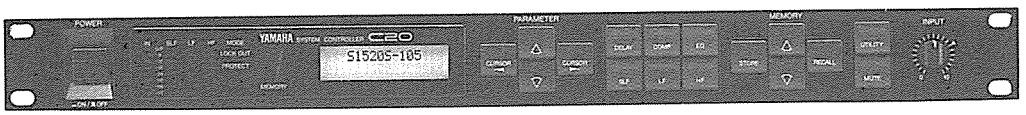
SYSTEM CONTROLLER

C20

SERVICE MANUAL



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LM 011041

YAMAHA CORP.
HAMAMATSU, JAPAN
3.0K-173 ㊀ Printed in Japan '90.12

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.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHAT SO EVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!.

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

SPECIFICATIONS（総合仕様）

- **ELECTRICAL CHARACTERISTICS**
  FREQUENCY RESPONSE: 20Hz－20kHz
  DYNAMIC RANGE: Greater than 100dB
  TOTAL HARMONIC DISTORTION: Less than 0.03% (@1kHz, level max.)
- **INPUT**
  NUMBER OF INPUTS: ELECTRONICALLY BALANCED × 1
  NOMINAL LEVEL: ＋4dBm
  IMPEDANCE: 10kΩ
- **OUTPUT**
  CONVERSION TYPE: DELTA-SIGMA
  NUMBER OF OUTPUTS: ELECTRONICALLY BALANCED × 3
  NOMINAL LEVEL: ＋4dBm
  IMPEDANCE: 150Ω
- **A/D, D/A CONVERSION**
  QUANTIZATION: 18 bits
  SAMPLING RATE: 50 kHz
- **DELAY TIME:** 0－1300msec.(20μsec. step)
- **MEMORY**
  NUMBER OF LOCATIONS: 15:1－9 & A－F
- **MIDI CONTROL:** PROGRAM CHANGE for memory select, BULK DUMP for up/down load
- **EXTERNAL CONTROL**
  CONNECTOR: 9-PIN D-SUB (contact-conclosure memory select)
- **FRONT PANEL**
  CONTROLS: INPUT LEVEL
  KEYS: PARAMETER (↑, ↓), CURSOR (→, ←), DELAY, COMP, EQ, SLF, LF, HF, STORE, RECALL, MEMORY (↑, ↓), UTILITY, MUTE
- **DISPLAYS**
  INPUT LEVEL: 8-SEGMENT LED
  OUTPUT LEVEL (SLF, LF, HF): 3 CHANNEL 8-SEGMENT LED
  MEMORY No.: 7-SEGMENT LED
  PARAMETER: 16-CHARACTER × 2 LINE, BACKLIT
- **REAR PANEL**
  CONNECTORS: OUTPUT (SLF, LF, HF), INPUT, MIDI (IN, OUT), REMOTE
  SWITCH MODE: VARIABLE/PROTECT/LOCK OUT
  HF ATT: 0dB, －6dB
- **GENERAL**
  POWER CONSUMPTION: 22W
  DIMENSIONS (W × H × D): 480 × 45.2 × 324mm (18-7/8'' × 1-3/4'' × 12-3/4'')
  WEIGHT: 3.8kg (8lbs 6oz)

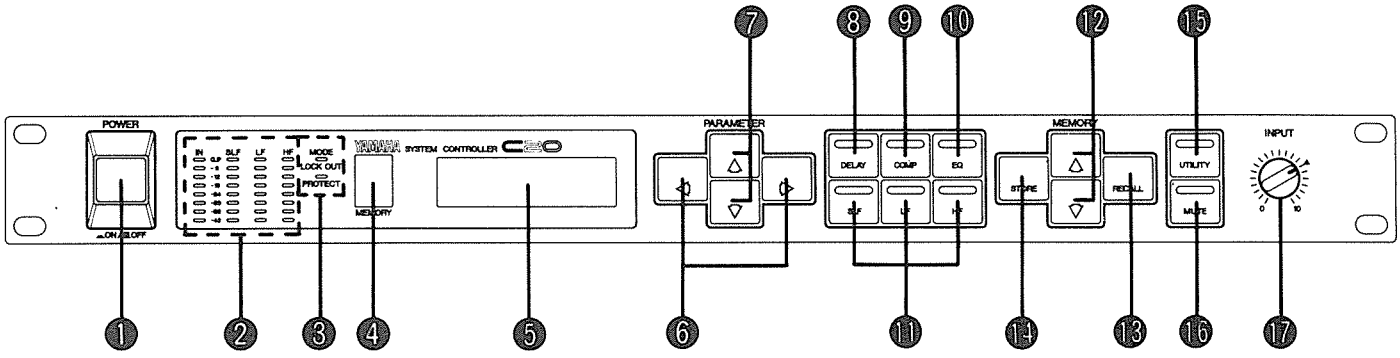
* *0dB＝0.775Vr.m.s.*
* *Internal circuit delays result in an oveall delay of approximately 0.9 msec even when the individual channel delays and overal delay offset are set to zero.*

- **電気特性**
  周波数特性 : 20Hz～20kHz
  S/N比 : 100dB
  全高調波歪率(T.H.D.) : 0.03%以下(@1kHz,Max level)
- **インプット(INPUT)**
  チャンネル数 : 1ch (電子バランス方式)
  規定出力レベル : ＋4dBm
  入力インピーダンス : 10kΩ
- **アウトプット(OUTPUT CH1,CH2,CH3)**
  チャンンネル数 : 3ch (電子バランス方式)
  規定出力レベル : ＋4dBm
  入力インピーダンス : 150Ω
- **AD/DA コンバーター**
  量子化ビット数 : 18bits
  サンプリング周波数 : 50kHz
- **ディレイタイム** : 0～1300msec
- **メモリー(15プログラム)**
- **MIDIコントロール** : プログラムチェンジ、バルクダンプ
- **REMOTEコントロール** : 9ピンD－SUB
- **フロントパネル**
  コントロール : インプットレベル
  スイッチ : パラメーター(↑,↓)、カーソル(→,←)、ディレイ、コンペア、イコライザー、SLF、LF、HF、ストア、リコール、メモリー(↑,↓)、ユーティリティー、ミュート
- **ディスプレイ**
  インプットレベル : 8素子LED
  アウトプットレベル : 8素子LED×3
  メモリーナンバー : 7セグメントLED
  LCD : 16文字2ライン
- **リアパネル**
  端子 : アウトプット(SLF、LF、HF)、インプット、MIDI(IN、OUT)、リモート
  スイッチ : モード(VARIABLE/PROTECT/LOOK OUT)、HFアッテネータ(0dB/－6dB)
- **電源** : AC100V、50/60Hz
- **寸法(W×H×D)** : 480×45.2×324㎜
- **重量** : 3.8kg

＊0dB＝0.775Vr.m.s.
＊DELAY TIME＝0、の状態でも、C20内部を信号が通過するのに要する時間分(約0.9msec)遅延時間が生じます。

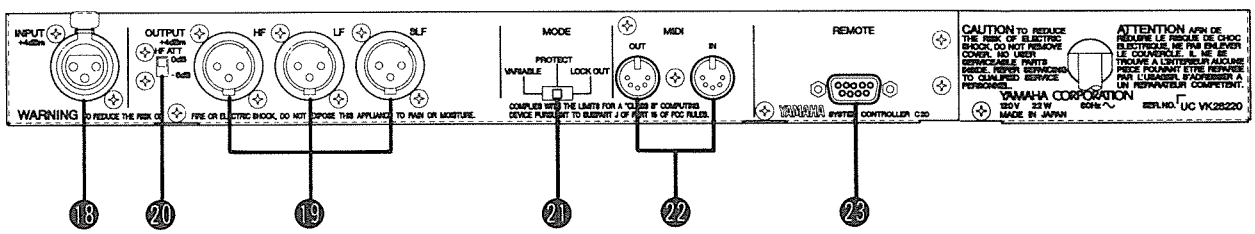
PANEL LAYOUT（パネルレイアウト）

● Front Panel（フロントパネル）



❶ [POWER] Switch
❷ Input & Output Level Indicators
❸ MODE Indicators
❹ MEMORY Display
❺ LCD Display
❻ CURSOR Keys
❼ PARAMETER Keys
❽ [DELAY] Key
❾ [COMP] Key
❿ [EQ] Key
⓫ [SLF], [LF], [HF] Keys
⓬ MEMORY [△] and [▽] Keys
⓭ [RECALL] Key
⓮ [STORE] Key
⓯ [UTILITY] Key
⓰ [MUTE] Key
⓱ INPUT Level Control

● Rear Panel（リアパネル）



⓲ INPUT Connector
⓳ HF, LF and SLF OUTPUT Connectors
⓴ HF ATT Switch (0dB/−6dB)
㉑ MODE Switch (VIRIABLE/PROTECT/LOCK OUT)
㉒ MIDI IN and OUT Connectors
㉓ REMOTE Connector

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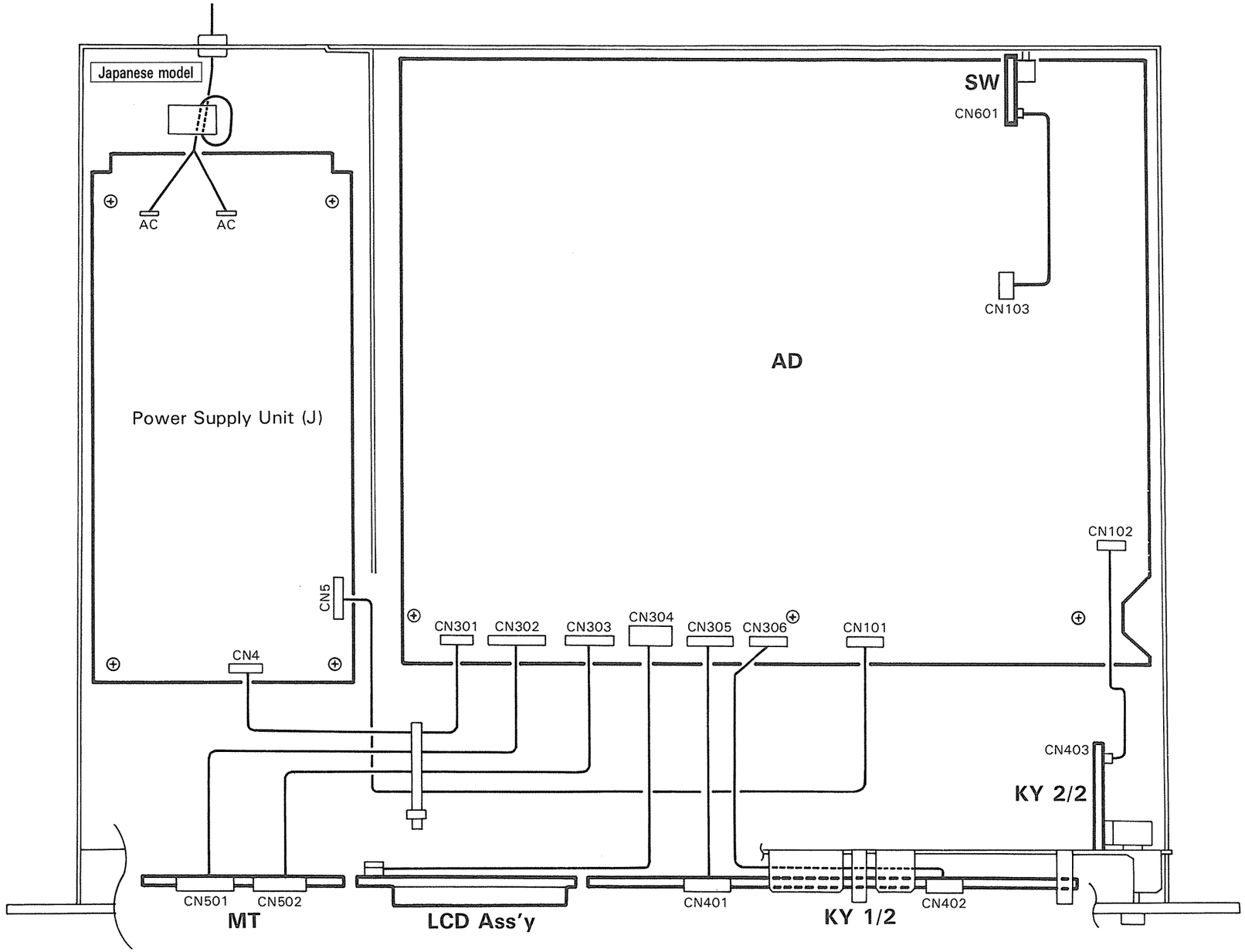
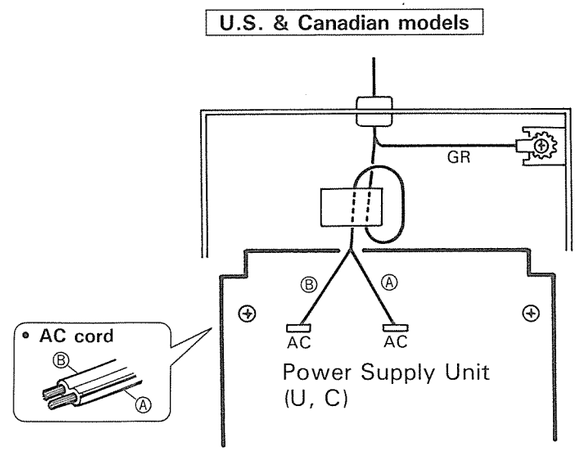
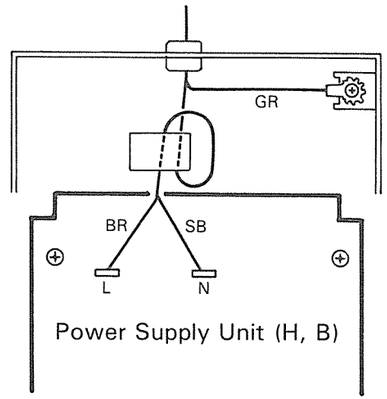
■ CIRCUIT BOARD LAYOUT & WIRING（ユニットレイアウト＆配線図）







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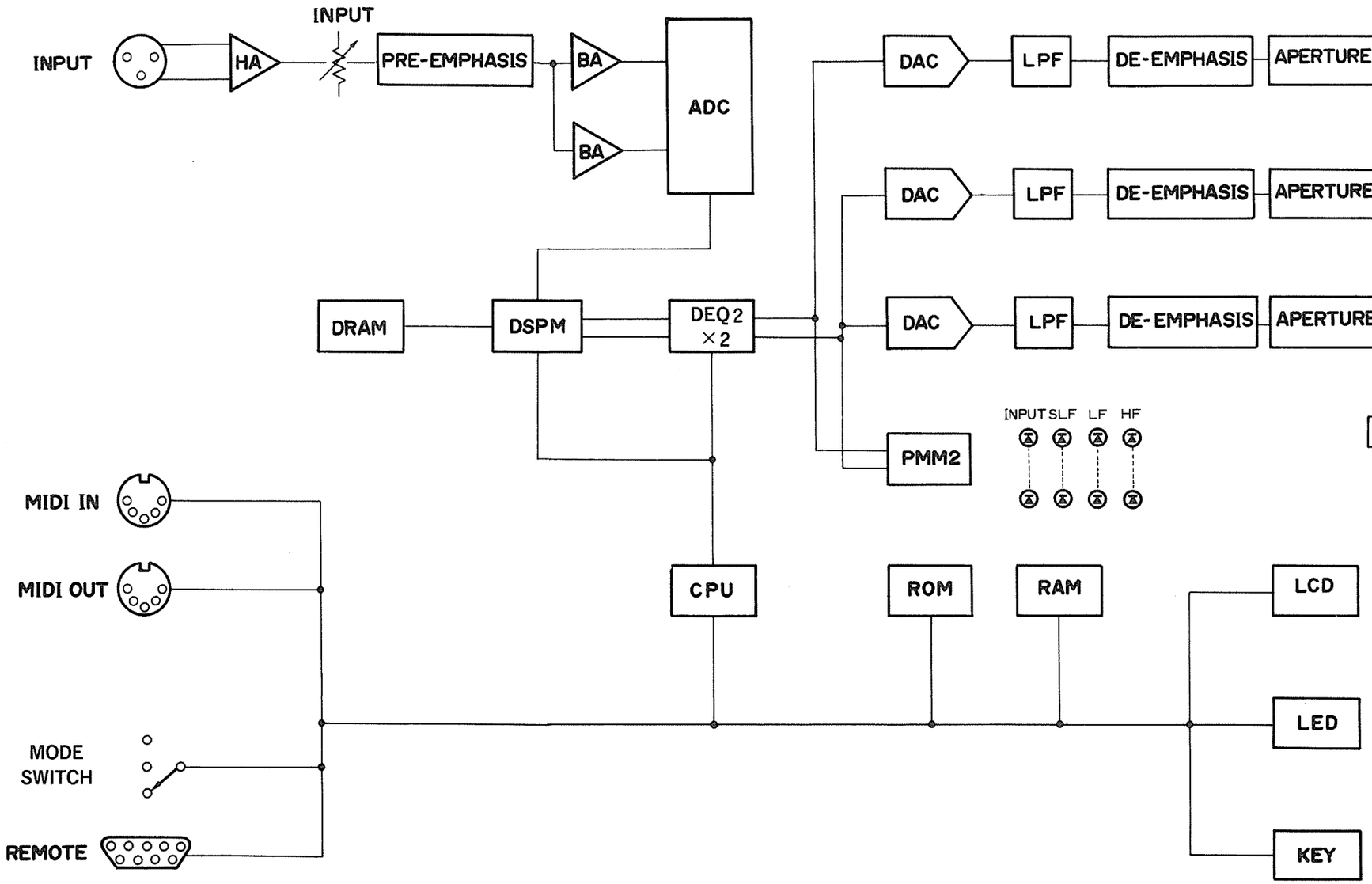
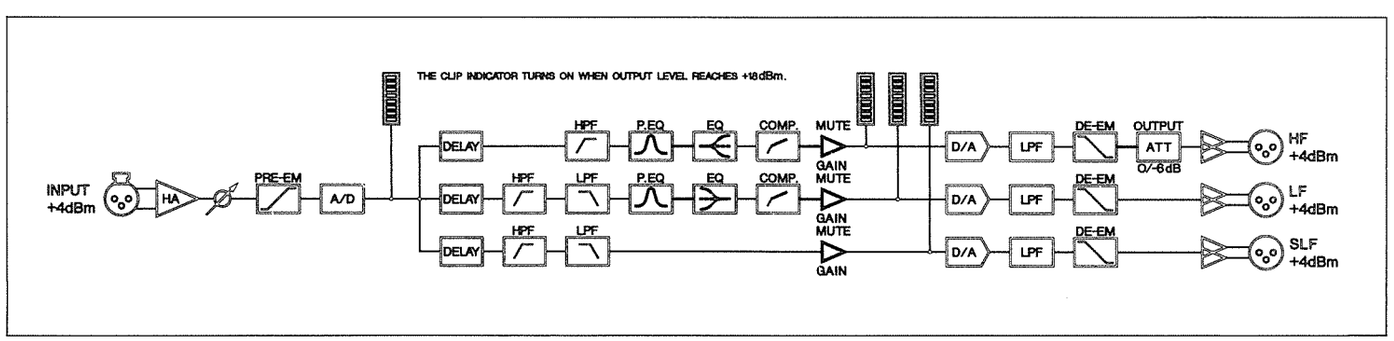
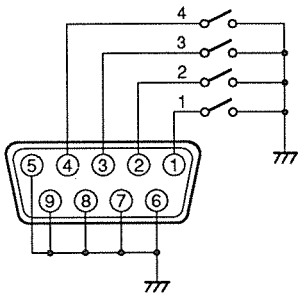
■BLOCK DIAGRAM（ブロックダイアグラム）





REMOTE CONNECTOR PIN ASSIGNMENT（リモート端子ピン配列）

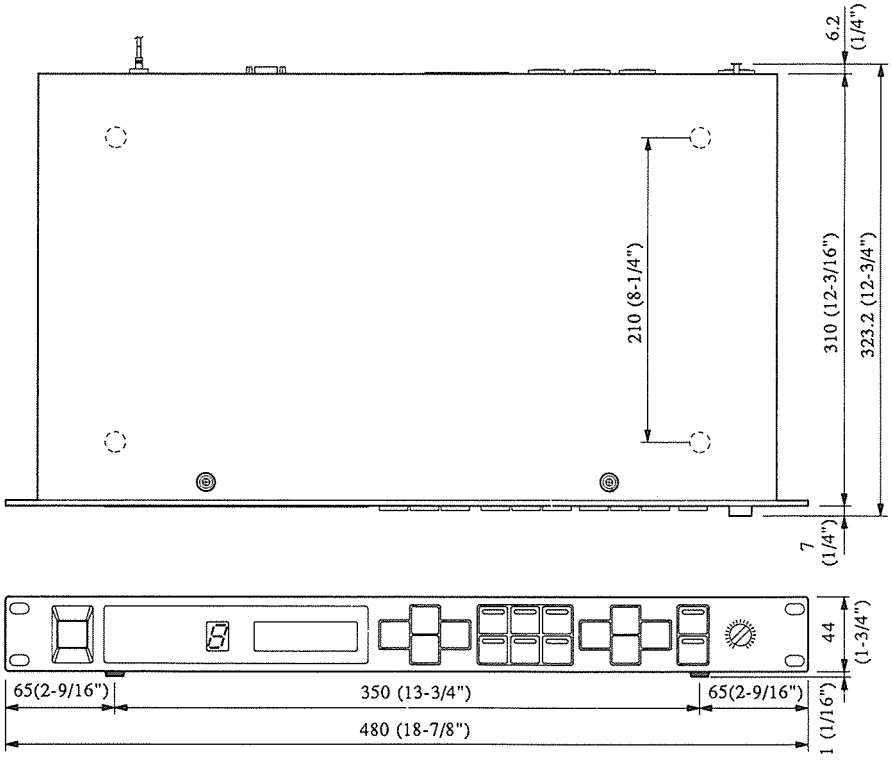
		Recalled Program Number														
		1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Pin Status (O = ON, X = OFF)	1	O	X	O	X	O	X	O	X	O	X	O	X	O	X	O
	2	X	O	O	X	X	O	O	X	X	O	O	X	X	O	O
	3	X	X	X	O	O	O	O	X	X	X	X	O	O	O	O
	4	X	X	X	X	X	X	X	O	O	O	O	O	O	O	O



* If more than one pin (1 ... 4) is grounded at the same time, the lowest-numbered pin takes priority.

* If at least one pin (1 ... 4) is grounded, the front panel keys and MIDI reception are locked out.

DIMENSIONS（寸法図）



Unit: mm (inch)

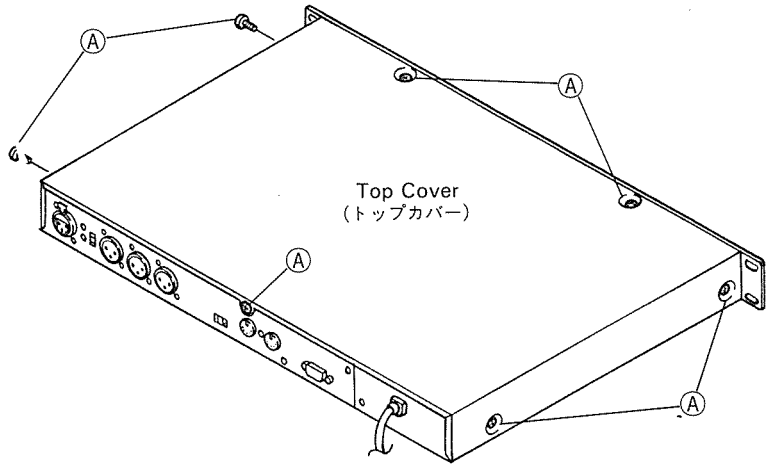
■ DISASSEMBLY PROCEDURE（分解手順）

1. Top Cover (Fig. 1)

1-1. Remove the seven (7) screws marked in the figure as Ⓐ (3.0 × 8 bind head screw), then the top cover can be removed.

1．トップカバーの外し方（図1参照）

1-1. Ⓐのネジ7本(3×8バインド小ネジ)を外して、トップカバーを外します。



(Fig. 1)

2. AD Circuit Board (Fig. 2 and Fig. 3)

2-1. Remove the top cover. (see procedure 1)

2-2. To remove the AD circuit board, remove the nine (9) screws marked Ⓑ (3.0 × 8 bind head screw), two (2) screws marked Ⓒ and three (3) screws marked Ⓓ (3.0 × 6 bind head screw), and then dissconnect the wire harness.

* After removing the top cover, remove the four (4) screws marked Ⓔ (3.0 × 8 bind head screw) and three (3) screws marked Ⓓ (3.0 × 6 bind head screw) to take the AD circuit board with the rear panel out of the unit. This will give you access to the pattern side of the AD circuit board without removing it. (Fig. 2, Fig. 3 and Fig. 4)

2．ADシートの外し方（図2，3参照）

2-1. トップカバーを外します。(1項参照)

2-2. Ⓑのネジ9本(3×8バインド小ネジ)とコネクターのネジⒸ2本とⒹのネジ3本(3×6バインド小ネジ)を外し、シートのコネクターを外してADシートを外します。

※トップカバーを外した後、Ⓔのネジ4本(3×8バインド小ネジ)とⒹのネジ3本(3×6バインド小ネジ)を外してリアAss'yを取り外すと、ADシートをパターン面からチェックすることが出来ます。(図2，3，4参照)

3. SW Circuit Board (Fig. 2 and Fig. 3)

3-1. Remove the top cover. (see procedure 1)

3-2. Remove the two (2) screws marked Ⓕ (3.0 × 8 bind head screw) and disconnect the wire harness, then remove the SW circuit board.

3．SWシートの外し方（図2，3参照）

3-1. トップカバーを外します。(1項参照)

3-2. ネジⒻ2本(3×8バインド小ネジ)とコネクターを外して、SWシートを外します。

4. Power Supply Unit (Fig. 3)

4-1. Remove the top cover. (see procedure 1)

4-2. Remove the push rod.

4-3. Remove the four (4) screws marked Ⓖ (3.0 × 8 bind head screw).

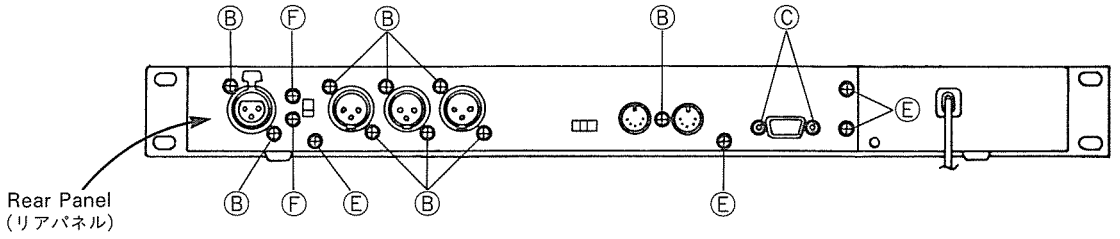
4-4. After the wire harness has been disconnected, the power supply unit can be removed.

4．電源ユニットの外し方（図3参照）

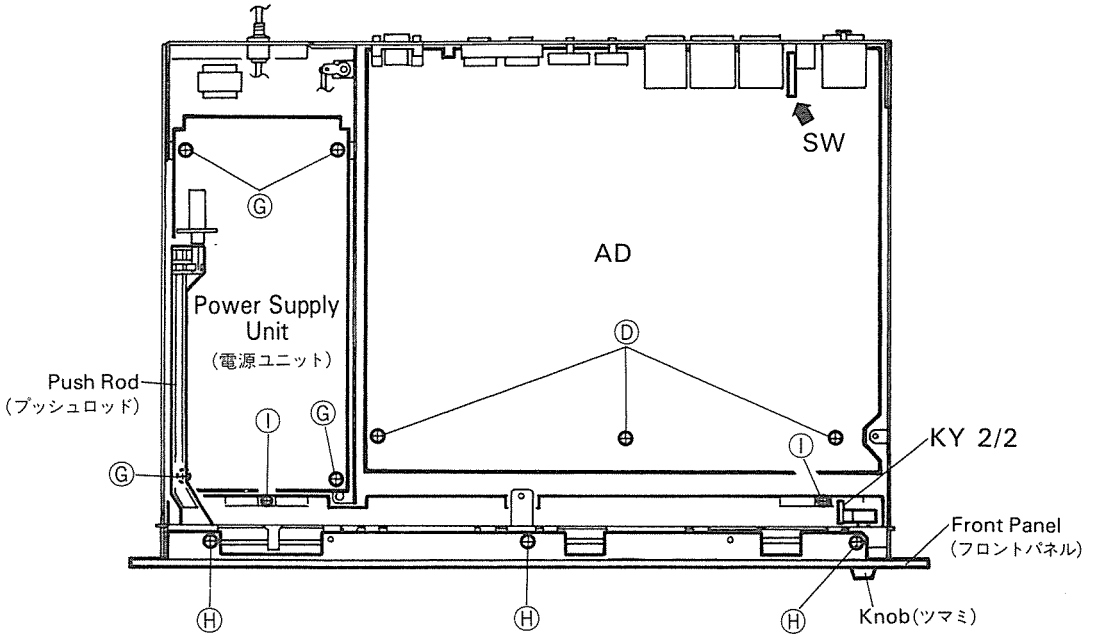
4-1. トップカバーを外します。(1項参照)

4-2. プッシュロッドを外します。

4-3. ネジⒼ4本(3×8バインド小ネジ)とコネクターを外して、電源ユニットを外します。

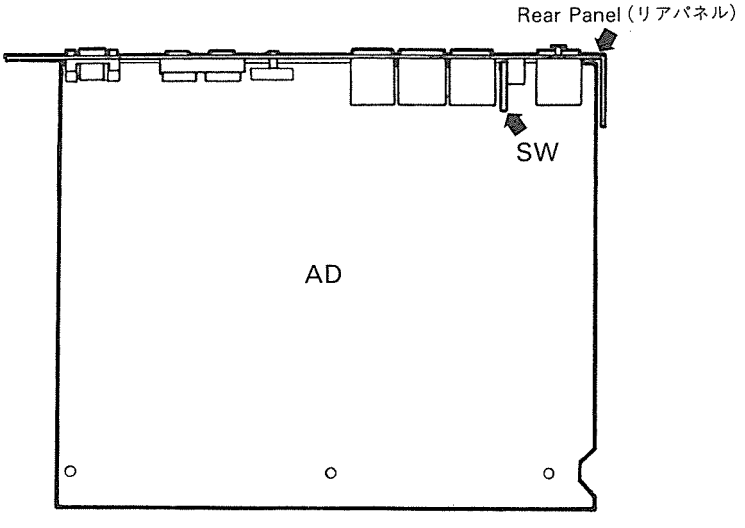


(Fig. 2)



(Fig. 3)

● Rear Assembly(リアAss'y)



(Fig. 4)

5. Front Panel (Fig. 3)

5-1. Remove the top cover. (see procedure 1)

5-2. Remove the three (3) screws marked Ⓗ (3.0 × 6 flat head screw) and two (2) screws marked Ⓘ (3.0 × 8 bind head screw), and then pull out the front panel toward you while lifting the unit slightly.

5．フロントパネルの外し方（図3参照）

5-1. トップカバーを外します。(1項参照)

5-2. ネジⒽ3本(3×6皿小ネジ)とネジⒾ2本(3×8バインド小ネジ)を外して、本体を少し持ち上げながらフロントパネルを手前に引き抜きます。

6. KY1/2 and KY2/2 Circuit Boards (Fig. 5)

6-1. Remove the top cover. (see procedure 1)
6-2. Remove the front panel. (see procedure 5)
6-3. KY1/2 circuit board removal
6-3-1. Disconnect the wire harness on the circuit board.
6-3-2. Take the KY1/2 circuit board out of the sub panel while pressing the three (3) hooks marked Ⓙ upward.
6-4. KY2/2 circuit board removal
6-4-1. Pull out the INPUT level control knob.
6-4-2. To remove the KY2/2 circuit board, remove the hexagonal nut marked Ⓚ (φ7.0) and disconnect the wire harness.

7. MT Circuit Board (Fig. 5)

7-1. Remove the top cover. (see procedure 1)
7-2. Remove the front panel. (see procedure 5)
7-3. Disconnect the wire harness on the circuit board.
7-4. Take the MT circuit board out of the sub panel while pressing the two (2) hooks marked Ⓛ upward.

8. LCD Assembly (Fig. 5)

8-1. Remove the top cover. (see procedure 1)
8-2. Remove the front panel. (see procedure 5)
8-3. Remove the LCD assembly while pressing the two (2) hooks marked Ⓜ upward.

6．KY1/2シートとKY2/2シートの外し方(図5参照)

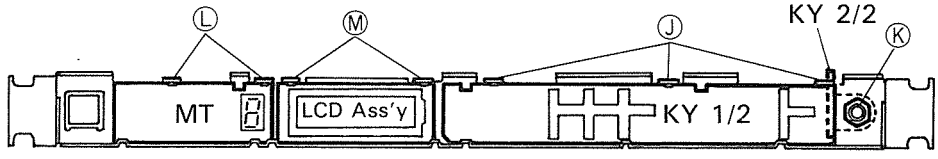
6-1. トップカバーを外します。(1項参照)
6-2. フロントパネルを外します。(5項参照)
6-3. KY1/2シートの外し方
6-3-1.シートのコネクターを外します。
6-3-2.サブパネルのフックⒿ3箇所を押上げながら、KY1/2シートを手前に引き抜きます。
6-4. KY2/2シートの外し方
6-4-1.ボリュームツマミを外します。
6-4-2.六角ナットⓀ1個(φ7)とコネクターを外して、KY2/2シートを外します。

7．MTシートの外し方（図5参照）

7-1. トップカバーを外します。(1項参照)
7-2. フロントパネルを外します。(5項参照)
7-3. シートのコネクターを外します。
7-4. サブパネルのフックⓁ2箇所を押上げながら、シートを手前に引き抜きます。

8．LCD Ass'yの外し方（図5参照）

8-1. トップカバーを外します。(1項参照)
8-2. フロントパネルを外します。(5項参照)
8-3. サブパネルのフックⓂ2箇所を押上げながら、LCD Ass'yを手前に引き抜きます。



(Fig. 5)

■LSI PIN DESCRIPTION (LSI端子機能表)

• HD63B03YP-N (XD245001) CPU

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	Vss		Ground	33	Vcc		DC Supply (+5V)
2	XTAL	I	Clock	34	A15	O	Address bus
3	EXTAL	I	Clock	35	A14	O	Address bus
4	MP0	I	Mode program	36	A13	O	Address bus
5	MP1	I	Mode program	37	A12	O	Address bus
6	$\overline{RES}$	I	Reset	38	A11	O	Address bus
7	$\overline{STBY}$	I	Stand-by mode signal	39	A10	O	Address bus
8	NMI	I	Non-maskable interrupt	40	A9	O	Address bus
9	P20	I/O	Port 2	41	A8	O	Address bus
10	P21	I/O	Port 2	42	Vss		Ground
11	P22	I/O	Port 2	43	A7	O	Address bus
12	P23	I/O	Port 2	44	A6	O	Address bus
13	P24	I/O	Port 2	45	A5	O	Address bus
14	P25	I/O	Port 2	46	A4	O	Address bus
15	P26	I/O	Port 2	47	A3	O	Address bus
16	P27	I/O	Port 2	48	A2	O	Address bus
17	P50	I/O	Port 5	49	A1	O	Address bus
18	P51	I/O	Port 5	50	A0	O	Address bus
19	P52	I/O	Port 5	51	D7	I/O	Data bus
20	P53	I/O	Port 5	52	D6	I/O	Data bus
21	P54	I/O	Port 5	53	D5	I/O	Data bus
22	P55	I/O	Port 5	54	D4	I/O	Data bus
23	P56	I/O	Port 5	55	D3	I/O	Data bus
24	P57	I/O	Port 5	56	D2	I/O	Data bus
25	P60	I/O	Port 6	57	D1	I/O	Data bus
26	P61	I/O	Port 6	58	D0	I/O	Data bus
27	P62	I/O	Port 6	59	$\overline{BA}$	O	Bus available
28	P63	I/O	Port 6	60	$\overline{LIR}$	O	Load instruction register
29	P64	I/O	Port 6	61	R/$\overline{W}$	O	Read/Write control
30	P65	I/O	Port 6	62	$\overline{WR}$	O	Write control
31	P66	I/O	Port 6	63	$\overline{RD}$	O	Read control
32	P67	I/O	Port 6	64	E	O	Enable

• HD63B50P (IG147300) ACIA (Asynchronous Communications Interface Adaptor)

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

• YM6104 (XE788A00) DEQ2 (Digital Equalizer)

Pin No.	Name	I/O	Function	Pin No.	Name	I/O	Function
1	VDD	I	+5V	12	Vss	I	Earth (Ground)
2	XMD	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
				15, 16	SO0, SO1	O	OUTPUT for Serial data signal
				17	$\overline{OVF}$	O	Detector for OVER Flow
3	$\overline{CRS}$	I	Initialized Serial Control Interface	18	$\overline{TEST}$	I	For test. Normally connecting to +5V
4	CDI	I	Inputs of μ PGM, Para, Ser. Cont. Data of Control Reg.	19	C2	O	Output is delayed Data of 2nd bit of P. Reg. by 1 bit.
5	CDO	O	Outputs of μ PGM, Para, Ser Cont. Data of Control Reg.	20	C1	O	Output is delayed Data of 1st bit of P. Reg. by 1 bit.
6	XCLK	I	In/Out clock for CDI & CDO	21	C0	O	Output is delayed Data of 0 bit of P. Reg. by 1 bit.
7	TRG	I	Determins transmit timming of PARA. to Para. Reg. from T BFR.	22	CEMD	I	+5V: It's necessory to input 2 Byte for CE to CDI 0V: It needs not to have a data for CE to CDI
8	ESL	I	Timming determination of data for External at Ext. Shift CLK				
9	ELD	I	Timming determination of data for Inner at Ext. Shift CLK	23	$\overline{IC}$	I	Initialized for DEQ
10	ECLK	I	Input Shift CLK of IN/OUT SR at Ext Shift CLK	24	$\overline{Sync}$	I	Synchro. signal for system
11	CLK	I	System Clock				

• YM3818 (XC354001) DSPM (Digital Signal Processor)

PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	MDAT15	I/O	Data bus	33	VDD		Power supply
2	MDAT14	I/O		34	MADR7	I	Address bus
3	MDAT13	I/O		35	MADR6	I	
4	MDAT12	I/O		36	MADR5	I	
5	MDAT11	I/O		37	MADR4	I	
6	MDAT10	I/O		38	MADR3	I	
7	MDAT9	I/O		39	MADR2	I	
8	MDAT8	I/O		40	MADR1	I	
9	MDAT7	I/O		41	MADR0	I	
10	MDAT6	I/O		42	TESTR	I	Test pin
11	MDAT5	I/O		43	$\overline{\text{TEST1}}$	I	
12	MDAT4	I/O		44	$\overline{\text{SYNC}}$	I	Synch pulse
13	MDAT3	I/O		45	CLK	I	Master clock
14	MDAT2	I/O		46	$\overline{\text{CE}}$	I	Chip enable
15	MDAT1	I/O		47	$\overline{\text{IC}}$	I	Initial clear
16	MDAT0	I/O		48	MOD7	I	Modulation data
17	SI1	I	Serial data IN	49	MOD6	I	
18	SI0	I		50	MOD5	I	
19	SO1	O	Serial data OUT	51	MOD4	I	
20	SO0	O		52	MOD3	I	
21	XMD	I	Internal ACIA synchronization mode	53	MOD2	I	
22	XCLK	I	Clock	54	MOD1	I	
23	$\overline{\text{TO}}$	O	Time-out	55	MOD0	I	
24	$\overline{\text{CRS}}$	I	CD counter reset	56	MDAT23	I/O	Data bus
25	CDO	O	CD data output	57	MDAT22	I/O	
26	CDI	I	CD data input	58	MDAT21	I/O	
27	TMI	O	Timing pulse	59	MDAT20	I/O	
28	$\overline{\text{REF}}$	O	Refresh	60	MDAT19	I/O	
29	$\overline{\text{OE}}$	O	Output enable	61	MDAT18	I/O	
30	$\overline{\text{WE}}$	O	Write enable	62	MDAT17	I/O	
31	$\overline{\text{CAS}}$	O	RAM control	63	MDAT16	I/O	
32	$\overline{\text{RAS}}$	O		64	Vss		Ground

• YM3934 (XE798A00) PMM 2 (Peak Meter Module)

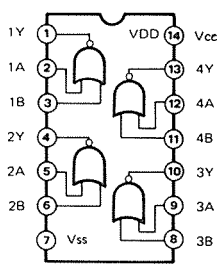
Pin No.	NAME	I/O	FUNCTION	Pin No.	NAME	I/O	FUNCTION
1	NC			33	NC		
2	NC			34	NC		
3	NC			35	NC		
4	DB11	O	Meter data output	36	DI0	I	Digital in data
5	DB10	O		37	DI1	I	
6	DB9	O		38	DI2	I	
7	DB8	O		39	DI3	I	
8	DB7	O		40	DI4	I	
9	DB6	O		41	DI5	I	
10	NC			42	NC		
11	DB5	O		43	DI6	I	
12	DB4	O		44	DI7	I	
13	DB3	O		45	DI8	I	
14	DB2	O		46	DI9	I	
15	DB1	O		47	DI10	I	
16	DB0	O		48	DI11	I	
17	NC			49	NC		
18	NC			50	NC		
19	NC			51	NC		
20	NC			52	NC		
21	OVD	I	Overflow data	53	HT1	I	Falling and holding times are determined by these inputs.
22	OMODE	I	Output mode control	54	HT0	I	
23	IMODE	I	Input mode control	55	FT1	I	
24	NC			56	FT0	I	
25	TST	I	Test pin	57	Vss		Ground
26	VDD		Power supply	58	VDD		Power supply
27	Vss		Ground	59	NC		
28	ICLK	I	System clock input	60	C3	O	Channel select
29	$\overline{\text{SYNC}}$	I	Synch. pulse	61	C2	O	
30	$\overline{\text{RST}}$	I	Initial reset	62	C1	O	
31	$\overline{\text{DIEN}}$	I	Digital input enable	63	C0	O	
32	NC			64	NC		

• **AK5327-VP** (XG898A00) ADC (Analog to Digital Converter)

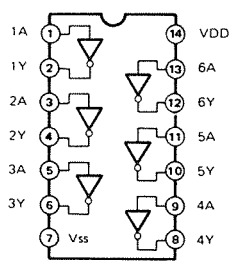
PIN NO.	NAME	I/O	FUNCTION	PIN NO.	NAME	I/O	FUNCTION
1	AGND		Analog ground	15	SCLK	I	Serial output data clock
2	AINL	I	Left channel analog input	16	SDATA	O	Serial data output
3	ZEROL	I	Zero level input for left channel	17	VD1+		Positive digital power supply
4	VA+		Positive analog power supply	18	VD2+		Positive digital power supply
5	VA−		Negative analog power supply	19	DGND		Digital ground
6	APD	I	Analog power down	20	DCLKA	I	Digital section input clock
7	ACAL	I	Analog calibrate	21	NC		No connection
8	NC		No connection	22	ACLKA	O	Analog section output clock
9	DCAL	O	Digital calibrate output	23	CLKIN	I	Master input clock
10	DPD	I	Digital power down	24	LGND		Logic ground
11	TST1	I	} Test inputs	25	VL+		Positive logic power supply
12	TST2	I		26	ZEROR	I	Zero level input for right channel
13	TST3	I		27	AINR	I	Right channel analog input
14	L/R	I	Left/Right select	28	VREF	O	Voltage reference output

■ IC BLOCK DIAGRAM (ICブロック図)

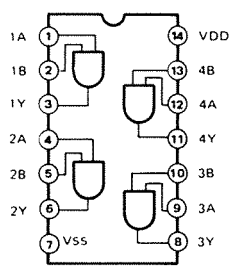
• **SN74HC02N** (IR000250)
Quad 2 Input NOR



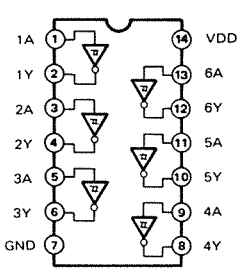
• **SN74HCU04N** (IG142250)
• **SN74HC04N** (IR000450)
Hex Inverter



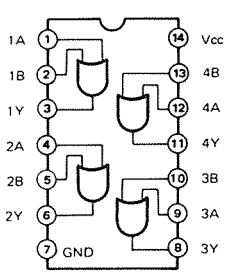
• **SN74HC08N** (IR000850)
Quad 2 Input AND



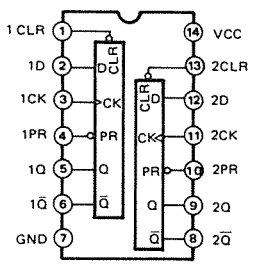
• **SN74HC14N** (IR001450)
Hex Inverter



• **SN74HC32N** (IR003250)
Quad 2 Input OR

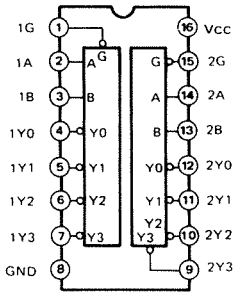


• **SN74HC74N** (IR007450)
Dual D-Type Flip-Flop

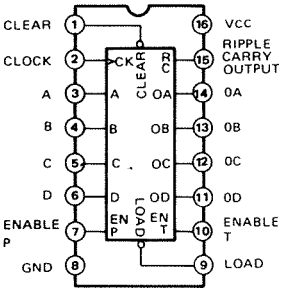


INPUTS				OUTPUTS	
PR	CLR	CLK	D	Q	Q̄
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	↑	H	H	L
H	H	↑	L	L	H
H	H	L	X	Q_0	$\bar{Q}_0$

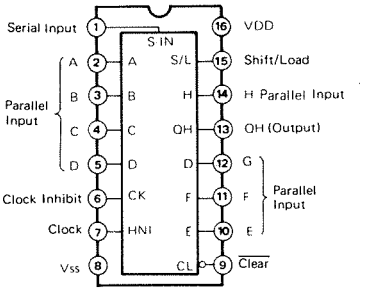
- **SN74HC139N** (IR013950)
  Dual 2 to 4 Demultiplexer



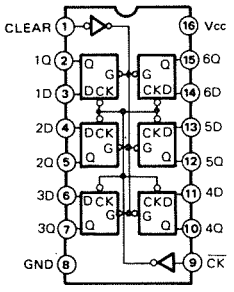
- **SN74HC163N** (IR016350)
  SYNC. Binary Counter



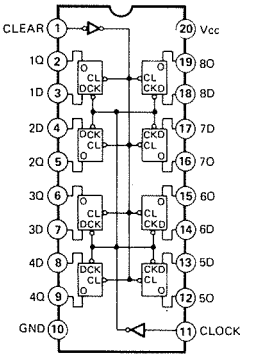
- **SN74HC166N** (IR016650)
  8-Bit Shift Register



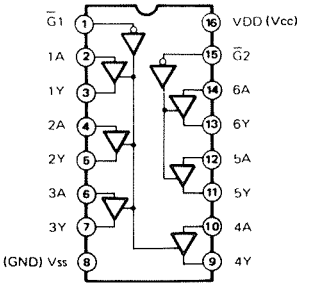
- **SN74HC174N** (IR017450)
  Hex D-Type Flip-Flop



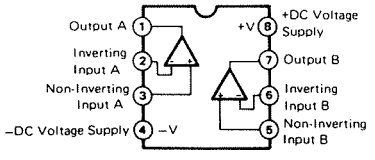
- **SN74HC273N** (IR027350)
  Octal D-Type Flip-Flop



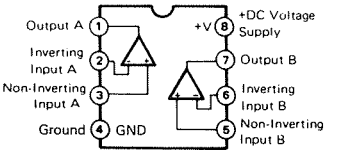
- **SN74HC367N** (IR036750)
  Hex 3-State Bus Buffer



- **M5238P** (XA013001)
- **NE5532P** (IG102500)
  Dual Operational Amplifier

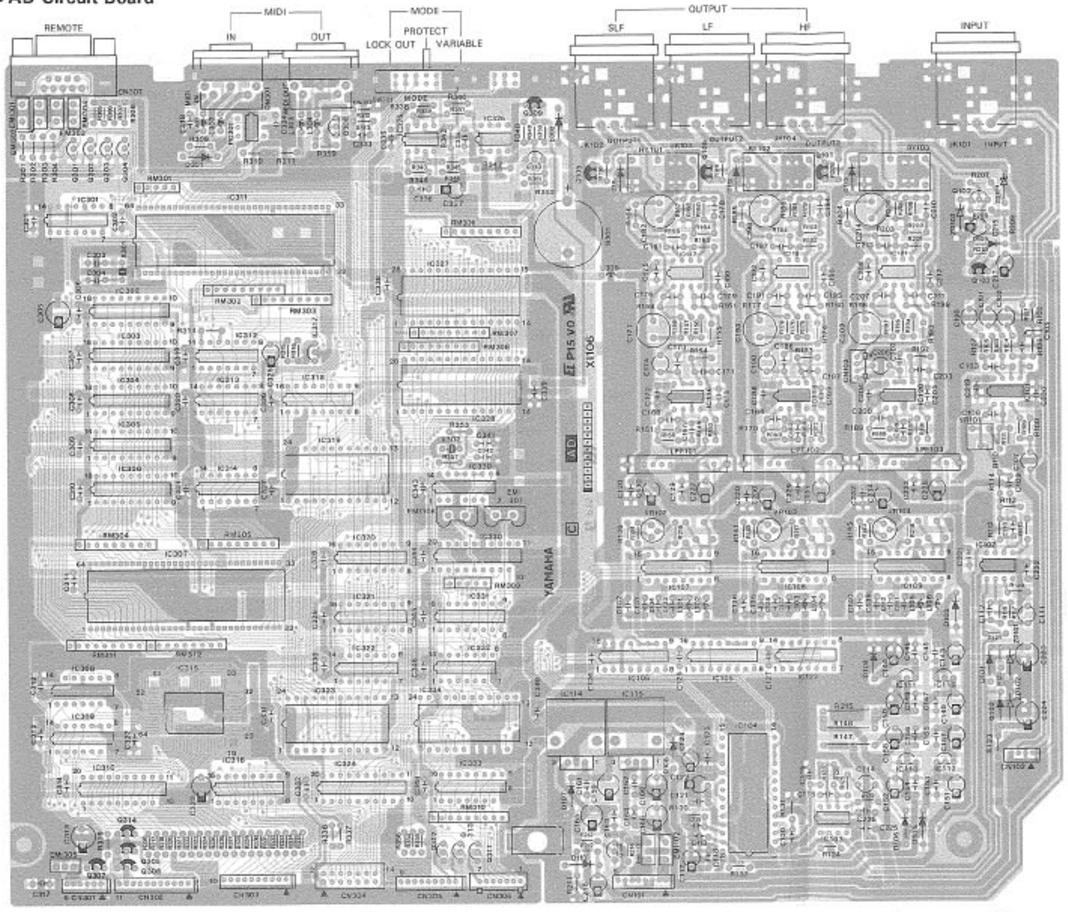


- **NJM2903D** (IG031000)
  Dual Single-Supply Comparator



■ CIRCUIT BOARDS（シート基板図）

● AD Circuit Board



Components side（部品側）

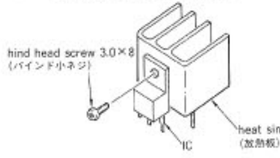
Notes)

Circuit Board: AD (VK116500) XI106C0

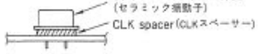
1. IC
   - IC101～103, 116～121: NE5532P (IG102500) OP AMP.
   - IC104: AK5327-VP (XG898A00) ADC
   - IC105,106: SN74HC166N (IR016650) SHIFT REGISTER
   - IC107～109: PCM61PJ (XG804A00) DAC
   - IC110,112: M5278L05 (XG945A00) 5V 100mA
   - IC111,113: M5279L05 (XG946A00) －5V 150mA
   - IC114: NJM7815FA (XD853A00) REGULATOR
   - IC115: NJM7915FA (XD854A00) REGULATOR
   - IC122,301: SN74HC74N (IR007450) D-FF
   - IC302－306: M5M4464AP-10 (XF981A00) DRAM 256K
   - IC307: YM3818 (XC354001) DSPM
   - IC308,332: SN74HC04N (IR000450) INVERTER
   - IC309,322: SN74HC08N (IR000850) AND
   - IC311: HD63B03YP-N (XD245001) CPU
   - IC312: SN74HC14N (IR001450) INVERTER
   - IC313: SN74HC02N (IR000250) NOR
   - IC314: SN74HC32N (IR003250) OR
   - IC315: YM3934 (XE798A00) PMM2
   - IC317: PST518B-2 (IG116200) SYSTEM RESET
   - IC318: SN74HC139N (IR013950) DECODER 2-4
   - IC319: HD63B50P (IG147300) ACIA
   - IC320,321: SN74HC163N (IR016350) COUNTER
   - IC323,334: YM6104 (XE788A00) DEQ2
   - IC324: SN74HC273N (IR027350) D-FF OCTAL
   - IC325: NJM2903D (IG031000) COMPARATOR
   - IC326: M5238P (XA013001) OP AMP.
   - IC327: DSC (XI435A00) EPROM
   - IC328: LC3664RL-12 (XG517A00) SRAM 64K
   - IC329: SN74HCU04N (IG142250) INVERTER
   - IC330: TBP28L22N-00 (XG962A00) BPROM 256K
   - IC331: SN74HC174N (IR017450) D-FF
   - IC333: SN74HC367N (IR036750) BUS DRIVER
   - LPF101～103: LP20C9B6 (XC561001) ACTIVE LPF
2. Photo Coupler
   - PC301: PC-900V (VG181900)
3. Transistor
   - Q101,103,105,106,309: 2SA1015 Y (IA101521)
   - Q102,104,301～304, 308,310: 2SC1815 Y (IC181520)
   - Q305～307,314: 2SA673A C,D (IA067310)
   - Q311～313: 2SC1213A C,D (IC121310)
4. Transistor Array
   - IC310: BA6212 (VF074800)
   - IC316: TD62506P (IG138700)
5. Diode
   - D101,102,109,110,301, 302: 1SS133 (IF003450)
   - D103～108,111～113: 11ES4 (VB481900)
6. Zener Diode
   - ZD101,102: MTZ4.7C 4.7V (IF010670)
   - ZD103,104: RD5.6EB2 5.6V (IF005600)
7. Monolithic Cera. Cap.
   - C118,121,123: 0.1μ 25V Z (VA762200)
   - C131～142: 1.5μ 25V Z (VD534400)
8. Semiconductive Cera. Cap. (44pcs): 0.1μ 16V M (VD534400)
9. Electrolytic Cap.
   - C315: 470μ 10V (UJ828470)
10. Trimmer Potentiometer
    - VR101: B10K (VA024800) A/D Gain adj.
    - VR102～104: B100K (HT560100) MSB adj.
11. Resistor Array
    - RM301,309: RMLS4 J 103 (VA822600)
    - RM302～308,310～312: RMLS8 J 103 (HZ004730)

12. Metal Film Resistor
    - R101: 68KΩ 1/6W F (VC826900)
    - R102,158,165,177,184, 186,203: 22KΩ 1/6W F (VC825700)
    - R103,104: 12KΩ 1/6W F (VC825100)
    - R105,106: 8.2KΩ 1/6W F (VC824700)
    - R112: 2KΩ 1/6W F (VC823200)
    - R113,114: 4.3KΩ 1/6W F (VC824000)
    - R118: 27KΩ 1/6W F (VC825900)
    - R126: 3.3KΩ 1/6W F (VC823700)
    - R134,139,143: 200KΩ 1/6W F (VC828000)
    - R136,141,145: 470KΩ 1/6W F (VC828900)
    - R150,169,188: 7.5KΩ 1/6W F (VC824600)
    - R151,170,189: 16KΩ 1/6W F (VC825400)
    - R153,154,172,173,191, 192: 1KΩ 1/6W F (VC822500)
    - R156,175,194: 430Ω 1/6W F (VC821600)
    - R159,166,178,185,197, 204: 75Ω 1/8W F (VC819600)
    - R160,161,179,180,198, 199: 24KΩ 1/6W F (VC825800)
    - R340: 2.4KΩ 1/6W F (VC823400)
    - R342: 1.5KΩ 1/6W F (VC822900)
    - R346: 910Ω 1/6W F (VC822400)
    - Others (23pcs): 10KΩ 1/6W F (VC824900)
13. Metal Oxide Film Resistor
    - R147,148,215: 150Ω 2W J (VC773700)
14. Solid Resister
    - R347: 10MΩ 1/4W K (HI209990)
15. Coil
    - L101～106,301～305: 20μH FL5R200QNT (VB835000)
16. EMI Filter
    - EMI 101,102,301～305: LS MT Y223NB (FZ006970)
    - EMI 306,307: NFV610-655T2A (VH227800)
17. Ceramic Resonator
    - X301: 4MHz CSA4.00MG (QU004800)
    - X302: 12.8MHz (VI575700)
18. Quartz Crystal Unit
    - X302: 12.8MHz AT-49 (VJ574400)
19. Slide Switch
    - SW301: SSSU12 2/3(NSI) (VI575400) MODE
20. Relay
    - RY101～103: DC12V RY12W (KC001900)
21. XLB Connector
    - JK101: XLB-3-31PCV (VI443700) INPUT
    - JK102～104: XLB-3-32PCV (VI579600) OUTPUT (SLF,LF,HF)
22. DIN Jack
    - DN301,302: 5P SK0266×2 (VF342200) MIDI (IN,OUT)
23. D-SUB Connector
    - CN307: DELC-J9SAF-10L9 9P (VI576000) REMOTE
24. Lithium Battery
    - B301: SONY/CR2032 (VE338400)

*** IC114, IC115 installation**

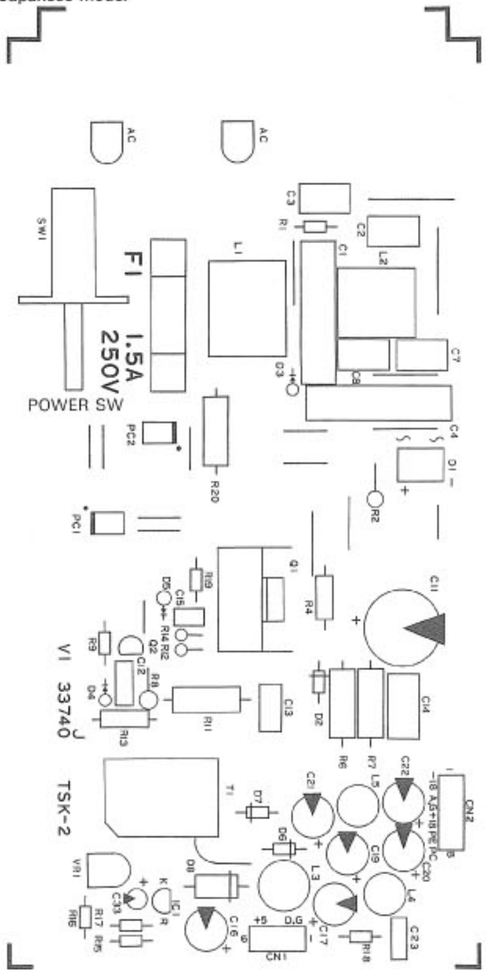


*** X302 installation**



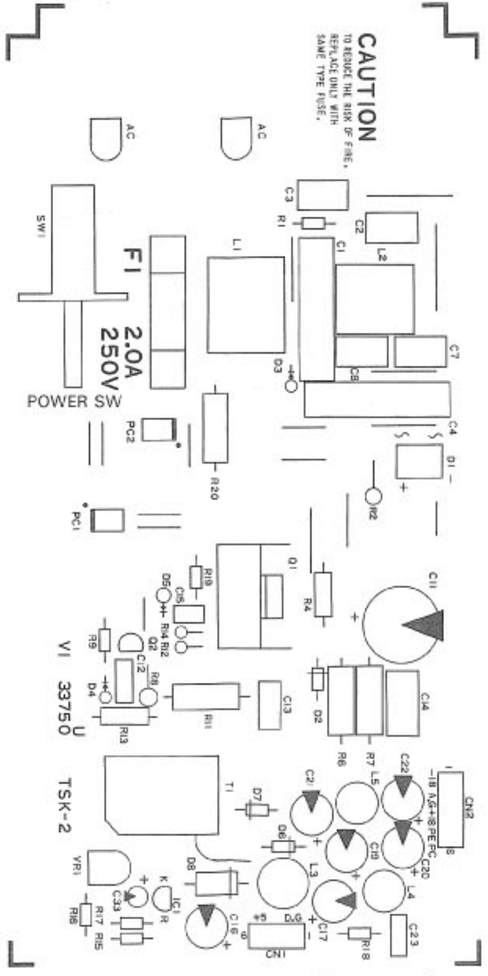
• Power Supply Unit

Japanese model



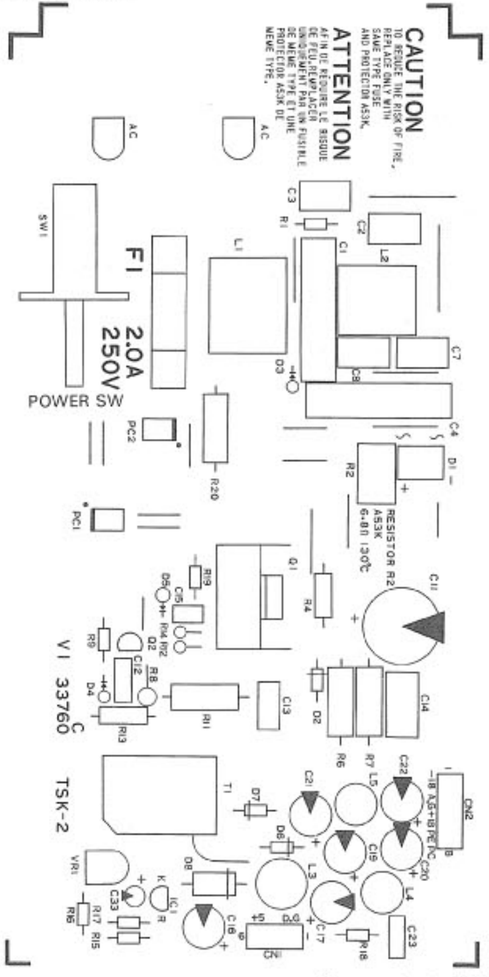
Components side (部品側)

U.S.model



Components side (部品側)

Canadian model



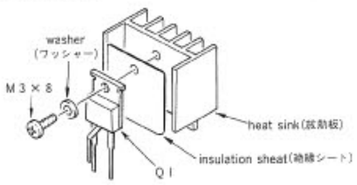
Components side (部品側)

Notes)

Power Supply Unit: (VI337400) J / (VI337500) U / (VI337600) C

1. IC
   IC 1: μPC1093J (IX802360) REGULATOR
2. Photo Coupler
   PC 1,2: PC817 (IK000480)
3. Transistor
   Q 2: 2SC2655 (IX552940)
4. FET
   Q 1: 2SK1153 (IX803780)
5. Diode
   D 2: 10DF6 (IX802390)
   D 3: 1SS1555 (IF000040)
   D 4: 1SS84 (IF001380)
   D 6,7: 11DQ06 (IH001530)
   D 8: 31DQ04 (IX802410)
6. Zener Diode
   D 5: RD12E (IF006500)
7. Diode Stack
   D 1: S1WB40 (IX553160)
8. Flame Proof C. Resistor
   R 9,19: 470Ω 1/4W (HV455470)
   R12: 8.2KΩ 1/4W (HV456820)
   R14: 15Ω 1/4W (HV456820)
9. Metal Oxide Resistor
   R 2 (J,U only): 6.8Ω 3W (HX801450)
   R 4: 100KΩ 1W (HL318100)
   R 6,7: 33KΩ 2W (HL327330)
   R 8: 82Ω 1/2W (HX804130)
   R11: 82Ω 2W (HL324820)
   R13: 1Ω 1W (HL313100)
   R20: 100KΩ 2W (HL328100)
10. Fuse Resistor
    R 2 (C only): 6.8Ω 5W (HX801390)
11. Trimmer Potentiometer
    VR 1: RVF08P B1K (HX801400)
12. Ceramic Cap.
    C 2,3,7,8: 1000P 250V (FX800550)
    C13: 100P 1KV (FX800230)
    C14: 0.01μ 250V DE (FI324100)
    C23: 0.01μ 50V Z (FG744100)
13. Mylar Cap.
    C12: 0.22μ 50V J (UA555220)
    C15: 0.022μ 50V K (FC364220)
14. Metallized Mylar Cap.
    C 1,4: 0.1μ 250V (FZ000680)
15. Electrolytic Cap.
    C11: 100μ 200V (FX800240)
    C16,17: 1000μ 10V (FX550550)
    C19~22: 330μ 25V M (UJ448330)
16. Choke Coil
    L 1: NFR5E203A 20mH (GX800990)
    L 2: NFR6UA103 10mH (GX800980)
    L 3: FL11Z180K-35 (GX801050)
    L 4,5: FL9H470K-30 (GX802450)
17. Power Switch
    SW 1 (J): ESB8213V (KX800440)
    SW 1 (U,C): M-3-1 (KX802550)
18. Fuse
    F 1 (J): T 1.5A 250V (LX8C0920)
    F 1 (U,C): 2A 250V ST4 (LX800930)
19. Power Transformer
    T 1: TUM017A (GX802460)

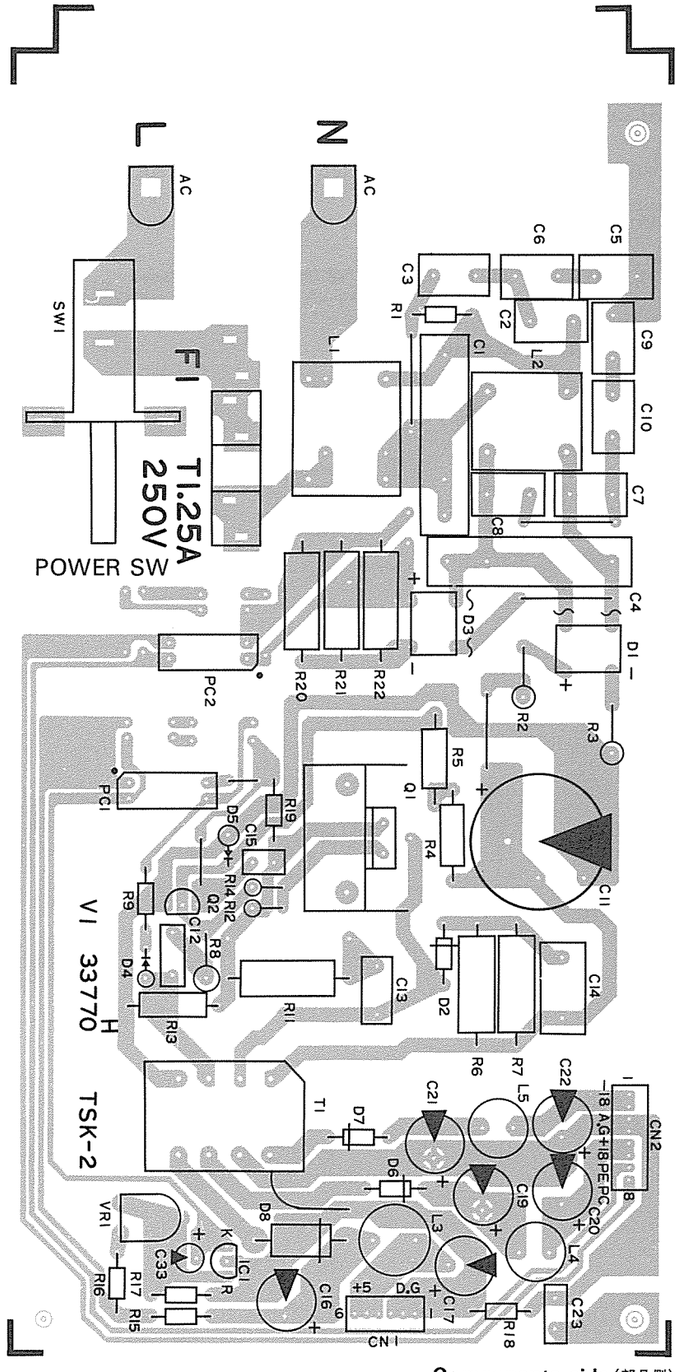
*** Q1 installation**



J: YG-4061-011
U: YG-4061-012
C: YG-4061-013

C20

North European & British models



Components side (部品側)

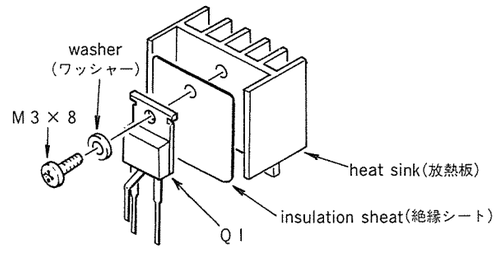
H, B: YG-4061-014

Notes)

Power Supply Unit: (VI337700) H, B

1. IC
   IC 1: μPC1093J (IX802360) REGULATOR
2. Photo Coupler
   PC 1,2: PC511 (IK000490)
3. Transistor
   Q 2: 2SC2655 (IX552940)
4. FET
   Q 1: 2SK513 (IX802380)
5. Diode
   D 2: 10DF6 (IX802390)
   D 4: 1SS84 (IF001380)
   D 6, 7: 11DQ06 (IH001530)
   D 8: 31DQ04 (IX802410)
6. Zener Diode
   D 5: RD12E (IF006500)
7. Diode Stack
   D 1,3: S1WB60 (IX553900)
8. Flame Proof C. Resistor
   R 9: 560Ω 1/4W (HJ355560)
   R12: 8.2KΩ 1/4W (HV456820)
   R14: 15Ω 1/4W (HV456820)
   R19: 5.1KΩ 1/4W (HX801380)
9. Metal Oxide Resistor
   R 2,3: 6.8Ω 3W (HX801450)
   R 4,5: 100KΩ 1W (HL318100)
   R 6,7: 68KΩ 2W (HL327680)
   R 8: 82Ω 1/2W (HX804130)
   R11: 150Ω 2W (HL325150)
   R13: 2.7Ω 1W (HL313270)
   R20~22: 100KΩ 2W (HL328100)
10. Trimmer Potentiometer
    VR 1: RVF08P B1K (HX801400)
11. Ceramic Cap.
    C 2,3,7,8: 1000P 250V (FX800550)
    C 5,6,9,10: 2200P 250V (FX551060)
    C13: 68P 2KV (FX800560)
    C14: 0.01μ 250V DE (FI324100)
    C23: 0.01μ 50V Z (FG744100)
12. Mylar Cap.
    C12: 0.22μ 50V J (UA555220)
    C15: 0.022μ 50V K (FC364220)
13. Metallized Mylar Cap.
    C 1,4: 0.1μ 250V (FZ000680)
14. Electrolytic Cap
    C11: 47μ 400V (FZ006890)
    C16,17: 1000μ 10V (FX550550)
    C19~22: 330μ 25V M (UJ448330)
15. Choke Coil
    L 1: LUMR3403 (GX801480)
    L 2: NFR6UA103 10mH (GX800980)
    L 3: FL11Z180K-35 (GX801060)
    L 4, 5: FL9H470K-30 (GX802450)
16. Power Switch
    SW 1: MM-13-1 (KX802560)
17. Fuse
    F 1: 1.25A 250V EAK (LX800940)
18. Power Transformer
    T 1: TMA025 (GX800810)

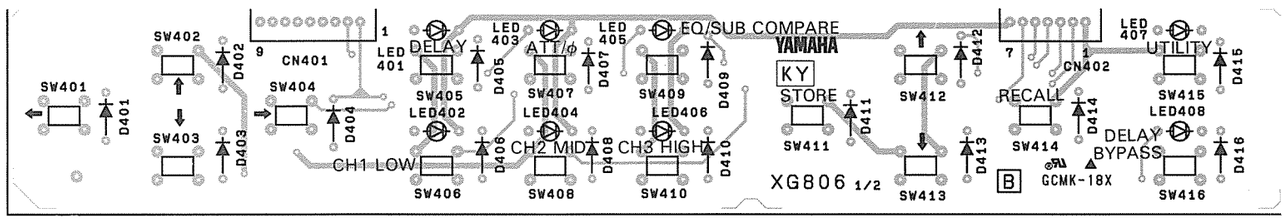
*** Q1 installation**



C20

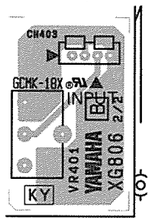
● KY Circuit Boards

KY 1/2



Components side(部品側)

KY 2/2



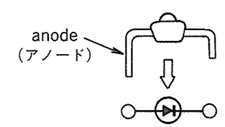
Components side
(部品側)

Notes)

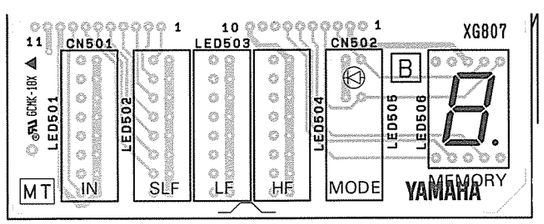
Circuit Board: KY (VI578900) XG806B0

1. Diode
   D401～416: 1SS133 (IF003450)
2. LED
   LED401～408: GL1HD212 RE (VG149600) Switch LEDs
3. Variable Resistor
   VR401: A10K EWH-14A (VA757600) INPUT level
4. Push Switch
   SW401～416: EVQ-QSL04M (VB799000) Function keys

*** LED401～408 installation**



● MT Circuit Board



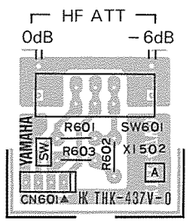
Components side(部品側)

Notes)

Circuit Board: MT (VI579000) XG807B0

1. LED Display
   LED501～504: SX-25J (VA039100) Level meters
   LED505: LN516RK (VI575100) Mode indicator
   LED506: SX-25Y GR 7seg. (VI697200) MEMORY

● SW Circuit Board



Components side(部品側)

Notes)

Circuit Board: SW (VK194000) XI502A0

1. Metal Film Resistor
   R601: 2KΩ 1/6W F (VC836100)
   R602: 2.2KΩ 1/6W F (VC836200)
   R603: 430Ω 1/6W F (VC833600)
2. Slide Switch
   SW601: SSSU12 (VG502300) HF ATT(0dB/−6dB)

KY: 3NA-VI57890 ⚠0
MT: 3NA-VI57900 ⚠0
SW: 3NA-VK19400

TEST PROGRAM（テストプログラム）

• **Precaution**

1. Remove all devices connected to the DDL3. When the test is initiated, the DELAY TIME of DSP chip is set to 0msec. and signal bypasses the DEQ chip.
2. After the system has entered the test program mode, the ROM, ACIA and Battery checks will be performed automatically. If these checks are OK, the LCD will indicate ''TEST BATT. OK'' message.
3. Select a test number by using the following procedure.
   Pressing the ''⇧''(MEMORY up) key will increase the test-number, and pressing the ''⇩''(MEMORY down) key will decrease it. Press the RECALL key to initiate the test.

• **Test Entry**

While pressing the DELAY and UTILITY keys, turn on the POWER switch.

• **Exit**

1. If the test 7 is activated after completion of tests 1 through 6, normal operation will be restored. Without completion of tests 1 through 6, the test 7 is initiated, ''CHECK NOT END'' message will appear. The test number that have been performed will be indicated by the following LED indicators:
   Test 1: DELAY
   Test 2: COMP
   Test 3: EQ
   Test 4: SLF
   Test 5: LF
   Test 6: HF
2. If the test 21(L) is activated, normal operation will be restored regardless of completion of tests.

● **準　　備**

1．テストプログラム起動時は、入力信号がダイレクトに出力端子に出力されるため、出力端子に通常使用機器を接続したまま行なわないこと。

2．テストプログラム起動時に、ROMのチェックサム、LSIの制御回線のチェック、バッテリーチェックを自動的に行なう。
テスト終了後、“TEST BATT. OK”を表示する。

3．テストプログラムモードに入ったら、メモリー・アップとメモリー・ダウンキーでテストナンバーを選択し、RECALLキーを押してプログラムを実行する。

4．テストプログラム起動時、DSP-LSIはDELAY＝0 ms, DEQ-LSIはバイパス状態にセットされ信号が出力される。

● **テストプログラムの起動方法**

DELAYキーとUTILITYキーを押しながら、POWER ONする。

● **EXIT**

1．テストプログラム１－６まで行い、初期設定までの項目が終了すると、テスト７を実行することにより通常モードに戻ることができる。
チェックが終了していない場合は、LCDに“CHECK NOT END”を表示する。
なお、テストプログラム１－６までは各シーケンスが終了すると、対応するLEDが点灯する。各シーケンスとLEDの対応は、

＃１：“DELAY”
＃２：“COMP”
＃３：“EQ”
＃４：“SLF”
＃５：“LF”
＃６：“HF”

となる。

2．テストプログラム１－６まで終了していない場合でも、テスト21(L)を実行することにより通常モードに戻ることができる。

1. TEST 1: LCD Check

1-1. Select test number 1, and press the RECALL key to initiate the test.

1-2. All dots of LCD are turned ON and OFF five times and then the TEST END message will appear on the LCD.

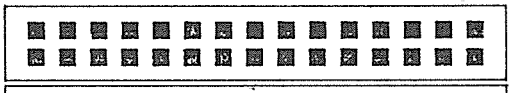
1-3. Verify the proper lighting of all dots on the LCD.

1．テスト1：LCD表示器の動作チェック

1-1. テストナンバー1を選択し、RECALLキーを押してテストを実行する。

1-2. LCD表示器が5回点滅した後、下図の様に変化する。

1-3. 目視により確認する。



```
  DIAGNOSIS  V1.0
TEST  LCD      END
```

2. TEST 2: LED Check

2-1. Select test-number 2, and press the RECALL key to initiate the test.

2-2. The 7-segments LED will indicate figure of ''0'' to ''5'' in sequence.

2-3. The LOCK OUT of MODE section will light and then PROTECT will light.

2-4. The switch LED indicators will light one after another in sequence.

2-5. All of LED indicators and segments will simultaneously light ON and then OFF, and the MEMORY number display will show ''2''. During this test, the LEVEL meter LED will remain OFF.

2-6. Verify proper lighting of all LED indicators and segments, and advance the program to next test.

2．テスト2：LED点灯チェック

2-1. テストナンバー2を選択し、RECALLキーを押してテストを実行する。

2-2. メモリーLEDが、0、1 …… 5と順次点灯する。

2-3. モードLEDが、LOCK OUT, PROTECTと順次点灯する。

2-4. キー内LEDが順次点灯する。

2-5. レベルメーターを除く全LTDが点灯する。その後LEDが消灯し、メモリーLEDが"2"を表示して停止する。

2-6. LEDがすべて点灯するかを目視により確認する。

3. TEST 3: Panel Switch Check

3-1. Select test number 3, and press the RECALL key to initiate the test.

3-2. The switch name ''LFT'' (Cursor left) will appear on the LCD as shown below.

3．テスト3：スイッチ動作の確認

3-1. テストナンバー3を選択し、RECALLキーを押してテストを実行する。

3-2. LCDに次の表示がでる。

```
  DIAGNOSIS  V1.0
TEST  SWITCH  LFT
```

3-3. Press the key of which the name is indicated on the LCD. Pressing the correct key can advance the program.

3-4. When these switch tests have been completed successfully, the message "OK" will appear on the LCD.

3-3. "カーソル←"キーを押すと、"LFT"のブリンクが"PUP"になる。

3-4. "パラメーター↑"キーを押すと、"PUP"のブリンクが"PDN"になる。以降、同じ様にスイッチを順番に押していき、最後に"MUTE"キーを押すと次の表示になる。

```
  DIAGNOSIS  V1.0
TEST  SWITCH    OK
```

3-5. If an incorrect key is pressed, the routine cannot proceed to the next switch test. Press the RECALL key to initiate this test again.

3-5. 途中で、キーを押す順番をまちがえた場合は、"RECALL" を押してからチェックを再開する。

4. TEST 4: REMOTE Terminal Check

4-1. Connect pins 6, 7, 8 and 9 of REMOTE terminal to ground.
4-2. Select test number 4, and press the RECALL key to initiate the test.
4-3. If the result of test is OK, "OK" will be shown on the LCD.

4．テスト4：リモート端子の動作チェック

4-1. リモート端子(CN307)の6、7、8、9ピンのデーターが、正常に受け取られるかをチェックする。
4-2. テストナンバー4を選択し、RECALLキーを押してテストを実行する。
4-3. リモート端子(CN307)の6、7、8、9ピンをすべてGNDに接続すると、次の表示になる。

```
DIAGNOSIS  V1.0
TEST  D-SUB     OK
```

5. TEST 5: MIDI Check

5-1. Connect the MIDI IN jack to the MIDI OUT via a MIDI cable.
5-2. Select test number 5, and press the RECALL key to initiate the test.
5-3. The results of test will be displayed on the LCD. When the test is OK, the LCD will display the message shown below.

5．テスト5：MIDI入出力チェック

5-1. MIDI IN, MIDI OUT端子をMIDIケーブルで接続すること。
5-2. テストナンバー5を選択し、RECALLキーを押してテストを実行する。
5-3. チェック結果がOKの時は、次のようにLCDに表示される。

```
DIAGNOSIS  V1.0
TEST  MIDI      OK
```

If the output data from the MIDI OUT doesn't return to CPU chip through the MIDI IN, or if the received data at CPU is not correct, the LCD will display the following message.

MIDI OUT端子に出力した信号が、MIDI IN端子を経由してCPUに戻ってこない時、あるいは、戻ってきた信号が正常でない時は、次のようにLCDに表示される。

```
DIAGNOSIS  V1.0
TEST  MIDI      NG
```

6. TEST 6: Initialization

6-1. Select test number 6, and press the RECALL key to initiate the test. The LCD will display the RAM INITIALIZE message.

6．テスト6：メモリーデーター等の初期設定

6-1. テストナンバー6を選択し、RECALLキーを押してテストを実行する。

```
DIAGNOSIS  V1.0
RAM  INITIALIZE?
```

6-2. If the STORE key is pressed, memorized data (utility data and etc.) will be initialized and the following message will be displayed.

6-2. STOREキーを押すと、LCDに次の表示がでてメモリーデーター、ユーティリティーデーター等の初期設定を行なう。

```
DIAGNOSIS  V1.0
SET  INITIALIZE
```

7. TEST 7: Exit
Refer to EXIT.

8. TESTS 8—12: DRAM Check

8-1. Select test number 8, and press the RECALL key to initiate the test. The following message is then displayed on the LCD.

```
D I A G N O S I S   V 1 . 0
T E S T   D R A M     * * *
```

8-2. Attach an amplifier/speaker system to the OUTPUT connector.

8-3. Execute TESTS 8 through 12 (c) in sequence to check to see if deterioration of the sound quality exist due to a bad or faulty DRAM IC.

TEST	DRAM IC no. MSB			LSB	MESSAGE AT ***
8	IC306	IC305	IC304	IC303	THR
9	IC305	IC304	IC303	IC302	04B
10	IC304	IC303	IC302	0000	08B
11	IC303	IC302	0000	0000	12B
12	IC302	0000	0000	0000	16B

9. TEST 13: DEQ Chip Check

9-1. Select test-number 13 (d), and press the RECALL key to initiate the test. The LCD will indicate TEST 13 entry by displaying the message shown below.

```
D I A G N O S I S   V 1 . 0
T E S T   D E Q
```

9-2. Verify the frequency characteristics of the OUTPUT connector as shown below.

7．テスト7：EXIT
EXITの項目参照。

8．テスト8－12：D-RAMチェック

8-1. テストナンバー8を選択し、RECALLキーを押してテストを実行する。

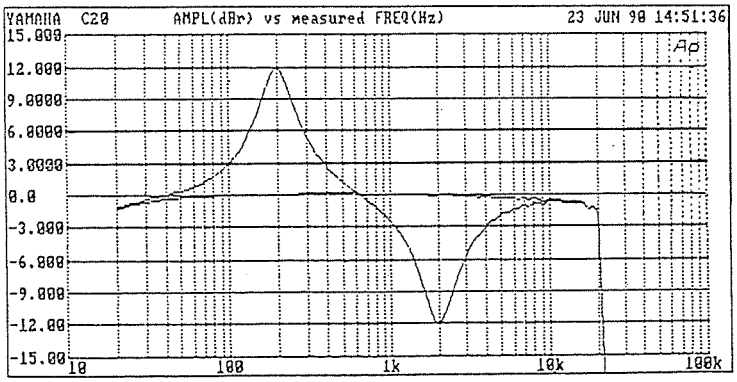
8-2. OUTPUT端子にアンプとスピーカを接続する。

8-3. テスト8～12を順次実行し、下表の様に信号の分解能を落して出力し、出力信号をモニターして不良のD-RAMをみつける。

9．テスト13：DEQ-LSIのチェック

9-1. テストナンバー13(d)を選択し、RECALLキーを押してテストを実行する。

9-2. 周波数特性を測定し、DEQ-LSIが正常かどうかチェックする。



TEST PROGRAM DEQ LSI FREQUENCY RESPONSE

10. TEST 14: AD Check

10-1. Select test-number 14 (E), and press the RECALL key to initiate the test.

10-2. When a signal of −20dBm, 100Hz is applied to the INPUT, output signals of 0 ±1.5dB will be obtained at the SLF, LF, HF. If the input signal level is increased within +0.5±1.5 dBm, a clipped signal will be obtained at the outputs.

10. テスト14：A/Dチェック

10-1. テストナンバー14(E)を選択し、RECALLキーを押してテストを実行する。

10-2. 入力端子INPUT(JK101)より、−20dBm/100Hzの入力信号を印加した時、出力端子OUTPUT SLF, LF, HF(JK102−JK104)には−10±1.5dBmの出力信号が得られること。また、入力信号を徐々に上げていき、JK102−JK104のいずれかの出力端子を監視する。出力信号が、+0.5±1.5dBmの範囲内で、出力信号にクリップ波形が現れることを確認する。(クリップ波形は、歪率計をモニターするのが望ましい。)

11. TEST 15: MODE Switch Check

11-1. Select test-number 15 (F), and press the RECALL key to initiate the test.

11-2. Then the LCD will show a switch name and the underline cursor will indicate which slide switch to set as shown below.

11. テスト15：リアパネル部スライドスイッチの動作チェック

11-1. テストナンバー15(F)を選択し、RECALLキーを押してテストを実行する。

11-2. “MODE SW.”の接点の位置をLCD内のカーソルにて表示する。

```
  D I A G N O S I S   V 1 . 0
T E S T   S − S W   L / P / V
```

L: LOCK OUT P: PROTECT V: VARIABLE

12. TEST 16−18: KEY and LED Port Check

TEST 16(G) through 18 (I) are utilized by the for shipping inspection purposes, these checks are not intended for field service use.

12. テスト16−18：KEY、LEDポートチェック

このテストは、工場出荷検査用のチェックですので、ここでは実行しません。

13. TEST 19: DAC Adjustment 1 (MSB)

13-1. Select test-number 19 (J), and press the RECALL key to initiate the test.

13-2. Attach an amplifier/speaker system to the OUTPUT.

13-3. Sine wave signals of approximately −60dBm, 500Hz are obtained at the OUTPUT SLF, LF and HF connectors.
Monitor each outputs with an amplifier and a distortion meter and adjust VR102 for SLF, VR103 for LF and VR104 for HF so that minimum distortion waveform is achieved.

13. テスト19：D/AコンバーターのMSB調整1

13-1. テストナンバー19(J)を選択し、RECALLキーを押してテストを実行する。

13-2. INPUT端子よりの入力信号に関係なくDSP-LSI内で正弦波を発生し、各出力端子より、約−60dBm / 500Hzの信号が出力されるので、その出力信号を低歪率アンプに通して歪率計に接続する。アンプの出力信号と歪率計の歪波形をモニターし、ゼロクロスの歪波形が最小となり、最も波形のつながりの良い位置に調整ボリュームVR102(SLF), VR103(LF),VR104(HF)を調整する。

14. TEST 20: DAC Adjustment 2 (MSB—fine adj.)

14-1. Select test number 20 (K), and press the RECALL key to initiate the test.

14-2 When the INPUT is opened, the noise levels of the SLF, LF and HF OUTPUT connectors should be minimized by adjusting VR102, VR103 and VR104.
(VR102: SLF, VR103: LF, VR104: HF)

14．テスト20：D/AコンバーターのMSB調整2(微調整)

14-1．テストナンバー20(K)を選択し、RECALLキーを押してテストを実行する。

14-2．無信号時のノイズレベルが最小になるように、VR102(SLF)、VR103(LF)、VR104(HF)、を調整する。
この時、すでにテスト19で一度調整されているので、ここでは少しだけ動かして最小ポイントに調整すること。

INSPECTIONS（検査）

1. Control and Switch Settings

1-1. Unless otherwise specified, the control and switches are to be set as follows;

INPUT level control:	MAX.
MODE switch:	VARIABLE
HF ATT switch:	0dB

1-2. The output loads of each OUTPUT SLF, LF and HF connector pin2 and pin3 are to be terminated by a 600 ohm load resistor.

1-3. Disconnect all devices connected to the C20.

1-4. Initiate the TEST PROGRAM.

2. Measuring Instrunments

2-1. Prepare the follwing: AF signal generator, AC voltmeter, distortion meter, and an oscilloscope.

2-2. For the distortion mesurement, a low-pass filter with a cut-off frequency of 80kHz and −6dB/oct must be used.

2-3. For the noise level mesurement, a low-pass filter with a cut-off frequency of 12.7kHz and −6dB/oct must be used.

2-4. The output impedance of the AF signal generator must be less than 600ohms.

2-5. The input impedance of the mesuring instruments must be over 1Megaohm.

3. Inspection

3-1. Gain

When a signal of −10dBm, 100Hz is applied to the INPUT connector, an output signal of 0±1.5dBm is to be obtained at each OUTPUT (SLF, LF and HF) connectors.

When the HF ATT switch is turned to −6dB, an output signal of −6±1.5dBm should be obtained at the HF OUTPUT connector. (After inspection, set the HF ATT switch to 0dB.)

3-2. Frequency Characteristics

When a signal of approximately −10dBm is applied to the INPUT connector, the frequency characteristics of each OUTPUT (SLF, LF and HF) should be within the range listed in the table below. The reference frequency used is 1kHz.

20Hz — 5kHz	±1.0dB
6kHz — 20kHz	+2, −3dB
23kHz —	less than −10dB

3-3. Distortion Factor

When a signal of 1kHz is applied to the INPUT connector, and adjust the INPUT level control so that the output signal of +10dBm should be obtained at each OUTPUT (SLF, LF and HF) connector with a distortion factor of less than 0.03%.

1．準　備

1-1. フロント及びリアパネルのボリューム及びスイッチは、特に指定の無い限り下記の状態とする。

INPUT VOL. ……MAX

MODE SW. ……VARIABLE

HF ATT SW. ……0dB

1-2. 出力端子OUTPUT SLF、LF、HF(JK102-JK104)の2－3ピン間に、600Ωの負荷抵抗を接続する。

1-3. テストプログラムを起動する。

2．測 定 器

2-1. 歪率測定時は80kHz、−6dB/OCTのローパスフィルターを使用すること。

2-2. ノイズレベル測定時は12.7kHz、−6dB/OCTのローパスフィルターを使用すること。

2-3. 発信器の出力インピーダンスは、600Ω以下のこと。

2-4. 測定器の入力インピーダンスは、1MΩ以上のこと。

3．検　査

3-1. 利得

入力端子INPUT(JK101)より−10dBm/100Hzの入力信号を印加した時、OUTPUT SLF、LF、HF(JK102-JK104)の各出力端子には、0±1.5dBmの出力信号が得られること。

HF ATT SW.を−6dB側にした場合、HF(JK104)端子には−6±1.5dBmの出力信号が得られること。

測定後、HF ATT SW.は 0dB側に戻すこと。

3-2. 周波数特性

入力端子INPUT(JK101)より−10dBm前後の信号を入力した時、OUTPUT SLF、LF、HF(JK102-JK104)の各出力端子の周波数特性は、1kHzを基準として下記の範囲内のこと。

20Hz − 5kHz	±1.0dB
6kHz −20kHz	+2、-3dB
23kHz −	-10dB以下

3-3. 歪率

入力端子INPUT(JK101)より、1kHzの入力信号を印加して、出力端子OUTPUT SLF、LF、HF(JK102-JK104)の出力レベルが+10dBmの時の歪率は、0.03%以内のこと。

3-4. Maximum Output
When a signal of 100Hz is applied to the INPUT connector and the INPUT level control is adjusted so that an output signal of +17.5dBm is obtained at each OUTPUT (SLF, LF and HF) connector, the distortion factor should be less than 3%.

3-5. Noise Level
When the INPUT is opened, the noise levels of the SLF, LF and HF OUTPUTS should be less than −82.5dBm.
It should be noted that this adjustment must be performed approximately three seconds after POWER switch is turned ON. If noise levels are not within rated level, perform the DAC(MSB) adjustment using test programs 19 and 20.

3-6. Meter Sensitivity
When an input signal of +10dBm, 1kHz is applied the to INPUT connector, the CLIP through −42 LEDs of the level meters (IN, SLF, LF and HF) will all be lit. When the input signal level is adjusted to +5dBm, the CLIP will turn off. Next, adjust the input signal level to −6, −12 and so on to verify their readings. Finally if an input signal of −37dBm is applied, all LEDs should be OFF.

4. Initialization

4-1. While pressing the DELAY and MUTE keys, turn on the POWER switch, RAM initialization will be performed.

4-2. Set control and switches as follows;

INPUT level control:	MIN.
MODE switch:	LOCK OUT
HF ATT switch:	−6dB
POWER switch:	OFF

3-4. 最大出力
入力端子INPUT(JK101)に100Hzの信号を入力し、レベルを徐々に上げていった時、OUTPUT SLF、LF、HF(JK102-JK104)の各出力端子には、+17.5dBmの出力信号が歪率3%以内で得られること。

3-5. ノイズレベル
入力端子INPUT(JK101)のプラグを外した時、OUTPUT SLF、LF、HF(JK102-JK104)の各出力端子でのノイズレベルは、−82.5dBm以下であること。
ノイズレベルの測定は、パワースイッチONした後3分程経過してから測定すること。
限度をわずかにオーバーする場合は、最大出力レベルを測定し、その値に対して−100dB以下であればOKとする。また、ノイズレベルが大きい場合は、各出力チャンネルのMSB調整ボリュームの調整具合いを確認すること。(テストプログラム 19,20 参照)

3-6. メーター感度
入力端子INPUT(JK101)に+10dBm/1kHzの信号を印加した時、レベルメーターのIN及びSLF、LF、HFは、"CLIP" ～ "-42" まですべて点灯していること。
その後、入力信号を+5dBmにした時、"CLIP" が消灯すること。
更に、−6dBステップで入力信号を下げた時、"-6", "-12" ……と順番に上から消灯していき、最後に入力信号を−37dBmにした時、すべてのLEDが消灯すること。

4．出荷時のセット

4-1. "DELAY"キーと "MUTE" キーを押してPOWER ONし、RAMイニシャライズ及びその他の初期設定すること。

4-2. ボリューム、スイッチのセット

INPUT VOL.……MIN.
MODE SW. ……LOCK OUT
HF ATT SW.……−6dB
POWER SW. ……OFF

SYSTEM CONNECTIONS

Using the C20 with the S1520S and Y20

When the C20 is to be used with the Yamaha S1520S Speaker System and Y20 Active Servo Processor, make all system connections as shown in the diagram below. Select C20 program number 1, since it has been pre-programmed for optimum operation with the S1520S and Y20.

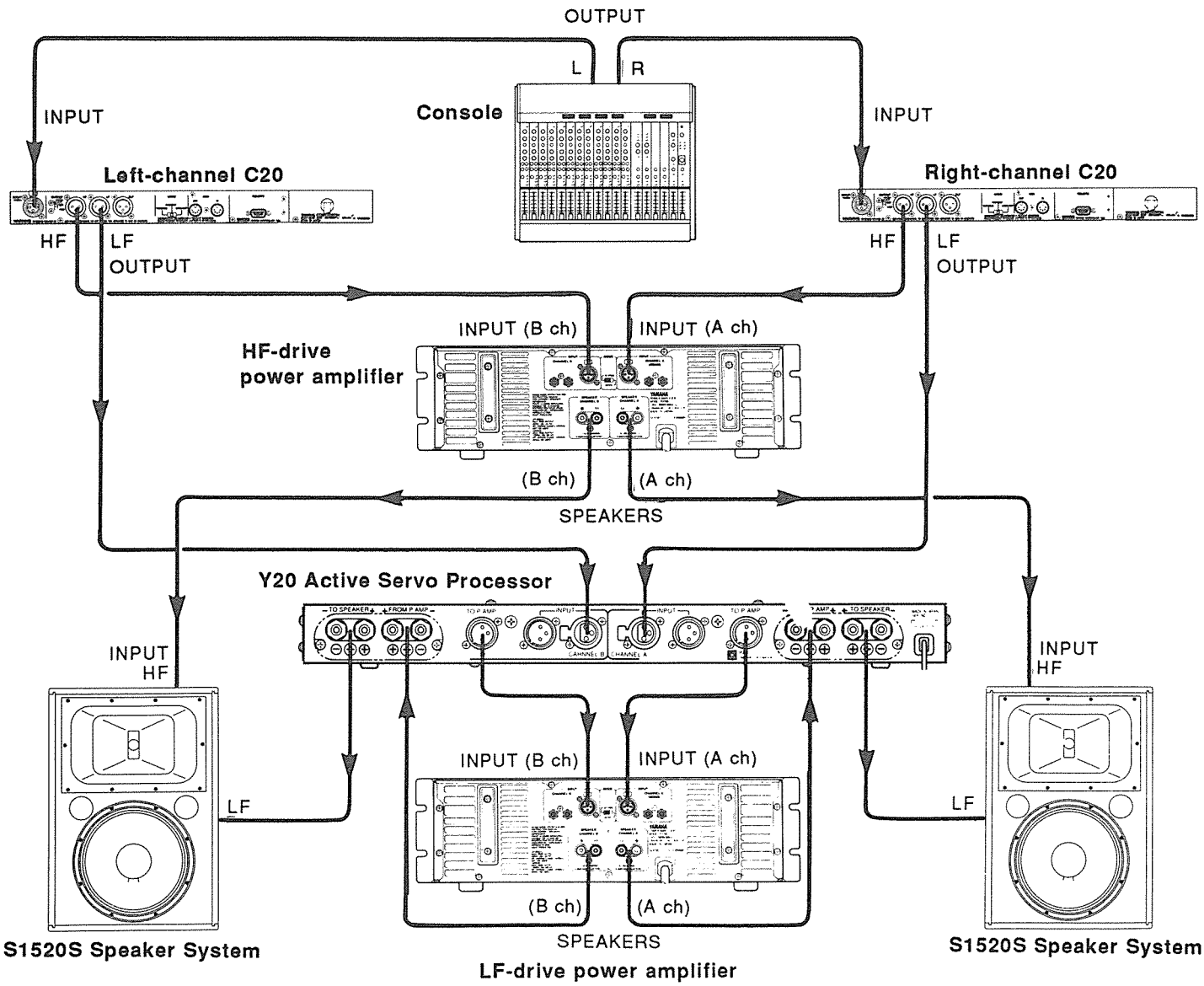
Speaker Efficiency & Level Adjustment

In a speaker system such as the S1520S which is designed for 2-way bi-amping, the HF driver is more efficient than the LF driver and therefore requires less power. In the "standard" system using the C20 (with program number 1 selected), the Y20 Active Servo Processor, and the S1520S Speaker System, the HF driver requires 10 dB less input than the LF driver. This means that if the same type of power amplifier is used for the LF and HF drivers, the gain of the HF amplifier must be reduced by 10 dB in order to deliver balanced output from the speaker system. To achieve the best possible signal-to-noise ratio, the LF gain should be adjusted by using the Y20 attenuators and the HF gain by using the C20 rear-panel HF ATT (0/–6B) switch. The C20 HF GAIN and LF GAIN parameters should only be used for fine adjustment.

● **To calculate LF and HF gain:**

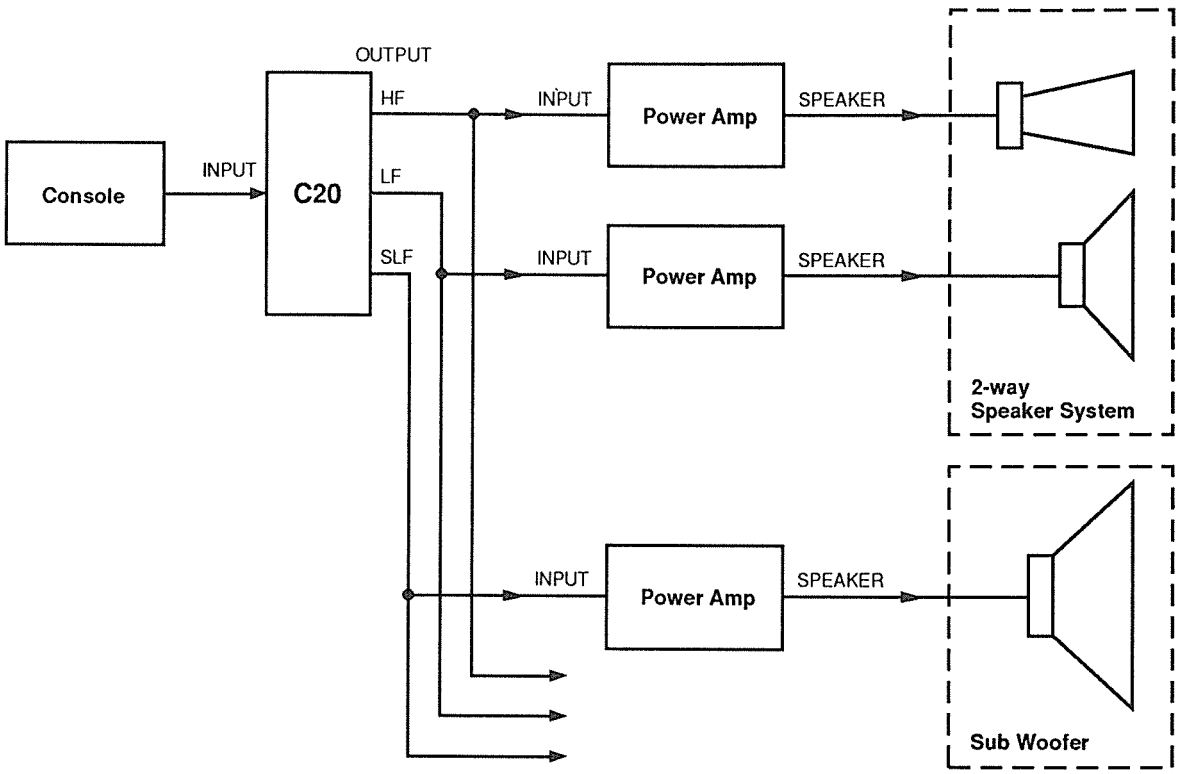
LF gain = C20 LF GAIN setting + Y20 attenuator setting + amp gain (31 dB).

HF gain = C20 HF GAIN + C20 HF ATT switch setting (0 or –6 dB) + amp gain (including attenuator settings).



Using the C20 with Other Amp & Speaker Systems

Connecting the C20 to a standard multi-amp and speaker system is fairly straightforward. Simply connect the HF, LF and SLF outputs directly to the inputs of the corresponding power amplifiers.

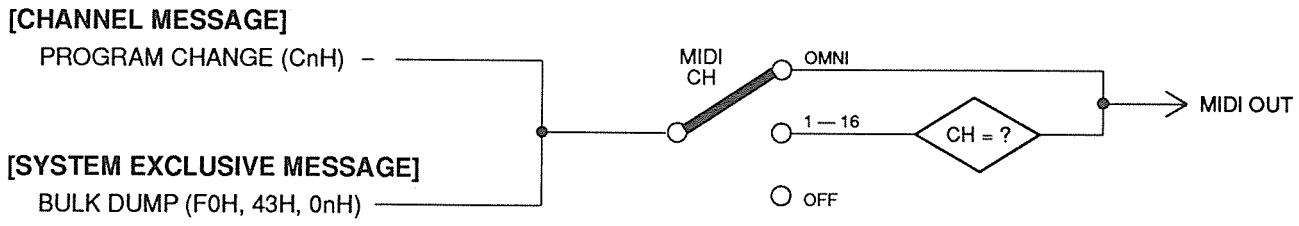


■ IMPORTANT!

- Make sure the power amplifiers are turned OFF when making connections.
- Make sure the C20 dividing filter characteristics are at least roughly set to match the characteristics of the individual speakers prior to delivering power to the system. Also make sure that the speakers are properly matched to the amplifiers used in terms of power capacity and impedance.
- The HF speaker will always require less power the LF and SLF units in a multi-amp system. If the power amplifier used has an output rating that exceeds the capacity of the HF speaker unit, be sure to carefully reduce the power level by using the amplifier's level control if available, the C20 HF channel GAIN parameter and/or the rear panel HF ATT switch.

■MDI DATA FORMAT（MIDIデータフォーマット）

1. Transmission Conditions



2. Transmission Data

2-1 Channel Information

Program Change

Transmitted whenever a program is recalled.

status	1100 nnnn(CnH)	nnnn=channel # *1
1st data	0ppp pppp	ppppppp=program # *2

2-2 System Information

Bulk Dump

The data group to be bulk dumped is selected in the utility mode bulk dump function — MEM(No.), MEM*, PGM-TBL, SYS, ALL.

• 1 Memory Bulk Data

The data in the currentl;selected memory location is transmitted.

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0000 nnnn(0nH)	nnnn=device # *3
format #	0111 1110(7EH)	Universal bulk dump
byte count	0000 0001(01H)	header and data
	0000 0100(04H)	=132bytes
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0100 1101(4DH)	"M" ; 1 memory data
	0mmm mmmm	mmm mmmm=memory # *4
	≀	
data	0000 aaaa	1st byte *5
	0000 bbbb	2nd byte
	0000 aaaa	121th byte
	0000 bbbb	122th byte
check sum	0eee eeee	*7
EOX	1111 0111(F7H)	End of exclusive

• All Memory (15) Bulk Data [MEM*]
The "1 Memory Bulk Data" described above is transmitted 15 times — once for each memory location.

• Program Change Table Bulk Data [PGM-TBL]

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0000 nnnn(0nH)	nnnn=device # *3
format #	0111 1110(7EH)	Universal bulk dump
byte count	0000 0001(01H)	header and data
	0000 1010(0AH)	=138bytes
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0101 0100(54H)	"T" Table data
	0000 0001(01H)	bank #=1
data	0mmm mmmm	1st byte *4
	0mmm mmmm	2nd byte
	≀	
	0mmm mmmm	127th byte
	0mmm mmmm	128th byte
check sum	0eee eeee	*7
EOX	1111 0111(F7H)	End of exclusive

• System Setup Bulk Data [SYS]

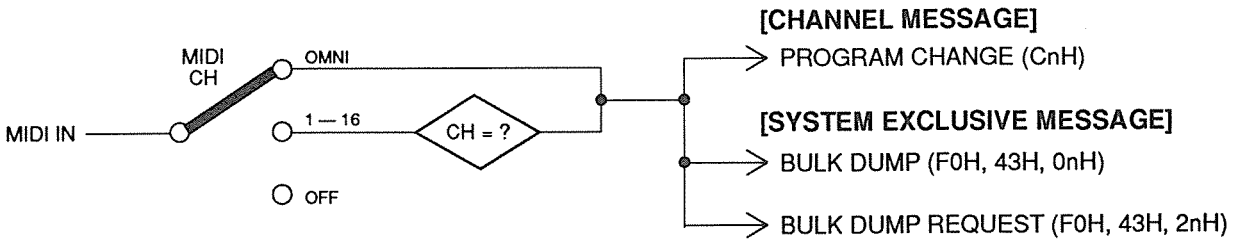
status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0000 nnnn(0nH)	nnnn=device # *3
format #	0111 1100(7CH)	Universal bulk dump
byte count	0000 0000(00H)	header and data
	0000 1111(0FH)	=15bytes
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0101 0011(53H)	"S" ; System data
version #	0vvv vvvv	version # (integer)
	0vvv vvvv	version # (decimal fraction)
data	0ddd dddd	Delay Unit data
	0ddd dddd	Peak Hold data
	0ddd dddd	MIDI Channel # data
check sum	0eee eeee	*7
EOX	1111 0111(F7H)	End of exclusive

• All Memory, Program Change Table, and System Setup Bulk Data [ALL]
The "All Memory Bulk Data," "Program Change Table Bulk Data," and "System Setup Bulk Data" transmissions described above are carried out in sequence.

Parameter Setup
Transmitted when parameter data is edited.

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0000 nnnn(0nH)	nnnn=device # *3
format #	0111 1100(7CH)	Condition setup
byte count	0000 0000(00H)	header and data
	0001 0001(11H)	=17bytes
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0101 0000(50H)	"P" ; Parameter change
	0010 0000(20H)	" "
version #	0vvv vvvv	version # (integer)
	0vvv vvvv	version # (decimal fraction)
data	0ppp pppp	parameter #
	0000 aaaa	1st data *6
	0000 bbbb	2nd data
	0000 cccc	3rd data
	0000 dddd	4th data
check sum	0eee eeee	*7
EOX	1111 0111(F7H)	End of exclusive

3. Reception Conditions



4. Reception Data

4-1 Channel Information

Program Change

The data received is the same as that described in "Program Change" in the preceding "Transmission Data" section.

4-2 System Information

Bulk Dump

• 1 Memory Bulk Data

The data received is the same as that described in "1 Memory Bulk Data" in the preceding "Transmission Data" section.

• All Memory (15) Bulk Data [MEM*]

The data received is the same as that described in "All Memory (15) Bulk Data" in the preceding "Transmission Data" section.

• Program Change Table Bulk Data [PGM-TBL]

The data received is the same as that described in "Program Change Table Bulk Data" in the preceding "Transmission Data" section.

• System Setup Bulk Data [SYS]

The data received is the same as that described in "System Setup Bulk Data" in the preceding "Transmission Data" section.

• All Memory, Program Change Table, and System Setup Bulk Data [ALL]

The data received is the same as that described in "All Memory, Program Change Table, and System Setup Bulk Data" in the preceding "Transmission Data" section.

Parameter Setup

The data received is the same as that described in "Parameter Setup" in the preceding "Transmission Data" section. The parameters of the currently selected program are changed accordingly when this data is received.

Bulk Dump Request

• Memory Data Bulk Dump Request

The data for the currently selected program is transmitted when this data is received.

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0010 nnnn(2nH)	nnnn=device # *3
format #	0111 1110(7EH)	Universal bulk dump
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0100 1101(4DH)	"M" ; 1 memory data
	0mmm mmmm	mmm mmmm=User's memory # *4
EOX	1111 0111(F7H)	End of exclusive

• Program Change Table Bulk Dump Request

Bulk transmission of the program change table data occurs when this data is received.

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0010 nnnn(2nH)	nnnn=device # *3
format #	0111 1110(7EH)	Universal bulk dump
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0101 0100(54H)	"T" ; Table data
	0000 0001(01H)	bank #=1
EOX	1111 0111(F7H)	End of exclusive

• System Setup Data Bulk Dump Request
Bulk transmission of the system setup data occurs when this data is received.

status	1111 0000(F0H)	System exclusive
ID #	0100 0011(43H)	YAMAHA
sub status	0010 nnnn(2nH)	nnnn=device # *3
format #	0111 1110(7EH)	Universal bulk dump
header	0100 1100(4CH)	"L"
	0100 1101(4DH)	"M"
	0010 0000(20H)	" "
	0010 0000(20H)	" "
	0011 1000(38H)	"8"
	0011 0111(37H)	"7"
	0011 0100(34H)	"4"
	0011 0110(36H)	"6"
	0101 0011(53H)	"S" ; Syetem data
	0010 0000(20H)	" "
EOX	1111 0111(F7H)	End of exclusive

■ NOTE

*1 nnnn=0(channel 1)~15(channel 16)
*2 ppppppp=0(program1)~127(program 128)
*3 nnnn=0(device 1)~15(device 16)
*4 mmmmmmm=1(MEM 1)~15(MEM 15)
*5 The upper and lower 4 bits of each byte are separated and transmitted as 2 bytes.
For example, the byte "aaaa bbbb" are transmitted as follows;

aaaa bbbb → 0000 aaaa
0000 bbbb

*6 1-byte and 2-byte data is separated into 4-bit groups and transmitted as 4 bytes.
For example, the two bytes "aaaa bbbb cccc dddd" are transmitted as follows:

aaaa bbbb → 0000 aaaa
0000 bbbb
cccc dddd → 0000 cccc
0000 dddd

The single byte "cccc dddd" is transmitted as follows:

0000 0000
0000 0000
cccc dddd → 0000 cccc
0000 dddd

*7 "eeeeeee" is the two's complement of the lower 7 bits of the sum of the header and data bytes.

*8 Parameter number

0	DELAY	SLF	
1		LF	
2		HF	
3		OFFSET	
4	COMP	LF	THRESHOLD
5			RATIO
6			ATTACK
7			RELEASE
8		HF	THRESHOLD
9			RATIO
10			ATTACK
11			RELEASE
12	EQ	STACKING	
13		DISTANCE	
14		ROOM CONDITION	
15	SLF	GAIN	
16		PHASE	
17		LPF	FREQUENCY
18			SLOPE
19		HPF	FREQUENCY
20			SLOPE
21	LF	GAIN	
22		PHASE	
23		LPF	FREQUENCY
24			SLOPE
25		HPF	FREQUENCY
26			SLOPE
27		PEQ	FREQUENCY
28			GAIN
29			Q
30	HF	GAIN	
31		PHASE	
32		HPF	FREQUENCY
33			SLOPE
34		PEQ	FREQUENCY
35			GAIN
36			Q
37	MUTE	SLF	
38		LF	
39		HF	

YAMAHA [System Controller]
Model C20 MIDI Implementation Chart

Date : 9/13, 1990
Version : 1.0

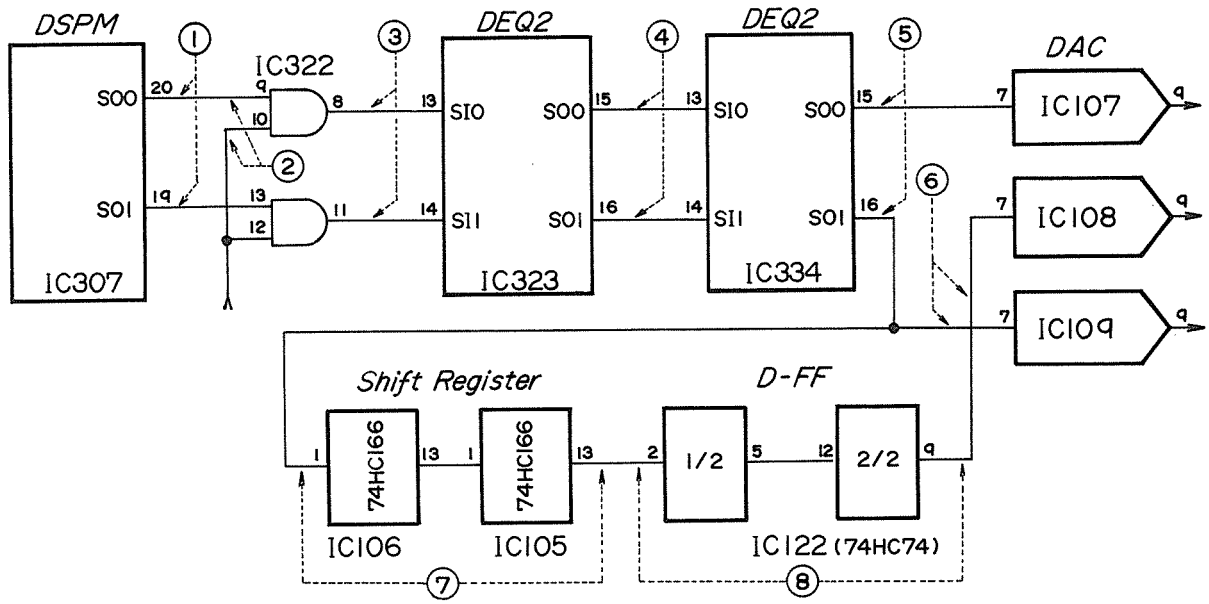
Function ...		Transmitted	Recognized	Remarks
Basic	Default	1 - 16, off	1 - 16, off	memorized
Channel	Changed	1 - 16, off	1 - 16, off	
Mode	Default	x	OMNIoff/OMNIon	memorized
	Messages	x	x	
	Altered	**********	x	
Note Number		x	x	
	True voice	**********	x	
Velocity	Note ON	x	x	
	Note OFF	x	x	
After Touch	Key's	x	x	
	Ch's	x	x	
Pitch Bender		x	x	
Control Change		x	x	
Prog Change		o 0 - 14	o 0 - 127	*1
	True #	**********		
System Exclusive		o	o	
System Common	Song Pos	x	x	
	Song Sel	x	x	
	Tune	x	x	
System Real Time	Clock	x	x	
	Commands	x	x	
Aux Mes- sages	Local ON/OFF	x	x	
	All Notes OFF	x	x	
	Active Sense	x	x	
	Reset	x	x	

Notes: *1 = For program 1 - 128, memory #1 - #F is selected.

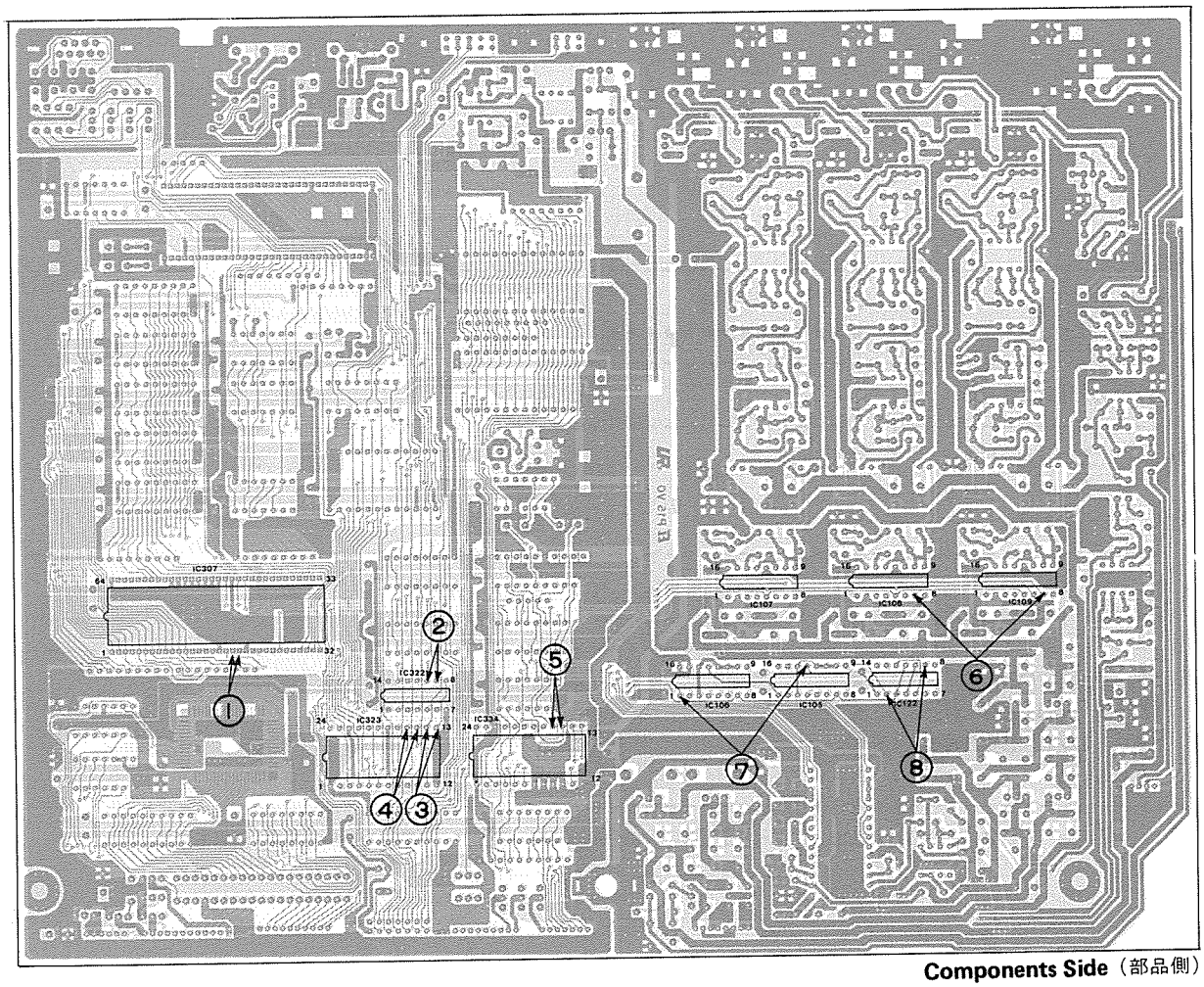
Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

● Output waveform at LSI when TEST PROGRAM 19 is executing. (refer to P30)

（テストプログラム19起動時のLSI出力波形。P30参照）

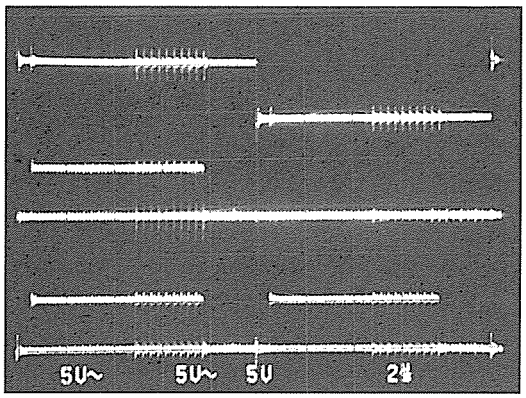


AD circuit board

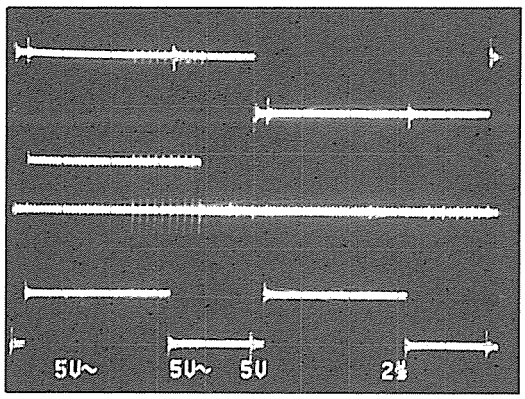


Components Side（部品側）

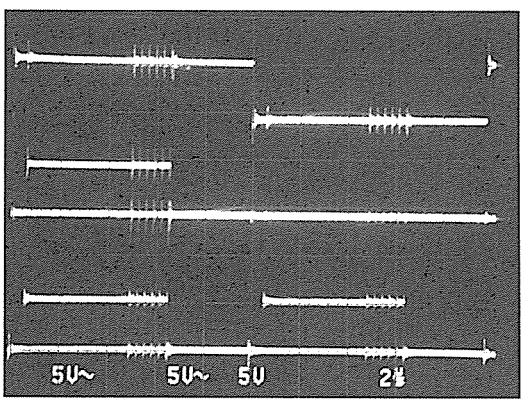
① DSPM (IC307) output
$\overline{SYNC}$ (pin 44)
SO0 (pin 20)
SO1 (pin 19)



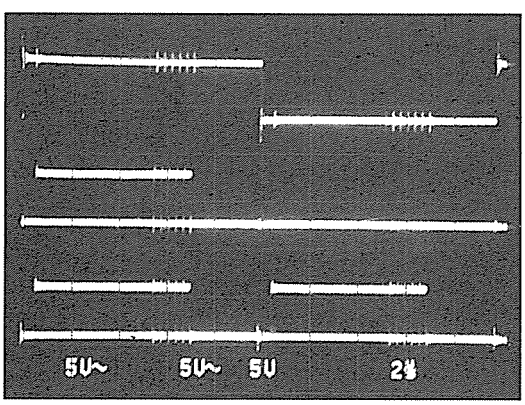
② IC322 input
$\overline{SYNC}$
pin 9
pin 10



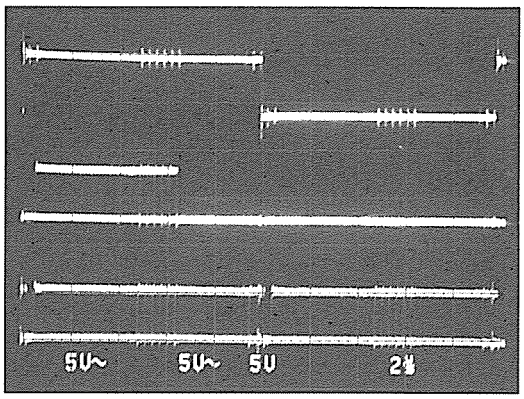
③ DEQ2 (IC323) input
$\overline{SYNC}$
SI0 (pin 13)
SI1 (pin 14)



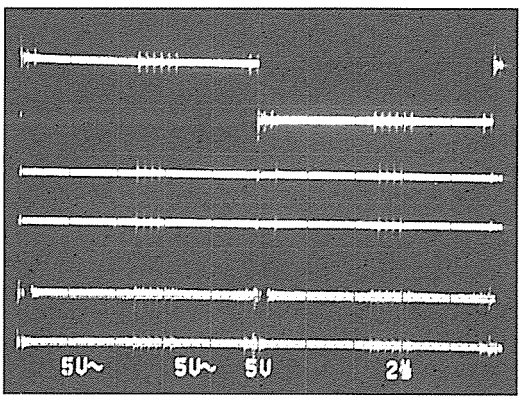
④ DEQ2 (IC323) output
$\overline{SYNC}$
SO0 (pin 15)
SO1 (pin 16)



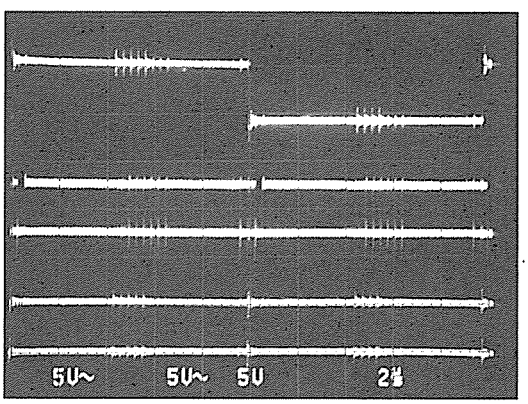
⑤ DEQ2 (IC334) output
$\overline{SYNC}$
SO0 (pin 15)
SO1 (pin 16)



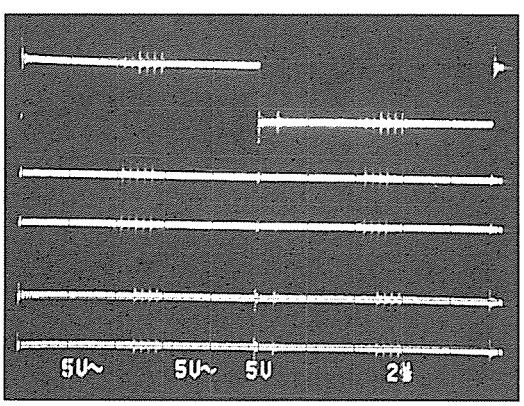
⑥ DAC input
$\overline{SYNC}$
IC108-pin 7
IC109-pin 7



⑦ Shift Register I/O
$\overline{SYNC}$
IC106-pin 1
IC105-pin 13



⑧ D-FF I/O
$\overline{SYNC}$
IC122-pin 2
IC122-pin 9



SYSTEM CONTROLLER

C20

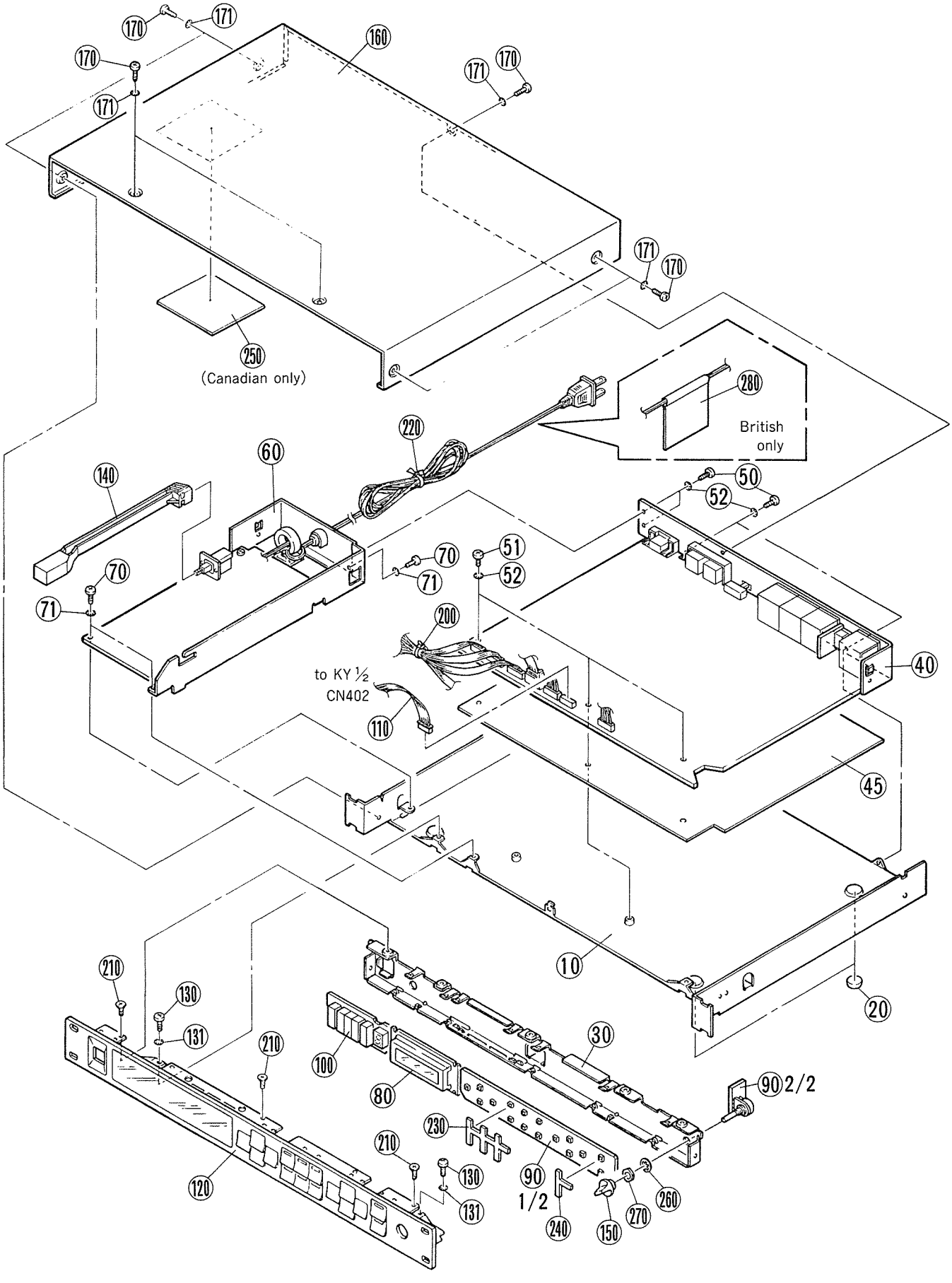
PARTS LIST

■CONTENTS（目次）

Note) DESTINATION ABBREVIATIONS

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

■OVERALL ASSEMBLY（総組立）

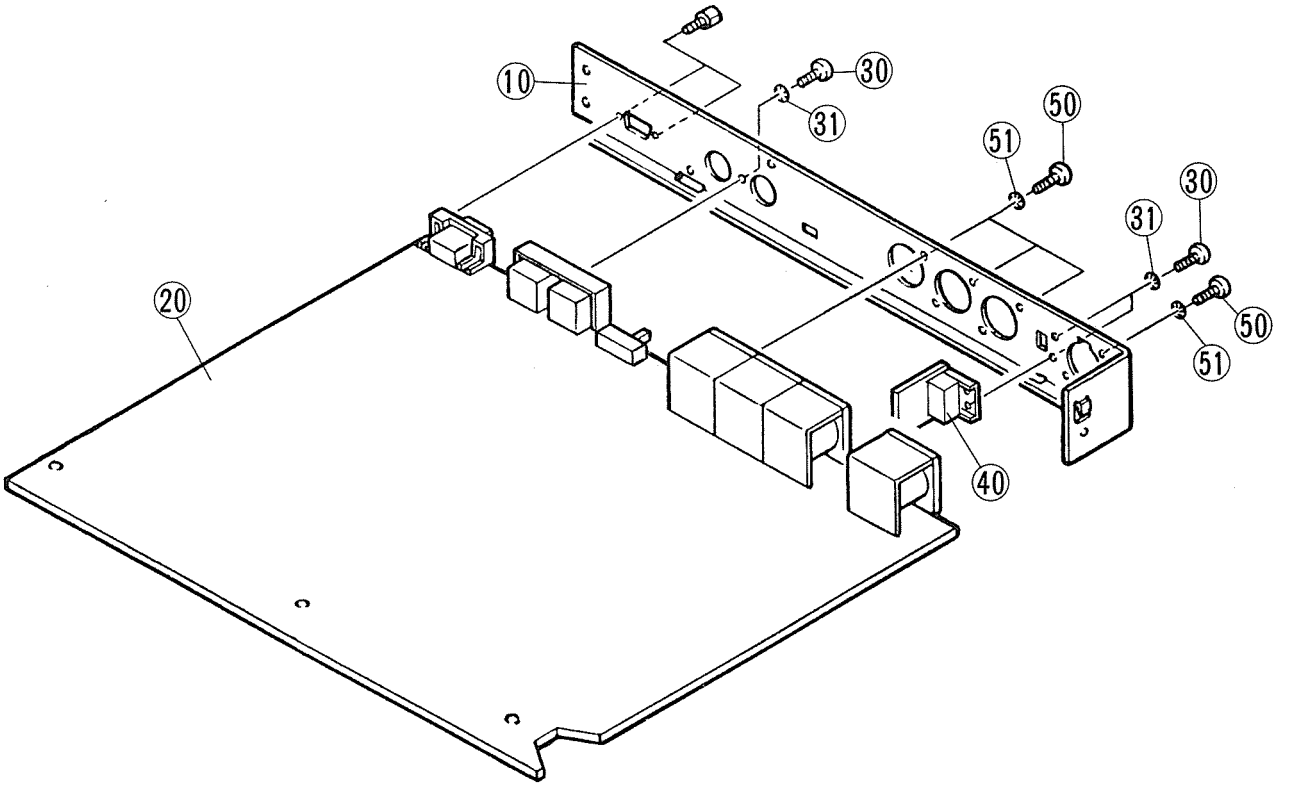


Ref. No.	Part No.	Description		部品名	Remarks	ランク
		Overall Assembly		総組立	C20	
10	VI470200	Bottom Cover		ボトムカバー		09
20	CB037120	Foot		スベリ座	4pcs	01
30	VI470500	Sub Panel		サブパネル		05
40		Rear Assembly		リアAss'y		
45	VI577700	Isolation Sheet		絶縁シート		04
50	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	4pcs	01
51	ED330066	Bind Head Screw	3.0×6 FCM3BL	バインド小ネジ	3pcs	01
52	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	7pcs	01
60		Power Supply Assembly		電源Ass'y		
70	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	3pcs	01
71	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	3pcs	01
80	VI575000	LCD Assembly	16×2	LCD Ass'y		17
90	VI578900	Circuit Board	KY(1/2,2/2)	KYシート		11
100	VI579000	Circuit Board	MT	MTシート		14
110		Stacked Wire	51004&51004 7P	束線 #28		
120		Panel Assembly		パネルAss'y		
130	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	2pcs	01
131	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	2pcs	01
140	VF888700	Push Rod		プッシュロッド	POWER	02
150	VF888400	Knob		内ツマミ	INPUT	02
160	VK301200	Top Cover		トップカバー		
170	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	7pcs	01
171	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	7pcs	01
200	CB069250	Cord Clamper	BK-1	束線止め	3pcs	01
210	EB330066	Flat Head Screw	3.0×6 FCM3BL	皿小ネジ	3pcs	01
220		Cord Clamper	L=160	束線止め	1pc.	
230	VG893300	Partition	L	パーティション(大)		01
240	VG893400	Partition	S	パーティション(小)		01
250		Isolation Sheet		絶縁シート	C only	
260	EV410076	Toothed Lock Washer	A φ7.0 ZMC2Y	歯付座金内歯形	1pc.	01
270	ES200180	Hexagonal Nut	φ7.0 ZMC2BL	特殊六角ナット	1pc.	01
280		Label		コード注意ラベル	B only	

※New Parts (新規部品)

ランク：Japan only

■REAR ASSEMBLY（リアAss'y）

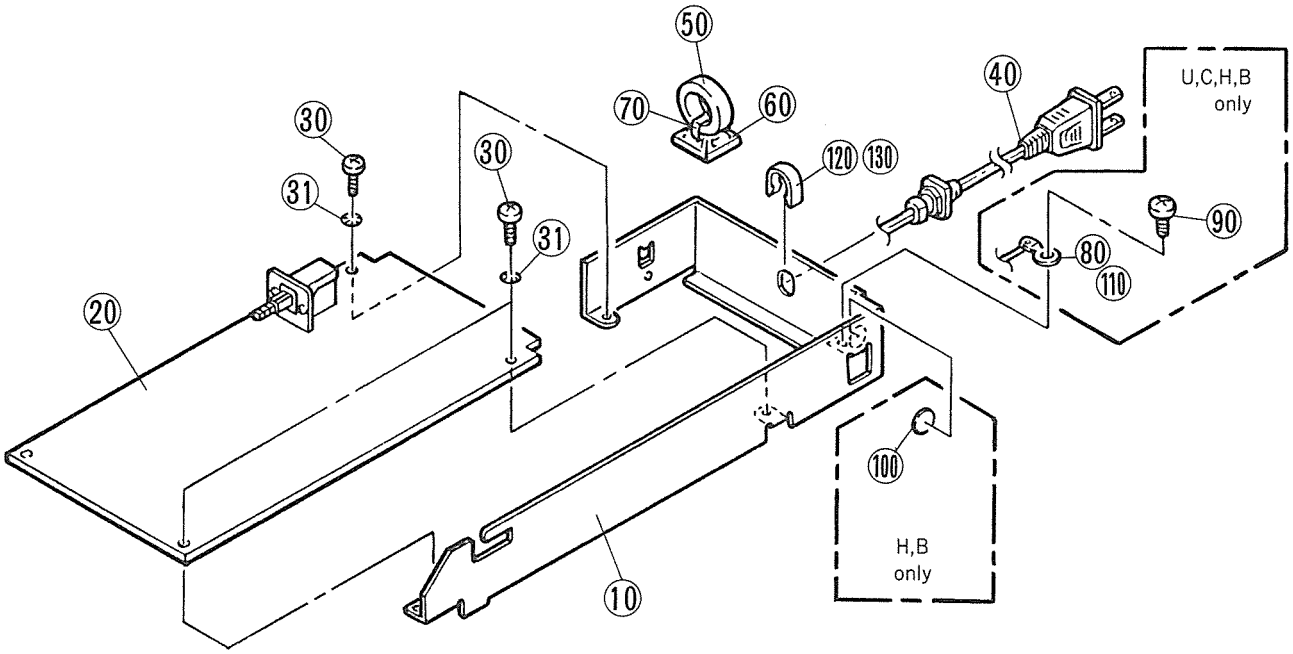


	Ref. No.	Part No.	Description		部品名	Remarks	ランク
			Rear Assembly		リアAss'y	C20	
*	10	VK280600	Rear Panel		リアパネル		13
*	20	VK116500	Circuit Board	AD	ADシート		
	30	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	3pcs	01
	31	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	3pcs	01
*	40	VK194000	Circuit Board	SW	SWシート		
	50	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	8pcs	01
	51	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	8pcs	01

* New Parts（新規部品）

ランク：Japan only

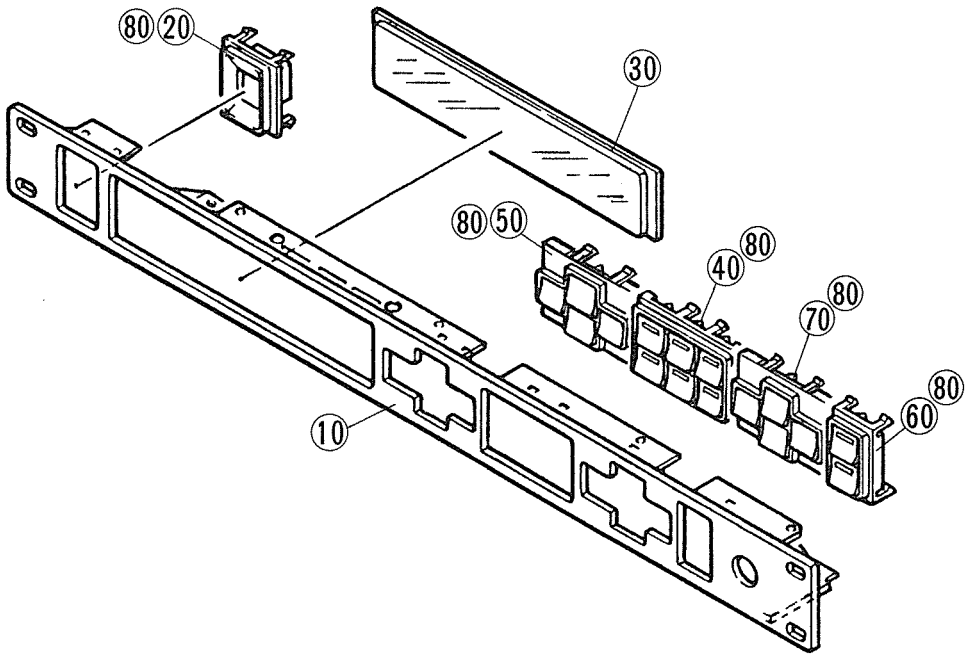
■POWER SUPPLY ASSEMBLY（電源Ass'y）



Ref. No.	Part No.	Description		部品名	Remarks	ランク
		Power Supply Assembly		電源Ass'y	C20	
※※ 10	VK282100	Panel, Power Supply		電源パネル	J	
※※ 10	VK282200	Panel, Power Supply		電源パネル	U,C	
※※ 10	VK282300	Panel, Power Supply		電源パネル	H,B	
20	VI337400	Power Supply Unit		電源ユニット	J	18
20	VI337500	Power Supply Unit		電源ユニット	U	18
20	VI337600	Power Supply Unit		電源ユニット	C	19
20	VI337700	Power Supply Unit		電源ユニット	H,B	21
30	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	3pcs	01
31	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	3pcs	01
40	VD279200	AC Cord	7A 2.5m	電源コード	J	04
40	VD654200	AC Cord	10A 2.44m	電源コード	U,C	05
40	VD279800	AC Cord	6A 2.5m	電源コード	H	08
40	VH890200	AC Cord	10A 2.5m	電源コード	B	09
50	GE300770	Ferrite Ring	FR25/15/12-2000	フェライトリング		06
60	CB835590	Band Relief	TMS-20	バンド固定具		01
70	CB069250	Cord Clamper	BK-1	束線止め		01
80	LA003690	Lug Terminal	Earth	ラグ端子	U,C,H,B only	01
90	ED340066	Bind Head Screw	4.0×6 FCM3BL	バインド小ネジ	U,C,H,B only	01
100		Earth Mark		アースマーク	H,B only	
110		Solder		半田		
120	VD705000	Cord Strain Relief	SR-5KN-4	コードストッパー	U,C only	02
130	CB032840	Cord Strain Relief	SR-5N-4	コードストッパー	H,B only	01

※New Parts（新規部品）　　ランク：Japan only

■PANEL ASSEMBLY（パネルAss'y）

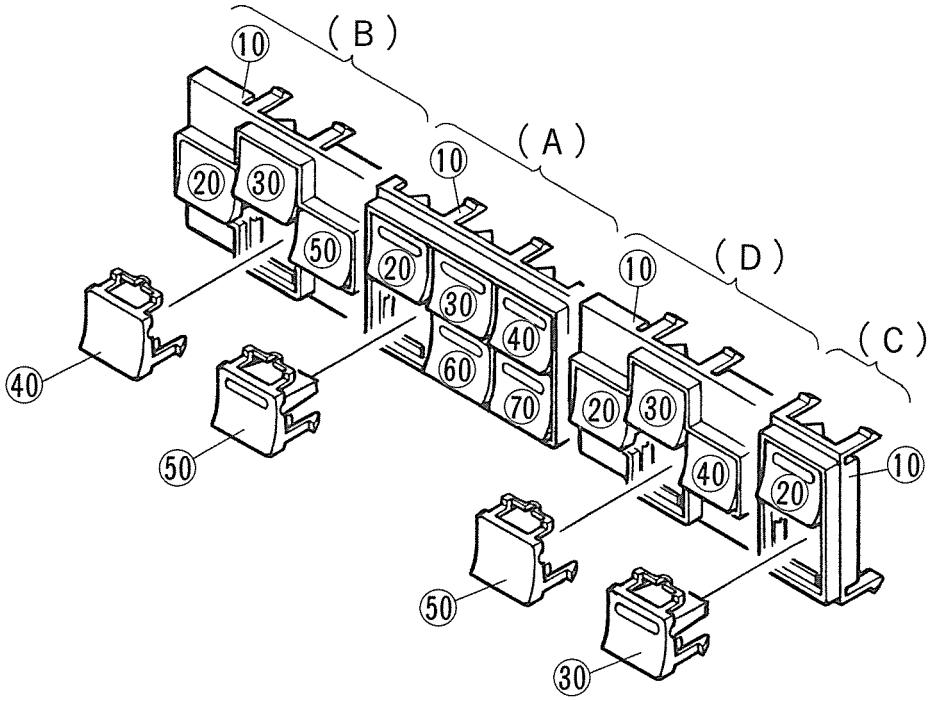


	Ref. No.	Part No.	Description		部品名	Remarks	ランク
			Panel Assembly		パネルAss'y	C20	
*	10	VK280000	Panel		パネル		
	20	VF888600	Escutcheon, PSW		ﾊﾟﾜｰｽｲｯﾁｴｽｶｯｼｮﾝ		01
*	30	VK280100	Cover, Meter		メーターカバー		
	40		Push Button Assembly	<6>	プッシュボタンAss'y		
	50		Push Button Assembly	<4>	プッシュボタンAss'y		
	60		Push Button Assembly	<2>	プッシュボタンAss'y		
	70		Push Button Assembly	<4>	プッシュボタンAss'y		
	80		Adhesive		接着剤		

* New Parts（新規部品）

ランク：Japan only

■PUSH BUTTON ASSEMBLY（プッシュボタンAss'y）



	Ref. No.	Part No.	Description		部品名	Remarks	ランク
	(A)		Push Button Assembly	<6>	プッシュボタンAss'y	C20	
	10	VI355300	Escutcheon	<6>	エスカッション		02
*	20	VK280700	Push Button with Lens	DELAY	プッシュボタン		
*	30	VK281100	Push Button with Lens	COMP	プッシュボタン		
*	40	VK281200	Push Button with Lens	EQ	プッシュボタン		
*	50	VK280800	Push Button with Lens	SLF	プッシュボタン		
*	60	VK280900	Push Button with Lens	LF	プッシュボタン		
*	70	VK281000	Push Button with Lens	HF	プッシュボタン		
	(B)		Push Button Assembly	<4>	プッシュボタンAss'y		
	10	VF890100	Escutcheon	<4>	エスカッション		01
*	20	VK281300	Push Button	CURSOR ←	プッシュボタン		
*	30	VK281400	Push Button	↑	プッシュボタン		
*	40	VK281500	Push Button	↓	プッシュボタン		
*	50	VK281600	Push Button	CURSOR →	プッシュボタン		
	(C)		Push Button Assembly	<2>	プッシュボタンAss'y		
	10	VI355400	Escutcheon	<2>	エスカッション		02
*	20	VK281700	Push Button with Lens	UTILITI	プッシュボタン		
*	30	VK281800	Push Button with Lens	MUTE	プッシュボタン		
	(D)		Push Button Assembly	<4>	プッシュボタンAss'y		
	10	VF890100	Escutcheon	<4>	エスカッション		01
*	20	VK281900	Push Button	STORE	プッシュボタン		
*	30	VK281400	Push Button	↑	プッシュボタン		
*	40	VK282000	Push Button	RECALL	プッシュボタン		
*	50	VK281500	Push Button	↓	プッシュボタン		

* New Parts（新規部品）

ランク：Japan only

■ELECTRICAL PARTS(電気部品)

Ref. No.	Part No.	Description		部品名	Remarks	ランク
＊＊	VK116500	Circuit Board	AD	ＡＤシート	C20	
＊＊	VK194000	Circuit Board	SW	ＳＷシート		
	VI578900	Circuit Board	KY	ＫＹシート		11
	VI579000	Circuit Board	MT	ＭＴシート		14
	VI337400	Power Supply Unit		電源ユニット	J	18
	VI337500	Power Supply Unit		電源ユニット	U	18
	VI337600	Power Supply Unit		電源ユニット	C	19
	VI337700	Power Supply Unit		電源ユニット	H,B	21
＊	VK116500	Circuit Board	AD	ＡＤシート		
	XD853A00	IC	NJM7815FA	ＩＣ	REGULATOR	03
	XD854A00	IC	NJM7915FA	ＩＣ	REGULATOR	03
	XG945A00	IC	M5278L05	ＩＣ	5V 100mA	01
	XG946A00	IC	M5279L05	ＩＣ	-5V 100mA	02
	IG102500	IC	NE5532P	ＩＣ	OP AMP.	06
	XA013001	IC	M5238P	ＩＣ	OP AMP.	04
	IG031000	IC	NJM2903	ＩＣ	COMPARATOR	05
	IG116200	IC	PST518B-2	ＩＣ	SYSTEM RESET	04
	XC561001	IC	LP20C9B6	ＩＣ	ACTIVE LPF	08
	IR000250	IC	SN74HC02N	ＩＣ	NOR	03
	IG142250	IC	SN74HCU04N	ＩＣ	INVERTER	01
	IR000450	IC	SN74HC04N	ＩＣ	INVERTER	03
	IR000850	IC	SN74HC08N	ＩＣ	AND	03
	IR001450	IC	SN74HC14N	ＩＣ	INVERTER	05
	IR003250	IC	SN74HC32N	ＩＣ	OR	03
	IR007450	IC	SN74HC74N	ＩＣ	D-FF	04
	IR013950	IC	SN74HC139N	ＩＣ	DECODER 2-4	05
	IR016350	IC	SN74HC163N	ＩＣ	COUNTER	03
	IR016650	IC	SN74HC166N	ＩＣ	SHIFT REGISTER	03
	IR017450	IC	SN74HC174N	ＩＣ	D-FF	05
	IR027350	IC	SN74HC273N	ＩＣ	D-FF OCTAL	05
	IR036750	IC	SN74HC367N	ＩＣ	BUS DRIVER	06
	IG147300	IC	HD63B50P	ＩＣ	ACIA	09
	XD245001	IC	HD63B03YP-N	ＩＣ	CPU	08
	XC354001	IC	YM3818	ＩＣ	DSPM	15
	XE798A00	IC	YM3934	ＩＣ	PMM2	12
	XE788A00	IC	YM6104	ＩＣ	DEQ2	11
	XG804A00	IC	PCM61PJ	ＩＣ	DAC	06
	XG898A00	IC	AK5327-VP	ＩＣ	AD CONVERTER	19
	XF981A00	IC	M5M4464AP-10	ＩＣ	DRAM 256K	08
	XG517A00	IC	LC3664RL-12	ＩＣ	SRAM 64K	08
	XG962A00	IC	TBP28L22N-00	ＩＣ	BPROM	07
＊	XI435A00	IC	DSC	ＩＣ	EPROM	
	VG181900	Photo Coupler	PC-900V	フォトカプラー		03
	IA067310	Transistor	2SA673A C,D	トランジスター		01
	IA101521	Transistor	2SA1015 Y	トランジスター		01
	IC121310	Transistor	2SC1213A C,D	トランジスター		01
	IC181520	Transistor	2SC1815 Y	トランジスター		01
	IG138700	Transistor Array	TD62506P	トランジスターアレイ		03
	VF074800	Transistor Array	BA6212	トランジスターアレイ		05
	VB481900	Diode	1ES4	ダイオード		01
	IF003450	Diode	1SS133	ダイオード		01
	IF005600	Zener Diode	RD5.6EB2 5.6V	ツェナーダイオード		01
	IF010670	Zener Diode	MTZ4.7C 4.7V	ツェナーダイオード		01
	VA024800	Trimmer Potentiometer	B10K EVN	半固定抵抗		02
	HT560100	Trimmer Potentiometer	B100K 3P 332	半固定抵抗		05
	HZ004730	Resistor Array	RMLS8 J 103	抵抗アレイ		02
	VA822600	Resistor Array	RMLS4 J 103	抵抗アレイ		01
	HI209990	Solid Resistor	10MΩ 1/4W K	ソリッド抵抗		01
	VC819600	Metal Film Resistor	75Ω 1/6W F	金属被膜抵抗		01
	VC821600	Metal Film Resistor	430Ω 1/6W F	金属被膜抵抗		01
	VC822400	Metal Film Resistor	910Ω 1/6W F	金属被膜抵抗		01
	VC822500	Metal Film Resistor	1KΩ 1/6W F	金属被膜抵抗		01
	VC822900	Metal Film Resistor	1.5KΩ 1/6W F	金属被膜抵抗		01
	VC823200	Metal Film Resistor	2KΩ 1/6W F	金属被膜抵抗		01
	VC823400	Metal Film Resistor	2.4KΩ 1/6W F	金属被膜抵抗		01
	VC823700	Metal Film Resistor	3.3KΩ 1/6W F	金属被膜抵抗		01
	VC824000	Metal Film Resistor	4.3KΩ 1/6W F	金属被膜抵抗		01
	VC824600	Metal Film Resistor	7.5KΩ 1/6W F	金属被膜抵抗		01
	VC824700	Metal Film Resistor	8.2KΩ 1/6W F	金属被膜抵抗		01
	VC824900	Metal Film Resistor	10KΩ 1/6W F	金属被膜抵抗		01
	VC825100	Metal Film Resistor	12KΩ 1/6W F	金属被膜抵抗		01
	VC825400	Metal Film Resistor	16KΩ 1/6W F	金属被膜抵抗		01
	VC825700	Metal Film Resistor	22KΩ 1/6W F	金属被膜抵抗		01
	VC825800	Metal Film Resistor	24KΩ 1/6W F	金属被膜抵抗		01
	VC825900	Metal Film Resistor	27KΩ 1/6W F	金属被膜抵抗		01
	VC826900	Metal Film Resistor	68KΩ 1/6W F	金属被膜抵抗		01
	VC828000	Metal Film Resistor	200KΩ 1/6W F	金属被膜抵抗		01
	VC828900	Metal Film Resistor	470KΩ 1/6W F	金属被膜抵抗		01

＊New Parts (新規部品)

ランク：Japan only

Ref. No.	Part No.	Description		部品名	Remarks	ランク
	VC773700	Metal Oxide Film Resistor	150Ω 2W J	酸化金属被膜抵抗		01
	FZ004100	Semiconductive Cera. Cap.	0.1μ 16V M	半導体セラコン		01
	VA762200	Monolithic Cera. Cap.	0.1μ 25V Z	積層セラコン		01
	VD534400	Monolithic Cera. Cap.	1.5μ 25V Z	積層セラコン		01
	UJ828470	Electrolytic Cap.	470μ 10V	ケミコン		01
	VB835000	Coil	FL5R200QNT	コイル	20μH	01
	FZ006970	EMI Filter	LS MT Y223NB	LCフィルターEMI		02
	VH227800	EMI Filter	NFV610-655T2A	LCフィルターEMI	50MHz	03
	QU004800	Ceramic Resonator	4MH CSA4.00MG	セラミック振動子		03
	VJ574400	Quartz Crystal Unit	12.8MH AT-49	水晶振動子		04
	VI575400	Slide Switch	SSSU12 2/3	スライドスイッチ	MODE	02
	KC001900	Relay	DC12V RY12W	リレー		07
	VI443700	XLB Connector	XLB-3-31PCV	キャノンジャック	INPUT	07
	VI579600	XLB Connector	XLB-3-32PCV	キャノンジャック	OUTPUT(HF,LF,SL	06
	VF342200	DIN Jack	5P SK0266×2	DINジャック	MIDI(IN,OUT)	03
	VI576000	D-SUB Connector	DELC-J9SAF-10L9	D-SUBコネクター	9P REMOTE	05
	VE338400	Lithium Battery	SONY/CR2032	リチュウム電池		03
	VI579500	Holder, XLB Connector		キャノン金具		03
	BA808520	Heat Sink	T220M 25L	ヒートシンク	for REG.IC(2pcs	03
	VB438700	Angle Bracket, Earth		アース金具		01
*	VJ579700	Spacer		CLKスペーサー	for Q.Crystal	
	ED330086	Bind Head Screw	3.0×8 FCM3BL	バインド小ネジ	for REG.IC(2pcs	01
	EV413036	Toothed Lock Washer	A φ3.0 FCM3BL	歯付座金内歯形	for REG.IC(2pcs	01
*	VK194000	Circuit Board	SW	SWシート		
*	VC833600	Metal Film Resistor	430Ω 1/6W F	金属被膜抵抗		
*	VC836100	Metal Film Resistor	2KΩ 1/6W F	金属被膜抵抗		
*	VC836200	Metal Film Resistor	2.2KΩ 1/6W F	金属被膜抵抗		
*	VG502300	Slide Switch	SSSU12	スライドスイッチ	HF ATT(0dB/-6dB	02
*	VK249300	Switch Bracket		スイッチ金具		09
	VI578900	Circuit Board	KY	KYシート		11
	IF003450	Diode	1SS133	ダイオード		01
	VG149600	LED	GL1HD212 RE	LED	Key's LEDs(8pcs	01
	VA757600	Variable Resistor	A10K EWH-14A-	ロータリーボリューム	INPUT level	03
	VB799000	Push Switch	EVQ-QSL04M	プッシュスイッチ	Funct.keys(16pc	01
	VI579000	Circuit Board	MT	MTシート		14
	VA039100	LED Display	SX-25J	LEDディスプレイ	Level meter(4pc	06
	VI575100	LED Display	LN516RK	LEDディスプレイ	MODE indicator	05
	VI697200	LED Display	SX-25Y GR	LEDディスプレイ	MEMORY	05
	VI337400	Power Supply Unit		電源ユニット	J	18
	VI337500	Power Supply Unit		電源ユニット	U	18
	VI337600	Power Supply Unit		電源ユニット	C	19
	VI337700	Power Supply Unit		電源ユニット	H,B	21
	IX802360	IC	μPC1093J	IC	REGULATOR	03
	IK000480	Photo Coupler	PC817	フォトカプラー	J,U,C	03
	IK000490	Photo Coupler	PC511	フォトカプラー	H,B	05
	IX552940	Transistor	2SC2655	トランジスター		01
	IX803780	FET	2SK1153	FET	J,U,C	04
	IX802380	FET	2SK513	FET	H,B	06
	IF000040	Diode	1SS1555	ダイオード	J,U,C	01
	IF001380	Diode	1SS84	ダイオード		01
	IH001530	Diode	11DQ06	ダイオード		08
	IX802390	Diode	10DF6	ダイオード		02
	IX802410	Diode	31DQ04	ダイオード		03
	IF006500	Zener Diode	RD12E	ツェナーダイオード		01
	IX553160	Diode Stack	S1WB40	ダイオードスタック	J,U,C	03
	IX553900	Diode Stack	S1WB60	ダイオードスタック	H,B	04
	HV456820	Flame Proof C. Resistor	15Ω 1/4W	不燃化カーボン抵抗		01
	HV455470	Flame Proof C. Resistor	470Ω 1/4W	不燃化カーボン抵抗	J,U,C	01
	HJ355560	Flame Proof C. Resistor	560Ω 1/4W	不燃化カーボン抵抗	H,B	01
	HX801380	Flame Proof C. Resistor	5.1KΩ 1/4W	不燃化カーボン抵抗	H,B	01
	HV456820	Flame Proof C. Resistor	8.2KΩ 1/4W	不燃化カーボン抵抗		01
	HX804130	Metal Oxide Film Resistor	82Ω 1/2W	酸化金属被膜抵抗		01
	HL313270	Metal Oxide Film Resistor	2.7Ω 1W	酸化金属被膜抵抗	H,B	01
	HL318100	Metal Oxide Film Resistor	100KΩ 1W	酸化金属被膜抵抗		01
	HL313100	Metal Oxide Film Resistor	1Ω 1W	酸化金属被膜抵抗	J,U,C	01
	HL324820	Metal Oxide Film Resistor	82Ω 2W	酸化金属被膜抵抗	J,U,C	01
	HL325150	Metal Oxide Film Resistor	150Ω 2W	酸化金属被膜抵抗	H,B	01
	HL327330	Metal Oxide Film Resistor	33KΩ 2W	酸化金属被膜抵抗	J,U,C	01
	HL327680	Metal Oxide Film Resistor	68KΩ 2W	酸化金属被膜抵抗	H,B	01
	HL328100	Metal Oxide Film Resistor	100KΩ 2W	酸化金属被膜抵抗		01
	HX801450	Metal Oxide Film Resistor	6.8Ω 3W	酸化金属被膜抵抗	J,U,H,B	01
	HX801390	Fuse Resistor	6.8Ω 5W	ヒューズ抵抗	C	03
	HX801400	Trimmer Potentiometer	RVF08P B1K	半固定抵抗		01
	FG744100	Ceramic Cap.	0.01μ 50V Z	セラコン		01
	FX800550	Ceramic Cap.	1000P 250V	セラコン		01

＊New Parts（新規部品）

ランク：Japan only

Ref. No.	Part No.	Description		部品名	Remarks	ランク
	FX551060	Ceramic Cap.	2200P 250V	セラコン	H,B	03
	FI324100	Ceramic Cap.	0.01μ 250V DE	セラコン		01
	FX800230	Ceramic Cap.	100P 1KV	セラコン	J,U,C	01
	FX800560	Ceramic Cap.	68P 2KV	セラコン	H,B	01
	FC364220	Mylar Cap.	0.022μ 50V K	マイラーコン		02
	UA555220	Mylar Cap.	0.22μ 50V J	マイラーコン		02
	FZ000680	Metallized Mylar Cap.	0.1μ 250V	MMコン		02
	FX550550	Electrolytic Cap.	1000μ 10V	ケミコン		02
	UJ448330	Electrolytic Cap.	330μ 25V M	ケミコン		02
	FX800240	Electrolytic Cap.	100μ 200V	ケミコン	J,U,C	04
	FZ006890	Electrolytic Cap.	47μ 400V	ケミコン	H,B	05
	GX800980	Choke Coil	NFR6UA103 10mH	チョークコイル		05
	GX800990	Choke Coil	NFR5E203A 20mH	チョークコイル	J,U,C	06
	GX801480	Choke Coil	LUMR3403	チョークコイル	H,B	05
	GX802450	Choke Coil	FL9H470K-30	チョークコイル		03
	GX801060	Choke Coil	FL11Z180K-35	チョークコイル		03
	KX800440	Power Switch	ESB8213V	パワースイッチ	J	03
	KX802550	Power Switch	M-3-1	パワースイッチ	U,C	03
	KX802560	Power Switch	MM-13-1	パワースイッチ	H,B	03
	LX800920	Fuse	T 1.5A 250V	ヒューズ	J	01
	LX800930	Fuse	2A 250V ST4	ヒューズ	U,C	02
	LX800940	Fuse	1.25A 250V EAK	ヒューズ	H,B	02
	LB201880	Fuse Holder	PC-FH1	ヒューズホルダー		01
	GX802460	Power Transformer	TUM017A	電源トランス	J,U,C	08
	GX800810	Power Transformer	TMA025	電源トランス	H,B	09
	CX802990	Switch Panel	YG-4030-009	スイッチパネル		01
	EA030066	Pan Head Screw	3.0×6 ZMC2Y	ナベ小ネジ	for SW.panel(2p	01
	EA030086	Pan Head Screw	3.0×8 ZMC2Y	ナベ小ネジ	for FET(1pc.)	01
	EV300036	Spring Washer	φ3.0 ZMC2Y	バネ座金	3pcs	01
	EV200036	Flat Washer	φ3.0 ZMC2Y	平座金	3pcs	01
	VI575000	LCD Assembly	16X2	LCD Ass'y		17
	VH203400	LCD	LM16X221	液晶ディスプレイ		16
	VD279200	AC Cord	7A 2.5m	電源コード	J	04
	VD654200	AC Cord	10A 2.44m	電源コード	U,C	05
	VD279800	AC Cord	6A 2.5m	電源コード	H	08
	VH890200	AC Cord	10A 2.5m	電源コード	B	09

※New Parts（新規部品）

ランク：Japan only

C20 OVERALL CIRCUIT DIAGRAM

AD 1/2

KY 2/2

PU For North European Model

PU For Japanese, US, and Canadian Models