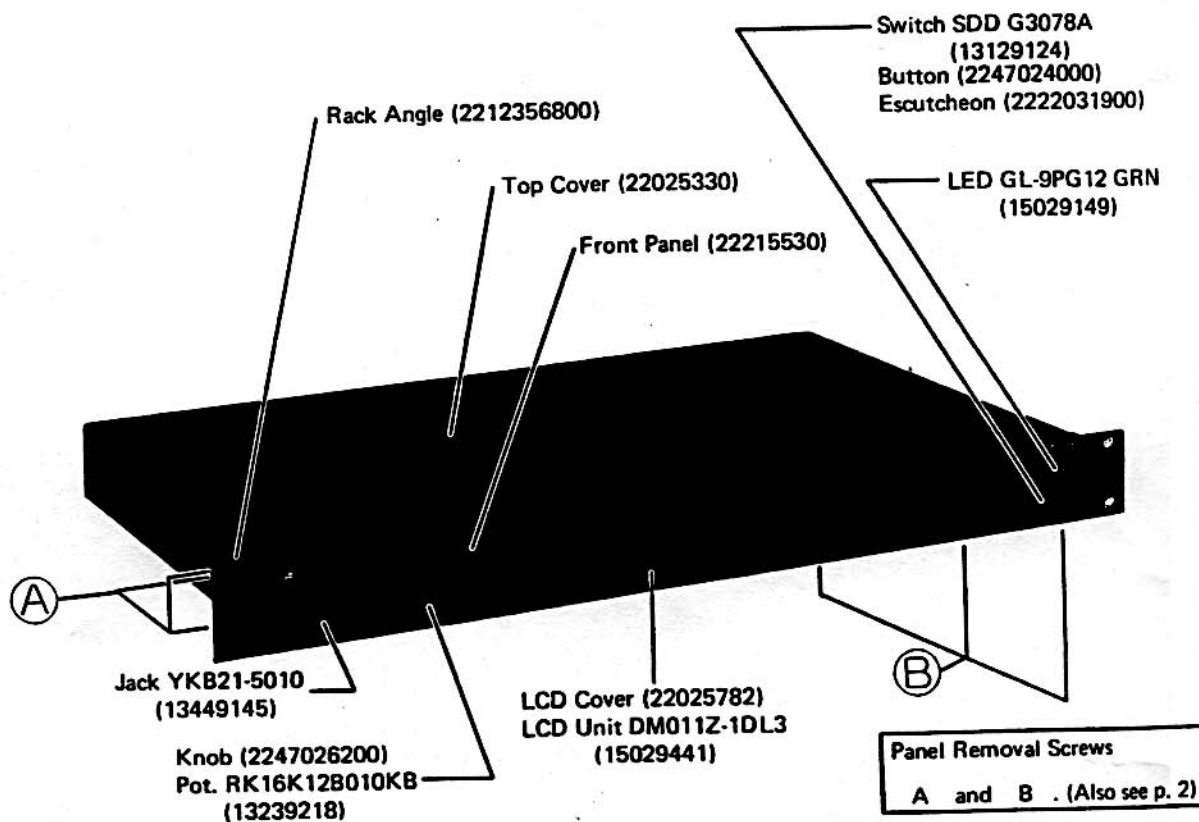
MKS-50

SERVICE NOTES

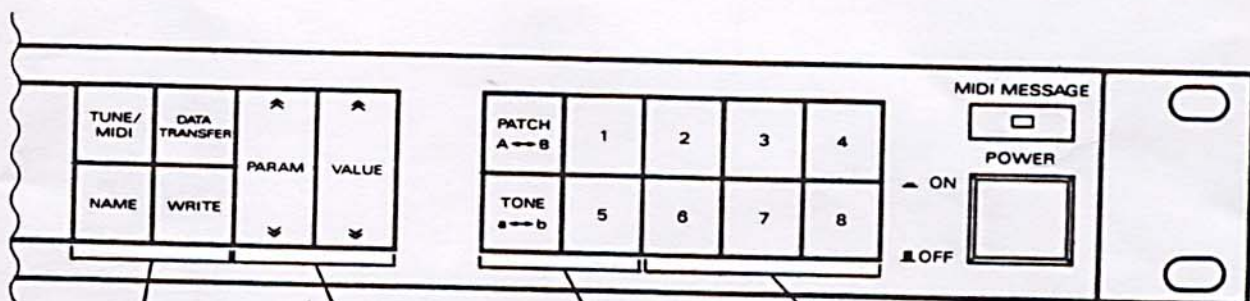
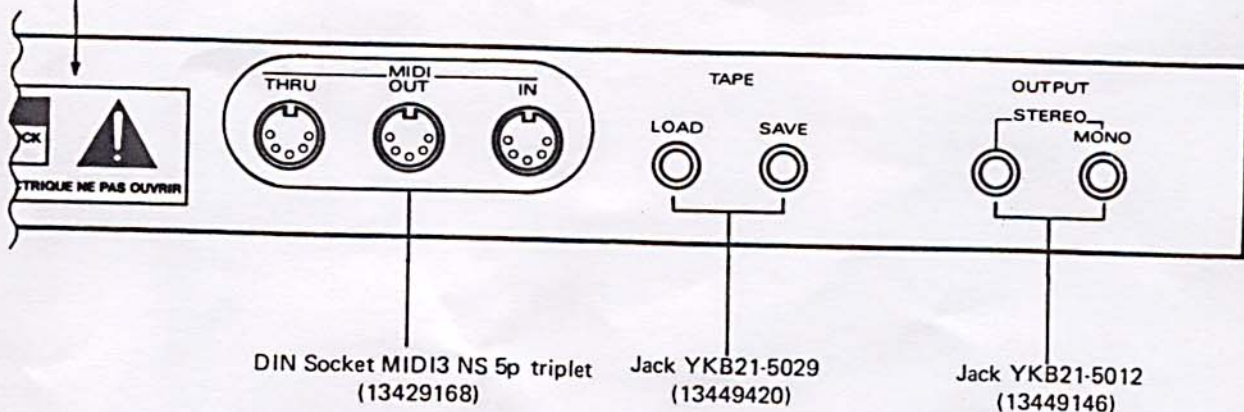
First Edition

SPECIFICATIONS

DCO	TUNE	±50 cents
	LFO MOD	±400 cents
	ENV MOD	±3200 cents
	AFTERTOUCH	±400 cents
	BENDER	±1200 cents
VCF	CUTOFF FREQ.	8Hz to 33kHz, -24dB/oct
	ENV MOD	±12 oct
	LFO MOD	±6 oct
	AFTERTOUCH	+6 oct
	KEY FOLLOW	0 - 100%
ENV	T1 4ms - 30s	
	T2 4ms - 30s	
	T3 8ms - 30s	
	T4 8ms - 30s	
LFO	RATE	0.03Hz - 60Hz
	DELAY TIME	0 - 30s
OUTPUT	AUDIO	-3dBm
	PHONES	8 - 150Ω Stereo
POWER CONSUMPTION	EXP	16W, 12W (Japan)
DIMENSIONS480(W) x 290(D) x 44(H) mm	
	18-7/8(W) x 11-7/16(D) x 1-3/4(H) in	
WEIGHT3.5kg, 7 lb, 120 oz	



Bottom Cover (22025331)



Button Assy A
(22475966)

Button Assy B
(22475967)

Button Assy C
(22475968)

Button Assy D
(22475969)

Set of the followings.

Button Frame 2P
(13129124)

Buttons
MIDI/TUNE
(22495501)

NAME
(22475699)

DATA TRANSFER
(22495502)

WRITE
(22495503)

Set of the followings.

Button Frame 2P
(13129124)

Buttons
PARAM
(22495504)

VALUE
(22495505)

Set of the followings.

Button Frame 2P
(13129124)

Buttons
PATCH A-B
(22495506)

TONE A-B
(22495507)

BUTTON 1
(22495508)

BUTTON 5
(22495515)

Set of the followings.

Button Frame 3P
(2247024000)

Buttons
BUTTON 2
(22495509)

BUTTON 3
(22495511)

BUTTON 4
(22495513)

BUTTON 6
(22495510)

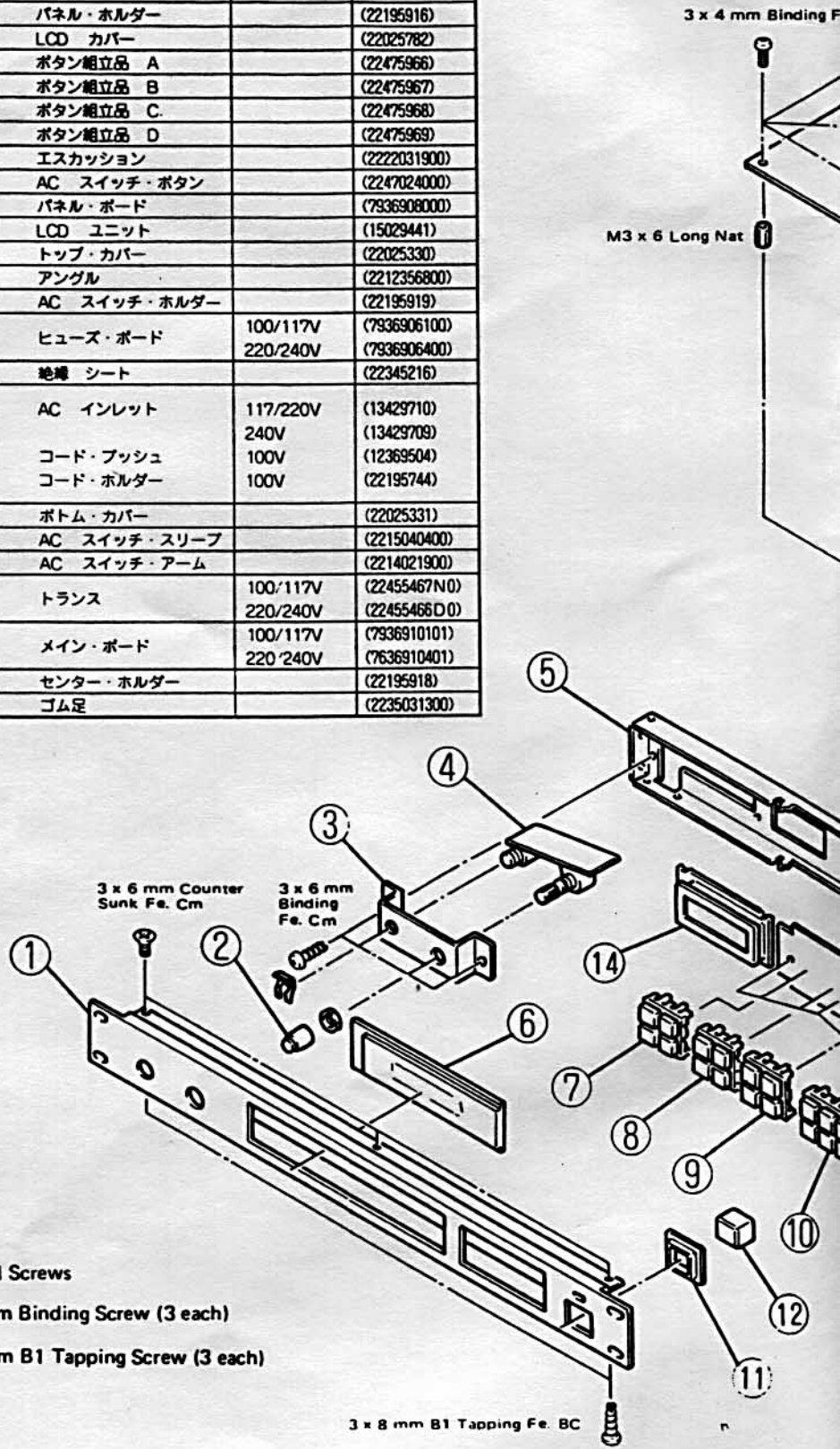
BUTTON 7
(22495512)

BUTTON 8
(22495514)

All switches : SKHHBS (13129733)

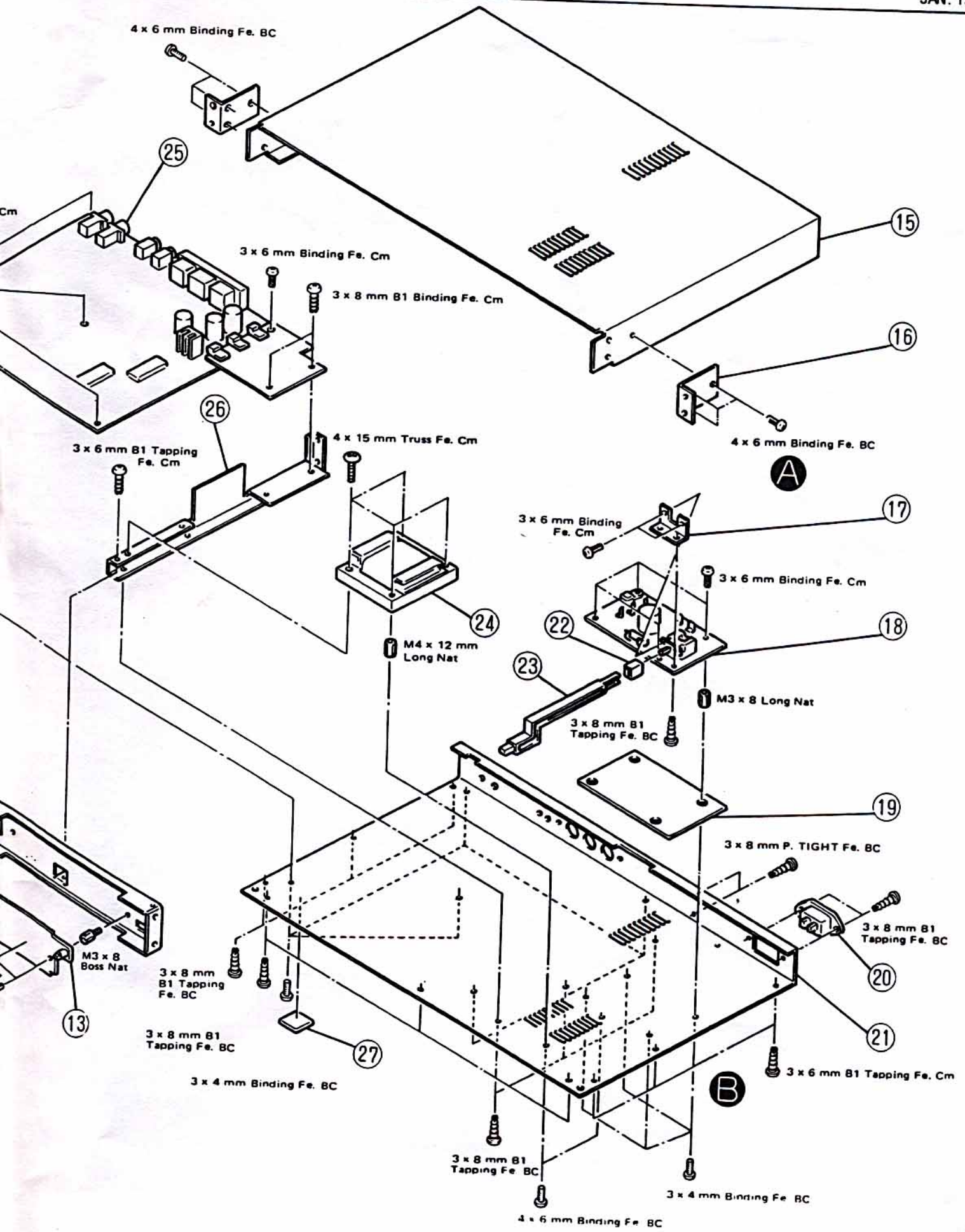
EXPLODED VIEW / 分解図

No	PART NAME (部品名)		PART. NO.
1	Front Panel	フロント・パネル	(222155300)
2	Knob	ボリューム・ツマミ	(2247026200)
3	Jack Holder	ジャック・ホルダ	(22195917)
4	Phone Board	フォン・ボード	(7936914000)
5	Panel Bracket	パネル・ホルダー	(22195916)
6	LCD Cover	LCD カバー	(22025782)
7	Button Assy A	ボタン組立品 A	(22475966)
8	Button Assy B	ボタン組立品 B	(22475967)
9	Button Assy C	ボタン組立品 C	(22475968)
10	Button Assy D	ボタン組立品 D	(22475969)
11	Escutcheon	エスカッション	(2222031900)
12	Button	AC スイッチ・ボタン	(2247024000)
13	Panel Board	パネル・ボード	(7936908000)
14	LCD Unit	LCD ユニット	(15029441)
15	Top Cover	トップ・カバー	(22025330)
16	Rack Angle	アングル	(2212356800)
17	Bracket	AC スイッチ・ホルダー	(22195919)
18	Fuse Board	ヒューズ・ボード	100/117V (7936906100) 220/240V (7936906400)
19	Insulating Shield	絶縁 シート	(22345216)
20	AC Inlet	AC インレット	117/220V (13429710) 240V (13429709)
	Cord Bushing	コード・ブッシュ	100V (12369504)
	Cord Holder	コード・ホルダー	100V (22195744)
21	Bottom Cover	ボトム・カバー	(22025331)
22	Sleeve	AC スイッチ・スリーブ	(2215040400)
23	Extension Shaft	AC スイッチ・アーム	(2214021900)
24	Power Transformer	トランス	100/117V (22455467N0) 220/240V (22455466D0)
25	Main Board	メイン・ボード	100/117V (7936910101) 220/240V (7636910401)
26	Center Bracket	センター・ホルダー	(22195918)
27	Rubber Foot	ゴム足	(2235031300)



Panel Removal Screws

- A 4 x 6 mm Binding Screw (3 each)
- B 3 x 6 mm B1 Tapping Screw (3 each)



PARTS LIST

PANEL/COVER

22215530		Front Panel
22025330		Top Cover
22025331		Bottom Cover
22025782		LCD Cover

KNOB, BUTTON

2247024000	Button	Power SW
2247026200	Knob	VOLUME
22475966	Button Assy A	NAME
2219076000	Button Frame 2p Buttons NAME, MIDI/TUNE, DATA TRANSFER, WRITE	
22475967	Button Assy B	
2219076000	Button Frame 2p Buttons PARAM, VALUE	
22475968	Button Assy C	
2219076000	Button Frame 2p Buttons PATCH A-B, TONE a-b, 1, 5	
22475969	Button Assy D	
2219076100	Button Frame 3p Buttons 2, 3, 4, 6, 7, 8	

SWITCH

13129124	SDD G3078A	Power SW
13129733	SKHHBS	light touch Panel Board

PCB ASSY

7936908000	(PCB 2292540701) 2/4	Panel Board
7936914000	(PCB 2292540701) 4/4	Phone Board
7936910101	(PCB 2292540701) 1/4	Main Board 100/117V
7936910401	(PCB 2292540701) 1/4	Main Board 220/240V
7936906100	(PCB 2292540701) 3/4	Fuse Board 100/117V
7936906400	(PCB 2292540701) 3/4	Fuse Board 220/240V

NOTE: Main and Fuse Boards.

Difference between voltage versions: Only in fuse system.

Any version can be supplied as a replacement for particular voltage order, with correct fuses. Specify the line voltage when ordering.

(メイン・ボードおよびヒューズボード)

電圧区分による違いはヒューズ値のみですので、補修用には異なった電圧のものが供給されることがあります。その際、ヒューズの値が適当か確認して下さい。

JACK

13449145	YKB21-5010	PHONES (stereo type)
13449146	YKB21-5012	OUTPUT (each)
13449420	YKB21-5029	TAPE (SAVE, LOAD, each)

SOCKET

13429168	MID13-NS	5P Triplet DIN
13429532	TDH4100-28B	28P ROM

CONNECTOR

13439333	IL-S-2P-S2T2-EF	2P	
13439330	IL-S-3P-S2T2-EF	3P	
13439331	IL-S-11P-S2T2-EF	11P	
13439343	PS-14PE-D-41T1-PN1	14P	
13439341	5277-05A	5P	Main to Power Transformer

FUSE

12559412	SD-6	200mA	100/117V prim.
12559335	T-GGS 1A	1A	100/117V F1, Main Brd
12559538	CEE-100mAT	100mA	220/240V prim.
12559546	CEE-630mAT	630mA	220/240V F1, Main Brd

CAPACITOR

13519695	DD107-959CH680J	68pF	Temperature Compensating
13639156S0		3300 μ F/16V	
13639194S0		1000 μ F/35V	
13529104	DE7150F472MAI	0.0047 μ F	Line Bypass

CAPACITOR ARRAY

13529127	B8ZC0111-32N	8200pF x 7	
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RESISTOR ARRAY

13919146	RKM14L503F	R-2R	Ladder Network
13919312	RMLS8-153J	15k x 10	
13919334	RMLS10-153J	15k x 8	
13919166	EXB-G810860S	VCF/VCA	

POSISTOR

15229919	ERS-A33J 561T	560 Ohm	
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POTENTIOMETER

13239118	RK16K12B010KB	10kB	slide VOLUME
13299197	EVN-D4A00B15	100kB	trimpot VCF FREQUENCY

POWER TRANSFORMER

22455467N0		100/117V
22455466D0		220/240V

AC CORD, AC CORD SET

13439801W0	VFF2.5m	100V
13439812F0	UC-704-J01	117V
13439813F0	DNS EC210-J06	220V
13439846	BH-301-J01	240V England
13439814F0	SC-415-J06	240V Australian

MISCELLANEOUS

12389765	Xtal	12MHz
15029441	DM011Z-1DL3	LCD Unit
12569329	CR2032-FT6	Lithium Battery
(12569149S0	CR2032-T12)	
12449229	FK0B-160MH15	Line Filter Coil
13529105	DSS310-55D223S	EMI Filter
2222031900	Escutcheon	Power SW
2214021900	Extension Shaft	Power SW
2215040400	Sleeve	Power SW
2235031300	Rubber Foot	
22345216	Insulating Shield	
12469137	16PC16	Heat Sink (Tr)
22465154	Heat Sink	Regulator
12169333	PS-307	LED Guide
2212356800	Rack Angle	Front Panel
12199556	MET41-0105	Snap Pin (Phone Jack)

IC

15179253	MSM80C31F	CPU
15179823	M5L27128K-2	EP-ROM
15179334	TC5564PL-20	RAM
15229835	MB87123P-G	DCO
15229834	MB62H195PF-G-BND	Gate Array
15229826	IR3R05	VCF, VCA
15229836	NJU7302	S/H
15219150	μ PD7001C	A/D Converter
15219157	M5241L	VCA
15159128T0	TC4050BP	Hex Buffer/ Converter Non-inverting
15159113H0	HD14051BP	8-channel Multiplexer/ Demultiplexer
15159114T0	TC4052BP	4-channel Multiplexer/ Demultiplexer
15159505	TC40H004P	Hex Inverter
15219213	MN3009	BBD
15169504	MN3101	BBD Driver
15189136	M5218L	Low-noise OP Amp
15189147N0	μ PC4072C	BI-FET OP Amp
15159159	μ PC4570HA	Low-noise OP Amp single in line
15199133	AN7815F	+ 15V Voltage Regulator
15199134	AN7915F	- 15V Voltage Regulator
15199135	LM78MR05	+ 5V Voltage Regulator and Reset

TRANSISTOR

15129152	2SC2878A	
15129153	2SC1740	
15119134	2SA933	
15019272	2SD1406-0	
15139118B0	2SK381CP	FET

DIODE

15019125	1SS133	
15019208	1SR35-200	100V/1A
(LED)		
15029149	GL-9PG12 green	MIDI MESSAGE
(RECTIFIER)		
15019245SN	S1VB10	100/1A
(15019243	1B4B41)	
150129272	2B4B41	100/1A

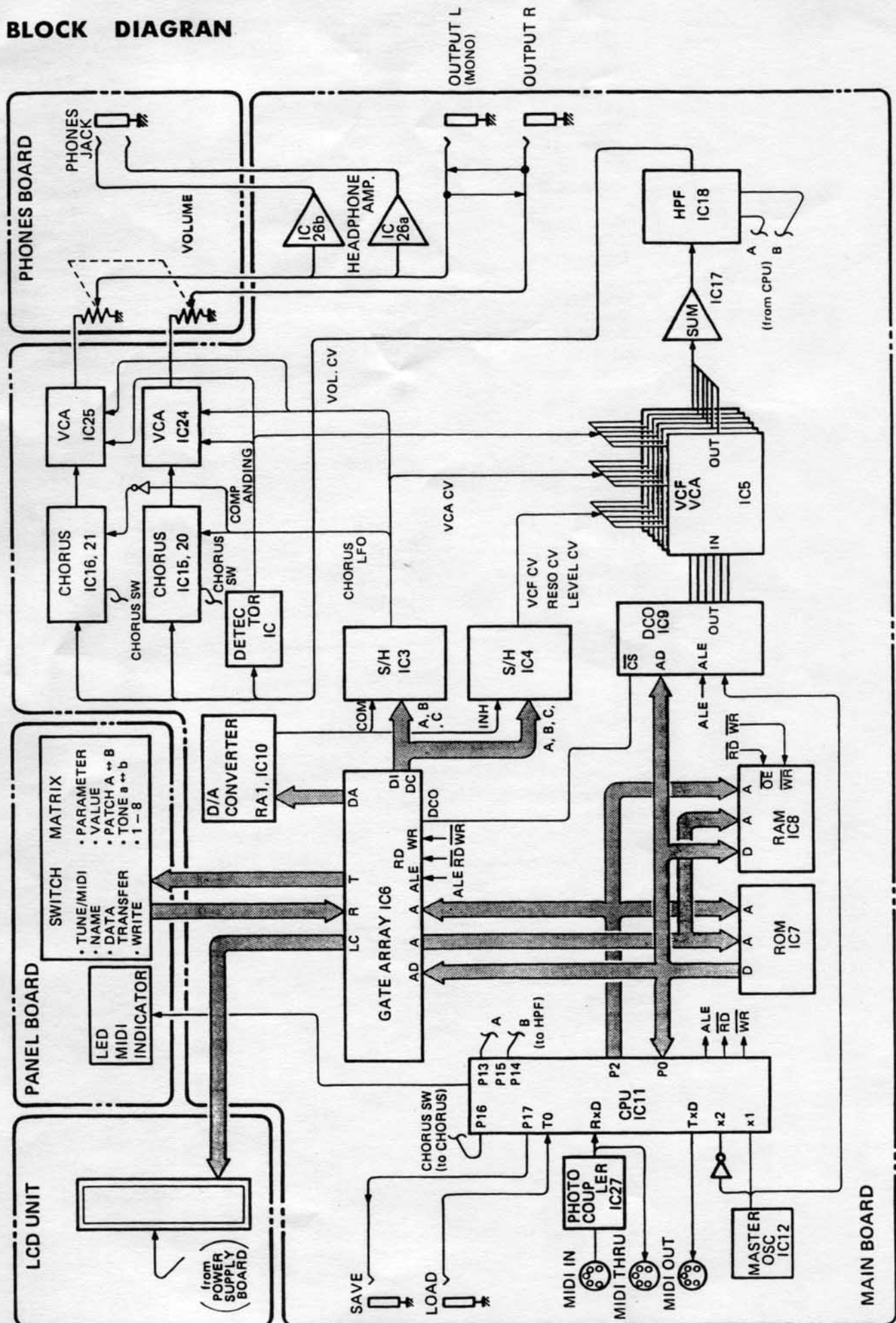
OPTOISOLATOR

15229706S0	PC910
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HOLDER

22195916	Bracket	Panel
22195917		Jack, MIDI
22195918	Center Bracket	Center
22195919	Bracket	Power SW
2219076000	Frame 2p	Button
2219076100	Frame 3p	Button

BLOCK DIAGRAM



CIRCUIT DESCRIPTION / 回路解説

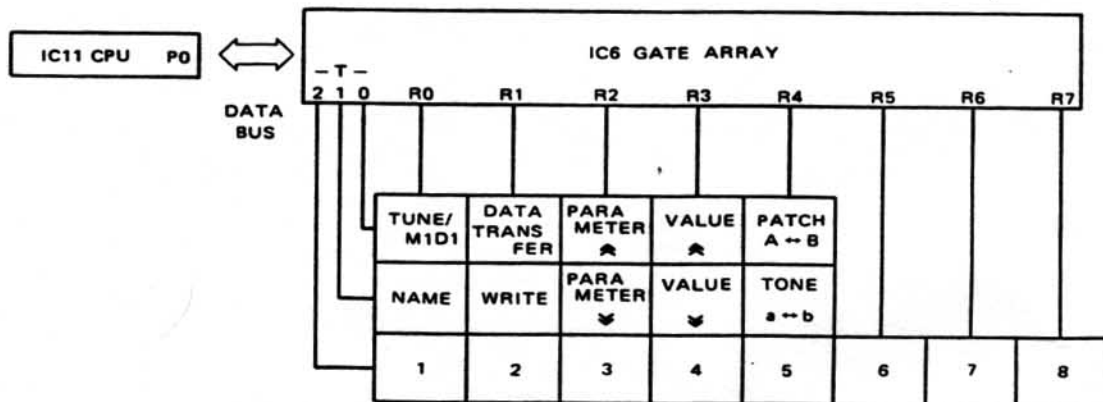
DESIGNATION	PIN NO.	FUNCTION	I/O		
P0 (Data Bus)	7 32	ROM RAM GATE ARRAY DCO Address Data	I/O		
	6 33		I/O		
	5 34		I/O		
	4 35		I/O		
	3 36		I/O		
	2 37		I/O		
	1 38		I/O		
	0 39		I/O		
	P1		7 8	SAVE (Serial Data OUTPUT for CMT)	O
			6 7	CHORUS SW	I
5 6		HPF A	I		
4 5		HPF B	I		
3 4		MIDI INDICATOR	I		
2 3		NC	I		
1 2		NC	I		
0 1		NC	I		
P2	7 28	GATE ARRAY Address ROM Address RAM Address	O		
	6 27		O		
	5 26		O		
	4 25		O		
	3 24		O		
	2 23		O		
	1 22		O		
	0 21		O		
P3	7 17	RD: RAM, GATE ARRAY READ PULSE	O		
	6 16	WR: RAM, GATE ARRAY WRITE PULSE	O		
	5 15	T1: NOT USED	I		
	4 14	T0: LOAD (Serial Data INPUT from CMT)	I		
	3 13	INT1: NOT USED	I		
	2 12	INT0: NOT USED	I		
	1 11	TXD: MIDI SERIAL OUTPUT	O		
	0 10	RXD: MIDI SERIAL INPUT	I		
RST	9	RESET PULSE INPUT	I		
X2	18	CLOCK INPUT	I		
X1	19		I		
Vss	20	GND	I		
PSEN	29	READ PULSE FOR ROM ONLY	O		
ALE	30	ADDRESS LATCH PULSE	O		
EA	31	EXT ROM MODE (LOW)	I		
Vcc	40	+5V	I		

CONTROLS READING

Various function controls (switches, external control jacks, etc.) on the MKS-50 are read into the CPU IC11 directly or through gate array IC6 or some appropriate devices (filter). Most of them are read group by group.

・ Panel Board

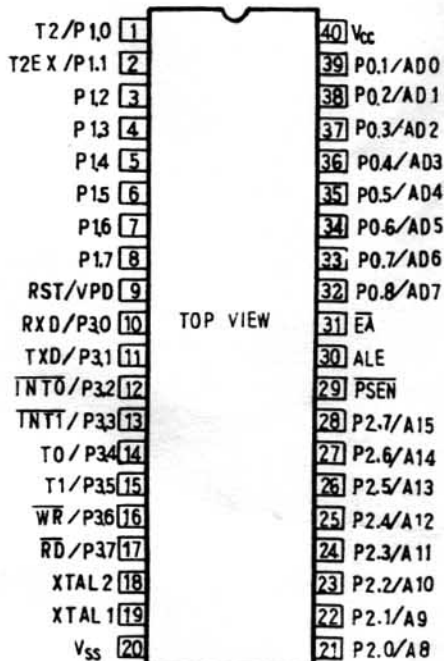
The 18 switches on the panel board are connected to gate array IC6 through 3 by 8 matrix.



Upon receiving switch scanning address on the CPU data bus P0, IC6 places latched data on T0-T2.

The 8 rows are pulled to low one by one while the switches on the low row are read through R0-R7. IC6 sends the switch status to the CPU IC11 through P0.

CPU IC11(Main Board) MSM80C31F



各種コントロールの読み込み

各ファンクション・コントロール (スイッチ, 外部ジャック) CPU11 に読み込まれます。それらは、直接読み込まれるものもあれば、ゲート・アレイ IC6 や専用デバイス (フィルター) を読み込まれるものもあります。

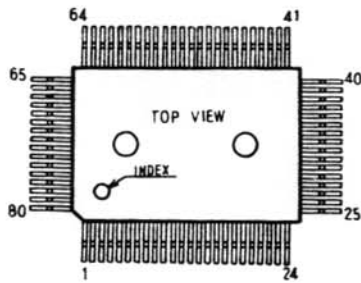
・ パネルボード

パネルボードには、合計18個のスイッチが下図のように3×8マトリクス上に並べられていて、ゲート・アレイ IC6 に接続されます。

CPU IC11 がデータバス P0 よりスキャン・アドレスをゲート・アレイ IC6 の AD に出力すると、ゲート・アレイ IC6 は 3本の順次ロー・レベルにしていきます。

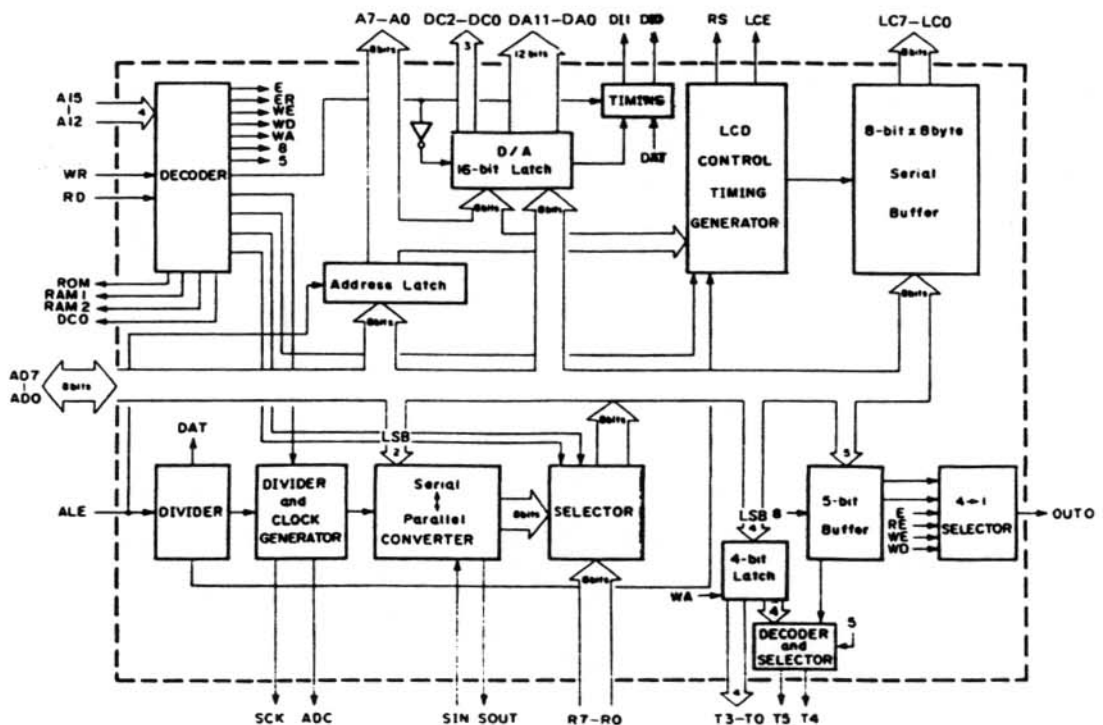
各スイッチの状態はゲート・アレイ IC6 の R0-T より取り込データ・バスを通じて CPU11 に転送されます。

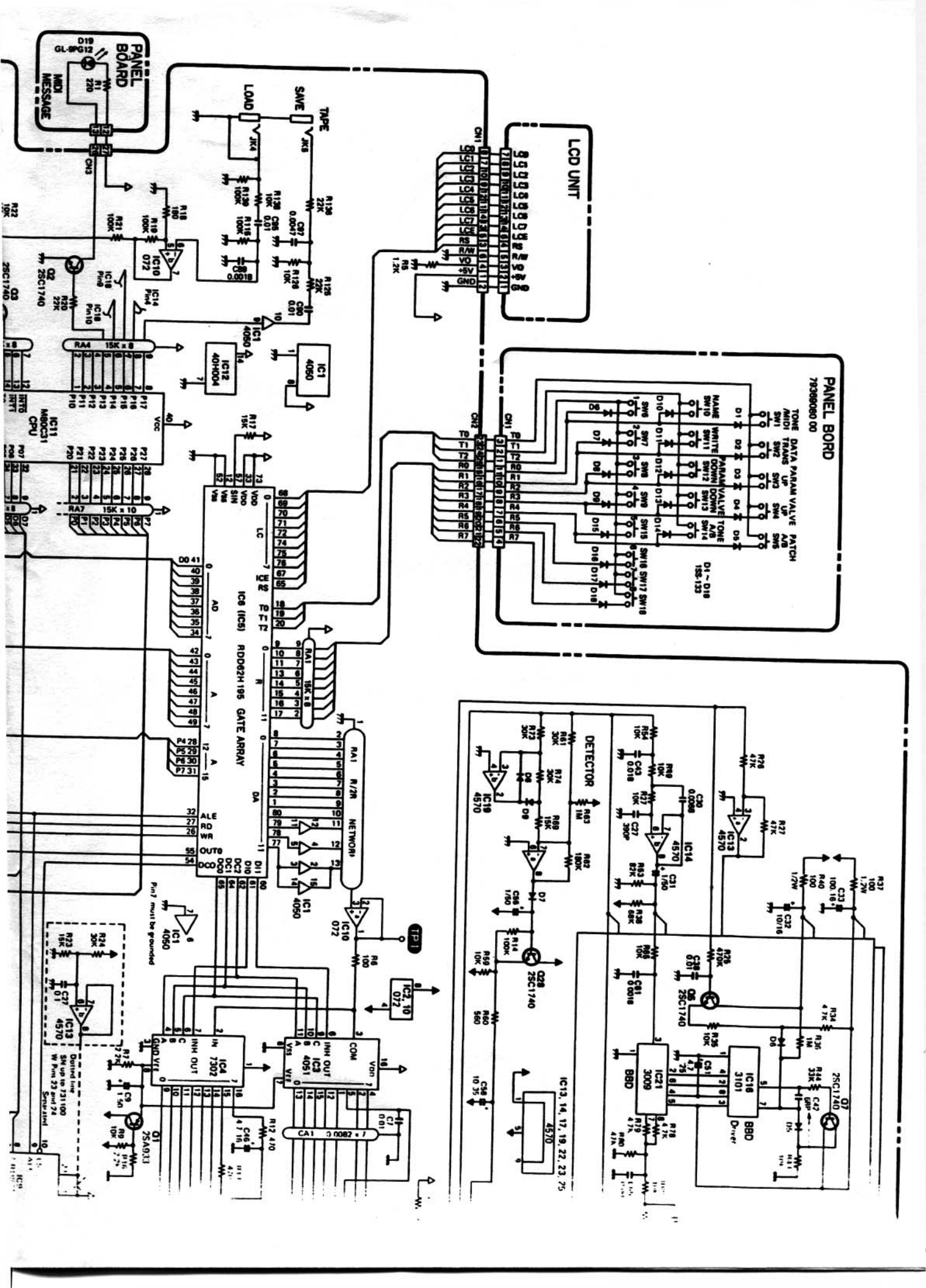
GATE ARRAY IC6(Main Board) MB62H195

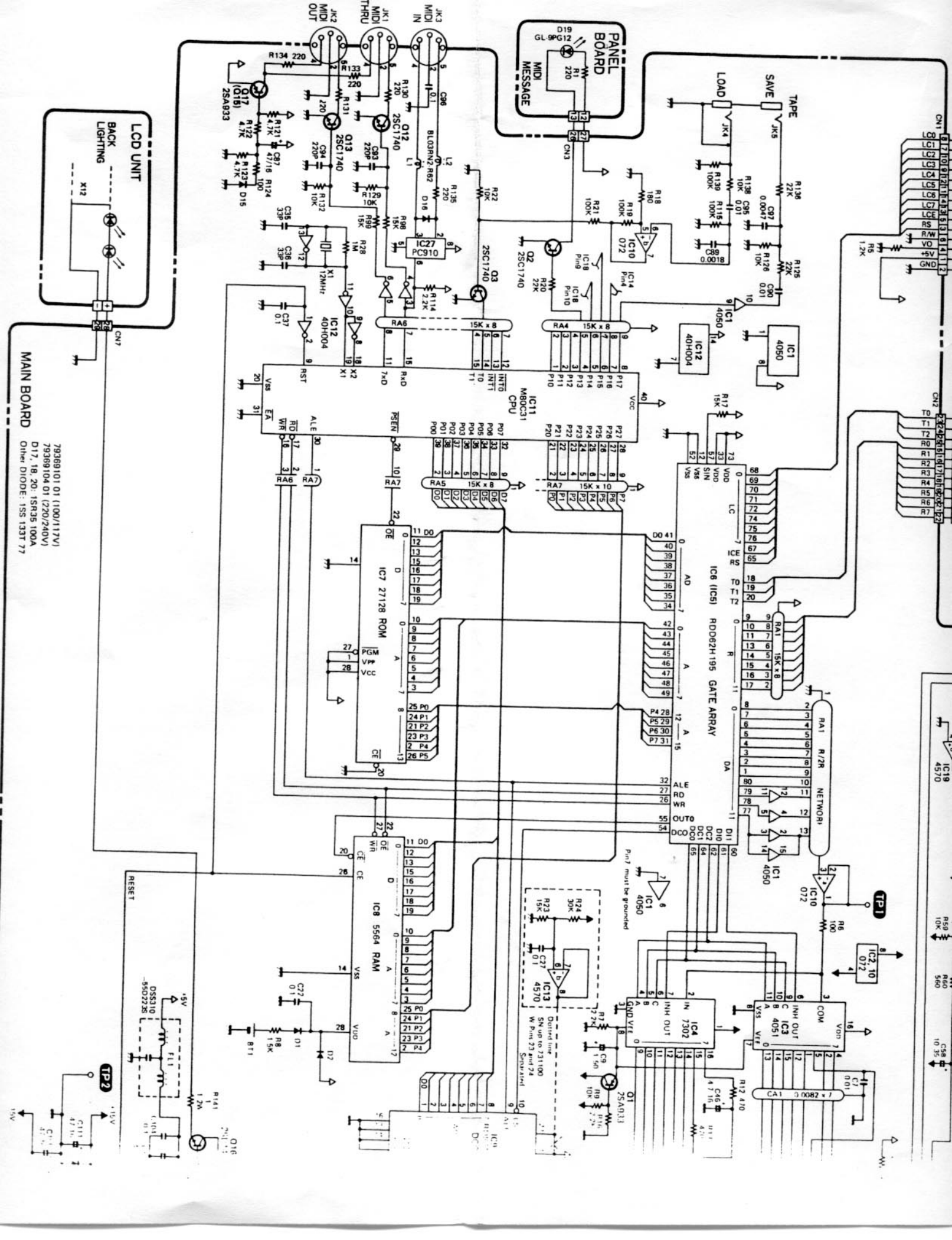


DESIGNATION	PIN NO.	FUNCTION	I/O
DA	0	D/A CONVERTER (12 bits)	O
	1		O
	2		O
	3		O
	4		O
	5		O
	6		O
	7		O
	8		O
	9		O
	10		O
R	0	Switch Read	I
	1		I
	2		I
	3		I
	4		I
	5		I
	6		I
T	0	Switch Scan	O
	1		O
	2		O
	3		O
	4		O

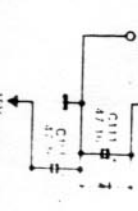
DESIGNATION	PIN NO.	FUNCTION	I/O
AD	0	Data Bus	I/O
	1		I/O
	2		I/O
	3		I/O
	4		I/O
	5		I/O
	6		I/O
A	0	ROM and RAM Address (lower 8 bits)	O
	1		O
	2		O
	3		O
	4		O
	5		O
	6		O
	7		O
LC	12	Address (for chip select)	I
	13		I
	14		I
	15		I
	15		I
DC	0	LCD Data	O
	1		O
	2		O
	3		O
	4		O
	5		O
	6		O
DI	0	S/H Channel Select	O
	1		O
	2		O
DI	0	IC18	O
	1		IC19
SOUT	59	NC	O
SCK	58	NC	O
SIN	57	+5V	I
ADC	56	NC	O
LCE	67	LCD Write Pulse	O
RS	66	LCD Resistor Select L: Instruction H: Data	O
ROM	50	NC	O
ALE	32	ALE Pulse	I
RD	27	Read Pulse	I
WR	26	Write Pulse	I
RAM 2	53	NC	O
LED	25	NC	O
DCO	54	DCO Chip Select	O
RAM 1	51	NC	O
OUT0	55	NC	O
NC	23	NC	-
NC	63	NC	-
VDD	33	+5V	I
VDD	73	+5V	I
VSS	12	GND	I
VSS	52	GND	I







79369101 01 (100/117V)
 79369104 01 (220/240V)
 D17, 18, 20: 1SR35 100A
 Other Diode: 1SS 13T 77

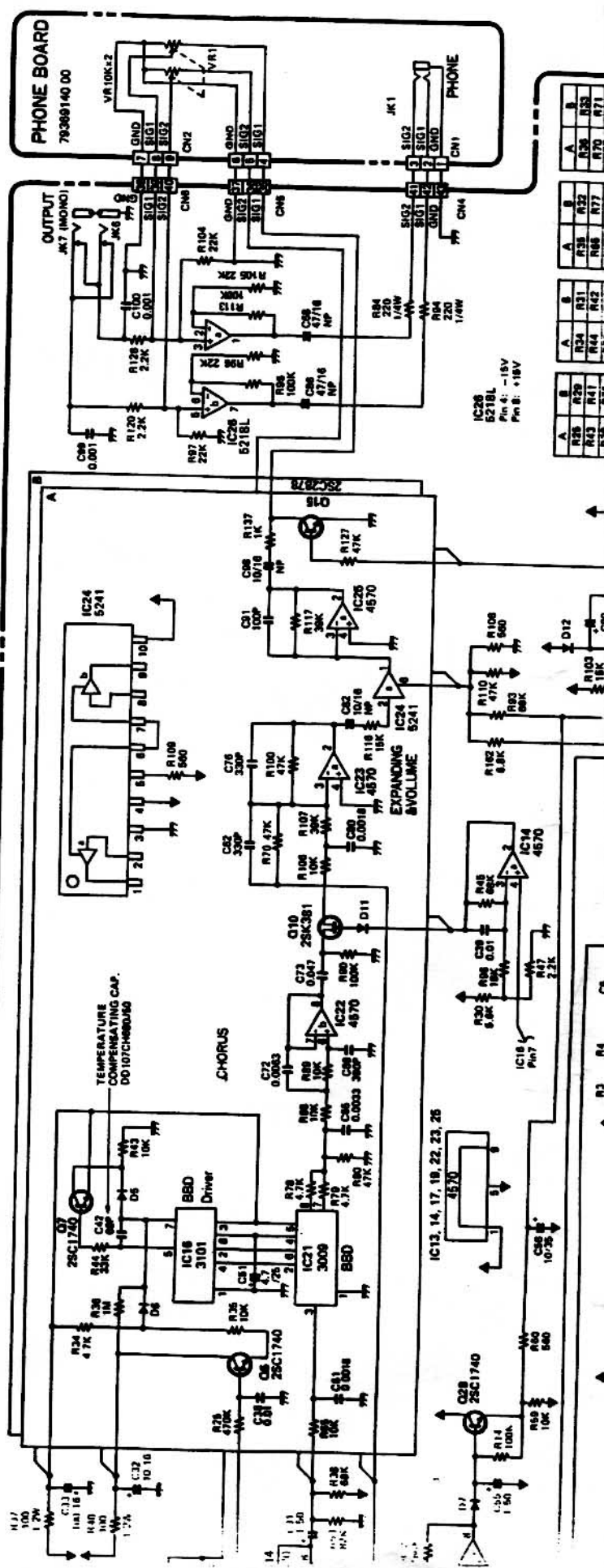


TP2

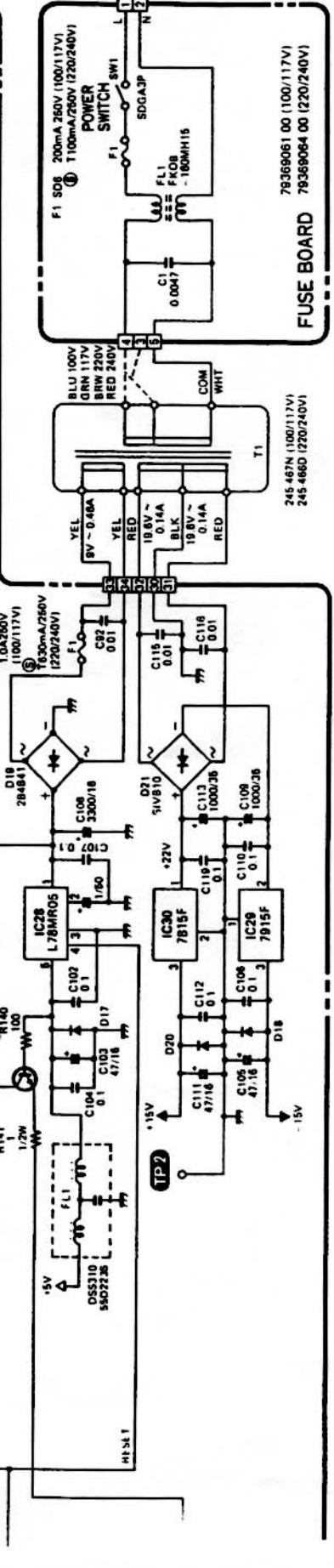
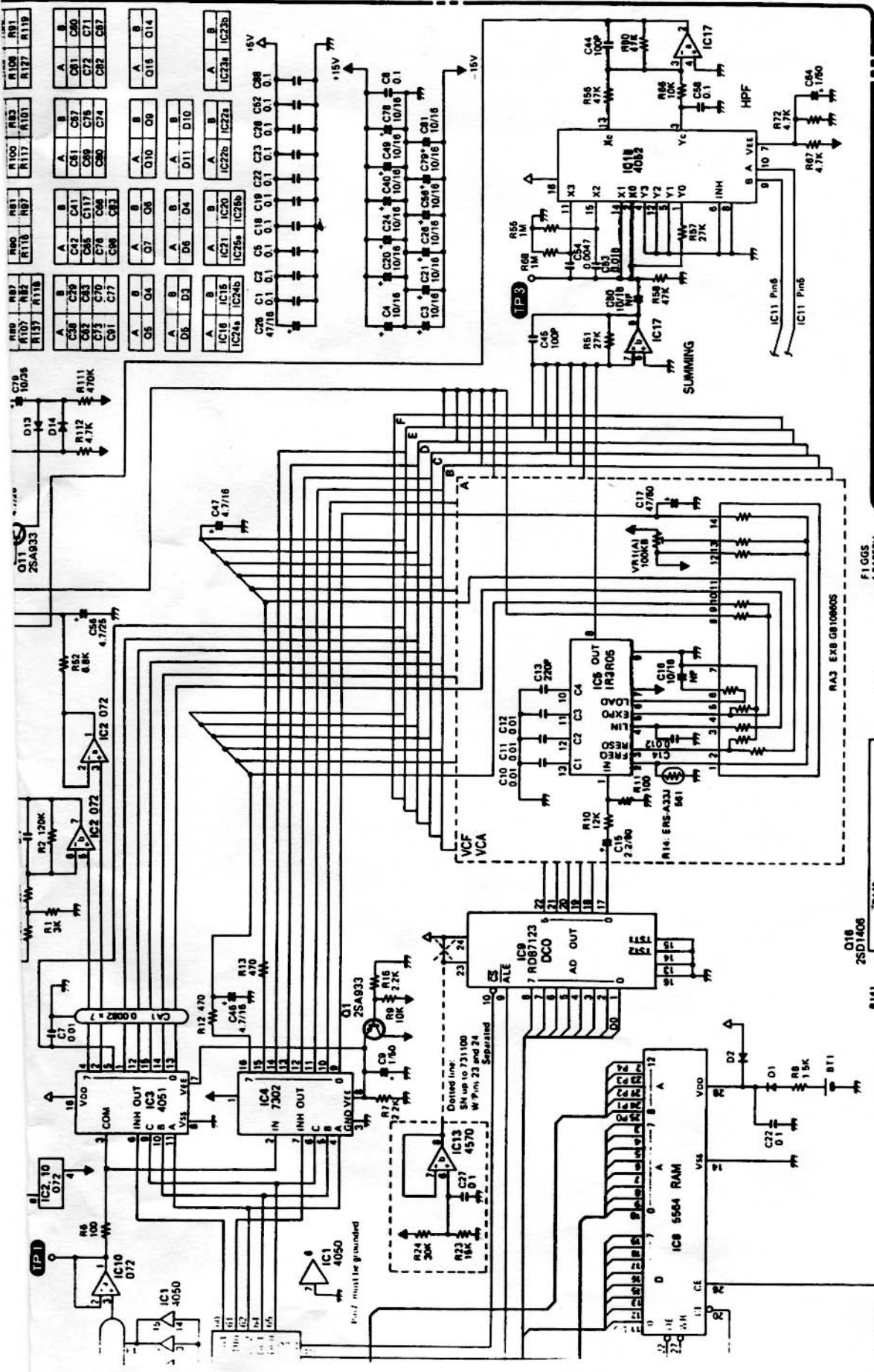


TP1

TP2

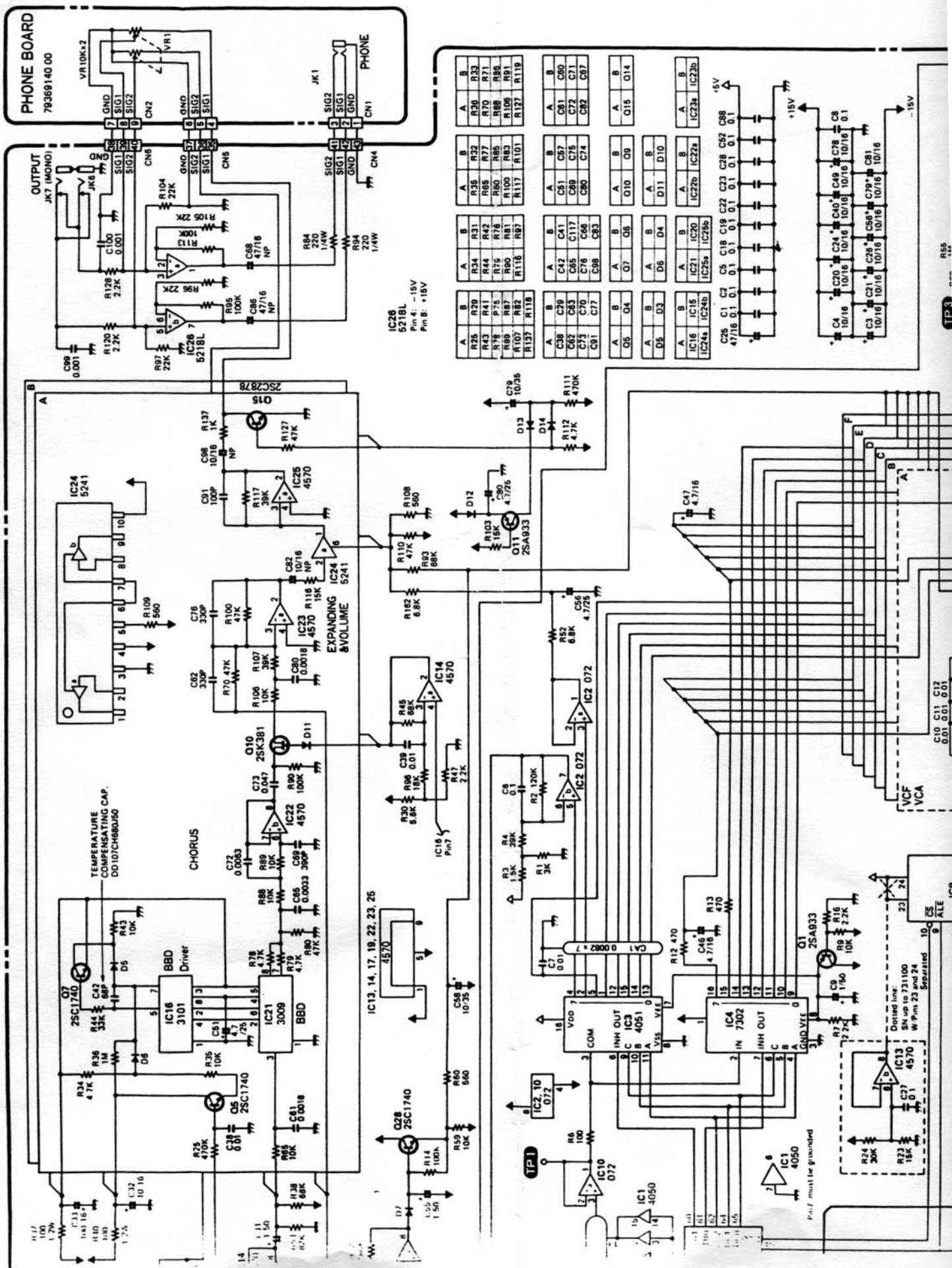


R5	R29	R31	R32	R33	R34	R35	R36	R37	R38
R6	R39	R41	R42	R43	R44	R45	R46	R47	R48
R7	R49	R51	R52	R53	R54	R55	R56	R57	R58
R8	R59	R61	R62	R63	R64	R65	R66	R67	R68
R9	R69	R71	R72	R73	R74	R75	R76	R77	R78
R10	R79	R81	R82	R83	R84	R85	R86	R87	R88
R11	R89	R91	R92	R93	R94	R95	R96	R97	R98
R12	R99	R101	R102	R103	R104	R105	R106	R107	R108
R13	R109	R111	R112	R113	R114	R115	R116	R117	R118
R14	R119	R121	R122	R123	R124	R125	R126	R127	R128
R15	R129	R131	R132	R133	R134	R135	R136	R137	R138
R16	R139	R141	R142	R143	R144	R145	R146	R147	R148
R17	R149	R151	R152	R153	R154	R155	R156	R157	R158
R18	R159	R161	R162	R163	R164	R165	R166	R167	R168
R19	R169	R171	R172	R173	R174	R175	R176	R177	R178
R20	R179	R181	R182	R183	R184	R185	R186	R187	R188
R21	R189	R191	R192	R193	R194	R195	R196	R197	R198
R22	R199	R201	R202	R203	R204	R205	R206	R207	R208
R23	R209	R211	R212	R213	R214	R215	R216	R217	R218
R24	R219	R221	R222	R223	R224	R225	R226	R227	R228
R25	R229	R231	R232	R233	R234	R235	R236	R237	R238
R26	R239	R241	R242	R243	R244	R245	R246	R247	R248
R27	R249	R251	R252	R253	R254	R255	R256	R257	R258
R28	R259	R261	R262	R263	R264	R265	R266	R267	R268
R29	R269	R271	R272	R273	R274	R275	R276	R277	R278
R30	R279	R281	R282	R283	R284	R285	R286	R287	R288
R31	R289	R291	R292	R293	R294	R295	R296	R297	R298
R32	R299	R301	R302	R303	R304	R305	R306	R307	R308
R33	R309	R311	R312	R313	R314	R315	R316	R317	R318
R34	R319	R321	R322	R323	R324	R325	R326	R327	R328
R35	R329	R331	R332	R333	R334	R335	R336	R337	R338
R36	R339	R341	R342	R343	R344	R345	R346	R347	R348
R37	R349	R351	R352	R353	R354	R355	R356	R357	R358
R38	R359	R361	R362	R363	R364	R365	R366	R367	R368
R39	R369	R371	R372	R373	R374	R375	R376	R377	R378
R40	R379	R381	R382	R383	R384	R385	R386	R387	R388
R41	R389	R391	R392	R393	R394	R395	R396	R397	R398
R42	R399	R401	R402	R403	R404	R405	R406	R407	R408
R43	R409	R411	R412	R413	R414	R415	R416	R417	R418
R44	R419	R421	R422	R423	R424	R425	R426	R427	R428
R45	R429	R431	R432	R433	R434	R435	R436	R437	R438
R46	R439	R441	R442	R443	R444	R445	R446	R447	R448
R47	R449	R451	R452	R453	R454	R455	R456	R457	R458
R48	R459	R461	R462	R463	R464	R465	R466	R467	R468
R49	R469	R471	R472	R473	R474	R475	R476	R477	R478
R50	R479	R481	R482	R483	R484	R485	R486	R487	R488
R51	R489	R491	R492	R493	R494	R495	R496	R497	R498
R52	R499	R501	R502	R503	R504	R505	R506	R507	R508
R53	R509	R511	R512	R513	R514	R515	R516	R517	R518
R54	R519	R521	R522	R523	R524	R525	R526	R527	R528
R55	R529	R531	R532	R533	R534	R535	R536	R537	R538
R56	R539	R541	R542	R543	R544	R545	R546	R547	R548
R57	R549	R551	R552	R553	R554	R555	R556	R557	R558
R58	R559	R561	R562	R563	R564	R565	R566	R567	R568
R59	R569	R571	R572	R573	R574	R575	R576	R577	R578
R60	R579	R581	R582	R583	R584	R585	R586	R587	R588
R61	R589	R591	R592	R593	R594	R595	R596	R597	R598
R62	R599	R601	R602	R603	R604	R605	R606	R607	R608
R63	R609	R611	R612	R613	R614	R615	R616	R617	R618
R64	R619	R621	R622	R623	R624	R625	R626	R627	R628
R65	R629	R631	R632	R633	R634	R635	R636	R637	R638
R66	R639	R641	R642	R643	R644	R645	R646	R647	R648
R67	R649	R651	R652	R653	R654	R655	R656	R657	R658
R68	R659	R661	R662	R663	R664	R665	R666	R667	R668
R69	R669	R671	R672	R673	R674	R675	R676	R677	R678
R70	R679	R681	R682	R683	R684	R685	R686	R687	R688
R71	R689	R691	R692	R693	R694	R695	R696	R697	R698
R72	R699	R701	R702	R703	R704	R705	R706	R707	R708
R73	R709	R711	R712	R713	R714	R715	R716	R717	R718
R74	R719	R721	R722	R723	R724	R725	R726	R727	R728
R75	R729	R731	R732	R733	R734	R735	R736	R737	R738
R76	R739	R741	R742	R743	R744	R745	R746	R747	R748
R77	R749	R751	R752	R753	R754	R755	R756	R757	R758
R78	R759	R761	R762	R763	R764	R765	R766	R767	R768
R79	R769	R771	R772	R773	R774	R775	R776	R777	R778
R80	R779	R781	R782	R783	R784	R785	R786	R787	R788
R81	R789	R791	R792	R793	R794	R795	R796	R797	R798
R82	R799	R801	R802	R803	R804	R805	R806	R807	R808
R83	R809	R811	R812	R813	R814	R815	R816	R817	R818
R84	R819	R821	R822	R823	R824	R825	R826	R827	R828
R85	R829	R831	R832	R833					



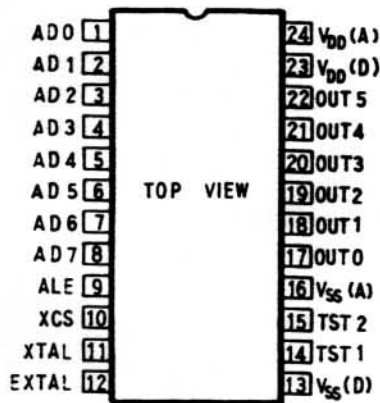
79369061 00 (100/117V)
 79369064 00 (220/240V)

245 467N (100/117V)
 245 466D (220/240V)

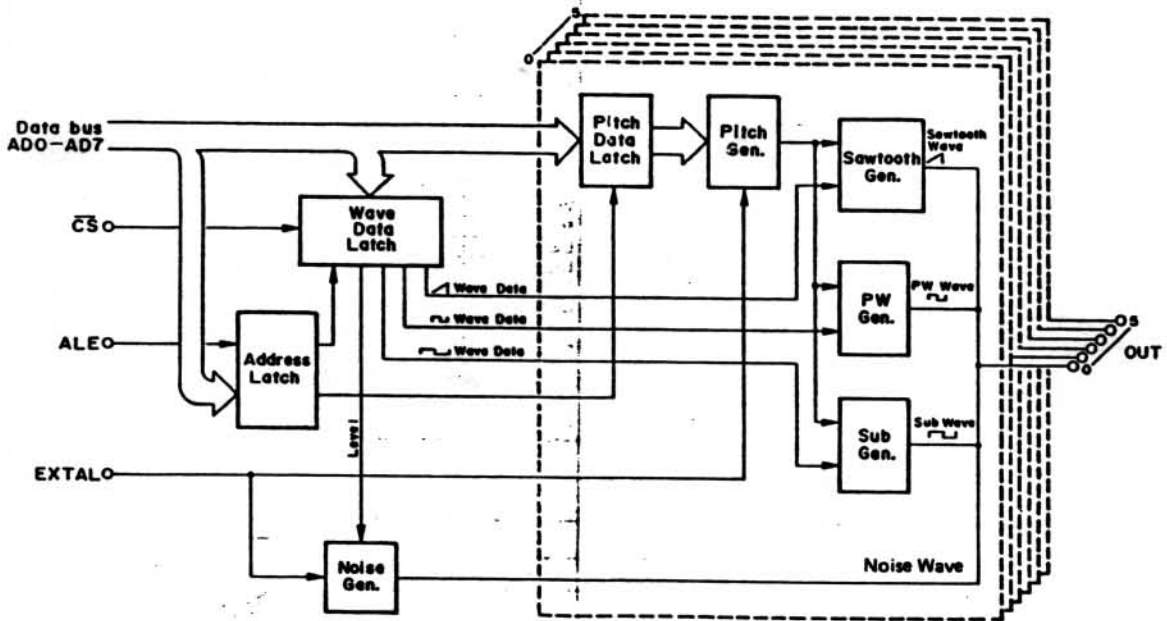


R25	A	B	R26	A	B	R27	A	B	R28	A	B	R29	A	B	R30	A	B	R31	A	B	R32	A	B	R33	A	B	R34	A	B	R35	A	B	R36	A	B	R37	A	B	R38	A	B	R39	A	B	R40	A	B	R41	A	B	R42	A	B	R43	A	B	R44	A	B	R45	A	B	R46	A	B	R47	A	B	R48	A	B	R49	A	B	R50	A	B	R51	A	B	R52	A	B	R53	A	B	R54	A	B	R55	A	B	R56	A	B	R57	A	B	R58	A	B	R59	A	B	R60	A	B	R61	A	B	R62	A	B	R63	A	B	R64	A	B	R65	A	B	R66	A	B	R67	A	B	R68	A	B	R69	A	B	R70	A	B	R71	A	B	R72	A	B	R73	A	B	R74	A	B	R75	A	B	R76	A	B	R77	A	B	R78	A	B	R79	A	B	R80	A	B	R81	A	B	R82	A	B	R83	A	B	R84	A	B	R85	A	B	R86	A	B	R87	A	B	R88	A	B	R89	A	B	R90	A	B	R91	A	B	R92	A	B	R93	A	B	R94	A	B	R95	A	B	R96	A	B	R97	A	B	R98	A	B	R99	A	B	R100	A	B	R101	A	B	R102	A	B	R103	A	B	R104	A	B	R105	A	B	R106	A	B	R107	A	B	R108	A	B	R109	A	B	R110	A	B	R111	A	B	R112	A	B	R113	A	B	R114	A	B	R115	A	B	R116	A	B	R117	A	B	R118	A	B	R119	A	B	R120	A	B	R121	A	B	R122	A	B	R123	A	B	R124	A	B	R125	A	B	R126	A	B	R127	A	B	R128	A	B	R129	A	B	R130	A	B	R131	A	B	R132	A	B	R133	A	B	R134	A	B	R135	A	B	R136	A	B	R137	A	B	R138	A	B	R139	A	B	R140	A	B	R141	A	B	R142	A	B	R143	A	B	R144	A	B	R145	A	B	R146	A	B	R147	A	B	R148	A	B	R149	A	B	R150	A	B	R151	A	B	R152	A	B	R153	A	B	R154	A	B	R155	A	B	R156	A	B	R157	A	B	R158	A	B	R159	A	B	R160	A	B	R161	A	B	R162	A	B	R163	A	B	R164	A	B	R165	A	B	R166	A	B	R167	A	B	R168	A	B	R169	A	B	R170	A	B	R171	A	B	R172	A	B	R173	A	B	R174	A	B	R175	A	B	R176	A	B	R177	A	B	R178	A	B	R179	A	B	R180	A	B	R181	A	B	R182	A	B	R183	A	B	R184	A	B	R185	A	B	R186	A	B	R187	A	B	R188	A	B	R189	A	B	R190	A	B	R191	A	B	R192	A	B	R193	A	B	R194	A	B	R195	A	B	R196	A	B	R197	A	B	R198	A	B	R199	A	B	R200	A	B	R201	A	B	R202	A	B	R203	A	B	R204	A	B	R205	A	B	R206	A	B	R207	A	B	R208	A	B	R209	A	B	R210	A	B	R211	A	B	R212	A	B	R213	A	B	R214	A	B	R215	A	B	R216	A	B	R217	A	B	R218	A	B	R219	A	B	R220	A	B	R221	A	B	R222	A	B	R223	A	B	R224	A	B	R225	A	B	R226	A	B	R227	A	B	R228	A	B	R229	A	B	R230	A	B	R231	A	B	R232	A	B	R233	A	B	R234	A	B	R235	A	B	R236	A	B	R237	A	B	R238	A	B	R239	A	B	R240	A	B	R241	A	B	R242	A	B	R243	A	B	R244	A	B	R245	A	B	R246	A	B	R247	A	B	R248	A	B	R249	A	B	R250	A	B	R251	A	B	R252	A	B	R253	A	B	R254	A	B	R255	A	B	R256	A	B	R257	A	B	R258	A	B	R259	A	B	R260	A	B	R261	A	B	R262	A	B	R263	A	B	R264	A	B	R265	A	B	R266	A	B	R267	A	B	R268	A	B	R269	A	B	R270	A	B	R271	A	B	R272	A	B	R273	A	B	R274	A	B	R275	A	B	R276	A	B	R277	A	B	R278	A	B	R279	A	B	R280	A	B	R281	A	B	R282	A	B	R283	A	B	R284	A	B	R285	A	B	R286	A	B	R287	A	B	R288	A	B	R289	A	B	R290	A	B	R291	A	B	R292	A	B	R293	A	B	R294	A	B	R295	A	B	R296	A	B	R297	A	B	R298	A	B	R299	A	B	R300	A	B	R301	A	B	R302	A	B	R303	A	B	R304	A	B	R305	A	B	R306	A	B	R307	A	B	R308	A	B	R309	A	B	R310	A	B	R311	A	B	R312	A	B	R313	A	B	R314	A	B	R315	A	B	R316	A	B	R317	A	B	R318	A	B	R319	A	B	R320	A	B	R321	A	B	R322	A	B	R323	A	B	R324	A	B	R325	A	B	R326	A	B	R327	A	B	R328	A	B	R329	A	B	R330	A	B	R331	A	B	R332	A	B	R333	A	B	R334	A	B	R335	A	B	R336	A	B	R337	A	B	R338	A	B	R339	A	B	R340	A	B	R341	A	B	R342	A	B	R343	A	B	R344	A	B	R345	A	B	R346	A	B	R347	A	B	R348	A	B	R349	A	B	R350	A	B	R351	A	B	R352	A	B	R353	A	B	R354	A	B	R355	A	B	R356	A	B	R357	A	B	R358	A	B	R359	A	B	R360	A	B	R361	A	B	R362	A	B	R363	A	B	R364	A	B	R365	A	B	R366	A	B	R367	A	B	R368	A	B	R369	A	B	R370	A	B	R371	A	B	R372	A	B	R373	A	B	R374	A	B	R375	A	B	R376	A	B	R377	A	B	R378	A	B	R379	A	B	R380	A	B	R381	A	B	R382	A	B	R383	A	B	R384	A	B	R385	A	B	R386	A	B	R387	A	B	R388	A	B	R389	A	B	R390	A	B	R391	A	B	R392	A	B	R393	A	B	R394	A	B	R395	A	B	R396	A	B	R397	A	B	R398	A	B	R399	A	B	R400	A	B	R401	A	B	R402	A	B	R403	A	B	R404	A	B	R405	A	B	R406	A	B	R407	A	B	R408	A	B	R409	A	B	R410	A	B	R411	A	B	R412	A	B	R413	A	B	R414	A	B	R415	A	B	R416	A	B	R417	A	B	R418	A	B	R419	A	B	R420	A	B	R421	A	B	R422	A	B	R423	A	B	R424	A	B	R425	A	B	R426	A	B	R427	A	B	R428	A	B	R429	A	B	R430	A	B	R431	A	B	R432	A	B	R433	A	B	R434	A	B	R435	A	B	R436	A	B	R437	A	B	R438	A	B	R439	A	B	R440	A	B	R441	A	B	R442	A	B	R443</
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DCO IC9(Main Board)
MB87123



DESIGNATION	PIN NO.	FUNCTION	I/O	
AD	0	1	DCO DATA INPUT (8 bits)	I
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
OUT	0	17	Ach	O
	1	18	Bch	
	2	19	Cch	
	3	20	Dch	
	4	21	Ech	
	5	22	Fch	O
ALE	9	ADDRESS LATCH PULSE INPUT	I	
CS	10	CHIP SELECT INPUT	I	
EXTAL	11	MASTER CLOCK INPUT	I	
XTAL	12	NC	I	
TST	1	14	GND	I
	2	15		
VS	13	Digital GND	I	
VS	16	Analog GND	I	
VD	23	Analog +5V	I	
VD	24	Digital +5V	I	



DMUX AND S/H

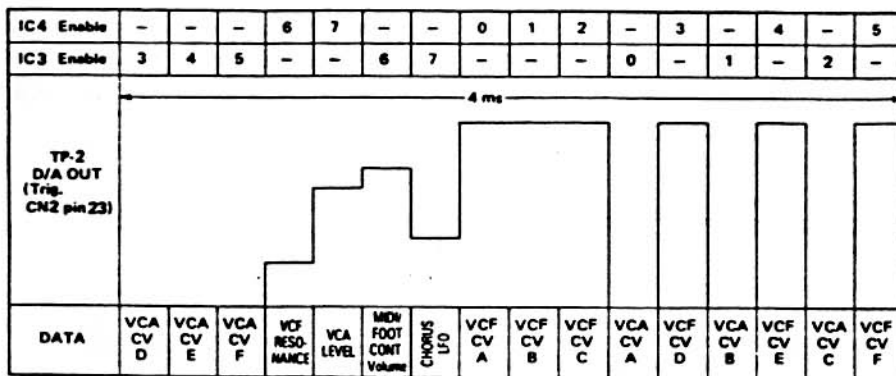
Data for controlling VCF, VCA and subsequent stages are fed from DAC RA1 and IC10 to IC3 and IC4 in multiplexed analog form as shown below. IC3 and IC4 demultiplex the data and sample each of the signals into the correct destination. Note that IC4 7302 has hold capacitors built internally.

デマルチプレクサー サンプル・アンド・ホールド

VCF,VCA 等を制御するデータは、DAC RA1,IC10 から出力され、IC3,IC4 に入ります。この間のデータは右図のように時分割多重のアナログ・データです。

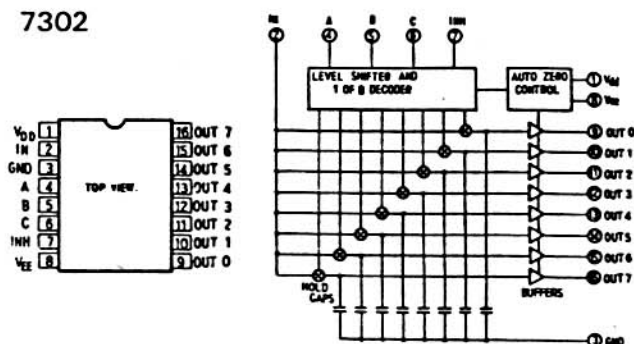
IC3,IC4 は、このデータを振り分けて次のデータが入ってくるまでホールドします。

注) IC4 7302 は内部にホールド・コンデンサとバッファを持っています。



A	B	C	IC4 OUT		IC3 OUT	
0	0	0	0	VCF A CV	0	VCA A CV
0	0	1	1	VCF B CV	1	VCA B CV
0	1	0	2	VCF C CV	2	VCA C CV
0	1	1	3	VCF D CV	3	VCA D CV
1	0	0	4	VCF E CV	4	VCA E CV
1	0	1	5	VCF F CV	5	VCA F CV
1	1	0	6	RESONANCE CV	6	VOLUME CV
1	1	1	7	VCA LEVEL CV	7	CHORUS RATE CV

7302



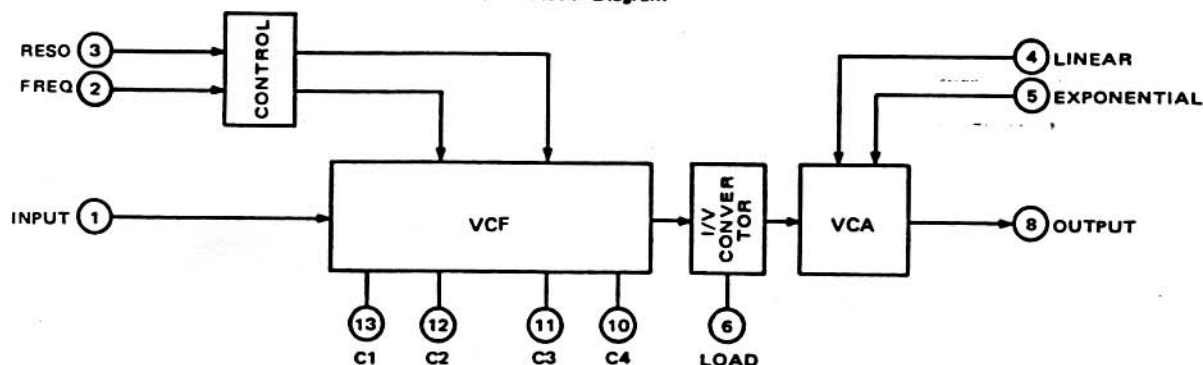
VCF, VCA

IC5 IR3R05 consists of VCF and VCA. The VCF has two 2-pole LPFs (-12dB/oct) in series to have a total -24dB/oct capability. The VCA has two control inputs, LINEAR and EXPONENTIAL. Applied to EXPONENTIAL is a CV for compression to provide companding function in combination with expanding being performed at IC24 in CHORUS stage.

VCF, VCA

IC5 IR3R05 はワンチップの VCF/VCA です。VCF はステートバリエブルな 2 ポール LPF 2 段構成で、4 ポール -24dB/oct(-12dB/oct×2) の特性を持っています。VCA の LINEAR 入力には VCA CV が、EXPONENTIAL 入力には VCA LEVEL CL と COMPRESSION が加えられます。VCA は CHORUS 回路の IC24 での Expanding との組合せで Companding 回路を形成します。

IR3R05 Block Diagram



ADJUSTMENT AND CHECKING

The test routine should be preceded by DC voltage confirmation.

1. POWER SUPPLIES

NOTE:

Paragraphs 1 and 2 correlate: some steps may have to be repeated after corrective procedure is taken at another step.

1A. Battery

Test points: IC8 (RAM) pin 24 (Vdd), pin 12 (GND)

With power off measure the voltage across the test points. It should be within 2.800 to 3.500V.

1B. DC Supplies

Test points: Main Board DC rails +5V, +15V, -15.

Turn the power on. (See NOTE for LCD reading.)

The voltages should be as follows:

+5V +5.0 ±0.2V

+15V +15.0 ±0.5V

-15V -15.0 ±0.5V

NOTE:

The display will show an error message "CHECK BATTERY!!!" if the unit has problems around RAM IC8:

Memory destroyed. . . . RAM defective or erased due to poor backup battery.

*RAM Initialization. . . . Not attempted or failed
(See RAM INITIALIZATION)*

2. RAM AND LCD

2A. RAM, IC8

No fear of memory erasure or overwrite in this step.

2-1. With power OFF. Press and hold PATCH A-B and DATA TRANSFER and switch the power ON.

The LCD will read either:
"RAM CHECK OK!!"
"RAM wr/rd ERR!!"

2B. LCD

2-2. Press PATCH A-B. All LCD segments and the back-light LED will be lit.

2-3. Press PATCH A-B. All LCD segments will go off while the LED will remain lit.

2-4. Repetition of PATCH A-B should alternately turn on and off the LCD.

RAM INITIALIZATION

CAUTION:

User program will be erased. Should be performed only when in the following cases.

RAM, IC8 replaced

Backup battery replaced

RAM contents erased

MIDI mode to be changed (POLY or MONO)

During initialization the following data are transferred from ROM IC7 to RAM IC8.

TUNE/MIDI function

16 chord memories

64 tones for the a group

128 patches for A/B groups

In addition, TONE-names in A group are copied to the A group PATCH NAMES.

The initialization also sets the MIDI receiving mode. So there are two ways through which the MKS-50 enters initialization.

INITIALIZATION WITH POLY MODE

Press and hold NUMBER Buttons 4 and 8, and switch the power on. The display will transiently show "FACTORY PRESET".

INITIALIZATION WITH MONO MODE

Press and hold NUMBER buttons 3 and 7, and switch the power on. The display will transiently show "FACTORY PRESET".

3. TEST MODE

3A. Entering Test Mode

Press and hold TUNE/MIDI and PATCH A-B, and turn the power on. The display will read "\$ADJ/INS MODE!!!", prompting a command input. In the test mode, some switches and functions change their effects.

3B. Key Assignment

Rotary mode.....One module is assigned to a key. Assignment is cyclic in the order from A to F.

Tone parameter.....Two test tone parameters are available. Only one set can be selected at a time, using one of the buttons shown in the table below.

SWITCH	LCD DISPLAY/FUNCTION
NAME	"\$adj VCF sine" Sets VCF cutoff adj parameter values
WRITE	"&adj BASIC wave" Sets basic tone parameter values

NOTE:

Default setting is NAME on, while LCD reading remains "\$ADJ/INS MODE!!!".

Pressing WRITE, TONE a-b (display shows T-all BASIC wave) and PARAMETER allows to glance over the basic parameter values one by one at a time.

The parameters not listed in the table below have values 00.

4B. Test points. TP-3 (SUM OUT), TP-2 (GND)

- 4-1. Press NAME. The display will show "\$adj VCF sine".
- 4-2. Press A4 key (Module No. 1 should be assigned to the key). Adjust VR1A for a maximum amplitude. (typ. 0.8-1.5Vp-p.)
- 4-3. Press A4 key (module No. 2). Adjust VR1B.
- 4-4. Repeat for the remainder.
If C6 key is available, check for no level reduction on this key at all modules.

5. DCO

5A. Test instrument.scope (0.5V/DIV, 1ms/DIV)

5B. Test pointone of OUTPUT jacks
(no connection for the other)

- 5-1. Press WRITE.
- 5-2. Press TONE a-b. The display will show T-all BASIC wave.
- 5-3. While watching the scope, generate A4 6 times; verify similarity of output from 6 modules in level and waveshape.
- 5-4. Press PARAMETER: the display will change reading to DCO RNG = 8'.
- 5-5. Press VALUE and the display changes 8' to 32' followed by pitch change in sound. Press VALUE for 16', 8' and 4'.
- 5-6. In a similar way perform PULSE and the subsequent items to the list in the table below.

LCD reading	Press SW	Check for
DCO RNG = 8' → 8' PULSE = 01 PULSE = 01 → 00 SAWTOOTH = 00	PARAMETER VALUE PARAMETER VALUE	Become inaudible No sound heard
SAWTOOTH = 00 → 01 SAWTOOTH = 00 → 02 SAWTOOTH = 00 → 03 SAWTOOTH = 00 → 04 SAWTOOTH = 00 → 05	A4 6 times A4 6 times A4 6 times A4 6 times A4 6 times	Waveform and its level remain unchanged
SAWTOOTH = 00 → 00	PARAMETER SELECT	No sounds

[テスト・ポイント]

メインボード TP3(SUM OUT), TP-2(GND)

[調整方法]

1. テストモードに設定し、(NAME) を押し VCF カットオフ・フリケンシー調整用音色データにセットをする。
以後モニタースピーカーも接続して、音を聞きながら調整する。
2. A4 を発音するごとにモジュールが1-6に変わるので、各モジュールごとにサイン波が最大になるように VR1 (A-F) で調整する。
0.8-1.5Vp-p の範囲に入っていれば良い。
できれば C6 を 6 回発音して、全てのモジュールの電圧が下がっていないことを確認する。

5. DCO チェック

[使用機器]

オシロスコープ (0.5V/DIV, 1ms/DIV)

[テスト・ポイント]

OUTPUT ジャック

[検査方法]

1. (WRITE) を押し、基本セッティングにする。
2. (TONE a-b) を一度押し、「T-all BASIC wave」にする。
3. A4 を 6 回発音して全てのモジュールの出力波形、レベルが同じであること。
4. (PARAMETER) を押しと「DCO RNG = 8'」と表示される。(VALUE) を押しごとに DCO RNG が 32' / 16' / 8' / 4' と変化する。同時に音程も変化するを確認する。

5. 以下同様にして確認する。

LCD 表示	押さえる SW	確認事項
DCO RNG = 8' → 8' PULSE = 01 PULSE = 01 → 00 SAWTOOTH = 00	PARAMETER VALUE PARAMETER VALUE	音は出なくなる。 音は出ない。
SAWTOOTH = 00 → 01 SAWTOOTH = 00 → 02 SAWTOOTH = 00 → 03 SAWTOOTH = 00 → 04 SAWTOOTH = 00 → 04	A4 6回 A4 6回 A4 6回 A4 6回 A4 6回	全てのモジュールの波形とレベルが同じであること。
SAWTOOTH = 00 → 00	PARAMETER	音は出ない。
オシロスコープのセッティングを 0.5V/DIV, 2m/DIV にする。		
SUB LEVEL = 00	VALUE	音は出ない。
SUB LEVEL = 00 → 01 SUB LEVEL = 00 → 02 SUB LEVEL = 00 → 03	A4 6回 A4 6回 A4 6回 PARAMETER	全てのモジュールの波形とレベルが同じであること。 表示されたレベルと共に、レベルが変わる。
SUB = 00 SUB = 00 → 01 SUB = 00 → 02 SUB = 00 → 03 SUB = 00 → 04 SUB = 00 → 05	VALUE A4 6回 A4 6回 A4 6回 A4 6回 A4 6回 PARAMETER	全てのモジュールの波形とレベルが同じであること。 表示された波形と共に波形が変わる。

PARAMETER	VALUE	PARAMETER	VALUE
DCO RNG	8'	DCO ENV	↘
DCO BEND	12	PULSE	01
PW/PWM	80	PWM RATE	80
HPF FREQ	01	VCF FREQ	127
VCF ENV	↘	VCF KYBD	14
VCA LEVEL	127	VCA ENV	↘
CHORUS	OFF	CRS RATE	64
LFO RATE	80	ENV L1	127
ENV L2	127	ENV L3	127
ENV T4	10		

— Test Keyboard —

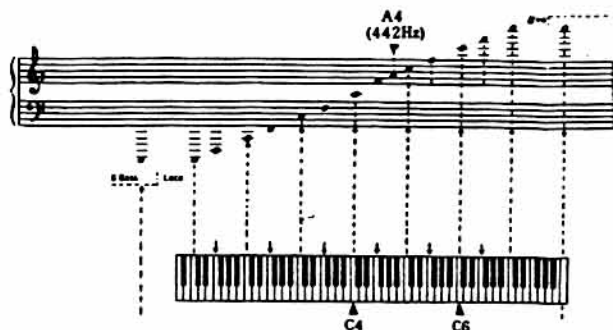
For the following tests, use of an external MIDI keyboard is recommended for simpler key operation, although VALUE button can be used to duplicate a one octave keyboard.

Assigned module number will appear at the right end of the LCD.

— VALUE Button as a Keyboard —

When the LCD is showing other than parameter, press the upper portion of the button, which will sound A4 (A above middle C).

When a parameter is shown, press TONE a-b (display will show T-all BASIC wave, but have no effects on key function) and then press upper portion of VALUE. To select the next parameter press PARAMETER.



4. VCF CUTOFF FREQUENCY

NOTE:

Start after 10-minute warmup period has passed.

4A. Test instrument . . . scope (0.5V/DIV, 1ms/DIV)
sound monitor system

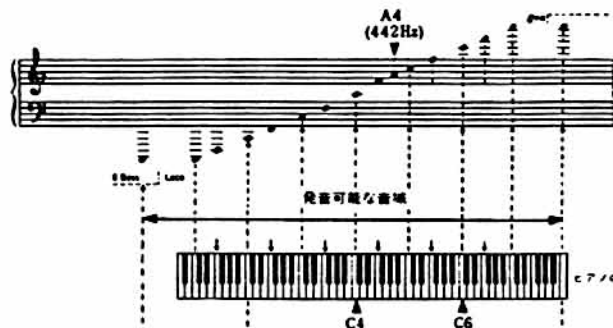
PARAMETER	VALUE	PARAMETER	VALUE
DCO RNG	8'	DCO ENV	↘
DCO BEND	12	PULSE	01
PW/PWM	80	PWM RATE	80
HPF FREQ	01	VCF FREQ	127
VCF ENV	↘	VCF KYBD	14
VCA LEVEL	127	VCA ENV	↘
CHORUS	OFF	CRS RATE	64
LFO RATE	80	ENV L1	127
ENV L2	127	ENV L3	127
ENV T4	10		

音を出すには外部に MIDI キーボードを接続して行なう方法と、本体で行なう方法とがありますが、外部キーボードを使用した方が便利です。

本体で行なう場合、テスト・モード表示の時とパラメーター表示の時とは操作が異なります。

- ・テスト・モード表示の時は (VALUE) の上側を押すと A4 が発音します。
- ・パラメーター表示の時は、一度 (TONE a-b) を押してから (VALUE) の上側を押すと A4 が発音します。表示は変わりますが問題ありません。次にパラメーターを選択する場合は (PARAMETER) を押して下さい。

テスト・モードの場合、音を出すとディスプレイの右端にアサインされたモジュール・ナンバーを表示します。

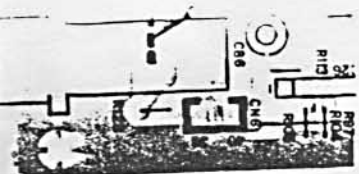


4. VCF カットオフ・フリケンシー調整

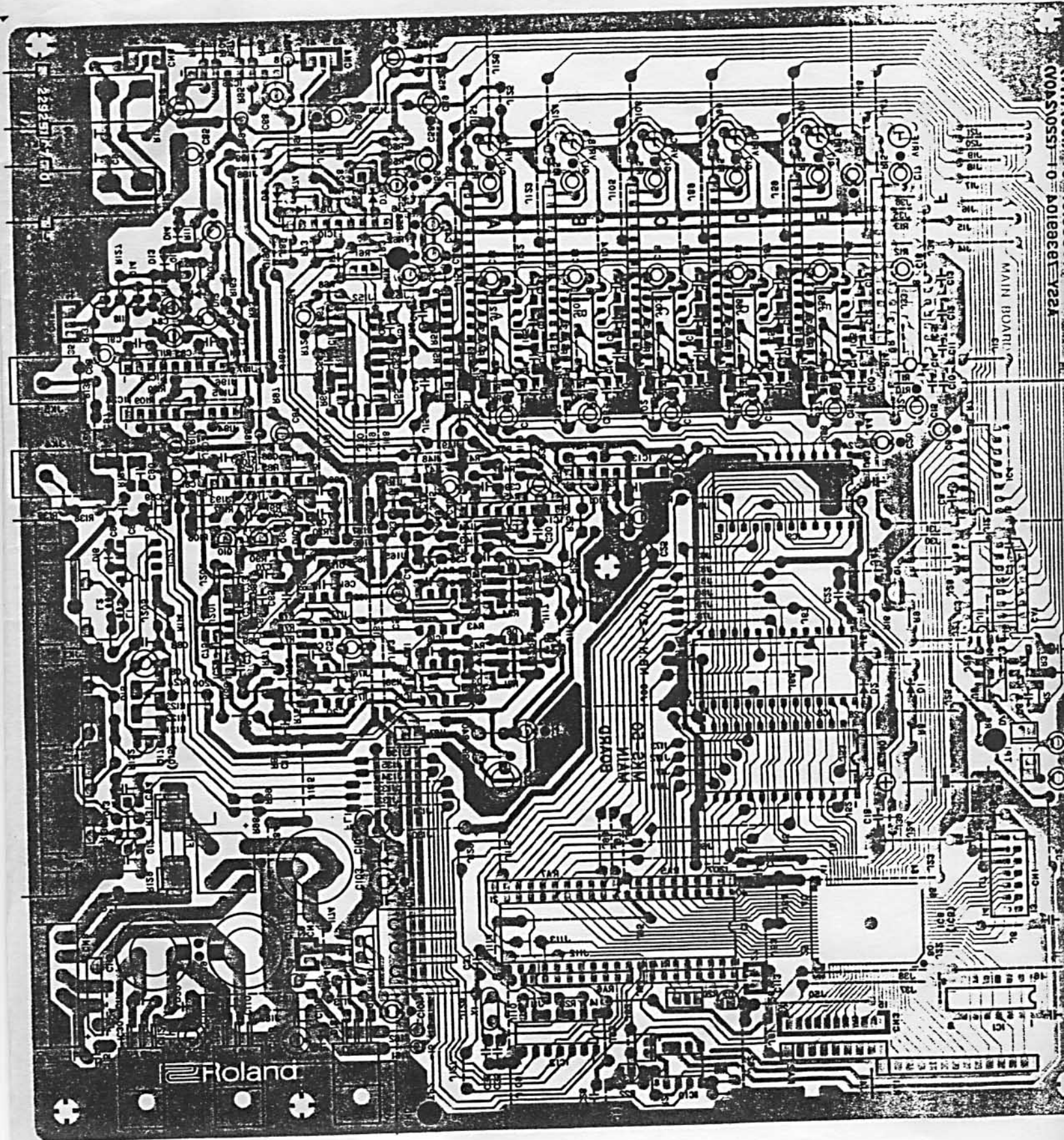
★注★ この調整は、通電後最低10分間たってから行なうこと。

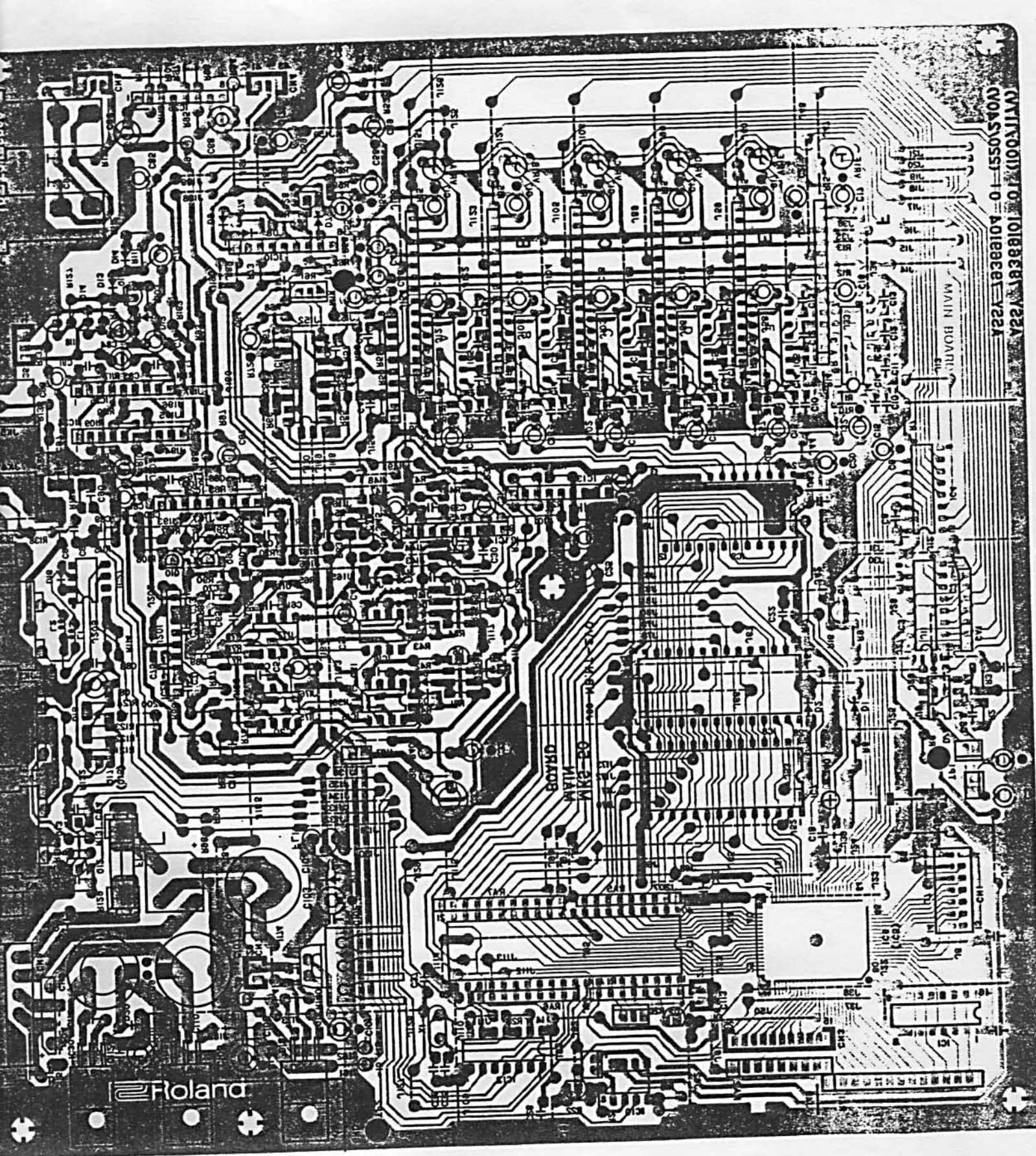
(使用機器)

オシロスコープ (0.5V/DIV, 1ms/DIV)



(4) bcpq vli.





WTIR001 10 1018881 Y2A
00AS0551-10 4018881 Y2A

MAIN BOARD

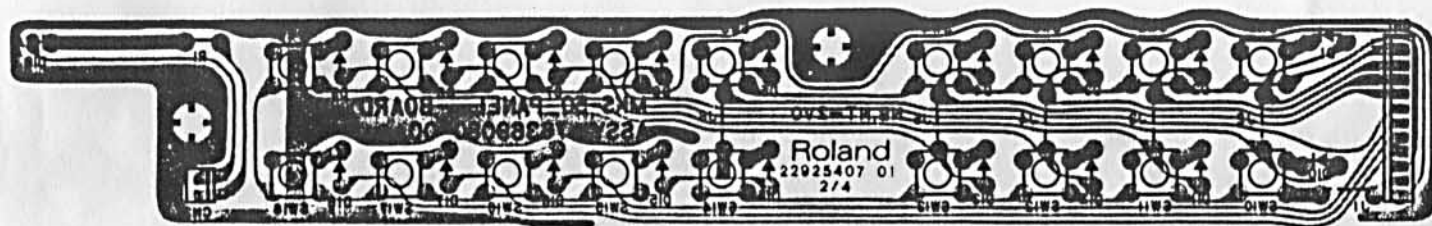
Roland

View from front

14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

Panel Board
7636908000
(pcb 2292540701 2/4)

100/117V
20/240V
1 1/4)



View from foil side

Reset scope inputs to 0.5V/DIV, 2ms/DIV		
SUB LEVL = 00	VALUE	No sounds
SUB LEVL = 00 → 01 SUB LEVL = 00 → 02 SUB LEVL = 00 → 03	A4 6 times A4 6 times A4 6 times PARAMETER SELECT	Waveform and its level unchanged Sound level keeps with value display
SUB = 00 SUB = 00 → 01 SUB = 00 → 02 SUB = 00 → 03 SUB = 00 → 04 SUB = 00 → 05	VALUE A4 6 times A4 6 times A4 6 times A4 6 times A4 6 times PARAMETER	Waveform and level will not change Waveform changes as value changes
Reset scope to 0.5V/DIV, 1ms/DIV		
SUB LEVL = 03 SUB LEVL = 03 → 00	VALUE PARAMETER	No sounds
NOIS LVL = 00 → 03	A4 6 times VALUE	All modules have the same noise level
NOIS LVL = 03 → 00 PULSE = 00	PARAMETER VALUE	No sounds heard
PULSE = 00 → 03	A4 6 times	PWM effect on all modules

6. HPF

6A. Test instrumentscope (0.5V/DIV, 1ms/DIV)

6B. Test pointone of OUTPUT jacks
(no connection for the other)

6-1. Press WRITE.

6-2. Press TONE a-b: The display will show T-all BASIC wave.

6-3. Press PARAMETER to call HPF FREQ parameter.

6-4. While watching the scope screen, press VALUE repeatedly to change the values from 00 to 01, 02 and 03. The waveform should change just as like below.

オシロスコープのセッティングを 0.5V/DIV, 1m/DIV にする。		
SUB LEVL = 03 SUB LEVL = 03 → 00	VALUE PARAMETER	音は出ない。
NOIS LVL = 00 → 03	A 4 6回 VALUE	全てのモジュールのレベルが同じであること
NOIS LVL = 03 → 00 PULSE = 00	PARAMETER VALUE	音は出ない。
PULSE = 00 → 03	A4 6回	全モジュールに PWM がかかっている。

6. HPF チェック

〔使用機器〕

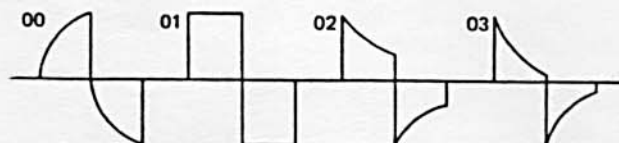
オシロスコープ (0.5V/DIV, 1ms/DIV)

〔テスト・ポイント〕

OUTPUT ジャック

〔検査方法〕

1. (WRITE) を押し、基本セッティングにする。
2. (TONE a-b) を一度押し、「T-all BASIC wave」にする。
3. (PARAMETER) を押し、「HPF FREQ」のパラメーターを選択する。
4. (VALUE) で「00 → 01 → 02 → 03」と変えて波形が変わること。



7. OUTPUT レベルチェック

〔使用機器〕

オシロスコープ (0.5V/DIV, 1ms/DIV)

〔テスト・ポイント〕

左右両方の OUTPUT ジャック

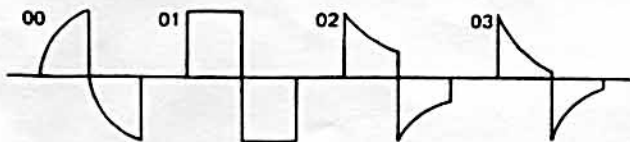
〔検査方法〕

1. (WRITE) を押し、基本セッティングにする。
2. 本体の VOLUME を最大にして、A4 を発音させたとき左右両方のレベルが 0.8~1.5V の範囲内であり、かつ左右のレベル差が 0.1V 以内であること。

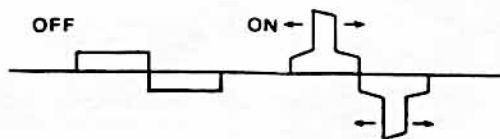
8. CHORUS チェック

〔使用機器〕

オシロスコープ (0.5V/DIV, 1ms/DIV)



- 8-1. Press WRITE.
- 8-2. Press TONE a-b.
- 8-3. Press PARAMETER to call CHORUS parameter.
- 8-4. Press VALUE and verify waveshape changes.



7. OUTPUT LEVEL

7A. Test instrumentscope (0.5V/DIV, 1ms/DIV)

7B. Test points.OUTPUT jacks

7-1. Press WRITE.

7-2. Turn up VOLUME to maximum.

7-3. Generate A4 sound. Read OUTPUTs. The levels should be 0.8-1.5Vp-p.

The difference between two readings must be less than 0.1Vp-p.

8. CHORUS

8A. Test instrumentscope (0.5V/DIV, 1ms/DIV)

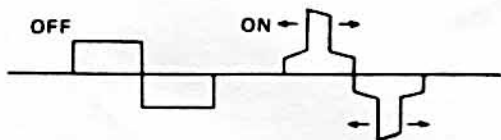
8B. Test pointone OUTPUT jack with the other plugged with an open-circuit plug

[テスト・ポイント]

OUTPUT ジャック (片方の OUTPUT ジャックに空プラグを差す。)

[検査方法]

1. (WRITE) を押し、基本セッティングにする。
2. (TONE a-b) を一度押し、「T-all BASIC wave」にする。
3. (PARAMETER) を押し、「CHORUS」のパラメーターを選択する。
4. (VALUE) で ON にすると波形の山が動くことを確認する。



MODEL MKS-50 MIDI Implementation

Date: Sep. 05 1986
Version: 1.0

1. TRANSMITTED DATA

Status	Second	Third	Description
1111 0000	1111 0111	SYSTEM EXCLUSIVE
Note : See Section 3. TRANSMITTED EXCLUSIVE MESSAGES.			
Status	Second	Third	Description
1000 nana	0kkk kkkk	0vvv vvvv	Note OFF, velocity ignored
1001 nana	0kkk kkkk	0000 0000	Note OFF kkkkkkk = 12 - 108 *1
1001 nana	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 12 - 108 *1 vvvvvvv = 1 - 127
1011 nana	0000 0001	0vvv vvvv	Modulation vvvvvvv = 0 - 127 *2
1011 nana	0000 0101	0vvv vvvv	Portamento Time vvvvvvv = 0 - 127 *2
1011 nana	0000 0110	0vvv vvvv	Data Entry (MSB) *3
1011 nana	0000 0111	0vvv vvvv	Main volume vvvvvvv = 0 - 127 *2, *4
1011 nana	0100 0000	01xx xxxx	Hold1 ON *2
1011 nana	0100 0000	00xx xxxx	Hold1 OFF *2
1011 nana	0100 0001	01xx xxxx	Portamento ON *2
1011 nana	0100 0001	00xx xxxx	Portamento OFF *2
1011 nana	0110 0100	0000 0000	RPC (LSB) *3
1011 nana	0110 0101	0000 0000	RPC (MSB) *3
1100 nana	0ppp pppp		Program Change ppppppp = 0 - 127 *5
1101 nana	0vvv vvvv		Channel After Touch vvvvvvv = 0 - 127 *2
1110 nana	0bbx xxxx	0bbb bbbb	Pitch Bend Change *2
1011 nana	0111 1011	0000 0000	ALL NOTES OFF *6, *7
1011 nana	0111 1100	0000 0000	OMNI OFF *6
1011 nana	0111 1101	0000 0000	OMNI ON *6
1011 nana	0111 1110	0000 0000	MOMO ON *6
1011 nana	0111 1111	0000 0000	POLY ON *6
1111 0000	1111 0111	SYSTEM EXCLUSIVE *8
1111 1110			Active Sensing

Notes :

*1 Note numbers outside the range 12 - 108 are transposed to the nearest octave inside this range.

While key assign mode is 'CHORD MEMORY', modified notes with CHORD MEMORY are sounded.

*2 Recognized if the corresponding PATCH MIDI function switch is ON.

*3 RPC and value (Data Entry) are recognized as follows.

RPC #	value MSB	value LSB	Description
0	0vvv vvvv	0xxx xxxx	BEND RANGE (0-24 semitone, 1 semitone step) xxxxxxx is ignored.

*4 The volume of the sound can be controlled by main volume message within level which adjusted by the panel volume knob.

*5 Recognized if MIDI PROG.CG in the TUNE/MIDI function is on.

0 - 63 : PATCH-A GROUP
64 - 127 : PATCH-B GROUP

*6 Note Messages (123 - 127) are also recognized as ALL NOTES OFF.

Note Messages are recognized as follows:

POLY ON (127)	MOMO ON (126)	MOMO ON (126)	MOMO ON (126)
OMNI OFF (124)	OMNI = OFF	OMNI = OFF	OMNI = OFF
OMNI ON (125)	OMNI = ON	OMNI = ON	OMNI = ON

** set 'CHORD MEMORY' key assign

*** nana : MOMO CHANNEL RANGE

0	6
1 - 6	1 - 6
7 - 16	6
17 - 127	ignore

Note event, Pitch bend change and Velocity change on each channels are recognized by each tone module. Other voice messages on only basic channel are recognized by all tone modules.

*7 Ignored in MOMO mode.

*8 See Section 3. RECOGNIZED EXCLUSIVE MESSAGES.

3. TRANSMITTED EXCLUSIVE MESSAGES

3.1 All Parameters (APR)

3.1.1 All Tone Parameters with Tone names (APR)

Transmitted if EXCL in the PATCH MIDI function is on and TX TONE APR in the TUNE/MIDI function is on.

When the PATCH or TONE Group, Bank or Number is changed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Excland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nana	Unit # = MIDI basic channel, nana = 0 - 15 where nana + 1 = channel #
e 0010 0011	Format type (JU-1, JU-2, MS-10, MS-80, MKS-50)
f 0010 0000	Level # = 1
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127) *1
i 00tt tttt	In sequence (36 bytes total) Tone name (0 - 63)
j 1111 0111	In sequence (10 bytes total) End of System Exclusive

3.1.2 All Patch Parameters with Patch names (APR)

Transmitted if EXCL in the PATCH MIDI function is on and TX PATCH APR in the TUNE/MIDI function is on.

When the PATCH Group, Bank or Number is changed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Excland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nana	Unit # = MIDI basic channel, nana = 0 - 15 where nana + 1 = channel #
e 0010 0011	Format type (JU-1, JU-2, MS-10, MS-80, MKS-50)
f 0011 0000	Level # = 2 (used MKS-50 only)
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127) *2
i 00tt tttt	In sequence (13 bytes total) Tone name (0 - 63)
j 1111 0111	In sequence (10 bytes total) End of System Exclusive

3.1.3 All Chord Memory Parameters (APR)

Transmitted if EXCL in the PATCH MIDI function is on and TX CM APR in the TUNE/MIDI function is on.

When the PATCH Group, Bank or Number is changed.

Byte	Description
a 1111 0000	Exclusive status
b 0100 0001	Excland ID #
c 0011 0101	Operation code = APR (all parameters)
d 0000 nana	Unit # = MIDI basic channel, nana = 0 - 15 where nana + 1 = channel #
e 0010 0011	Format type (JU-1, JU-2, MS-10, MS-80, MKS-50)
f 0100 0000	Level # = 3 (used MKS-50 only)
g 0000 0001	Group #
h 0vvv vvvv	Value (0 - 127) *3
i 00tt tttt	In sequence (6 bytes total) End of System Exclusive

Notes :

*1 Tone Parameter

#	Function	Value
0	DCO ENV MODE	0 = ENV normal 1 = ENV inverted 2 = ENV normal with dynamics 3 = ENV inverted with dynamics
1	VCF ENV MODE	0 = ENV normal 1 = ENV inverted 2 = ENV normal with dynamics 3 = dynamics
2	VCA ENV MODE	0 = ENV 1 = GATE 2 = ENV with dynamics 3 = GATE with dynamics
3	DCO WAVEFORM PULSE	0 - 3
4	DCO WAVEFORM SAWTOOTH	0 - 5
5	DCO WAVEFORM SUB	0 - 5
6	DCO RANGE	0 = 4° 1 = 8° 2 = 12° 3 = 16°
7	DCO SUB LEVEL	0 - 3
8	DCO NOISE LEVEL	0 - 3
9	MFF CUTOFF FREQ	0 - 3
10	CMORUS	0 = OFF 1 = ON
11	DCO LFO MOD DEPTH	0 - 127
12	DCO ENV MOD DEPTH	0 - 127
13	DCO AFTER DEPTH	0 - 127
14	DCO PM/PWM DEPTH	0 - 127
15	DCO PWM RATE	0 = PW manual 1 - 127 = PWM LFO RATE
16	VCF CUTOFF FREQ	0 - 127
17	VCF RESONANCE	0 - 127
18	VCF LFO MOD DEPTH	0 - 127
19	VCF ENV MOD DEPTH	0 - 127
20	VCF KEY FOLLOW	0 - 127
21	VCF AFTER DEPTH	0 - 127
22	VCA LEVEL	0 - 127
23	VCA AFTER DEPTH	0 - 127
24	LFO RATE	0 - 127
25	LFO DELAY TIME	1 - 127

MODEL MKS-50 MIDI Implementation Chart

Date: Sep, 05 1986
Version: 1.0

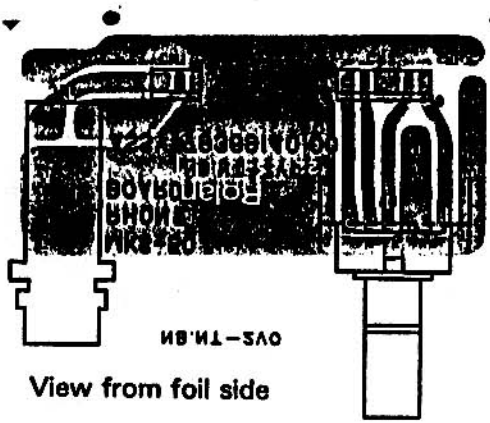
Function		Transmitted	Recognized	Remarks
Basic Channel	Default Changed	1-16 1-16	1-16 1-16	memorized
Mode	Default Messages Altered	Mode 3 POLY, OMNI OFF *****	Mode 1, 2, 3, 4 MONO, POLY, OMNI, ON/OFF	
Note Number	True voice	X *****	0-127 12-108	
Velocity	Note ON Note OFF	X X	O v=1-127 X	
After Touch	Key's Ch's	X X	X .	
Pitch Bender		X	* 0-24 semi-tone	9 bit resolution
Control Change	1 5 6 7 64 65 100 101	X X X X X X X X	* Mod. depth . O ** Volume * Hold . O O	Modulation Portamento Time Data Entry (MSB) Hold-1 Portamento Switch RPC (LSB) RPC (MSB)
Prog Change	True #	X *****	* 0-127 0-127	
System Exclusive		.	.	
System Common	Song Pos Song Sel Tune	X X X	X X X	
System Real Time	Clock Commands	X X	X X	
Aux Messages	Local ON/OFF All Notes OFF Active Sense Reset	X X X X	X O (123-127) O X	
Notes		<ul style="list-style-type: none"> * Can be set to O or X and memorized. ** Can adjust the volume of the sound within the level set with the panel volume knob. <p>RPC-PITCH BEND SENSITIVITY only</p>		

Mode 1 : OMNI ON POLY
Mode 3 : OMNI OFF POLY

Mode 2 : OMNI ON MONO
Mode 4 : OMNI OFF MONO

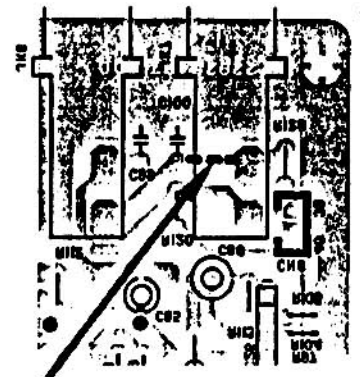
O : Yes
X : No

Phone Board
7936914000
(pcb 2292540701 4/4)



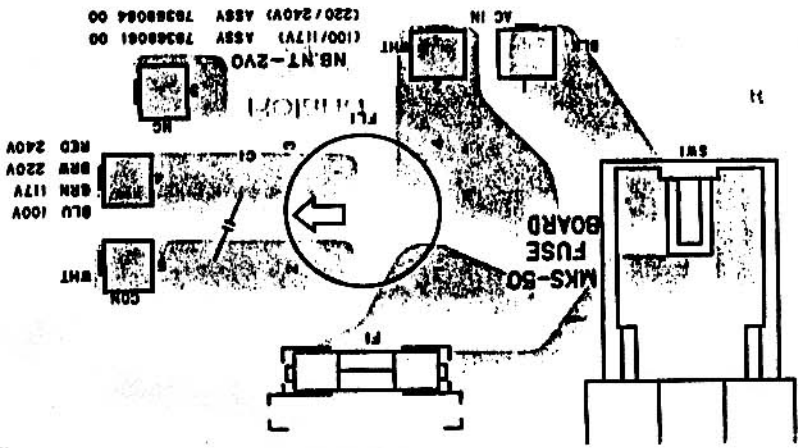
View from foil side

Main Board
7936910101 100/117V
7936910401 220/240V
(pcb 2292540701 1/4)



Jumper wire on early pcbs
 (2292540700 1/4)

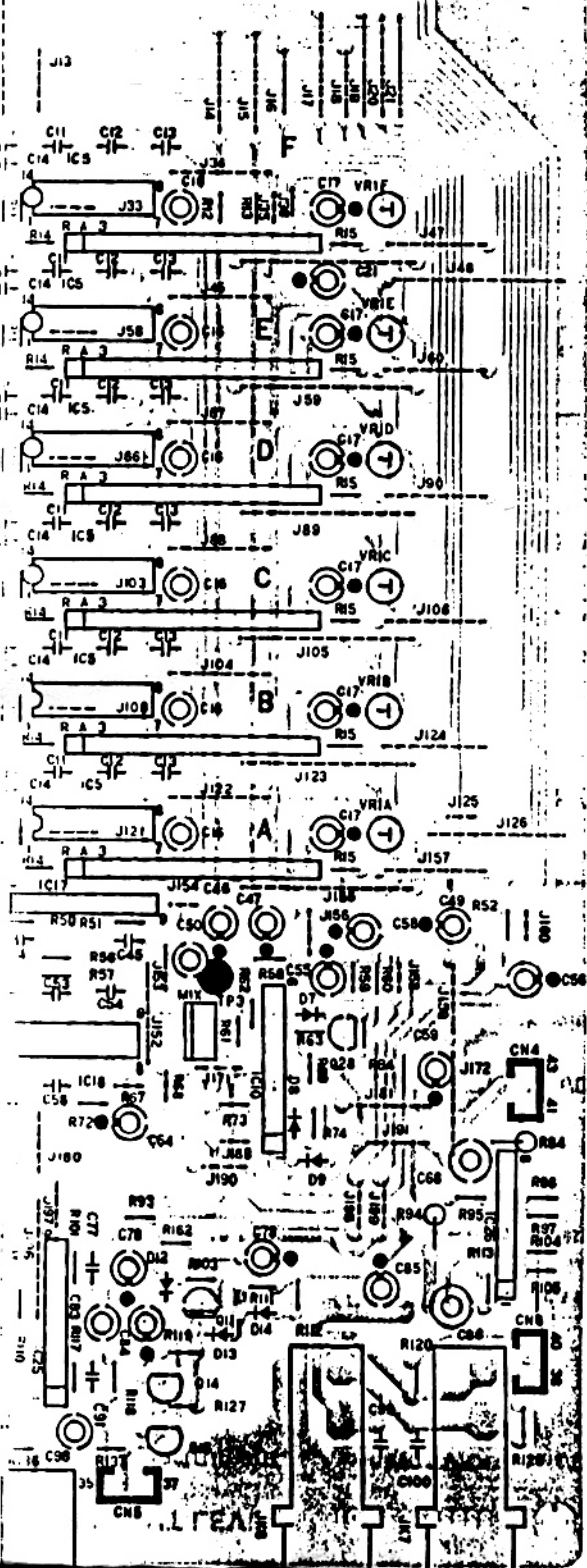
Fuse Board
7936906100 100/117V
7936906400 220/240V
(pcb 2292540701 3/4)



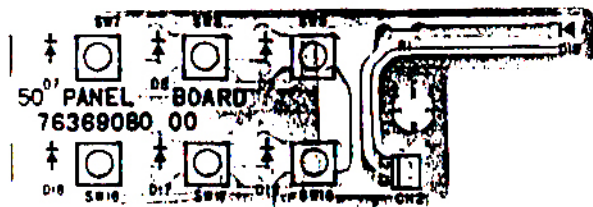
View from component side

F1		
12559412	SD6 200mA	100/117V
12559538	CEE-100mAT	220/240V

ASSY 79369101 01 (100/117V)
ASSY 79369104 01 (220/240V)



Panel Board
7636908000
(pcb 2292540701 2/4)



View from foil side

EXPLODED VIEW / 分解図

No	PART NAME (部品名)		PART. NO.
1	Front Panel	フロント・パネル	(222155300)
2	Knob	ボリュウム・ツマミ	(2247026200)
3	Jack Holder	ジャック・ホルダ	(22195917)
4	Phone Board	フォン・ボード	(7936914000)
5	Panel Bracket	パネル・ホルダー	(22195916)
6	LCD Cover	LCD カバー	(22025782)
7	Button Assy A	ボタン組立品 A	(22475966)
8	Button Assy B	ボタン組立品 B	(22475967)
9	Button Assy C	ボタン組立品 C	(22475968)
10	Button Assy D	ボタン組立品 D	(22475969)
11	Escutcheon	エスカッション	(2222031900)
12	Button	AC スイッチ・ボタン	(2247024000)
13	Panel Board	パネル・ボード	(7936908000)
14	LCD Unit	LCD ユニット	(15029441)
15	Top Cover	トップ・カバー	(22025330)
16	Rack Angle	アングル	(2212356800)
17	Bracket	AC スイッチ・ホルダー	(22195919)
18	Fuse Board	ヒューズ・ボード	100/117V (7936906100) 220/240V (7936906400)
19	Insulating Shield	絶縁 シート	(22345216)
20	AC Inlet	AC インレット	117/220V (13429710) 240V (13429709)
	Cord Bushing	コード・フッシュ	100V (12369504)
	Cord Holder	コード・ホルダー	100V (22195744)
21	Bottom Cover	ボトム・カバー	(22025331)
22	Sleeve	AC スイッチ・スリーブ	(2215040400)
23	Extension Shaft	AC スイッチ・アーム	(2214021900)
24	Power Transformer	トランス	100/117V (22455467N0)
			220/240V (22455466D0)
25	Main Board	メイン・ボード	100/117V (7936910101)
			220/240V (7636910401)
26	Center Bracket	センター・ホルダー	(22195918)
27	Rubber Foot	ゴム足	(2235031300)