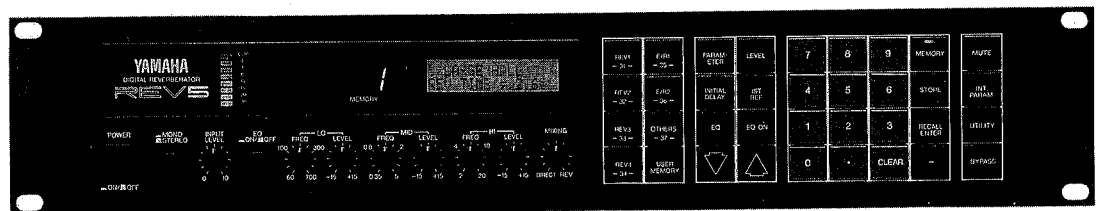


DIGITAL REVERBERATOR

REV5

SERVICE MANUAL

REV5



■ CONTENTS (目次)

SPECIFICATIONS (総合仕様).....	2
PANEL LAYOUT (パネルレイアウト).....	3
BLOCK DIAGRAM (ブロックダイアグラム).....	4
LSI DATA TABLE (LSI端子機能表).....	5
IC BLOCK DIAGRAM (ICブロック図).....	8
MIDI IMPLEMENTATION CHART.....	11
CIRCUIT BOARDS (シート基板図).....	12
CHECKS and ADJUSTMENS (検査と調整).....	22
TEST PROGRAM (テストプログラム).....	26
PARTS LIST (パーツリスト)	

006753

SINCE 1887



YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

2.33K-843 ❏ Printed in Japan '87.6

IMPORTANT NOTICE

This manual has been provided for the use of authorized Yamaha Retailers and their service personnel. It has been assumed that basic service procedures inherent to the industry, and more specifically Yamaha Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components and failure of the product to perform as specified. For these reasons, we advise all Yamaha product owners that all service required should be performed by an authorized Yamaha Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification, recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of Yamaha are continually striving to improve Yamaha products. Modifications are, therefore, inevitable and changes in specification are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and parts replacement. Recheck all work before you apply power to the unit.

This product uses a lithium battery for memory back-up.

WARNING: Lithium batteries are dangerous because they can be exploded by improper handling. Observe the following precautions when handling or replacing lithium batteries.

- Leave lithium battery replacement to qualified service personnel.
- Always replace with batteries of the same type.
- When installing on the PC board, solder using the connection terminals provided on the battery cells. Never solder directly to the cells. Perform the soldering as quickly as possible.
- Never reverse the battery polarities when installing.
- Do not short the batteries.
- Do not attempt to recharge these batteries.
- Do not disassemble the batteries.
- Never heat batteries or throw them into fire.

ADVARSEL!

Lithiumbatteri. Eksplosionsfare.

Udskiftning må kun foretages af en sagkyndig, og som beskrevet i servicemanualen.

■ SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Effect Freq. Response	20 Hz—20 kHz
Dynamic Range	Reverb: 78 dB Delay: 84 dB
THD	0.03% @ 1 kHz, max. level
Analog Equalizer	LOW: ±15 dB, 50 Hz—700 Hz MID: ±15 dB, 350 Hz—5 kHz HI: ±15 dB, 2 kHz—20 kHz

INPUT

Number of Channels	Elec. balanced × 2 (XLR type) Elec. balanced × 2 (TRS phone)
Nominal Level	-20/+4 dBm, switchable
Impedance	10 k-ohms
Level Control	Rotary, continuous
Level Monitor	8-segment LED

A/D CONVERSION

Number of Channels	1
Sampling Freq.	44.1 kHz
Quantization	16 bits
Bandwidth	20 Hz—20 kHz

D/A CONVERSION

Number of Channels	2
Sampling Freq.	44.1 kHz
Quantization	16 bits
Bandwidth	20 Hz—20 kHz

OUTPUT

Number of Channels	Elec. balanced × 2 (XLR type) Elec. balanced × 2 (TRS phone)
Nominal Level	-20/+4 dBm, switchable
Impedance	600 ohms

MEMORY

Presets (ROM)	1—30, 91—99
User Memory (RAM)	31—90 (Battery Backup)

MIDI CONTROL

Program selection by MIDI program change number.
MIDI base key selection for pitch change programs.
Bulk dump & load.

FRONT PANEL

Controls	INPUT LEVEL, EQ (LO FREQ & LEVEL, MID FREQ & LEVEL, HI FREQ & LEVEL), MIXING, EQ ON/OFF, MONO/STEREO
Keys	Direct recall (REV1/-31-, REV2/-32-, REV3/-33-, REV4/-34, ER1/-35-, ER2/-36-, OTHERS/-37-), USER MEMORY, PARAMETER, LEVEL, INITIAL DELAY, 1ST REF, EQ, EQ ON, Δ, ∇, Numeric/Editing Keys, CLEAR, MEMORY, STORE, RECALL/ENTER, -, MUTE, INT PARAM, UTILITY, BYPASS
Display	16 char. × 2 line LCD 2-digit 7-segment LED

GENERAL

Power Supply	U.S & Canada: 120V AC, 30W General Model: 220—240V AC, 30W
Dimensions (W × H × D)	480 × 90 × 343 mm (18-7/8" × 3-1/2" × 13-1/2")
Weight	5.5 kg (12 lbs. 2 ozs.)

ACCESSORIES

Remote control unit (RC-5)

* 0 dB = 0.775 Vr.m.s.

■ 総合仕様

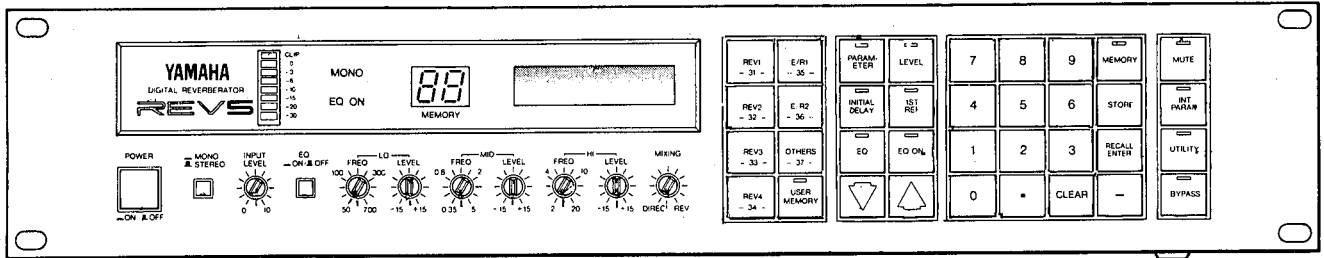
MODE	STEREO/MONO切替
INPUT	
入力チャンネル	2CH
方式	電子バランス方式
規定入力レベル	+4dB/-20dB切替
適合インピーダンス	10kΩ
コネクタ	XLRタイプコネクタ×2, TRSホーンジャック×2
OUTPUT	
出力チャンネル数	2CH
方式	電子バランス方式
規定出力レベル	+4dB/-20dB切替
適合インピーダンス	600Ω
コネクタ	XLRタイプコネクタ×2, TRSホーンジャック×2
周波数特性	20Hz—20kHz 0 [±] 3.5dB
ダイナミックレンジ	
リバース時	>78dB
ディレイ時	>84dB
高調波歪率	<0.03% @ 1kHz, 出力14dBm
イコライザー特性 (アナログ部イコライザー)	
LOW	±15dB (50Hz—700Hz)
MID	±15dB (350Hz—5kHz)
HIGH	±15dB (2kHz—20kHz)
サンプリング周波数	44.1kHz
AD変換	1CH 16ビット
DA変換	2CH 16ビット

メモリー	
プリセットプログラム	30種類 (No.1—30)
ユーザープログラム	60種類 (No.31—90)
コンビネーション	
ディスプレイ	
メモリーNo.	7セグメント2桁LED
プログラム名称, パラメーター, メッセージ	16文字2ラインLCD (LED照明付)
入力レベルメーター	8素子LED (CLIP—30dB表示)
コントロール	
POWER, STEREO/MONO, INPUT LEVEL, EQ ON/OFF, PARAMETRIC EQ, MIXING, プリセットキー, PARAMETER, INITIAL DELAY, EQ, EQ ON, 1ST REF, LEVEL, INT PARAM, MUTE, BYPASS, MEMORY, RECALL/ENTER, STORE, アップ/ダウンキー, テンキー, CLEAR, -, UTILITY,	
コネクタ	
INPUT L(MONO), INPUT R, OUTPUT L, OUTPUT R, REMOTE CONTROL, BYPASS, MEMORY, MIDI IN, MIDI THRU/OUT	
電源	AC100V, 50/60Hz
消費電力	25W
寸法 (W × H × D)	480 × 90 × 343mm
重量	5.5kg
付属品	リモートコントローラー (プリセット呼び出し)

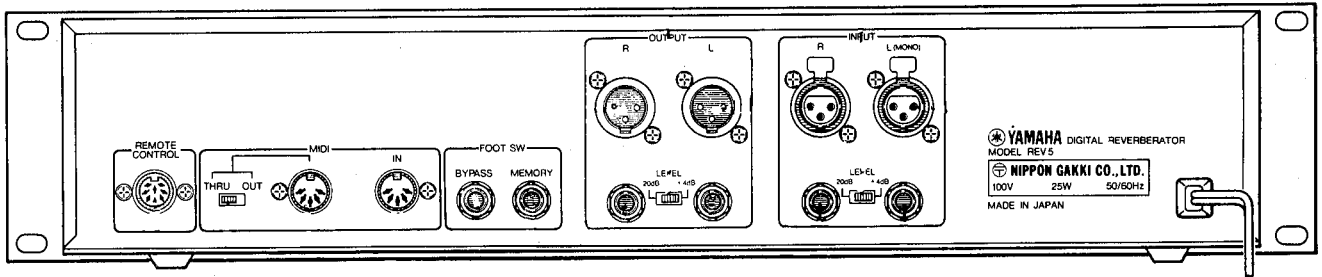
● 0dB = 0.775 Vr.m.s.

■ PANEL LAYOUT (パネルレイアウト)

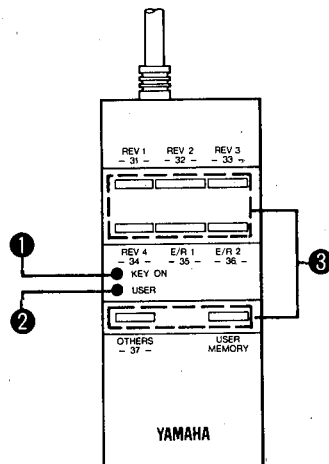
● Front Panel (フロントパネル)



● Rear Panel (リアパネル)



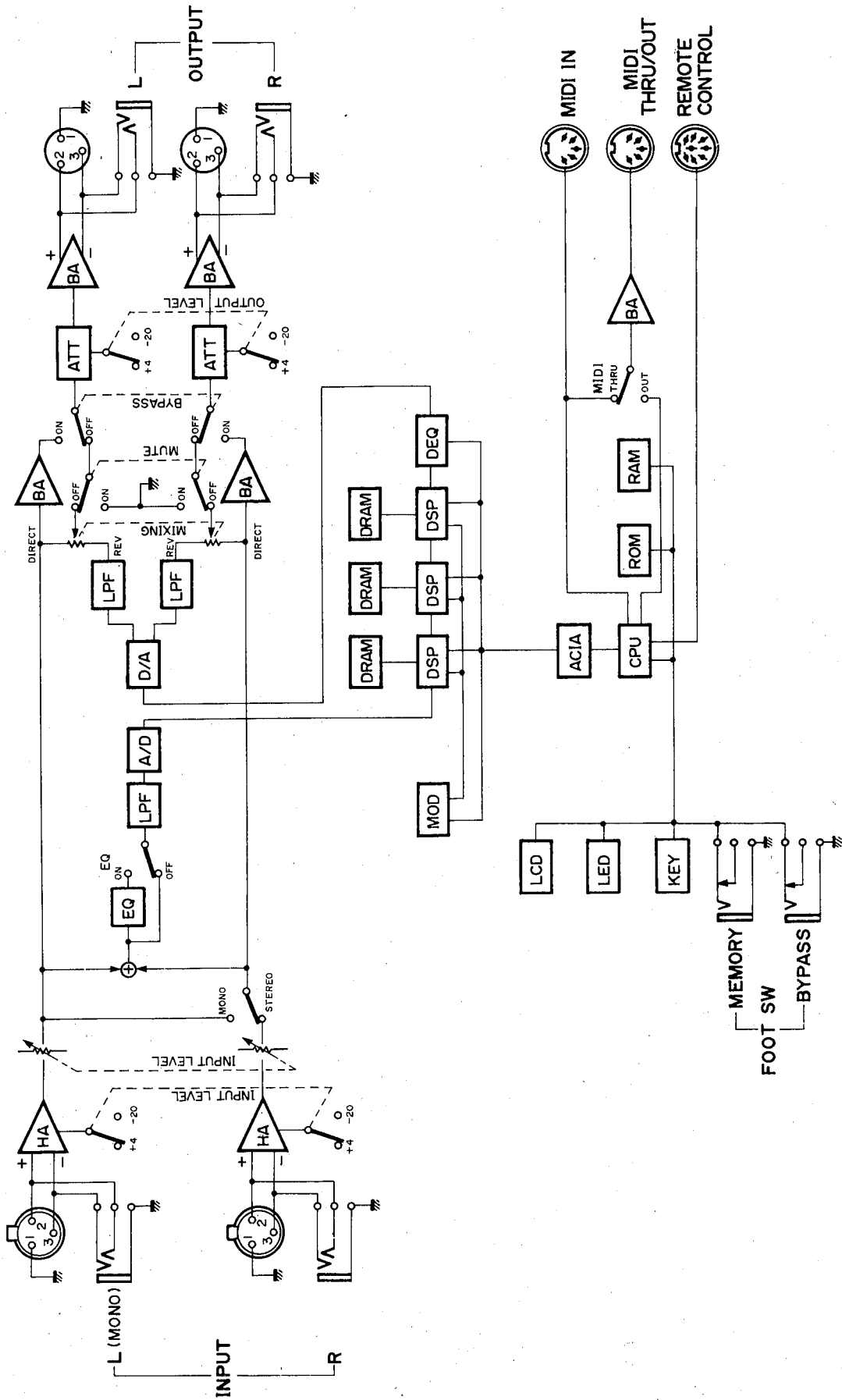
● Remote Control Unit (リモコンユニット)



- ① KEY ON LED (キーオンインジケータ)
KEY ON LED will illuminate only when a DIRECT RECALL key is pressed.
- ② USER LED (ユーザーインジケータ)
USER LED indicates the REV5 is switched to USER MEMORY.
- ③ DIRECT RECALL key (プリセットキー)

REV5

■ BLOCK DIAGRAM (ブロックダイアグラム)



REV5

LSI DATA TABLE (LSI 端子機能表)

● HD6303RP (IG093500) CPU

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	Vss		Ground	21	Vcc		+5V
2	XTAL	I	Clock	22	A15	} Address bus	
3	EXTAL	I					
4	NMI	I	Non-maskable Interrupt	23	A14		
5	IRQ1	I	Interrupt Request	24	A13		
6	RESET	I	Reset	25	A12		
7	STBY	I	Stand-by mode Signal	26	A11		
8	P20	} Port		27	A10		
9	P21						
10	P22						
11	P23						
12	P24	} Address bus (/ Port)		28	A9		
13	A0/P10						
14	A1/P11						
15	A2/P12						
16	A3/P13						
17	A4/P14						
18	A5/P15						
19	A6/P16						
20	A7/P17			29	A8	} (Data bus /) Address bus	
				30	D7/A7		
				31	D6/A6		
				32	D5/A5		
				33	D4/A4		
				34	D3/A3		
				35	D2/A2		
				36	D1/A1		
				37	D0/A0	} Read/Write control Not used	
				38	R/W		
				39	AS		
				40	E		

● HD63B50P (IG147300) Asynchronous Communications Interface Adaptor

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	Vss		DC supply 0V	13	R/W	I	Read/Write Enable
2	Rx Data	I	Receive data	14	E	I	} Data bus
3	Rx CLK	I	Receive clock	15	D7	I/O	
4	Tx CLS	O	Transmit clock	16	D6	I/O	
5	RTS	I/O	Request to send	17	D5	I/O	
6	Tx Data	O	Transmit data	18	D4	I/O	
7	IRQ	I	Interrupt request	19	D3	I/O	
8	CS0	I	} Chip select	20	D2	I/O	
9	CS1	I					
10	CS2	I					
11	RS	I	Resist select	21	D1	I/O	
12	Vcc		DC supply (+5.0V)	22	D0	I/O	
				23	DCD	I	Data carrier detect
				24	CTS	I	Clear to send

● YM3807 (XA902001) Modulation Signal Generator

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	NC		} Inputs data to add to the waveform data inside MOD	24	VSS		Power supply ground
2	MDSIO	I					
3	MDSI1	I					
4	MDSO0	O		} Outputs MOD internal waveform data with the same data format as MDSIO.	23	CDO	O
5	MDSO1	O					
6	MD0	O	} Outputs waveform data for all channels inside MOD.	22	CDI	I	CD interface serial data input
7	MD1	O					
8	MD2	O					
9	MD3	O					
10	MD4	O					
11	MD5	O					
12	VDD		Power supply +5V	21	NC		} CD interface transmission clock input
				20	XCLK	I	
				19	XMD	I	Selects 1/16 mode (asynchronous) or 1/1 mode (synchronous) for the CD interface
				18	$\overline{\text{CRS}}$	I	CD counter reset
				17	CLK	I	3.2MHz
				16	$\overline{\text{TC}}$	I	Initial clear
				15	SYW	I	Sync signal input. One 64th of the master clock.
				14	MD7	O	} Outputs waveform data for all channels inside MOD.
				13	MD6	O	

●YM3901 (XC282001) ADA

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	MCLK	I	System clock	37	DA5	O	Outputs Parallel data 5 to DAC
2	SYIN	I	Input of System synch. signal	38	DA6	O	Outputs Parallel data 6 to DAC
3	SYO	O	Output of System synch. signal	39	DA7	O	Outputs Parallel data 7 to DAC
4	REST	I	System reset signal, except Ran, gen.	40	DA8	O	Outputs Parallel data 8 to DAC
5	DRST	I	Reset signal for Random generator	42	DA9	O	Outputs Parallel data 9 to DAC
6, 7, 8	MD 0, 1 & 3	I	Selecting System Mode	43	DA10	O	Outputs Parallel data 10 to DAC
9, 11	DIC 0, 1	I	Mode selection for Diser	44	DA11	O	Outputs Parallel data 11 to DAC
10, 41	GND	I	Ground (Earth) Terminal	45	DA12	O	Outputs Parallel data 12 to DAC
12	DN	I	Selection of Ser. data format (DSP/Normal)	46	DA13	O	Outputs Parallel data 13 to DAC
13	TD	I	For test, External synch control.	47	DA14	O	Outputs Parallel data 14 to DAC
14	TNC	I	Selection of Ser. Input data mode at MODE 0 or 3 (Time sharing/NOT)	48	DA15	O	Outputs Parallel data 15 (MSB) to DAC
15, 16	DLY 0, 1	I	Selection of Phase lag value for DIN 1, 2	49	CPIN	I	Inputs the output signal of Comparator, at Successive Approximation
17, 18	DIN 2	I	Inputs serial data for DAC	50	ADCK	O	Inner successive comparing register CLOCK
19	DOUT	O	Outputs Serial data after AD converting	51	SH 1	O	Sample/hold signal 1, Outputs SW sel. signal at MODE 1.
20, 21	DDO 1, 2	O	Outputs serial data of phase delay for DIN 1, 2	52	SH 2	O	Sample/hold signal 2 (Mode 2: Switch sel. signal) (Mode 4: Deglitch signal 3)
22	DAOVC/PRIN	I	Over flow control terminal for DA. GND: OFF, 5V: ON or PRCN: 5 V; Initialization of Random number	53	ASW 1	O	Outputs Switch select signal (Mode 4: Deg. signal)
23	PRCN	I	For test, at 5 V Initialization of Random number	54	SD EN	O	Latch enable signal for data input from DIN 1, 2
24	TM 1	O	Outputs Timing signal	55	SD OUT	O	Converted Data input DIN1, 2 to Serial data (out)
25	D32	O	More delayed 32 bit in DIN 2 are output	56	MPX1	O	For test, Select data Out
26, 58	VDD	I	+5V DC voltage	57	REG1	O	For test, Enable signal of register out
27	OVFL	O	Outputs Over flow signal after AD converting (Active L)	59	MPX3	O	For test, Select signal out
28	PRDL	O	Outputs the timing of input for output serial random data from PRDO	60	DEGL 11	O	De-glitch signal 11
29	PRDO	O	Outputs Ser. random data (Two comp. data) For YM3015, 3020	61	DEGL 12	O	De-glitch signal 12
30, 31	DEG 1, 2	O	Outputs De-glitch signal	62	REG 3	O	For test, Enable signal for reg. 3
32	DA0	O	Outputs Parallel data 0 (LSB) to DAC	63	ADCX	O	For test, outputs Control signal of clock for Successive approximation
33	DA1	O	Outputs Parallel data 1 to DAC	64	ADST	O	For test, outputs Start signal for Successive approximation
34	DA2	O	Outputs Parallel data 2 to DAC				
35	DA3	O	Outputs Parallel data 3 to DAC				
36	DA4	O	Outputs Parallel data 4 to DAC				

●YM3608 (XA895001) DEQ

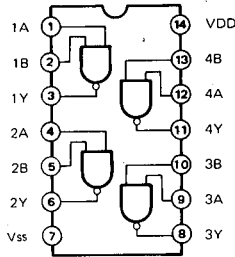
Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	Vdd	I	+5V	12	Vss	I	Earth (Ground)
2	XHD	I	Alteration of Sync. (=+5V) or Asynch. (=0V) for CDI input terminal (Synch: 1:1), Asynch: 16:1)	13, 14	SI0, SI1	I	INPUT for Serial data signal
3	CRS	I	Initialized Serial Control Interface	15, 16	SO0, DO1	O	OUTPUT for Serial data signal
4	CDI	I	Inputs of μ PGM, Para, Ser. Cont. Data of Control Reg.	17	OVF	O	Detector for OVER Flow
5	CDO	O	Outputs of μ PGM, Para, Ser. Cont. Data of Control Reg.	18	TEST	I	For test. Normally connecting to +5V
6	XCLK	I	In/Out clock for CDI & CDO	19	C2	O	Output is delayed Data of 2nd bit of P. Reg. by 1 bit.
7	TRG	I	Determines transmit timing of PARA. to Para. Reg. from T BFR.	20	C1	O	Output is delayed Data of 1st bit of P. Reg. by 1 bit.
8	ESL	I	Timing determination of data for External at Ext. Shift CLK	21	C0	O	Output is delayed Data of 0 bit of P. Reg. by 1 bit.
9	ELD	I	Timing determination of data for Inner at Ext. Shift CLK	22	CEMD	I	+5V: It's necessary to input 2 Byte for CE to CDI 0V: It needs not to have a data for CE to CDI.
10	ECLK	I	Input Shift CLK of IN/OUT SR at Ext Shift CLK	23	IC	I	Initialized for DEQ
11	CLK	I	System Clock	24	Sync	I	Synchro. signal for system

● YM3804 (IT380401) Digital Signal Processor

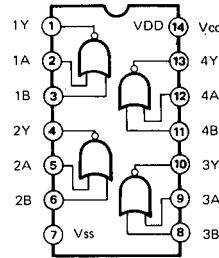
Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	D15	I.O	Data bus	64	VSS		Ground
2	D14	I.O		63	D16	I.O	Data bus
3	D13	I.O		62	D17	I.O	
4	D12	I.O		61	D18	I.O	
5	D11	I.O		60	D19	I.O	
6	D10	I.O		59	D20	I.O	
7	D9	I.O		58	D21	I.O	
8	D8	I.O		57	D22	I.O	
9	D7	I.O		56	D23	I.O	
10	D6	I.O		55	MOD0	I	MOD data input terminal
11	D5	I.O		54	MOD1	I	
12	D4	I.O		53	MOD2	I	
13	D3	I.O		52	MOD3	I	
14	D2	I.O		51	MOD4	I	
15	D1	I.O		50	MOD5	I	
16	D0	I.O		49	MOD6	I	
17	ST1	I	48	MOD7	I	Initial clear	
18	ST0	I	47	\overline{TC}	I		
19	SO1	O	46	CE	I	Chip enable	
20	SO0	O	45	CLK	I	Master clock input terminal	
21	XMD	I	44	SYW	I	Input for generating SYNC signals internally	
22	XCLK	I	43	\overline{TSTI}	I	Terminal for internal test. To enter test mode, connect to GND. When in use, VDD.	
23	\overline{TO}	O	42	\overline{TSTR}	I		
24	\overline{CRS}	I	41	A0	O	Address bus	
25	CDO	O	40	A1	O		
26	CDI	I	39	A2	O		
27	TIMI	O	38	A3	O		
28	\overline{REF}	O	37	A4	O		
29	OE	O	36	A5	O		
30	R/W	O	35	A6	O		
31	CAS	O	34	A7	O	Power supply 5V	
32	RAS	O	33	VDD			

■ IC BLOCK DIAGRAM (IC ブロック図)

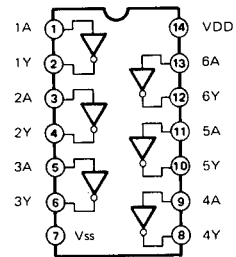
● SN74HC00N (IR000050)
Quad 2 Input NAND



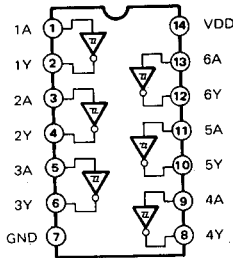
● SN74C02N (IR000250)
Quad 2 Input NOR



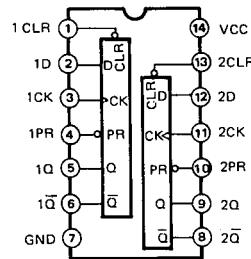
● SN74HC04N (IR000450)
Hex Inverter



● SN74HC14N (IR001450)
Hex Inverter

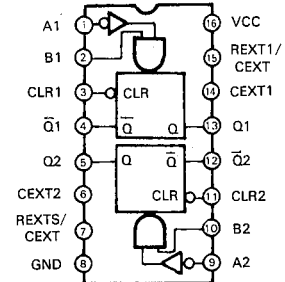


● SN74HC74N (IR007450)
Dual D-Type Flip-Flop

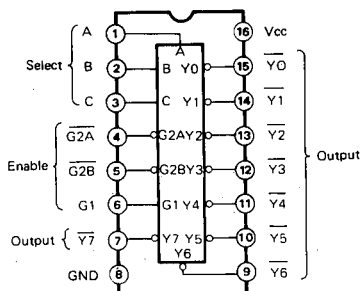


INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q̄
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q _o	Q̄ _o

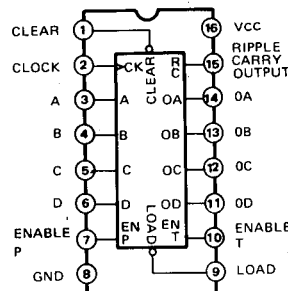
● TC74HC123P (IR012300)
Dual Retriggerable Monostable Multivibrator



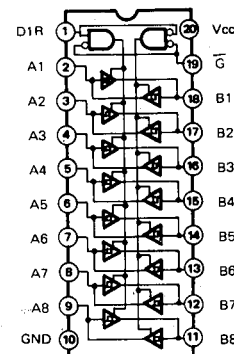
● SN74HC138N (IR013850)
3 to 8 Demultiplexer



● SN74HC163N (IR016350)
SYNC. Binary Counter



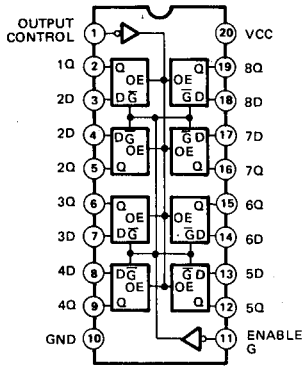
● SN74HC245N (IR024550)
Octal 3-State Bus Transceiver



REV5

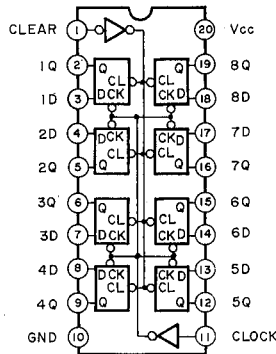
● **SN74HC373N** (IR037350)

Octal 3-State D-Type Latch



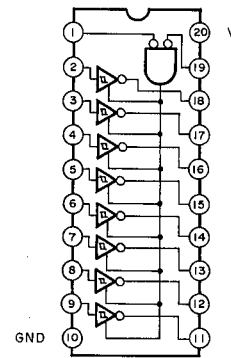
● **SN74HC273N** (IR027350)

Octal D-FFs



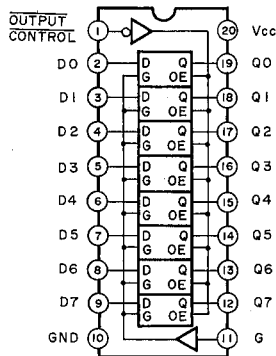
● **SN74HC540N** (IR054050)

Octal 3-State Buffer (Inverted)



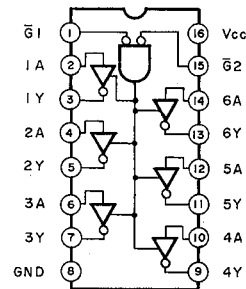
● **μPD74HC573** (IR057320)

Octal 3-State D-Latches



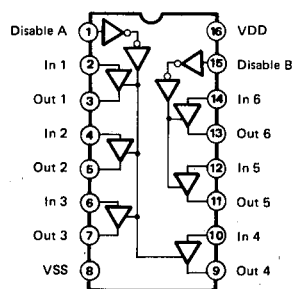
● **TC74HC366P** (IR036600)

Hex 3-State Bus Inverters



● **TC4053BP** (IG055100)

Hex 3-State Buffer

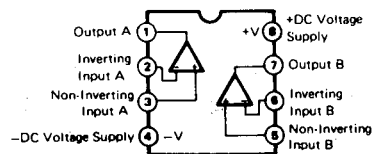


● **NJM4558DV** (IG001390)

● **NJM4556DE** (XA772001)

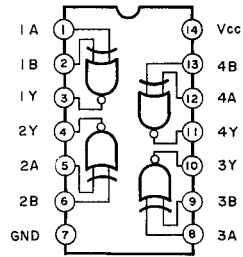
● **M5238P** (XA013001)

Dual Operational Amplifier



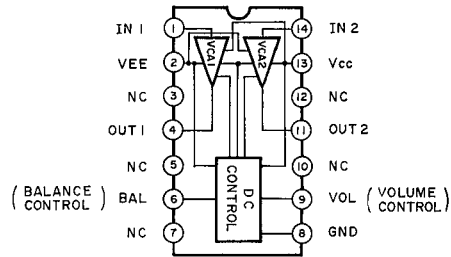
● HD74LS266P (XA379001)

Quad 2 Input O.C. Ex-NOR



● M51133P (XD003001)

VCA



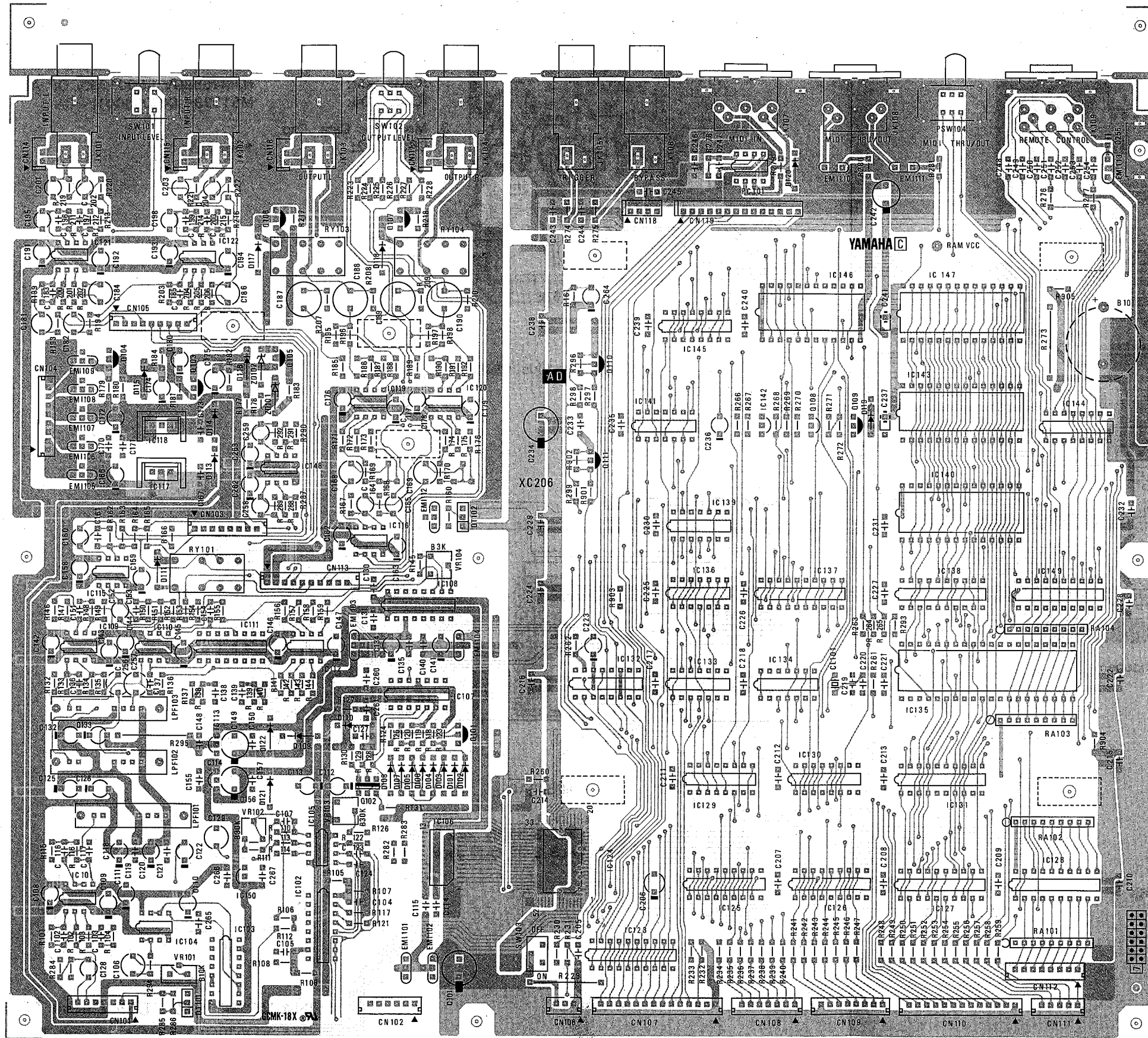
REV5

REV5

Function ...	Transmitted	Recognized	Remarks
Basic Default	: x	: 1 - 16, off	: memorized
Channel Changed	: x	: 1 - 16, off	:
Mode Default	: x	: OMNion/OMNioff	: memorized
Mode Messages	: x	: x	:
Mode Altered	: XXXXXXXXXXXXXXXX	: x	:
Note Number : True voice	: x	: 0 - 127 X1	:
Velocity Note ON	: x	: x	:
Velocity Note OFF	: x	: x	:
After Key's	: x	: x	:
Touch Ch's	: x	: x	:
Pitch Bender	: x	: x	:
	: x	: x	:
Control	:	:	:
Change	:	:	:
Prog Change : True #	: x	: 0 0 - 127 X2	:
	: XXXXXXXXXXXXXXXX	:	:
System Exclusive	: o	: o	: Bulk dump
System : Song Pos	: x	: x	:
System : Song Sel	: x	: x	:
Common : Tune	: x	: x	:
System : Clock	: x	: x	:
Real Time : Commands	: x	: x	:
Aux : Local ON/OFF	: x	: x	:
Aux : All Notes OFF	: x	: x	:
Mes- : Active Sense	: x	: x	:
sages:Reset	: x	: x	:
Notes	: X1 Note ON/OFF is recognized only for pitch change and MIDI trigger.		
	: X2 For program 1 - 128, memory #1 - #99 is selected.		

■CIRCUIT BOARDS (シート基板図)

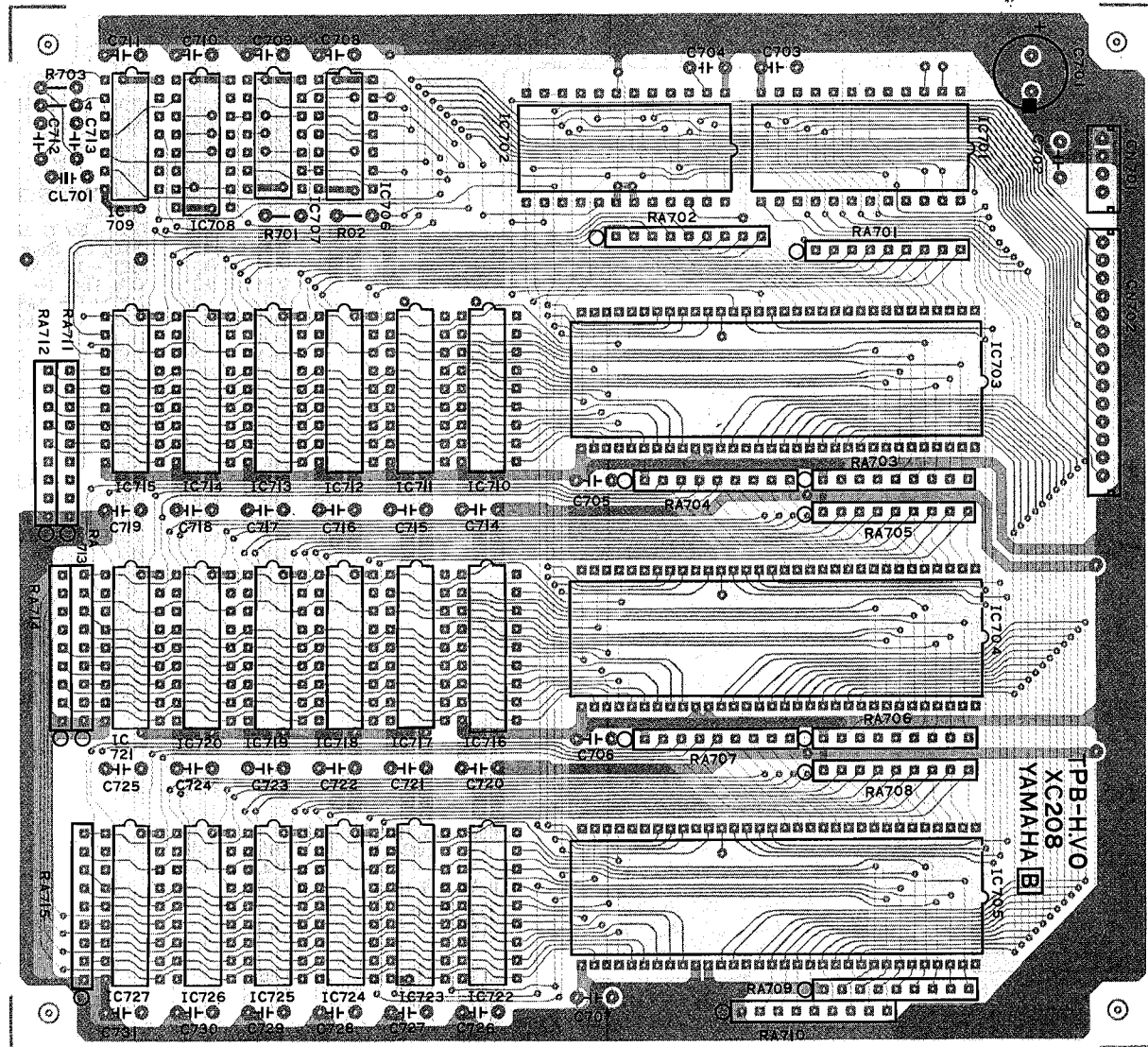
●AD Circuit Board



Notes)

1. Circuit Board: XC206C0
2. IC
 - IC101,104,109,115,116,121,122,148: NJM4558DV (IG001390) OP AMP.
 - IC102,111: TC4053BP (IG055100) MPX
 - IC103: YM3020 (XA860001) DAC
 - IC105,110,112: M5238P (XA013001) OP AMP.
 - IC106: PCM55HP (XC271001) DAC
 - IC107: UPC319C (IG086700) COMPARATOR
 - IC108: PCM56P (XB637001) DAC
 - IC113: NJM79L05 (IG130500) -5V 0.1A
 - IC114: NJM78L05A (IG065510) 5V Regulator
 - IC117: NJM7915A (IG147500) -15V 1A
 - IC118: NJM7815A (IG147400) 15V 1A
 - IC119,120: NJM4556DE (XA772001) OP AMP.
 - IC123: SN74HC245N (IR024550) TRANSCEIVER
 - IC124: YM3901 (XC282001) ADA
 - IC125,126: UPD4513BC (XC290001) 7SEG DRIVER
 - IC127,131: SN74HC273N (IR027350) D-FF OC
 - IC128: SN74HC540N (IR054050) INV-BUF
 - IC129,130: SN74HC138N (IR013850) DECO
 - IC132: TC74HC123P (IR012300) MONO-FF
 - IC133: SN74HC04N (IR000450) INV
 - IC134: SN74HC74N (IR007450) DFF
 - IC135: HD6303RP (IG093500) 8BIT CPU
 - IC136: SN74HC02N (IR000250) NOR
 - IC137: TBP28L22N (XD002001) BPRM 256
 - IC138: SN74HC373N (IR037350) D-LATCH
 - IC139: SN74HC00N (IR000050) NAND (XC270001) EPROM
 - IC141: SN74HC14N (IR001450) INV
 - IC142: PST518B-2 (IG116200) SYSTEM RESET
 - IC143,147: TC5664PL-15 (XB013001) SRAM 8kx8
 - IC145: TC74HC366P (IR036600) BUFFER
 - IC146: HD63B50P (IG147300) ACIA
 - IC149: UPD74HC573 (IR057320) LATCH
 - IC150: NJM78L12A (XD066001) 12V Regulator
3. Photo Coupler PC101: TLP552 (IK000470)
4. Transistor Array IC144: TD62003P (IG127300)
5. Transistor
 - Q101,103,106,107,109,110: 2SA1015 Y
 - Q102: 2SC3064 F, G Dual
 - Q104,105,108,111: 2SC1815 Y
6. Digital Transistor DT101,102: DTC143XF
7. Diode
 - D101~111,115~120: 1SS176
 - D113,114,121,122: 11ES4
8. Zener Diode ZD101,102: RD5.6EB2
9. Metal Oxide Resistor
 - R229: 22Ω 1W
 - R273: 100Ω 1W
 - R295: 150Ω 1W
10. Resistor Array RA101~104: RMLS8-103J
11. Trimmer Potentiometer
 - VR101: B10K 3P POT
 - VR102,103: B30K 3P EVN
 - VR104: B3K 3P EVN
12. Low Pass Filter LPF101~103: LP20C9B6
13. EMI Filter EMI101~109,112,113: LS MT Y223NB
14. FL Coil EMI110,111: 20μH
15. Ceramic Resonator CL101: CSA4.00MG
16. Relay RY101,103,104: DC RY12W
17. Lithium Battery B101: ICR2032 3V

● DSP Circuit Board

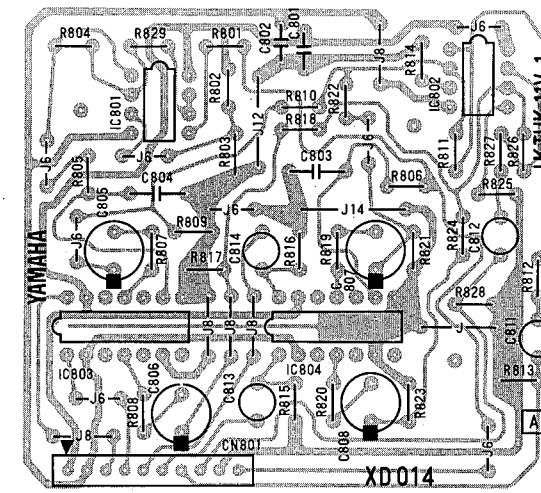


Components Side (部品側)

Notes)

1. Circuit Board: XC208A0
2. IC
 - IC701: YM3807 (IT380700) MOD
 - IC702: YM3608 (XA895001) DEQ
 - IC703~705: YM3804 (IT380400) DSP
 - IC706: HD74LS266P (XA379001) EX-NOR
 - IC707: SN74HC74N (IR007450) DFF
 - IC708: SN74HC163N (IR016350) CNT
 - IC709: SN74HC04N (IR000450) INV
 - IC710~727: MB81464-12 (XA457001) DRAM 256K
3. Resistor Array
 - RA701~715: RMLS8-103J
4. Semiconductive Cera. Cap.
 - C702~711, 714~731: 0.1μ 16V
5. Ceramic Resonator
 - CL701: CSA564MT

● VCA Circuit Board

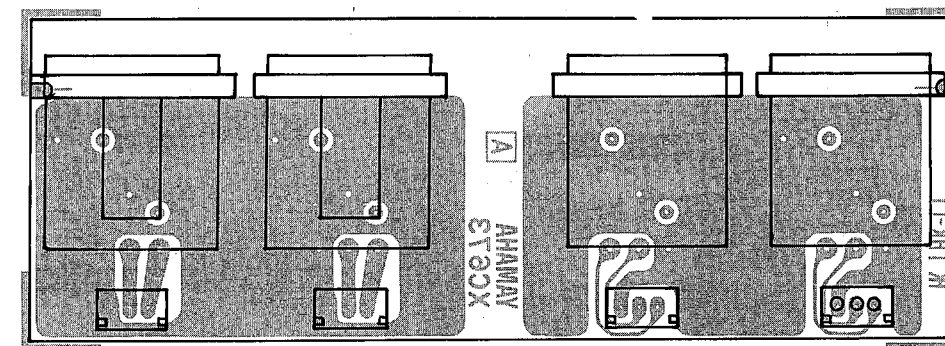


Components Side (部品側)

Notes)

1. Circuit Board: XD014A0
2. IC
 - IC801,802: NJM4558DV (IG001390) OP AMP.
 - IC803,804: M51133P (XD003001) VCA
3. Monolithic Cera. Cap.
 - C801,802: 1.5μ 25V

● CN Circuit Board



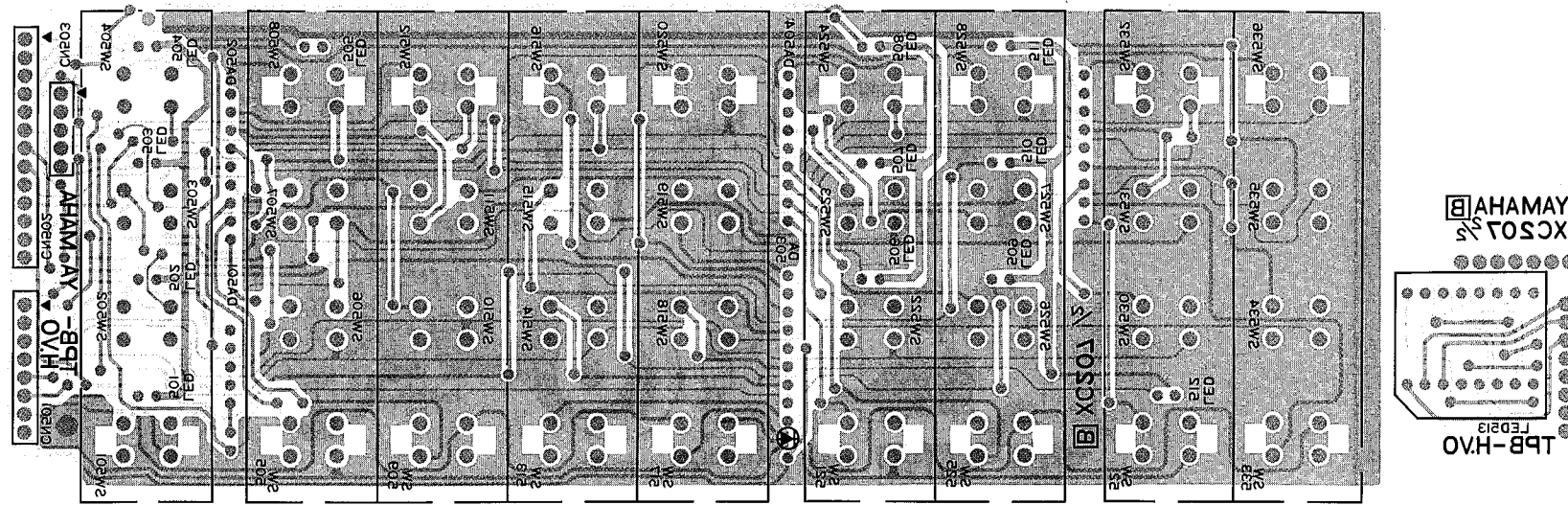
Components Side (部品側)

Notes)

1. Circuit Board: XC673A0
2. Connector
 - XL601,602: XLB-3-31 IN Jack
 - XL603,604: XLB-3-32 OUT Jack

- 3NA-VC79030-6Z : DSP Circuit Board
- 3NA-VD67060△ : VCA Circuit Board
- 3NA-VD25690 : CN Circuit Board

● KY Circuit Board

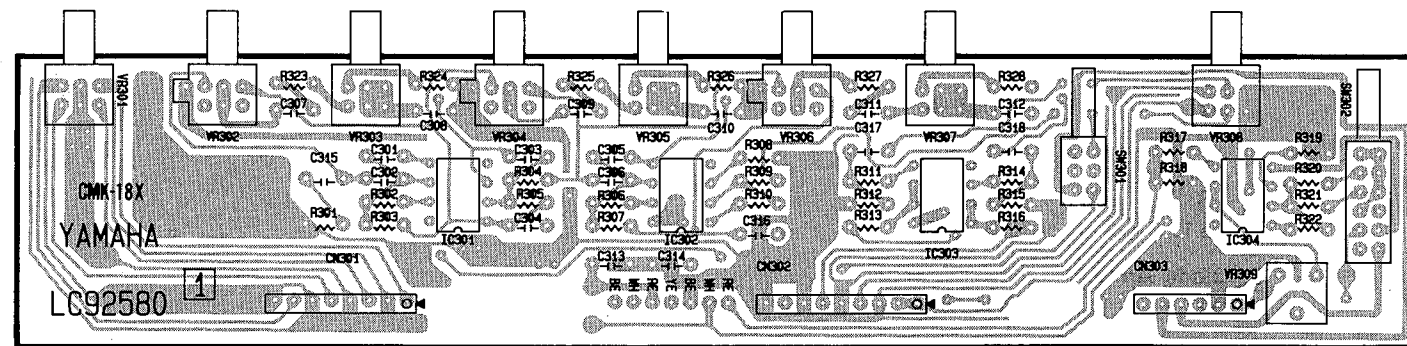


Pattern side (パターン側)

Notes)

- | | |
|-------------------|-------------------------|
| 1. Circuit Board: | XC207B0 |
| 2. Diode Array | |
| DA501: | DAN401 25mA |
| DA502~505: | DAN801 |
| 3. LED | |
| LED501~512: | LN242RP RE |
| 4. LED Display | |
| LED513: | LN524RKS 7 SEG×2 MEMORY |
| 5. Push Switch | |
| SW501~536: | KHH10908 |

● EQ Circuit Board



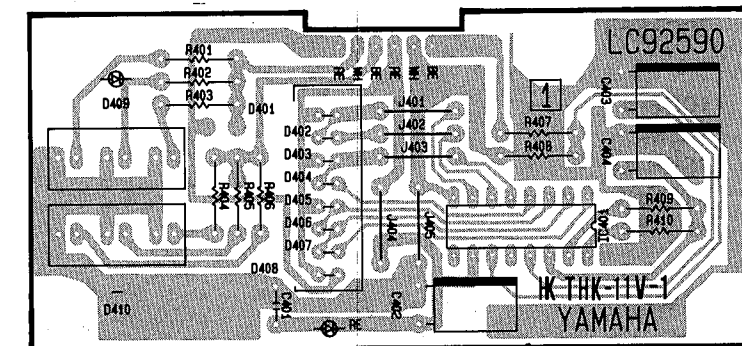
Components Side (部品側)

Notes)

- | | | |
|--------------------------|------------------------------|--------------|
| 1. Circuit Board: | LC92584 | |
| 2. IC | | |
| IC301~304: | NJM4558DV (IG001390) OP AMP. | |
| 3. Variable Resistor | | |
| VR301: | B10K×2 | MIXING |
| VR302,304,306: | G20K×2 | LEVEL |
| VR303,305,307: | C100K×2 | FREQUENCY |
| VR308 | A10K×2 | INPUT VOLUME |
| 4. Trimmer Potentiometer | | |
| VR309: | B30K 3P EVN | |
| 5. Monolithic Cera. Cap. | | |
| C313,314: | 1.5μ, 25V | |

3NA-VC81390△ : KY Circuit Board
 : EQ Circuit Board
 : MT Circuit Board

● MT Circuit Board



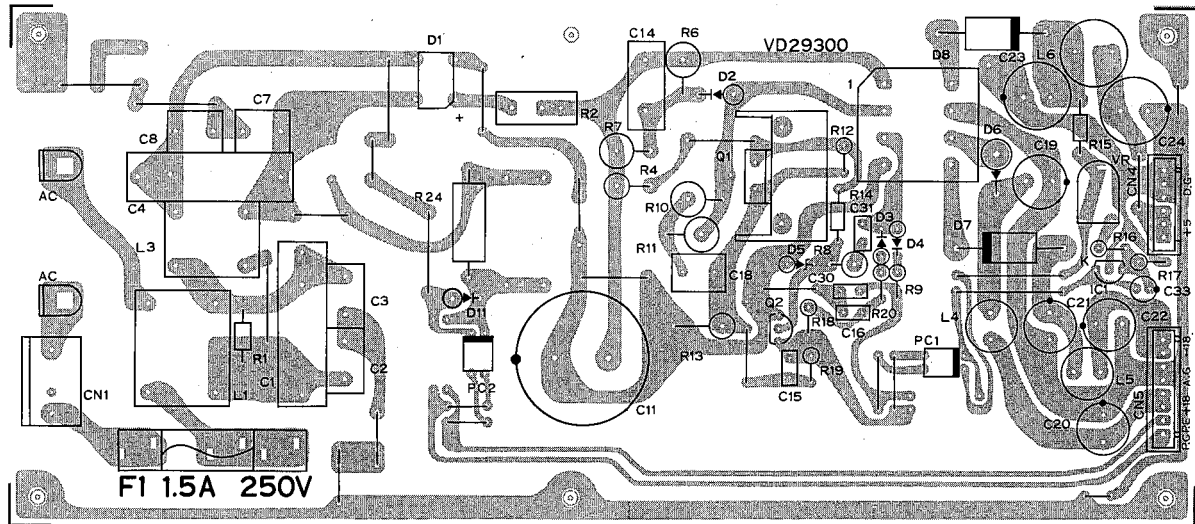
Components Side (部品側)

Notes)

- | | |
|------------------------------|--------------------|
| 1. Circuit Board: | LC92591 |
| 2. LED Driver | |
| IC401: | IR2E19 (IG136600) |
| 3. LED Display | |
| LED401~408: | SX-25J LEVEL |
| 4. LED | |
| LED409,410: | LT9230D MONO,EQ.ON |
| 5. Semiconductive Cera. Cap. | |
| C401: | 0.1μ 16V |

● Power Supply Circuit Board

Japanese Model (VD293000)

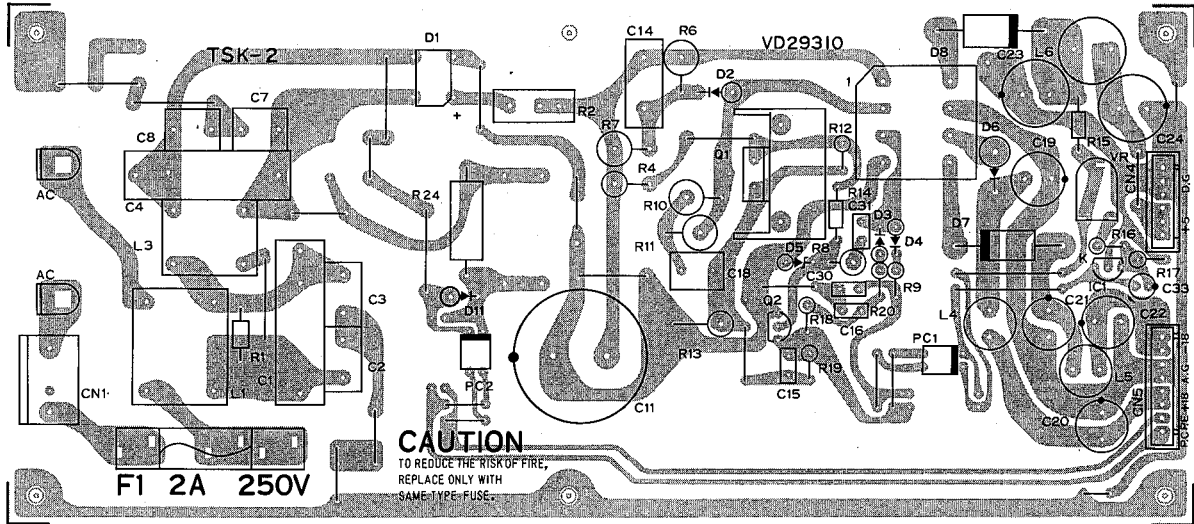


Components Side (部品側)

Notes)

1. IC
IC1: μ PC1093J
2. Photo Coupler
PC1,2: PC817
3. Transistor
Q1: 2SK319 (Power MOS FET)
2: 2SC2655
4. Diode
D2: 10DF-6
3,4: 1SS84
6,7: 2SKH10
8: 31DQ04
11: 1S1555
5. Diode Array
D1: S1WB40
6. Zener Diode
D5: HZ15-3
7. Choke Coil
L1: 20mH
3: 10mH
4,5: 150 μ H
6: 18 μ H
8. Resistor
marked*: Flame Proof Carbon Resistor
R2 Wire Wound Resistor 6.8 Ω 5W
9. Fuse
F1: T1.5A 250V

U.S. Model (VD293100)



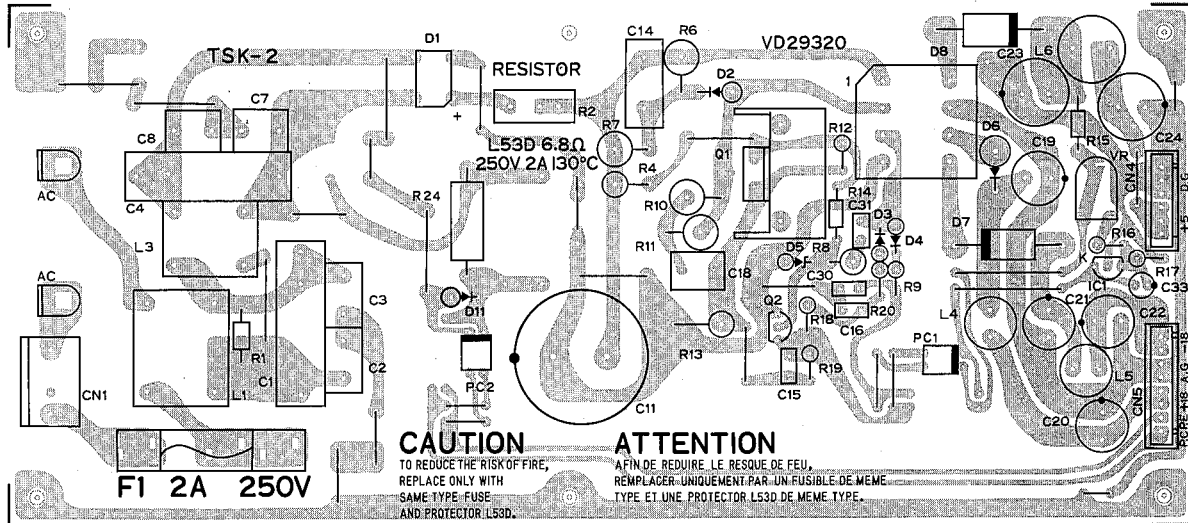
Components Side (部品側)

Notes)

1. IC
IC1: μ PC1093J
2. Photo Coupler
PC1,2: PC817
3. Transistor
Q1: 2SK319 (Power MOS FET)
2: 2SC2655
4. Diode
D2: 10DF-6
3,4: 1SS84
6,7: 2SKH10
8: 31DQ04
11: 1S1555
5. Diode Array
D1: S1WB40
6. Zener Diode
D5: HZ15-3
7. Choke Coil
L1: 20mH
3: 10mH
4,5: 150 μ H
6: 18 μ H
8. Resistor
marked*: Flame Proof Carbon Resistor
R2: Wire Wound Resistor 6.8 Ω 5W
9. Fuse
F1: T2A 250V

YG-4041-000-4 : Japanese Model
YG-4041-000-5 : U.S. Model

● Canadian Model (VD293200)

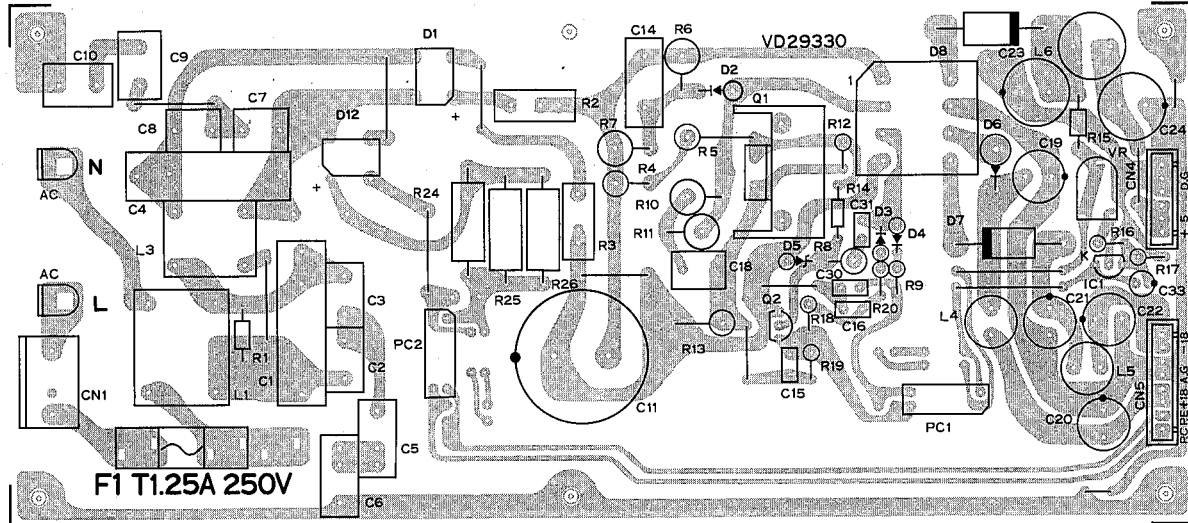


Components Side (部品側)

Notes)

1. IC
IC 1: μ PC1093J
2. Photo Coupler
PC 1,2: PC817
3. Transistor
Q1: 2SK319 (Power MOS FET)
2: 2SC2655
4. Diode
D2: 10DF-6
3,4: 1SS84
6,7: 2SKH10
8: 31DQ04
11: 1S1555
5. Diode Array
D1: S1WB40
6. Zener Diode
D5: HZ15-3
7. Choke Coil
L1: 20mH
3: 10mH
4,5: 150 μ H
6: 18 μ H
8. Resistor
marked※: Flame Proof Carbon Resistor
R2: Fuse Resistor 6.8 Ω 5W
9. Fuse
F1: T2A 250V

● North European & West Germany Model (VD29330)



Components Side (部品側)

Notes)

1. IC
IC1: μ PC1093J
2. Photo Coupler
PC1,2: PC511
3. Transistor
Q1: 2SK513 (Power MOS FET)
2: 2SC2655
4. Diode
D2: 10DF-6
3,4: 1SS84
6,7: 2SKH10
8: 31DQ04
11: 1S1555
5. Diode Array
D1 S1WB60
6. Zener Diode
D5: HZ15-3
7. Choke Coil
L1: 20mH
3: 10mH
4,5: 150 μ H
6: 18 μ H
8. Resistor
marked*: Flame Proof Carbon Resistor
R2: Wire Wound Resistor 6.8 Ω 3W
9. Fuse
F1: T1.25A 250V

■ CHECKS AND ADJUSTMENTS

1. Preparation Instructions

1-1. Preparatory setting

Unless otherwise specified, the volumes and switches on the front and rear panels are to be set as follows:

● Front Panel

- INPUT VOL. ————— MAX
- LOW FREQ. ————— MIN
- LOW LEVEL ————— CENTER
- MID FREQ. ————— MIN
- MID LEVEL ————— CENTER
- HIGH FREQ. ————— MIN
- HIGH LEVEL ————— CENTER
- MIXING VOL. ————— MAX(REV)
- MONO/STEREO SW — OFF(STEREO)
- EQ ON/OFF SW — OFF

● Rear Panel

- INPUT/OUTPUT LEVEL SWs — +4
- MIDI THRU/OUT SW — OUT
- "RECALL" the "MEMORY1"(REV1), and press the LEVEL switch to set the BALANCE to "0".
- The loads of the L and R OUTPUT connectors are to be connected to the 600 Ω load resistors.

1-2 Measuring Instruments

- Prepare the following: AF signal generator, electronic voltmeter, distortion meter, oscilloscope, load resistors on.
- For the distortion measurement, a low-pass filter with cut-off frequency of 80kHz and -6dB/OCT must be used.
- For the noise level measurement, a low-pass filter with the cut-off frequency of 12.7kHz and -6dB/OCT must be used.
- The output impedance of the AF signal generator must be less than 600 Ω .
- The input impedance of the measuring instruments must be over 1 M Ω .

2. Level meter Adjustment

- (1) Apply signals of 0dBm at 1kHz to the L and R INPUT connectors and adjust VR-309 on the EQ circuit board so that the "0" level of the level meter is illuminated.
- (2) Apply signals of -1dBm at 1kHz to the L and R OUTPUT connectors and adjust VR309 so that the "0" indicator is turned off.

3. Gain

3-1. A/D and D/A gain adjustments

After performing adjustment 9, apply signals of -6dBm at 1kHz to the L and R connectors, adjust VR104 on the AD circuit board so that output signals of $+4 \pm 1.5\text{dBm}$ can be obtained at the L and R connectors.

3-2. Bypass circuit

- (1) When the BYPASS switch is switched ON according to the conditions of section 3-1, output signals of $+4 \pm 2\text{dBm}$ are obtained at the L and R OUTPUT connectors.
- (2) The LED indicator of the BYPASS would be illuminated.

(After inspection, turn the BYPASS switch OFF.)

* When the Foot switch is connected to the BYPASS jack and the switch is ON, the inspections are the same as above.

3-3. Direct and Mute 1 circuit

When the MIX VOL. is turned to minimum (DIRECT) according to the conditions of section 3-1, output signals of $+4 \pm 2\text{dBm}$ are obtained at the L and R connectors. When the MUTE switch is ON, no output signals are generated and the MUTE LED indicator is illuminated.

(After inspection, turn the MIX VOL. to maximum (REV) and set the BYPASS switch to OFF.)

3-4. MONO/STEREO circuit

- (1) When the MONO/STEREO switch is turned ON (MONO) according to the conditions of output signals of $+4 \pm 2\text{dBm}$ are obtained at the L and R OUTPUT connectors.
- (2) The LED indicator of the MONO would be illuminated.

4. Frequency Characteristics

4-1. A/D and D/A circuit

When an input signal of approximately -10dBm is applied to the INPUT connector, the frequency characteristics of the L and R OUTPUT connectors are within the range listed in the table below. The reference frequency used is 1kHz.

Hz — 5kHz	$\pm 1.0\text{dB}$
6kHz — 18kHz	$\pm 1.5\text{dB}$
22kHz	less than -10dB

4-2. Direct circuit

When the MIXING VOL. is turned to minimum (DIRECT) according to the status of section 4-1, the frequency characteristics of the L and R OUTPUT connectors are within the range listed in the table below. The reference frequency is 1kHz.

20Hz — 20kHz	$+1$ -3dB
--------------	-----------------------

(After inspection, turn the MIX VOL. to maximum (REV).)

5. Distortion Factor

- (1) With the conditions set according to section 3-1, the distortion factor should be less than 0.1 %.
- (2) When the output level is set to $+14\text{dBm}$, the distortion factor should be less than 0.03 %.

6. Noise Level and Offset Adjustments

- (1) With the conditions set according to section 1-1, the noise levels of the L and R OUTPUT connectors should be less than -66dBm .
- (2) Attach an amplifier to the R OUTPUT connector so that the noise should be slightly heard from a monitor speaker.
- (3) When the "OUT PHASE" of the LEVEL parameter is turned "ON and OFF", the click is to be within the approval.
- (4) If the click noise is loud, adjust VR103 on the AD circuit board to minimize the noise level.

7. Maximum Output

When 1kHz input signals are applied to the L and R INPUT connectors according to the conditions of section 1-1, the maximum level of the output signal at the L and R OUTPUT connectors should be $+18\text{dBm}$ with a distortion factor of less than 3%.

(The INPUT VOL. should be turned to nominal (-10dB). After inspection, be turned to maximum.)

8. Equalizer Check

- (1) Attach an amplifier to the R OUTPUT connector.
- (2) Apply pink noises to the L and R INPUT connectors and turn the EQ ON/OFF switch ON.
- (3) Turn the LOW LEVEL VOL. to maximum.
- (4) When you operate the LOW FREQ., the frequency characteristics is varied.
- (5) Inspections for the MID and HIGH could be performed in the same ways as above.

9. Meter Sensitivity

- (1) Apply signals of $0 \pm 0.5\text{dBm}$ at 1kHz to the L and R INPUT connectors according

to the conditions of section 1-1, and adjust VR309 on the EQ circuit board so that the "0" level of the level meter is illuminated.

- (2) When 1kHz input signals of -1 ± 0.5 dBm are applied, the "0" level of the level meter is turned off.
- (3) At this point, all LED indicators below the "0" level are illuminated.
- (4) Afterwards, apply signals of 9 ± 0.5 dBm at 1kHz to the L and R INPUT connectors, and adjust VR102 on the AD circuit board so that the CLIP indicator of the level meter is turned on.
- (5) When signals of 8 ± 0.5 dBm are applied, the CLIP indicator of the level meter is turned off.
- (6) When the INPUT is opened, all indicators of the level meter are off.

10. Mute 2 Circuit

After the POWER switch is turned ON, muting is effective for three to four seconds, and no output signals are generated. After this time delay output signals can be obtained at each OUTPUT connector.

When the POWER switch is turned OFF, muting becomes effective so that no clicking noise is generated.

■検査と調整

1. 準備

1-1. 準備

フロントパネルのボリュームおよび、スイッチは特に指定のない限り下記の状態とする。

[A] フロントパネル

- INPUT VOL MAX
- LOW FREQ..... MIN
- LOW LEVEL CENTER
- MID FREQ..... MIN
- MID LEVEL..... CENTER
- HIGH FREQ..... MIN
- HIGH LEVEL..... CENTER
- MIXING VOL..... MAX(REV)
- MONO/STEREO SW OFF(STEREO)
- EQ ON/OFF SW..... OFF

[B] リアパネル

- INPUT/OUTPUT LEVEL SW +4
- MIDI SW OUT

※メモリー1 (REV1) をリコールし、LEVEL キー内の BALANCE= 0 にする。

※OUTPUT L/R 共、XLR あるいは PHONE Jack 端子のいずれかに、600Ωを負荷すること。

1-2. 測定器

- (1) 歪率測定時は、80KHz、-6dB/oct のフィルターを使用すること。
- (2) ノイズレベル測定時は、12.7KHz、-6dB/oct のフィルターを使用すること。
- (3) 発振器の出力インピーダンスは、600Ω以下のこと。
- (4) 測定器の入力インピーダンスは、1MΩ以上のこと。

2. 調整

2-1. レベルメータの調整

インプット L、R 各端子に、0dBm/1KHz の信号を入力した時、レベルメータ用 LED の "0" が点灯し、-1dBm にした時、消灯するように、EQ シート内 VR309 を調整する。

3. 利得

3-1. AD、DA 回路

インプット L、R 各端子 (XLR) より、-6dBm/

1KHz の入力信号を加えた時、アウトプット L、R 各端子 (XLR) には、+4±1.5dBm の出力信号が得られること。(再調整を行う場合は、9項の、"CLIP" の調整を行った後、VR104 により上記レベルに、調整すること。)

3-2. バイパス回路

3-1の状態より、"BYPASS" SW を ON した時、アウトプット L、R 各端子には、+4±2dBm の出力信号が得られること。又、この時 "BYPASS" キー内の LED が点灯すること。(検査後、"BYPASS" キーは、OFF にすること。)

リア、パネルのバイパス用 Jack に、フットスイッチを接続し、ON しても同様のこと。

3-3. ダイレクト回路および MUTE1 回路

3-1の状態より、MIX VOL を MIN(DIRECT 側) にした時、アウトプット L、R 端子には、+4±2dBm の出力信号が得られること。又、"MUTE" キーを ON にした時、上記の信号が消え "MUTE" キー内の LED が点灯すること。(検査後、MIX VOL は MAX(REV 側) に、"MUTE" キーは、OFF にすること。)

3-4. MONO 入力回路

3-1の状態より MONO/STEREO SW を ON(MONO) にした時、アウトプット L、R には、+4±2dBm の出力信号が得られること。又、この時、フロントパネルに、"MONO" の LED が点灯すること。(検査後、MONO/STEREO SW は、"STEREO" 側にする。)

4. 周波数特性

4-1. AD、DA 回路

L、R の各 INPUT 端子 (PHONE Jack) に、約 -10dBm の信号を加えた時、L、R の各 OUTPUT 端子 (PHONE Jack) での、周波数特性は、1KHz を基準として下表の範囲内のこと。

20 Hz~5KHz	±1.0dB
6KHz~18KHz	±1.5dB
22KHz	-10dB以下

4-2. ダイレクト回路

4-1の状態より MIXING VOL を MIN "DIRECT" 側にした時、OUTPUT L、R での周波数特性は、

1KHz を基準として下表の範囲内のこと。

20Hz~20KHz	± 1 -3 dB
------------	--------------------

(検査後、MIX VOL を MAX "REV" 側にすること。)

5. 歪率

3-1の状態での歪率は、0.1%以下のこと。

又、出力レベルを +14dBm にした時、0.03%以下のこと。

6. ノイズレベルおよびオフセット

1-1の状態、OUTPUT L、R のノイズレベルは、-66dBm 以下のこと。又、OUTPUT R 端子に、アンプ付スピーカを接続し、スピーカよりノイズがかすかに聞こえるようにセットし、"LEVEL" キー内の OUT PHASE を ON ↔ OFF した時、クリック音が気にならないこと。もし、クリック音が大きい時は、AD シート内の VR103 を調整して、クリック音が最小になるように、調整すること。

(ノイズが、規定値以下に、ならない場合は、VR103(オフセット値)をわずかにずらしても良い。)

7. 最大出力

1-1の状態より、L、R の各 INPUT 端子に 1KHz の信号を加えた時、L、R の各 OUTPUT 端子には、+18dBm の出力信号が、歪率 3% 以下で得られること。

(INPUT VOL は、出力 -10dB ダウンの標準位置とし、検査後 MAX にすること。)

8. アナログイコライザーのチェック

L、R の各インプット端子に、PINK NOISE を印加し、EQ ON/OFF SW を ON にして、スピーカよりノイズが聞こえるようにする。

LOW LEVEL VOL を MAX にして、LOW FR-EQ VOL を MIN ↔ MAX と動かした時、増強されるノイズの周波数帯域が、移動することを確認すること。

MID、HIGH についても、同様にチェックする。(但し、HIGH については、内部に 20KHz 以上をカットする FILTER が入っているため、20KHz 以上では、イコライザーの効果が確認できない。)

(検査後、EQ ON/OFF SW を "OFF" にすること。)

9. メータ感度

1-1の状態、L、R の各 INPUT 端子 (XLR) に、 0 ± 0.5 dBm/1KHz の信号を入力した時、レベルメータの "0" が点灯し、 -1 ± 0.5 dBm にした時、消灯すること。(再調整は、2-1項による。) この時、"CLIP"、"0" 以外の LED は全て点灯していること。又、入力レベルを 9 ± 0.5 dBm にした時、"CLIP" が点灯し 8 ± 0.5 dBm にした時、消灯すること。(再調整は、VR102 で行うこと。) 次に、無信号にした時、全ての LED が消灯すること。

2-10. ミューティング回路 (MUTE2)

パワースイッチを ON した後、3~4秒間はミューティングがかかり出力信号が出ず、その後出力信号が、各出力端子に得られること。

パワースイッチ ON → OFF 時は、速やかに、ミューティングがかかりクリックノイズを発生しないこと。

■ TEST PROGRAM

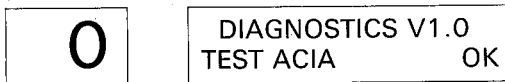
1. Preparation and Operation

- (1) Turn the "MIDI THRU/OUT" switch to "OUT".
 - * When the Test Program has been completed, return the switch to "THRU".
- (2) Pressing the switches in order of "MEMORY", "n" and "RECALL" will start the test from that number.
 - * "n" is the test number selected with the Numeric/Editing switch.
- (3) Pressing the switches in order of "MEMORY", "9", "9" and "RECALL" will restore the normal operation.

Otherwise turning off and on the Power Switch will restore normal operation.

2. Test Program Entry

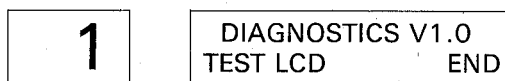
- (1) While pressing the "REV1" and "MUTE" switches, turn the POWER switch on. The message will be displayed on the LCD as shown below.



- (2) When the test is initiated, ROM check (check sum) and ACIA check will be performed automatically.
- (3) During this test, the AD/DA circuit would output only direct signals to the L and R OUTPUT connectors.

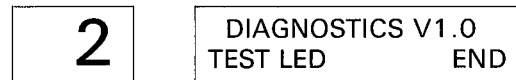
3. TEST 1 : LCD Check

- (1) Pressing the switches in order of "MEMORY", "1" and "RECALL" will activate the LCD test.
- (2) The LCD turns "ON and OFF" repeatedly.
- (3) Then, the message will be displayed on the LCD as shown below.



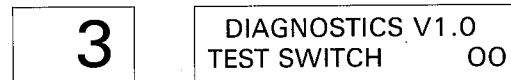
4. TEST 2 : LED Check

- (1) Pressing the keys in order of "MEMORY", "2" and "RECALL" will activate the LED test.
- (2) All of the LED indicators and segments will be turned out.
- (3) The 7-segments LED will display the figures "11" to "99" in sequence, and will be turned out.
- (4) All of the LED indicators will light one after another.
- (5) All of the LED indicators and segments will simultaneously light ON.
- (6) The message will be displayed on the LCD as shown below.



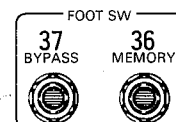
5. TEST 3 : Panel Switch Check

- (1) Connect the Foot Switches to the "FOOT SW MEMORY/BYPASS" connectors.
- (2) Pressing the switches in order of "MEMORY", "3" and "RECALL" will activate the Panel Switch test.
- (3) The switch number will be displayed on the LCD as shown below.



Press the switch which the number would be displayed on the LCD. The order is as shown below;

00	04	08	12	16	20	24	28	32
01	05	09	13	17	21	25	29	33
02	06	10	14	18	22	26	30	34
03	07	11	15	19	23	27	31	35



REV5

- (4) When the "37 BYPASS" switch check has been performed, the message will be displayed on the LCD as shown below.

3	DIAGNOSTICS V1.0 TEST SWITCH OK
---	---------------------------------------

6. TEST 4 : MIDI Check

In this routine, it is checked if the data sent from the MIDI OUT can be received at the CPU through the MIDI IN.

- (1) Connect the MIDI IN jack to the MIDI OUT with a MIDI cable.
- (2) Pressing the switches in order of "MEMORY", "4" and "RECALL" will activate the MIDI test.
- (3) A result for this test will be displayed on the LCD.

When this test is OK,

4	DIAGNOSTICS V1.0 TEST MIDI OK
---	---

If the output data from the MIDI OUT don't return to the CPU through the MIDI IN, nor the received data at the CPU is not correct,

4	DIAGNOSTICS V1.0 TEST MIDI NG
---	---

7. TEST 5 : AD OFFSET Adjustment 1

- (1) Connect a power amplifier and a monitor speaker to the R OUTPUT connector in order to obtain the sound check from the monitor speaker.
- (2) Pressing the switches in order of "MEMORY", "5" and "RECALL" will activate the AD Offset test 1.
- (3) The message will be displayed on the LCD as shown below.

5	DIAGNOSTICS V1.0 TEST OFFSET **
---	--

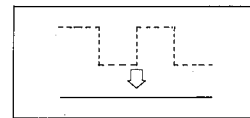
- (4) Adjust the VR103 on the AD Circuit Board to set the click from the monitor speaker to minimum level (the INPUT is opened).

8. TEST 6 : AD OFFSET Adjustment 2

- (1) Pressing the switches in order of "MEMORY", "5" and "RECALL" will activate the AD Offset test 2.
- (2) The message will be displayed on the LCD as shown below.

6	DIAGNOSTICS V1.0 TEST OFFSET2 **
---	--

- ※ Turn SW103 on the AD circuit board ON. Adjust VR103 on the AD circuit board so that the signal can be obtained at the IC 108-pin 9 as shown below.



9. TEST 7 : DRAM Check

- (1) Pressing the switches in order of "MEMORY", "nn" and "RECALL" will start the test. The number "nn" is shown in the table.
- (2) The message will be displayed on the LCD as shown in the table.

10	DIAGNOSTICS V1.0 TEST DRAM1 THR
----	---

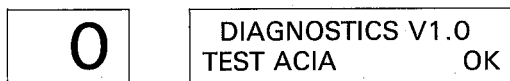
37	DIAGNOSTICS V1.0 TEST DRAM3 +MX
----	---

LED	LCD				LSB	
10	THR	MSB IC 710	711	712	713	(0AH)
11	04B	IC 711	712	713	714	(0BH)
12	08B	IC 712	713	714	715	(0CH)
13	12B	IC 713	714	715	0000	(0DH)
14	16B	IC 714	715	0000	0000	(0EH)
15	20B	IC 715	0000	0000	0000	(0FH)
16	-MX	1000	0000	0000	0000	(10H)
17	+MX	0111	1111	1111	1111	(11H)
20	THR	MSB IC 716	717	718	719	(14H)
21	04B	IC 717	718	719	720	(15H)
22	08B	IC 718	719	720	721	(16H)
23	12B	IC 719	720	721	0000	(17H)
24	16B	IC 720	721	0000	0000	(18H)
25	20B	IC 721	0000	0000	0000	(19H)
26	-MX	1000	0000	0000	0000	(1AH)
27	+MX	0111	1111	1111	1111	(1BH)
30	THR	MSB IC 722	723	724	725	(1EH)
31	04B	IC 723	724	725	726	(1FH)
32	08B	IC 724	725	726	727	(20H)
33	12B	IC 725	726	727	0000	(21H)
34	16B	IC 726	727	0000	0000	(22H)
35	20B	IC 727	0000	0000	0000	(23H)
36	-MX	1000	0000	0000	0000	(24H)
37	+MX	0111	1111	1111	1111	(25H)

■テストプログラム

●テストプログラムの起動方法

1. MIDI THRU/OUT スイッチを“OUT”側にする。
(テスト終了後、“THRU”側に戻すこと。)
2. **REV1** と **MUTE** を押しながら、パワースイッチを ON する。LCD の表示は下の様になる。



- ※テストプログラム起動後、AD/DA回路は、ダイレクト信号のみを OUTPUT L,R に出力する。
- ※テストプログラム起動時に、ROM のチェックサム、LSI の制御回線チェックを自動的に行なう。

●テストプログラムの各ルーチンの選択方法

MEMORY ⇨ **1** ⇨ **RECALL** の順にキーを押し、セットする。

※Test ナンバー(1~)を数字キーで入力する。

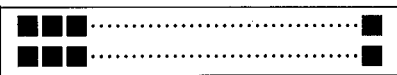
●テストプログラムから通常動作へ復帰

MEMORY ⇨ **9** ⇨ **9** ⇨ **RECALL** の順にキーを押す。

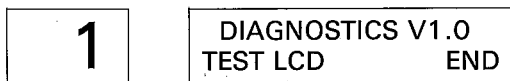
又は、パワースイッチを OFF する。

Test 1. LCD 表示器のチェック

1-1. セット **MEMORY** ⇨ **1** ⇨ **RECALL**

1-2. 動作 

LCD は上の状態となり、5回ブリンクした後、下の様な表示になる。



Test 2. LED 点灯チェック

2-1. セット **MEMORY** ⇨ **2** ⇨ **RECALL**

- 2-2. 動作 1) 全ての LED が消灯
- 2) 11~99まで点灯した後全部消灯。
- 3) 1ヶづつ順次点灯
- 4) 全点灯

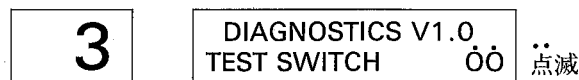
動作4終了後、LCD の表示は下の様になる。



Test 3. スイッチ動作のチェック

3-1. セット **MEMORY** ⇨ **3** ⇨ **RECALL**

3-2. 動作 1) LCD に次の表示が出る。

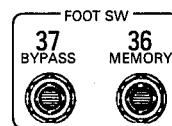


動作 2) 下図の“00”のスイッチ(REV1)を押すと、LCD の表示が“01”に変わる。

以下順次 LCD に表示されるNo.(00~37)のスイッチを押していく。

※“36 MEMORY”と“37 BYPASS”のチェックはフットスイッチを接続して行なうこと。

00	04	08	12	16	20	24	28	32
01	05	09	13	17	21	25	29	33
02	06	10	14	18	22	26	30	34
03	07	11	15	19	23	27	31	35



動作 3) “37 BYPASS”のチェック終了 OK が表示される。

Test 4. MIDI 入出力のチェック

4-1. セット MIDI IN と MIDI OUT を MIDI ケーブルにて接続する。

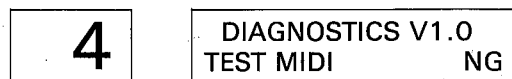
MEMORY ⇨ **4** ⇨ **RECALL**

4-2. 動作 起動後、チェック結果 LCD に表示され、コマンド待ちとなる。

1) OK の場合



2) MIDI OUT に出力した信号が、MIDI IN を経由して、CPU に戻ってこない場合、又は、信号は戻ってくるが、正常でない場合。



REV5

Test 5. AD オフセット調整 1

5-1. セット OUTPUT R に、アンプ付スピーカ
ーを接続する。

MEMORY ⇨ 5 ⇨ RECALL

5-2. 動作 1) LCD に下の表示が出る。

5 DIAGNOSTICS V1.0
TEST OFFSET **

※アナログ入力は、無信号の状態、スピーカーか
らのクリック音が最小になる様に、AD シート内
VR103 を調整する。

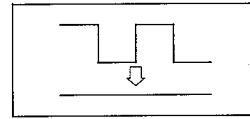
Test 6. AD オフセット調整 2

6-1. セット MEMORY ⇨ 6 ⇨ RECALL

6-2. 動作 LCD 下の表示が出る。

6 DIAGNOSTICS V1.0
TEST OFFSET2 **

※ADシート内 SW103をON側とし、IC108の
⑨ピンの波形が下図のように横一直線となるよう
に VR103 にて調整する。



DRAM チック

○セット MEMORY ⇨ nn ⇨ RECALL

※nn : 下記ナンバーによる。

LCD の表示は右の様になる。

(-MX は -MAX) を示す
(+MX は +MAX)

10 DIAGNOSTICS V1.0
TEST DRAM1 THR

37 DIAGNOSTICS V1.0
TEST DRAM3 +MX

LED 表示	LCD 表示	チェック内容					
		MSB 側			LSB 側		
10	THR	IC 710	711	712	713	714	でデータ出力 (0AH)
11	04B	IC 711	712	713	714	715	でデータ出力 (0BH)
12	08B	IC 712	713	714	715	0000	でデータ出力 (0CH)
13	12B	IC 713	714	715	0000	0000	でデータ出力 (0DH)
14	16B	IC 714	715	0000	0000	0000	でデータ出力 (0EH)
15	20B	IC 715	0000	0000	0000	0000	でデータ出力 (0FH)
16	-MX	1000	0000	0000	0000	0000	でデータ出力 (10H)
17	+MX	0111	1111	1111	1111	1111	でデータ出力 (11H)
		MSB 側			LSB 側		
20	THR	IC 716	717	718	719	720	でデータ出力 (14H)
21	04B	IC 717	718	719	720	721	でデータ出力 (15H)
22	08B	IC 718	719	720	721	722	でデータ出力 (16H)
23	12B	IC 719	720	721	0000	0000	でデータ出力 (17H)
24	16B	IC 720	721	0000	0000	0000	でデータ出力 (18H)
25	20B	IC 721	0000	0000	0000	0000	でデータ出力 (19H)
26	-MX	1000	0000	0000	0000	0000	でデータ出力 (1AH)
27	+MX	0111	1111	1111	1111	1111	でデータ出力 (1BH)
		MSB 側			LSB 側		
30	THR	IC 722	723	724	725	726	でデータ出力 (1EH)
31	04B	IC 723	724	725	726	727	でデータ出力 (1FH)
32	08B	IC 724	725	726	727	0000	でデータ出力 (20H)
33	12B	IC 725	726	727	0000	0000	でデータ出力 (21H)
34	16B	IC 726	727	0000	0000	0000	でデータ出力 (22H)
35	20B	IC 727	0000	0000	0000	0000	でデータ出力 (23H)
36	-MX	1000	0000	0000	0000	0000	でデータ出力 (24H)
37	+MX	0111	1111	1111	1111	1111	でデータ出力 (25H)

DIGITAL REVERBERATOR

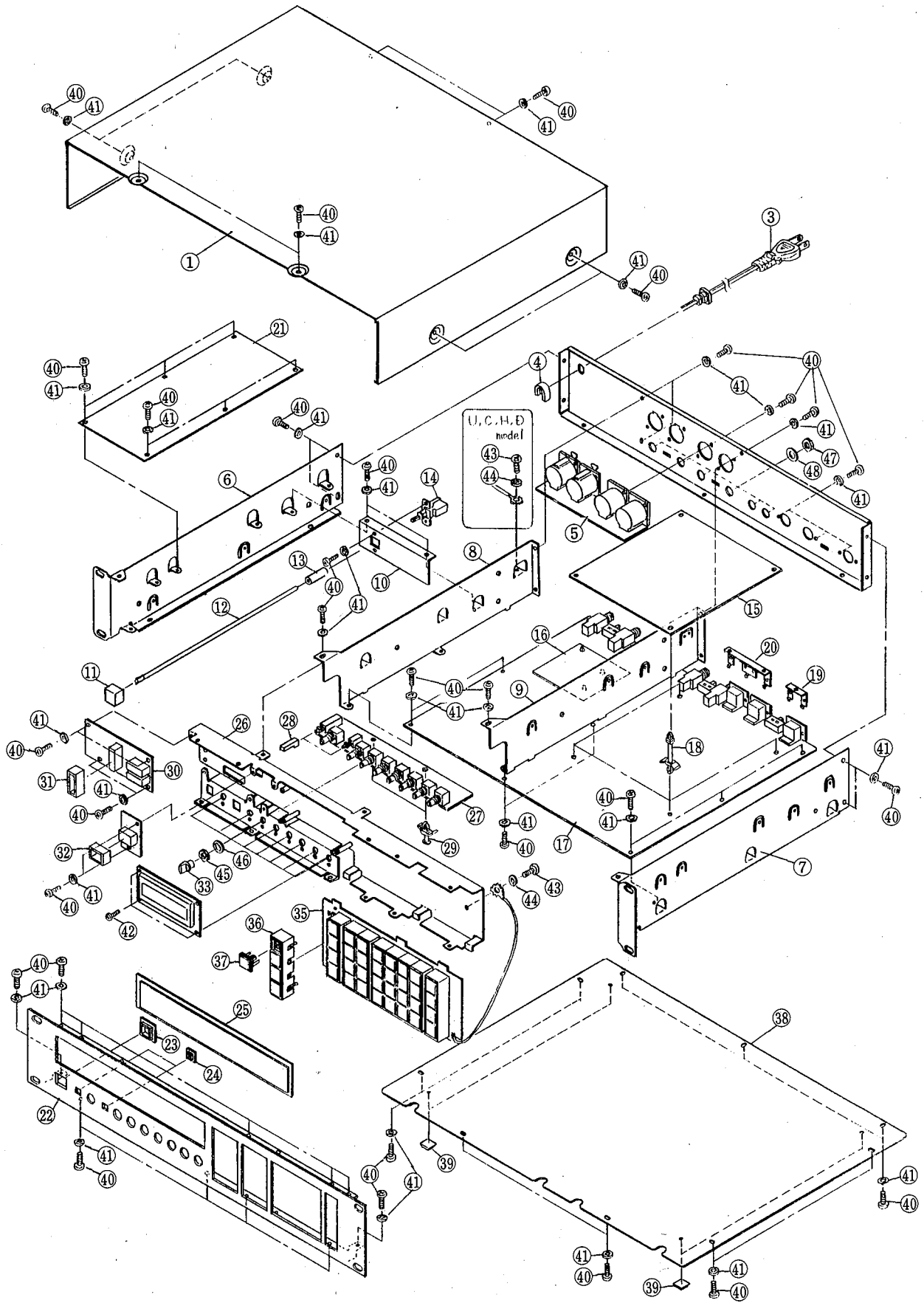
REV5

PARTS LIST

Notes DESTINATION ABBREVIATIONS

J : Japanese model	A : Australian model
U : U.S. model	E : European model
C : Canadian model	D : West German model
X : General model	B : British model
M : South African model	I : Indonesian model
H : North European model	

OVERALL ASSEMBLY (総組立)



OVERALL ASSEMBLY (総組立)

Ref	Part No	Description		部品名	Remarks	ランク
1	VA028600	Top Cover		トップカバー		09
2	VC812700	Rear Panel		リアパネル	J	
2	VC812800	Rear Panel		リアパネル	U,C	
2	VC812900	Rear Panel		リアパネル	H,D	
3	MG001820	AC Cord	7A 3M	電源コード	J	05
3	MG000270	AC Cord	10A 3.3M	電源コード	U,C	09
3	MG000450	AC Cord	6A 3.5M	電源コード	H,D	
4	CB800850	Cord Strain Relief	SR-6N3-4	コードストッパー	U,C	02
4	CB032840	Cord Strain Relief	SR-5N-4	コードストッパー	H,D	01
5	VD256900	Circuit Board	CN	コンシ		
6	VA028400	Side Cover	Left	サイドカバー (L)		05
7	VA028500	Side Cover	Right	サイドカバー (R)		05
8	VA027600	Stay	(A)	ステー (A)		05
9	VA027700	Stay	(B)	ステー (B)		04
10	VA047000	Angle, Power Switch		パワーSWアングル		01
11	CB812380	Push Button		プッシュボタン	Power	01
12	VA046900	Rod		ロッド		03
13	VA029700	Holder		ロッドホルダー		01
14	KA803610	Push Switch	ESB-8213A	プッシュスイッチ	Power	03
15	VC790300	Circuit Board	DSP	DSP		
16	VD670600	Circuit Board	VCA	VCAシート		
17	VC790200	Circuit Board	AD	ADシート		
18	CB046040	Support	KGLS-14S	基板サポート	VCA, DSP	01
19	VB968600	Holder, DIN		DINホルダー		03
20	VD258900	Holder, DIN Socket		DINソケットホルダー		
21	VD293000	Power Supply Unit		電源ユニット	J	
21	VD293100	Power Supply Unit		電源ユニット	U	
21	VD293200	Power Supply Unit		電源ユニット	C	
21	VD293300	Power Supply Unit		電源ユニット	H, D	
22	VC813300	Front Panel		フロントパネル		
23	VA029600	Escutcheon	Large	SWエスカッション	Power	02
24	VA029500	Escutcheon	Small	SWエスカッション	EQ, MONO/ST	
25	VD381200	Meter Cover		メーターカバー		
26	VC813800	Front Sub Panel		フロントサブパネル		
27	VA038600	Circuit Board	EQ	EQシート		18
28	VA029400	Knob		ノブ	EQ, MONO/ST	01
29	VA046800	Support	KGPS-6S	基板サポート	EQ	01
30	VA038800	Circuit Board	MT	MTシート		11
31	VA061700	LED Cover		LEDカバー	METER	02
32	VA302700	LED Cover		LEDカバー	MEMORY	01
33	VA029300	Knob		ノブ		01
34	VC814000	LCD Assembly		LCD Ass'y		
35	VC813900	Circuit Board	KY	KYシート		
36	VE144800	Escutcheon		SWエスカッション		
37	VD162400	Key Top	REV1-31-	ノブトッパキヤップ		
37	VD162500	Key Top	REV2-32-	ノブトッパキヤップ		
37	VD162600	Key Top	REV3-33-	ノブトッパキヤップ		
37	VD162700	Key Top	REV4-34-	ノブトッパキヤップ		
37	VD162800	Key Top	E/R1-35-	ノブトッパキヤップ		
37	VD162900	Key Top	E/R2-36-	ノブトッパキヤップ		
37	VD163000	Key Top	OTHERS-37-	ノブトッパキヤップ		
37	VD377300	Key Top	USERMEMORY	ノブトッパキヤップ		
37	VD163200	Key Top	EQ	ノブトッパキヤップ		
37	VD163300	Key Top	↓	ノブトッパキヤップ		
37	VD377400	Key Top	PARAMETER	ノブトッパキヤップ		
37	VD377500	Key Top	INITIALDELAY	ノブトッパキヤップ		
37	VD163500	Key Top	LEVEL	ノブトッパキヤップ		
37	VD164700	Key Top	EQ ON	ノブトッパキヤップ		
37	VD164800	Key Top	↑	ノブトッパキヤップ		
37	VD381700	Key Top	1STREF	ノブトッパキヤップ		
37	VD377900	Key Top	7	ノブトッパキヤップ		
37	VD378100	Key Top	4	ノブトッパキヤップ		
37	VD378200	Key Top	1	ノブトッパキヤップ		
37	VD378400	Key Top	0	ノブトッパキヤップ		
37	VD378600	Key Top	5	ノブトッパキヤップ		
37	VD378800	Key Top	2	ノブトッパキヤップ		
37	VD379000	Key Top	.	ノブトッパキヤップ		
37	VD379200	Key Top	9	ノブトッパキヤップ		
37	VD379300	Key Top	6	ノブトッパキヤップ		
37	VD379500	Key Top	3	ノブトッパキヤップ		
37	VD379600	Key Top	CLEAR	ノブトッパキヤップ		
37	VD164900	Key Top	RECALL ENTER	ノブトッパキヤップ		
37	VD379800	Key Top	MEMORY	ノブトッパキヤップ		
37	VD379900	Key Top	STORE	ノブトッパキヤップ		
37	VD380000	Key Top	-	ノブトッパキヤップ		
37	VD167000	Key Top	INTPARAM	ノブトッパキヤップ		
37	VD380200	Key Top	MUTE	ノブトッパキヤップ		
37	VD380400	Key Top	UTILITY	ノブトッパキヤップ		
37	VD380600	Key Top	BYPASS	ノブトッパキヤップ		

* New Parts (新規部品)

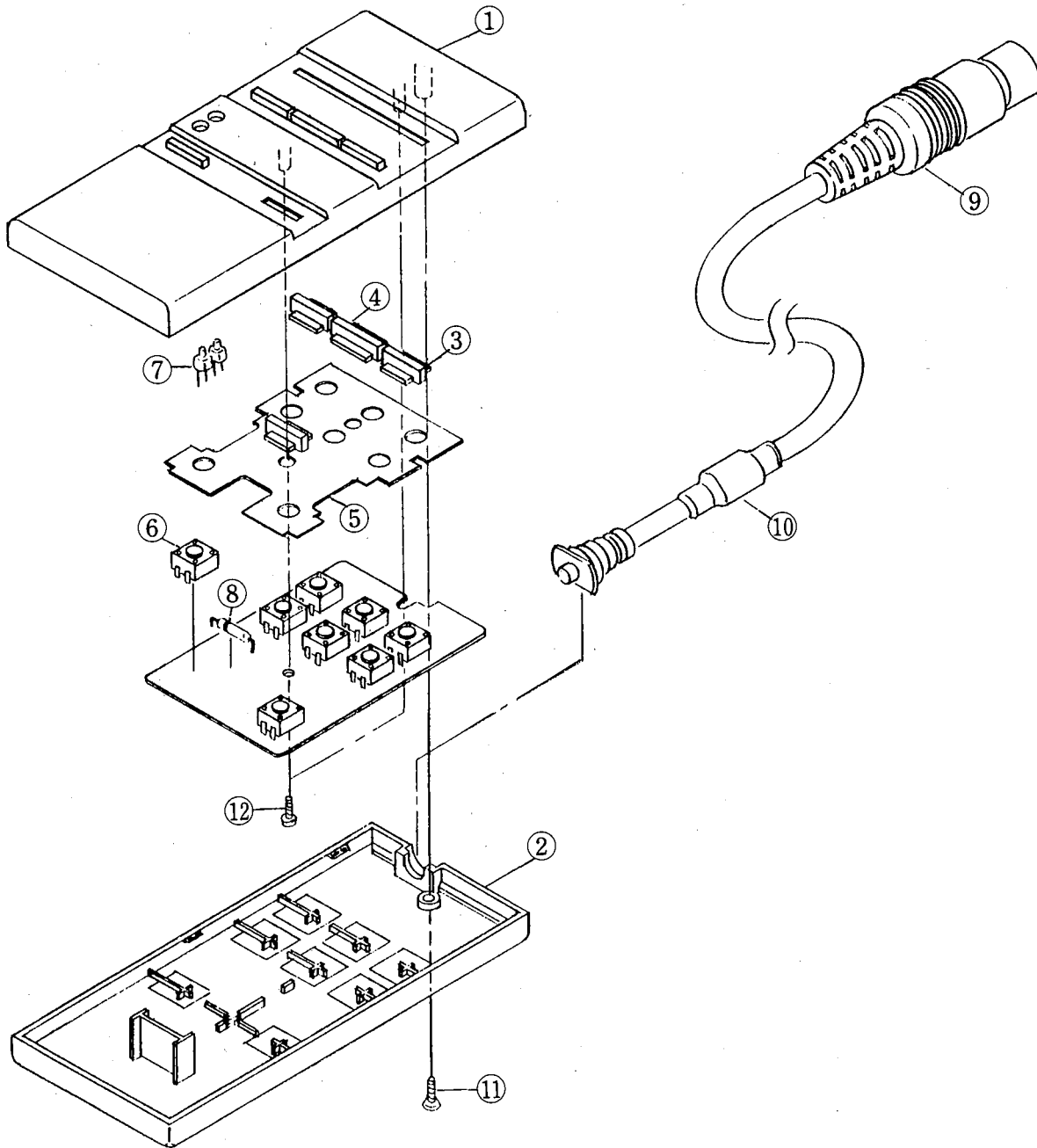
ELECTRICAL PARTS (電気部品)

REV5

Ref	Part No	Description		部品名	Remarks	ランク
**	VC790200	Circuit Board	AD	A D シート		18
	VC790300	Circuit Board	DSP	D S P シート		
	VD670600	Circuit Board	VCA	V C A シート		
	VA038600	Circuit Board	EQ	E Q シート		
	VD256900	Circuit Board	CN	C N シート		
**	VC813900	Circuit Board	KY	K Y シート		11
	VA038800	Circuit Board	MT	M T シート		
**	VC790200	Circuit Board	AD	A D シート		EPPROM
	XC270001	IC		I C		
**	IG001390	IC	NJM4558DV	I C	OP AMP.	03
	XA013001	IC	M5238P	I C	OP AMP.	04
	XA772001	IC	NJM4556DE	I C	OP AMP.	03
	IG065510	IC	NJM78L05A	I C	5V Regulator	03
	IG130500	IC	NJM78L05	I C	-5V 0.1A	03
**	IG147400	IC	NJM7815A	I C	15V 1A	04
	IG147500	IC	NJM7915A	I C	-15V 1A	04
	XD066001	IC	NJM78L12A	I C	12V Regulator	
	IG086700	IC	UPC319C	I C	COMPARATOR	05
	IG116200	IC	PST518B-2	I C	SYSTEM RESET	04
**	IG055100	IC	TC4053BP	I C	MPX	05
	IR000050	IC	SN74HC00N	I C	NAND	03
	IR000250	IC	SN74HC02N	I C	NOR	03
	IR000450	IC	SN74HC04N	I C	INV	03
	IR001450	IC	SN74HC14N	I C	INV	05
**	IR007450	IC	SN74HC74N	I C	DFP	04
	IR012300	IC	TC74HC123P	I C	MONO-FF	04
	IR013850	IC	SN74HC138N	I C	DECO	05
	IR024550	IC	SN74HC245N	I C	TRANSCIEVER	06
	IR027350	IC	SN74HC273N	I C	D-FF OC	05
**	IR036600	IC	TC74HC366P	I C	BUFFER	04
	IR037350	IC	SN74HC373N	I C	D-LATCH	05
	IR054050	IC	SN74HC540N	I C	INV-BUF	
	IR057320	IC	UPD74HC573	I C	LATCH	05
	XC290001	IC	UPD4513BC	I C	7SEG DRIVER	
**	IG093500	IC	HD6303RP	I C	8BIT CPU	16
	IG147300	IC	HD63B50P	I C	ACIA	09
	XB013001	IC	TC5564PL-15	I C	SRAM 8k x 8	20
	XD002001	IC	TBP28L22N	I C	BPROM 256	
	XA860001	IC	YM3020	I C	DAC	09
**	XB637001	IC	PCM56P	I C	DAC	09
	XC271001	IC	PCM55HP	I C	DAC	10
	XC282001	IC	YM3901	I C	ADA	15
	XC561001	Active Low Pass Filter	LP20C9B6	アクティブLPF		08
	IK000470	Photo Coupler	TLP552	フォトカプラー		06
**	JA101521	Transistor	2SA1015 Y	トランジスタ		03
	IC181520	Transistor	2SC1815 Y	トランジスタ		03
	VC845000	Transistor	2SC3064 F.G	トランジスタ	Dual	01
	IG127300	Transistor Array	TD62003P	トランジスタアレイ		04
	VA024600	Digital Transistor	DTC143XF	デジタルトランジスタ		03
**	VB481900	Diode	11ES4	ダイオード		01
	IX000760	Diode	1SS176	ダイオード		01
	IF002140	Zener Diode	RD5.6EB2	ツェナーダイオード		01
	HU575120	Metal Film Resistor	120Ω 1/4W	金属皮膜抵抗		02
	HU576470	Metal Film Resistor	4.7KΩ 1/4W	金属皮膜抵抗		02
**	HU576510	Metal Film Resistor	5.1KΩ 1/4W	金属皮膜抵抗		02
	HU576750	Metal Film Resistor	7.5KΩ 1/4W	金属皮膜抵抗		02
	HU597100	Metal Film Resistor	10KΩ 1/4W	金属皮膜抵抗		04
	HU577110	Metal Film Resistor	11KΩ 1/4W	金属皮膜抵抗		02
	HU577150	Metal Film Resistor	15KΩ 1/4W	金属皮膜抵抗		02
**	HU597300	Metal Film Resistor	30KΩ 1/4W	金属皮膜抵抗		03
	HL314220	Metal Oxide Resistor	22Ω 1W	酸化金属被膜抵抗		01
	HL315100	Metal Oxide Resistor	100Ω 1W	酸化金属被膜抵抗		01
	HL315150	Metal Oxide Resistor	150Ω 1W	酸化金属被膜抵抗		01
	HZ004730	Resistor Array	RMLS8-103J	抵抗アレイ		02
**	VB135200	Trimmer Potentiometer	B3K 3P EVN	半固定ボリューム		01
	VB135500	Trimmer Potentiometer	B30K 3P EVN	半固定ボリューム		01
	VC844900	Trimmer Potentiometer	B10K 3P POT	半固定ボリューム		
	FZ005610	Monolithic Cera. Cap.	1.5μ 25V	積層セラコン		03
	FZ004110	Semiconductive Cera. Cap.	0.1μ 16V	半導体セラコン		01
**	VB835000	Coil	20μ H FL Coil	コイル		01
	FZ006970	EMI Filter	LS MT Y223NB	LCフィルタ	EMI	02
	QU004800	Ceramic Resonator	CSA4.00HG	セラミック共振子		03
	KA401270	Slide Switch	SSS212	スライドスイッチ		03
	KA401280	Slide Switch	SSP32204	スライドスイッチ		03
**	LB301800	Phone Jack	HLJ0544	ホンジャック	MONAURAL	03
	LB302070	Phone Jack	HLJ0544	ホンジャック	STEREO	03
	LB500590	DIN Jack	5P TCS4650	DINジャック	MIDI	02
	LB605820	DIN Jack	8P TCS4680	DINジャック	REMOTE CONTROL	03

Ref	Part No	Description		部品名	Remarks	ランク
	LB606050	IC Socket	DL2-28A	ICソケット		05
	KC001900	Relay	DC RY12W	リレー		07
	PC900040	Lithium Battery	1CR2032	リチウム電池		04
*	VC790300	Circuit Board	DSP	DSPシート		
	JR000450	IC	SN74HC04N	IC	INV	03
	IR007450	IC	SN74HC74N	IC	DFF	04
	IR016350	IC	SN74HC163N	IC	CNT	
	XA379001	IC	HD74LS266P	IC	EX-NOR	03
	XA895001	IC	YM3608	IC	DEQ	16
	XA457001	IC	MB81464-12	IC	DRAM 256K	12
	IT380400	IC	YM3804	IC	DSP	17
	IT380700	IC	YM3807	IC	MOD	15
	HZ004730	Resistor Array	RMJS8-103J	抵抗アレイ		02
	FZ004110	Semiconductive Cera. Cap.	0.1 μ 16V	半導体セラコン		01
*	VC812500	Ceramic Resonator	CSA564MT	セラミック振動子		
	VD670600	Circuit Board	VCA	VCAシート		
	JG001390	IC	NJM4558DV	IC	OP AMP.	03
	XD003001	IC	M51133P	IC	VCA	
*	FZ005610	Monolithic Cera. Cap.	1.5 μ 25V	積層セラコン		03
	VA038600	Circuit Board	EQ	EQシート		18
	JG001390	IC	NJM4558DV	IC	OP AMP.	03
	VB130800	Variable Resistor	A10K \times 2	二連ロターポリウム	INPUT VOLUME	
	VB131100	Variable Resistor	B10K \times 2	二連ロターポリウム	MIXING	
	VB131300	Variable Resistor	C100K \times 2	二連ロターポリウム	FREQUENCY	
	VB131400	Variable Resistor	G20K \times 2	二連ロターポリウム	LEVEL	
	VB135500	Trimmer Potentiometer	B30K 3P EVN	半固定ポリウム		01
	FZ005610	Monolithic Cera. Cap.	1.5 μ 25V	積層セラコン		03
	VA025500	Push Switch	SUJ	プッシュスイッチ		02
	VA025600	Push Switch	SUJ	プッシュスイッチ		03
	VD256900	Circuit Board	CN	CNシート		
	LB302320	Connector	XLB-3-31	キャノンコネクタ	IN Jack	07
	LB302340	Connector	XLB-3-32	キャノンコネクタ	OUT Jack	06
	VC813900	Circuit Board	KY	KYシート		
	IF007640	Diode Array	DAN401 25mA	ダイオードアレイ		03
	VA026700	Diode Array	DAN801	ダイオードアレイ		04
	VA262300	LED	LN242RP RE	LED		01
	VA026000	LED Display	LN524RKS	LEDディスプレイ	7SEG \times 2 MEMORY	05
	KA907030	Push Switch	KHH10908	プッシュスイッチ		01
	VA038800	Circuit Board	MT	MTシート		11
	VA026100	LED	LT9230D	面発光LED	MONO, EQ.ON	04
	JG136600	LED Driver	IR2E19	IC	LED Driver	05
	VA039100	LED Display	SX-25J	LEDディスプレイ	LEVEL	06
	VA029000	Spacer		LEDスペーサー		01
	FZ004110	Semiconductive Cera. Cap.	0.1 μ 16V	半導体セラコン		01
*	VC814300	LCD Display	DMC16266UV-YGR	液晶ディスプレイ		16
	KA803610	Push Switch	ESB-8213A	プッシュスイッチ	Power	03
	VD293000	Power Supply Unit		電源ユニット	J	
	VD293100	Power Supply Unit		電源ユニット	U	
	VD293200	Power Supply Unit		電源ユニット	C	
	VD293300	Power Supply Unit		電源ユニット	H, D	

■REMOTE CONTROL UNIT (リモコンユニット)



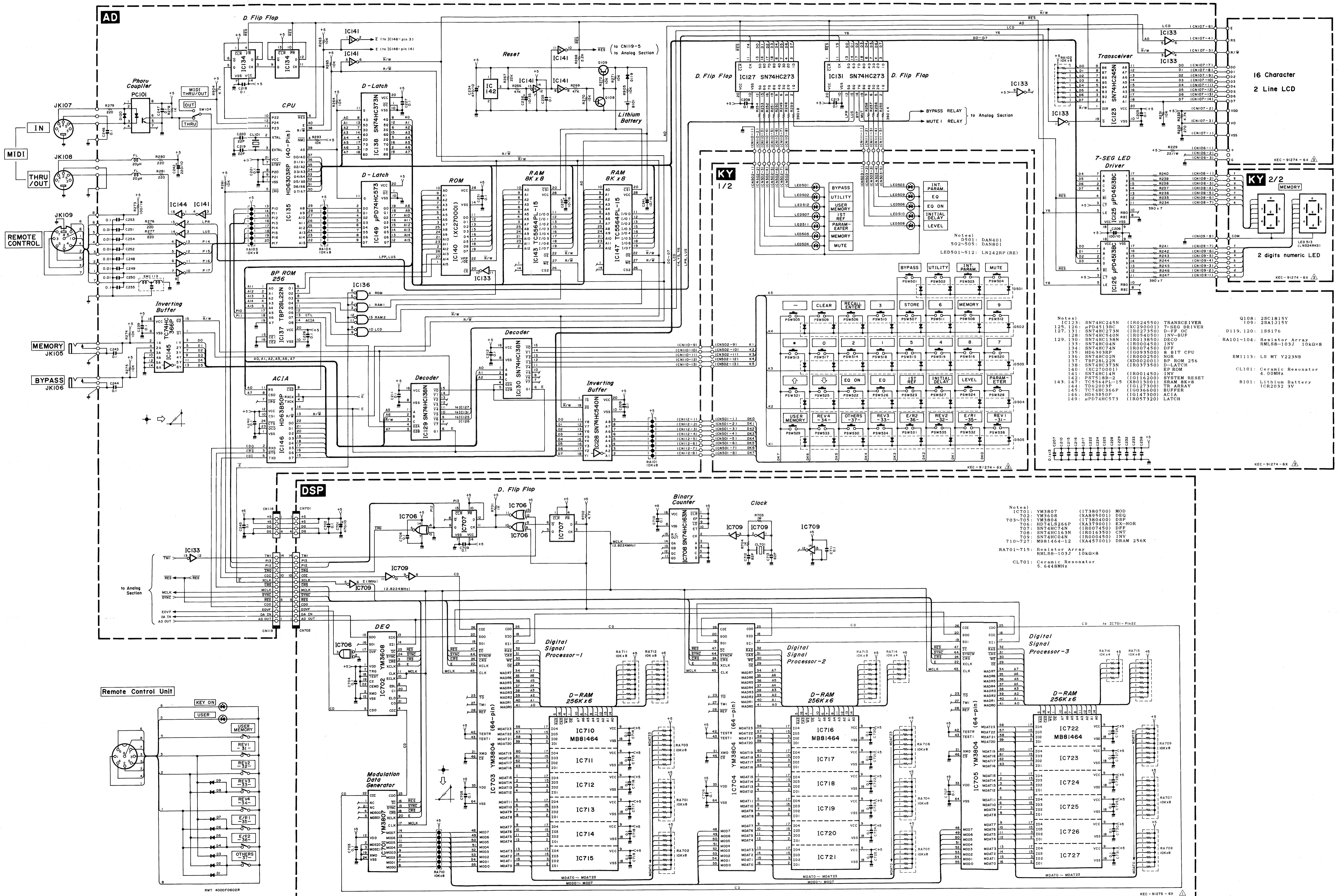
REV5

Ref	Part No	Description		部品名	Remarks	ランク
* * 01	VD374700	Remote Control Unit		リモコンユニット		
02	XX807130	Upper Case	102RWT-036-08R	上ケース		07
03	XX807140	Bottom Case	102RWT-037-01R	下ケース		04
04	XX807150	Key Top A	302RWT-025-01R	キートップ A		02
		Key Top B	302RWT-026-01R	キートップ B		
* 05		Cushion	SM-60	クッション		
* 06		MT Switch	701RWT-011-01R	MT スイッチ		
07	IF007950	LED	JPM1010-0401	LED		01
08	IF000460	Diode	TLR226	ダイオード		01
* 09		Plug Cord	8P E-PC0022-001	プラグコード		
* 10		Filter	811RWT-005-01R	フィルター		
11	EM326106	Oval Head Tapping Screw	2.6×10 FCM3-BL	丸皿タッピンクネジ		01
12	EI020066	Bind Head Tapping Screw	2×6 ZMC2-Y	ハイトタッピンクネジ		01

* New Parts (新規部品)

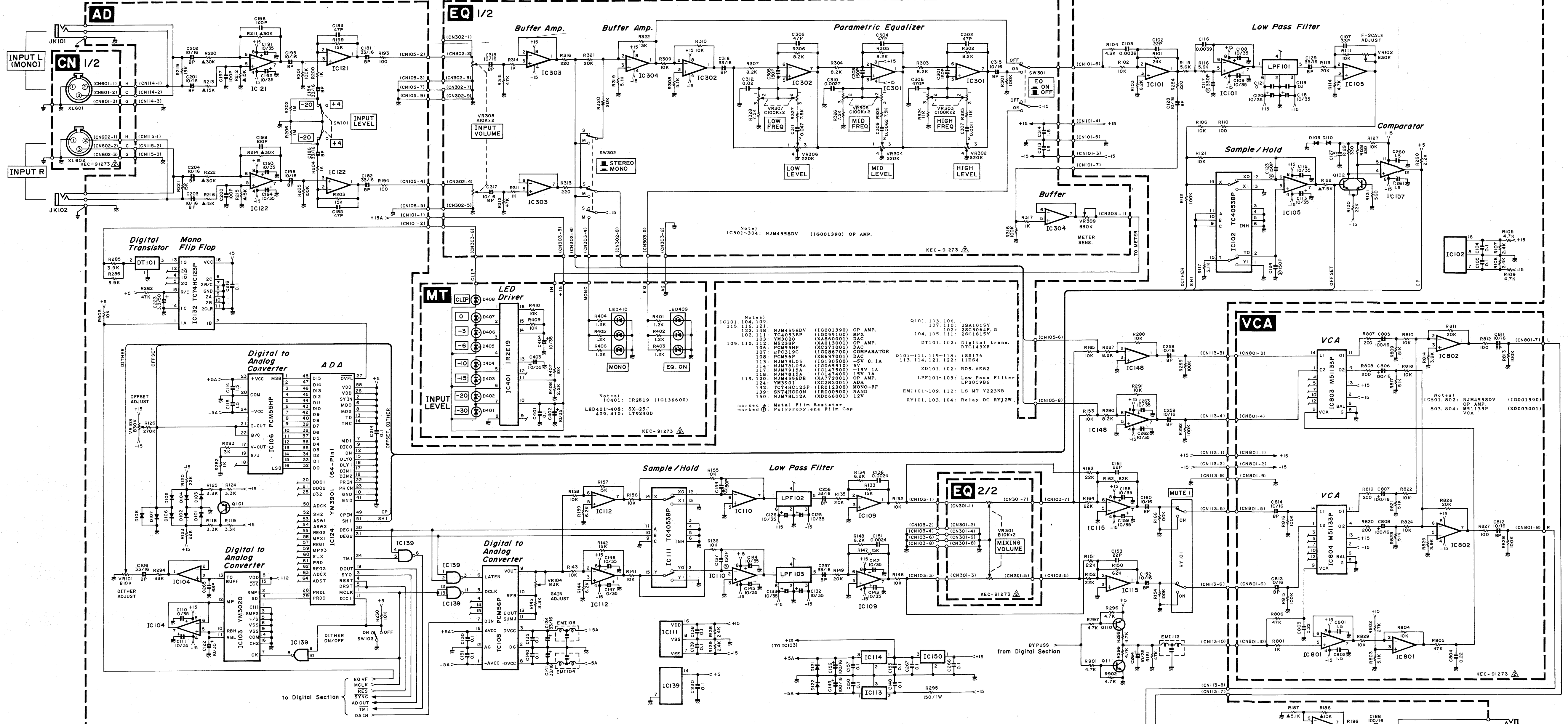
ランク:Japan only

REV5 OVERALL CIRCUIT DIAGRAM (Digital Section)



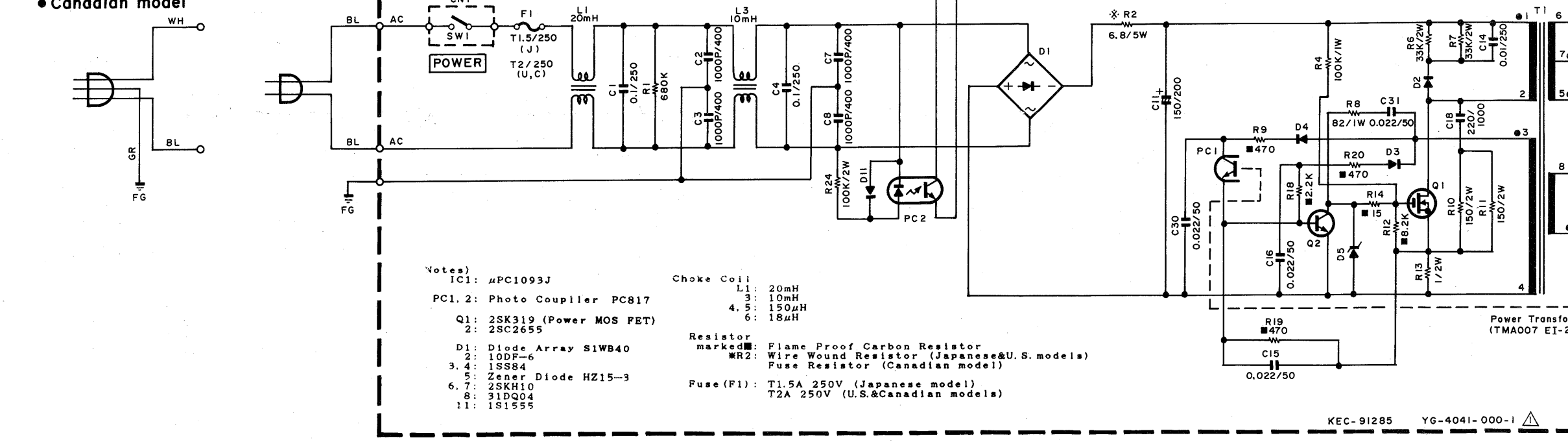
- Notes:
- IC123: SN74HC245N (IR024550) TRANSCIVER
 - 125: 126: μ PD4513BC (XC29001) 7-SEG DRIVER
 - 127: 131: SN74HC273N (IR027350) D-FF OC
 - 128: SN74HC540N (IR054050) INV-BUF
 - 129: 130: SN74HC138N (IR038550) DECO
 - 133: SN74HC04N (IR000450) INV
 - 134: SN74HC74N (IR007450) DFF
 - 135: HD63838N (IR005300) 8 BIT CPU
 - 136: SN74HC02N (IR000250) NOR
 - 137: TTP28222N (XD002001) BP ROM 256
 - 138: SN74HC373N (IR037350) D-LATCH
 - 140: (XC270001) INV
 - 141: SN74HC145N (IR001450) INV
 - 142: PST518B-2 (IG116200) SYSTEM RESET
 - 143: 147: TC5954AP-15 (XN013001) SRAM 8Kx8
 - 144: TD62003P (IG127300) TR ARRAY
 - 145: TC74HC364P (IR003640) BUFFER
 - 146: HD63850P (IG147300) ACIA
 - 149: μ PD74HC573 (IR057320) LATCH
- Q108: 2SC1815Y
109: 2SA1315Y
D119, 120: 1SS176
RA101-104: Resistor Array
RML58-103J 10Kx8
EM113: LS MT Y223NB
CL101: Ceramic Resonator
4.0MHz
R101: Lithium Battery
ICR2032 3V

- Notes:
- IC701: YM3807 (IT380700) MOD
 - 702: VM3608 (XA895001) DEG
 - 703-705: YM3804 (IT380400) EP
 - 706: HD74LS266P (XA379001) EX-NOR
 - 707: SN74HC74N (IR007450) DFF
 - 708: SN74HC163N (IR016350) CNT
 - 709: SN74HC04N (IR000450) INV
 - 710-727: M881464-12 (XA457001) DRAM 256K
- RA701-715: Resistor Array
RML58-103J 10Kx8
CL701: Ceramic Resonator
5.6448MHz

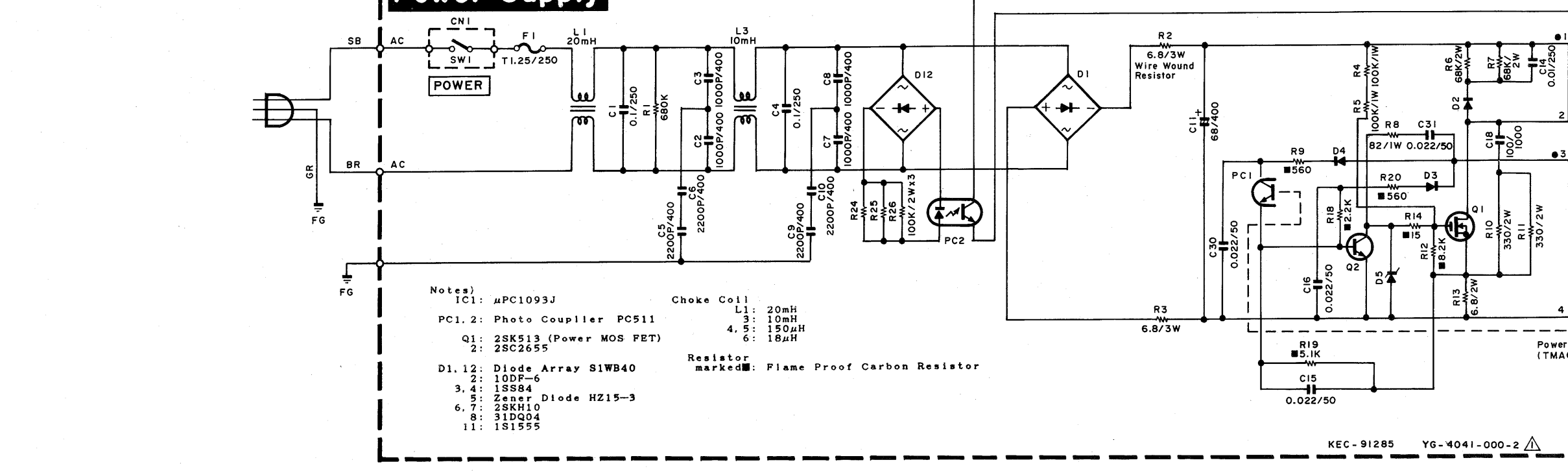


Japanese, U.S. and Canadian models
 • U.S. model
 • Japanese model

Power Supply



Power Supply



- Notes:
- IC301-304: NJM4558DV (10001390) OP. AMP.
 - IC101, 102, 103: TC4052BP (10001390) DUAL 4-BIT BINARY DECODER WITH 3-STATE OUTPUTS
 - IC104: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR
 - IC105: LM339 (10001390) COMPARATOR
 - IC106: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR
 - IC107: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR
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 - IC198: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR
 - IC199: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR
 - IC200: 74LS123 (10001390) MONO-PULSE-WIDTH GENERATOR

PRINTING THE SERVICE MANUAL

The PDF of this service manual is not designed to be printed from cover to cover. The pages vary in size, and must therefore be printed in sections based on page dimensions.

NON-SCHEMATIC PAGES

Data that does NOT INCLUDE schematic diagrams are formatted to 8.5 x 11 inches and can be printed on standard letter-size and/or A4-sized paper.

SCHEMATIC DIAGRAMS

The schematic diagram pages are provided in two ways, full size and tiled. The full-sized schematic diagrams are formatted on paper sizes between 8.5" x 11" and 18" x 30" depending upon each individual diagram size. Those diagrams that are LARGER than 11" x 17" in full-size mode have been tiled for your convenience and can be printed on standard 11" x 17" (tabloid-size) paper, and reassembled.

TO PRINT FULL SIZE SCHEMATIC DIAGRAMS


If you have access to a large paper plotter or printer capable of outputting the full-sized diagrams, output as follows:

- 1) Note the page size(s) of the schematics you want to output as indicated in the middle window at the bottom of the viewing screen.
- 2) Go to the File menu and select Print Set-up. Choose the printer name and driver for your large format printer. Confirm that the printer settings are set to output the indicated page size or larger.
- 3) Close the Print Set Up screen and return to the File menu. Select "Print..." Input the page number of the schematic(s) you want to print in the print range window. Choose OK.

TO PRINT TILED VERSION OF SCHEMATICS



Schematic pages that are larger than 11" x 17" full-size are provided in a 11" x 17" printable tiled format near the end of the document. These can be printed to tabloid-sized paper and assembled to full-size for easy viewing.


If you have access to a printer capable of outputting the tabloid size (11" x 17") paper, then output the tiled version of the diagram as follows:

- 1) Note the page number(s) of the schematics you want to output as indicated in the middle window at the bottom of the viewing screen.
- 2) Go to the File menu and select Print Set-up. Choose the printer name and driver for your printer. Confirm that the plotter settings are set to output 11" x 17", or tabloid size paper in landscape () mode.
- 3) Close the Print Set Up screen and return to the File menu. Select "Print..." Input the page number of the schematic(s) you want to print in the print range window. Choose OK.

TO PRINT SPECIFIC SECTIONS OF A SCHEMATIC

To print just a particular section of a PDF, rather than a full page, access the Graphics Select tool in the Acrobat Reader tool bar.

- 1) To view the Graphics Select Tool, press and HOLD the mouse button over the Text Select Tool which looks like: . This tool will expand to reveal to additional tools. Choose the Graphics Select tool by placing the cursor over the button on of the far right that looks like: 
- 2) After selecting the Graphics Select Tool, place your cursor in the document window and the cursor will change to a plus (+) symbol. Click and drag the cursor over the area you want to print. When you release the mouse button, a marquee (or dotted lined box) will be displayed outlining the area you selected.
- 3) With the marquee in place, go to the file menu and select the "Print..." option. When the print window appears, choose the option under the section called "Print Range" which says "Selected Graphic".

Select OK and the output will print only the area that you outlined with the marquee. 

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