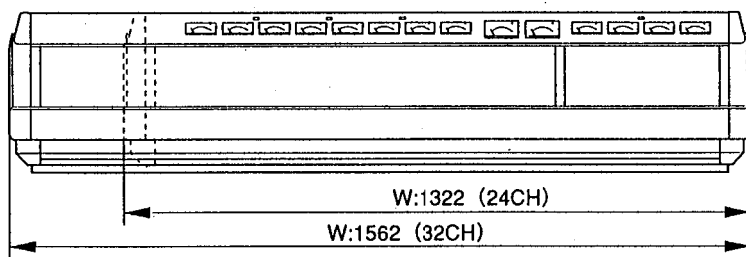
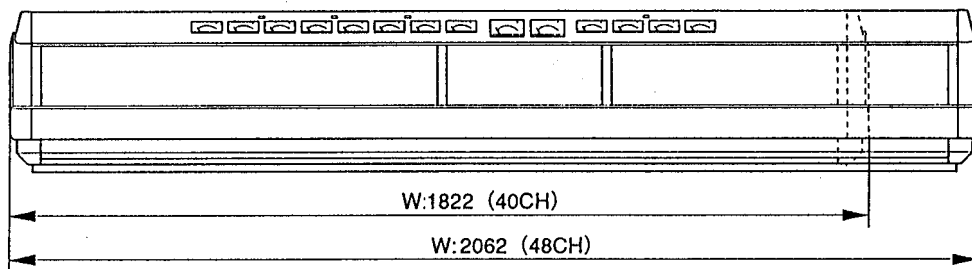
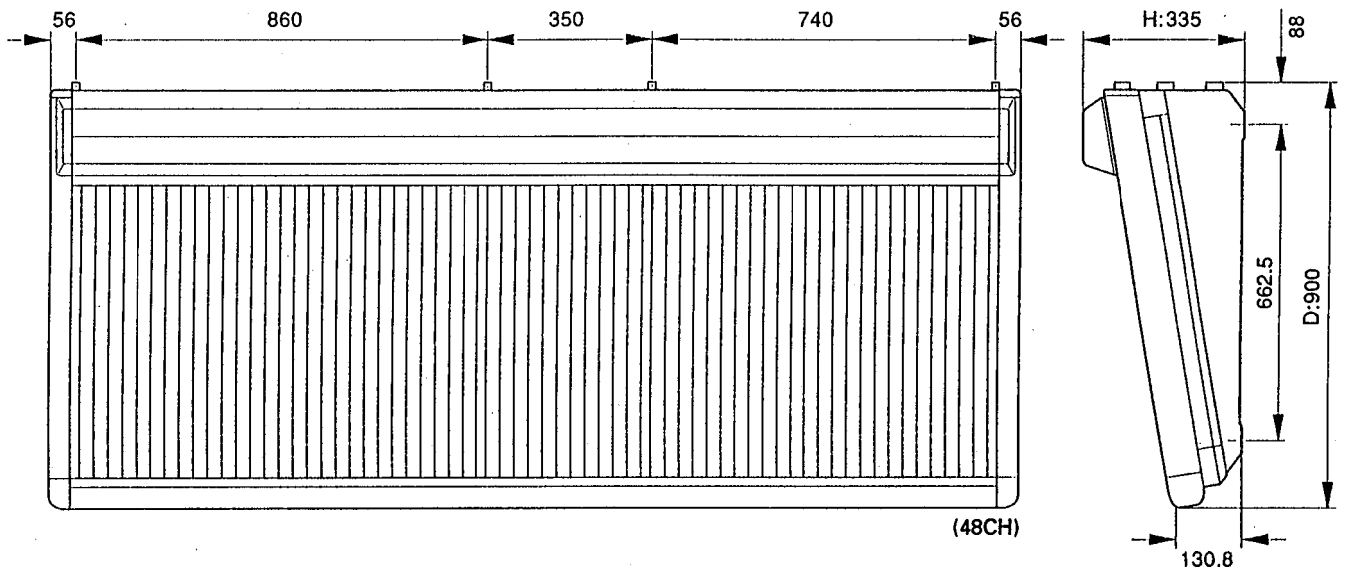


■ DIMENSION (寸法図)



Unit: mm  
(単位: mm)

## OPTIONAL FUNCTIONS (オプション機能)

The console is factory wired to suit what Yamaha engineers believe to be the greatest number of applications. Yamaha recognizes, however, that there are certain functions which must be altered for certain specific applications. In designing this console, a number of optional functions have been built in, and can be selected by moving factory preset switches or jumpers within certain modules.

PM3500はさまざまなバラエティの用途や状況に対応するように設計されていますが、目的によってはユーザーによる機能変更が必要になる場合があります。PM3500は、設計時に、多くのオプション機能が組み込まれており、モジュール内のスイッチ、ジャンパー線の切り替えによってそれらのオプションを選択することができます。

### 1 Removing and installing a module (オプションモジュールの交換手順)

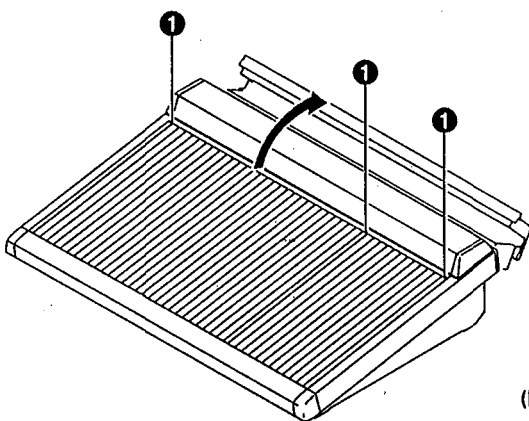
1. Loosen the screws ① on the front of the meter bridge. The number of screws differs according to the number of input channels. (Fig.1)
2. Loosen the screws ② on the rear of the meter bridge. (Fig.2)
3. Open the meter bridge as shown in Fig.1.
4. Remove the ground connection ③ on the ground bridge. (Fig.3)
5. Remove the ground bridge holding screws so that the ground bridge ④ can be raised and the three connections ⑤ disconnected. (Fig.3)
6. Loosen the retaining screws on the top and bottom of the module. These screws ⑥ should remain in the module. (Fig.4)
7. Lift up the bottom of the module, then carefully pull the module out of the console. (Fig.4)

オプションモジュールMN3500 / MN3500M / ST3500 / GRM3500-1 / GRM3500-2 / STM3500 / MON3500 / CNT3500 / BKL3500の交換手順は次のとおりです。

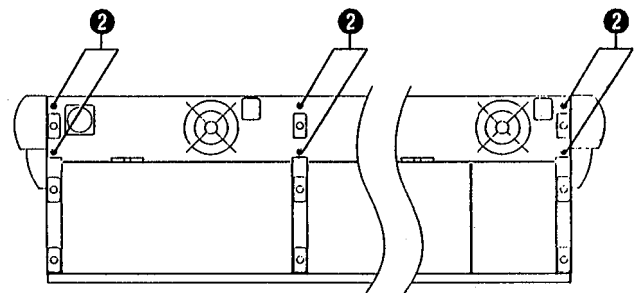
- 1.メーターブリッジをとめているフロント側のネジ①を外します。ネジの数は、チャンネル数によって異なります。(図1)
- 2.リアのネジ②を外します。(図2)
- 3.メーターブリッジを、図1のように開きます。
- 4.該当するモジュールのアース線③を外します。(図3)
- 5.アースブリッジ④を固定しているネジを外して動くようにします。そして、図3に示す3種類のコネクター⑤を外します。
- 6.モジュールを固定しているフロントパネルのネジ⑥2本をゆるめます。このネジはモジュールから外れないようになっています。(図4)
- 7.モジュール下部を持ち上げ、引き抜きます。(図4)

モジュールの取り付けは、逆の手順でおこないます。

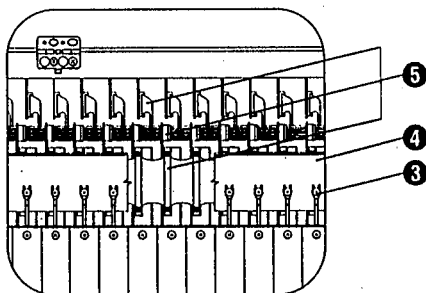
Installation of a module should be carried out by performing this procedure in reverse.



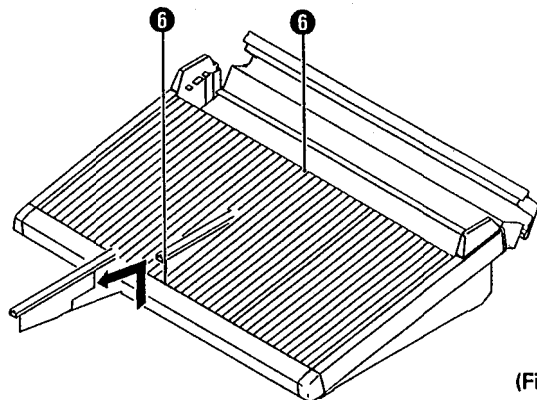
(Fig. 1)



(Fig. 2)

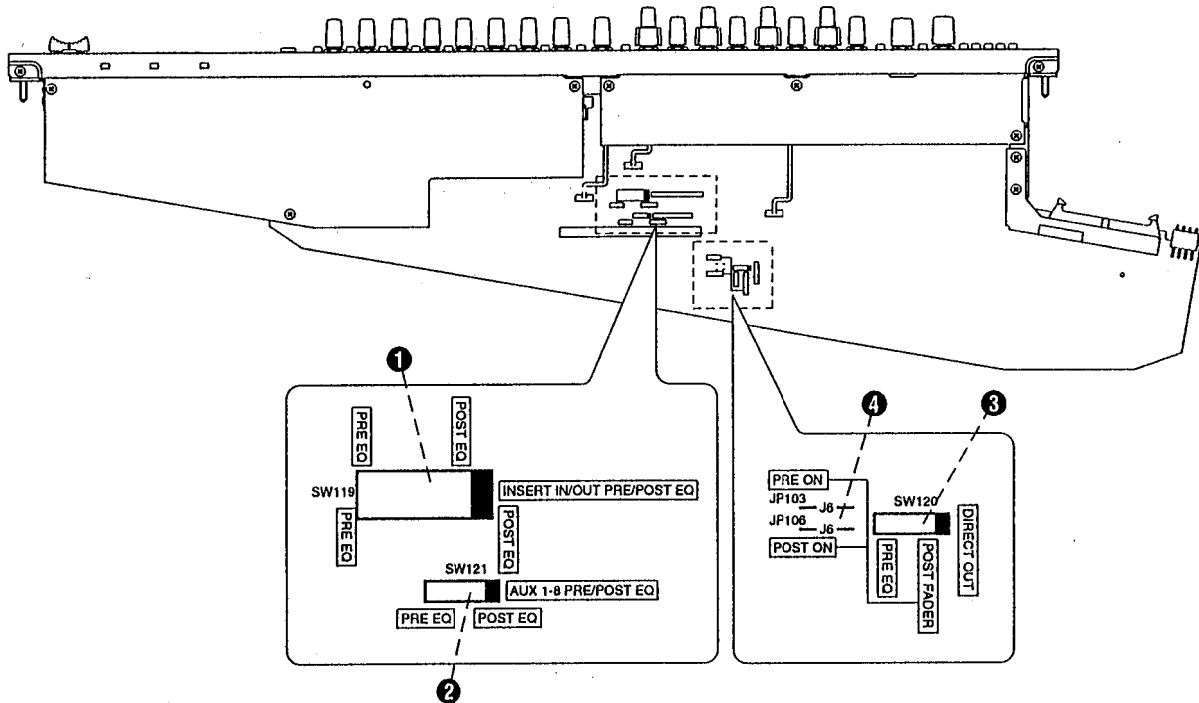


(Fig. 3)



(Fig. 4)

## 2 Monaural INPUT Modules (INPUTモジュール)



Monaural input modules can have the following settings changed by switches or jumpers mounted on the module boards:

	Setting	Options	Factory setting
①	Insert I/O	pre-EQ / post-EQ	post-EQ
②	Aux 1 through 8	pre-EQ / post-EQ	post-EQ
③	Direct out	pre-EQ/ post-fader	post-fader
④	Direct out	pre-ON / post-ON	pre-ON

### ① INSERT I/OのPRE EQ/POST EQ

このスイッチにより、INSERT IN/OUT端子の信号入出力位置をプリ・イコライザーにするか、ポスト・イコライザーにするかを選択できます。出荷時はポスト・イコライザーにセットされています。

### ② AUX1~8のPRE EQ/POST EQ

このスイッチにより、AUX (1~8) 信号の取出し位置を、プリ・イコライザーにするか、ポスト・イコライザーにするかを選択することができます。出荷時はポスト・イコライザーにセットされています。

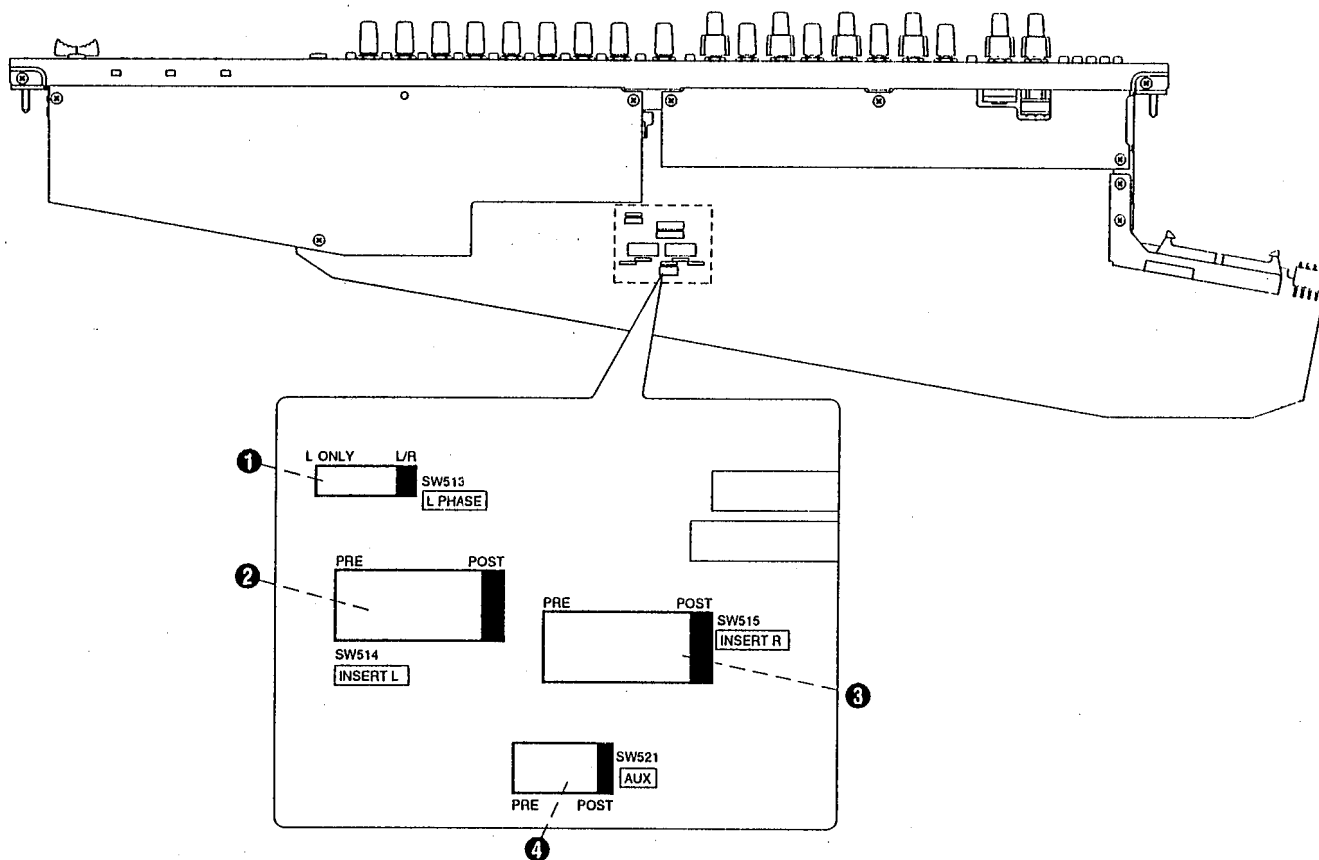
### ③ DIRECT OUTのPRE EQ, POST FADER

このスイッチにより、DIRECT OUTの出力を、プリ・イコライザーか、ポスト・フェーダーにするかを選択することができます。出荷時はポスト・フェーダーにセットされています。

### ④ DIRECT OUT POSTの位置でのPRE ON SW/POST ON SW

このジャンパー線により、DIRECT OUT信号取出しポイントをON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はプリONスイッチにセットされています。

### 3 STEREO INPUT Modules (ST INモジュール)



Stereo input modules can have the following settings changed by switches or jumpers mounted on the module boards:

	Setting	Options	Factory setting
①	Phase	L & R / L only	L & R
②	L insert I/O	pre-EQ / post-EQ	post-EQ
③	R insert I/O	pre-EQ / post-EQ	post-EQ
④	Aux 1 through 8	pre-EQ / post-EQ	post-EQ

#### ① Ø PHASE & R/L

このスイッチにより、STEREO INPUTモジュールのØ(位相反転)をL,R同時にするか、Lのみにするかを選択することができます。出荷時はL,R同時に位相が変わるようセットされています。

#### ② L INSERT IN/OUTのPRE EQ/POST EQ

このスイッチにより、L側のINSERT IN/OUT端子の信号入出力位置をプリ・イコライザーにするか、ポスト・イコライザーにするかを選択できます。出荷時はポスト・イコライザーにセットされています。

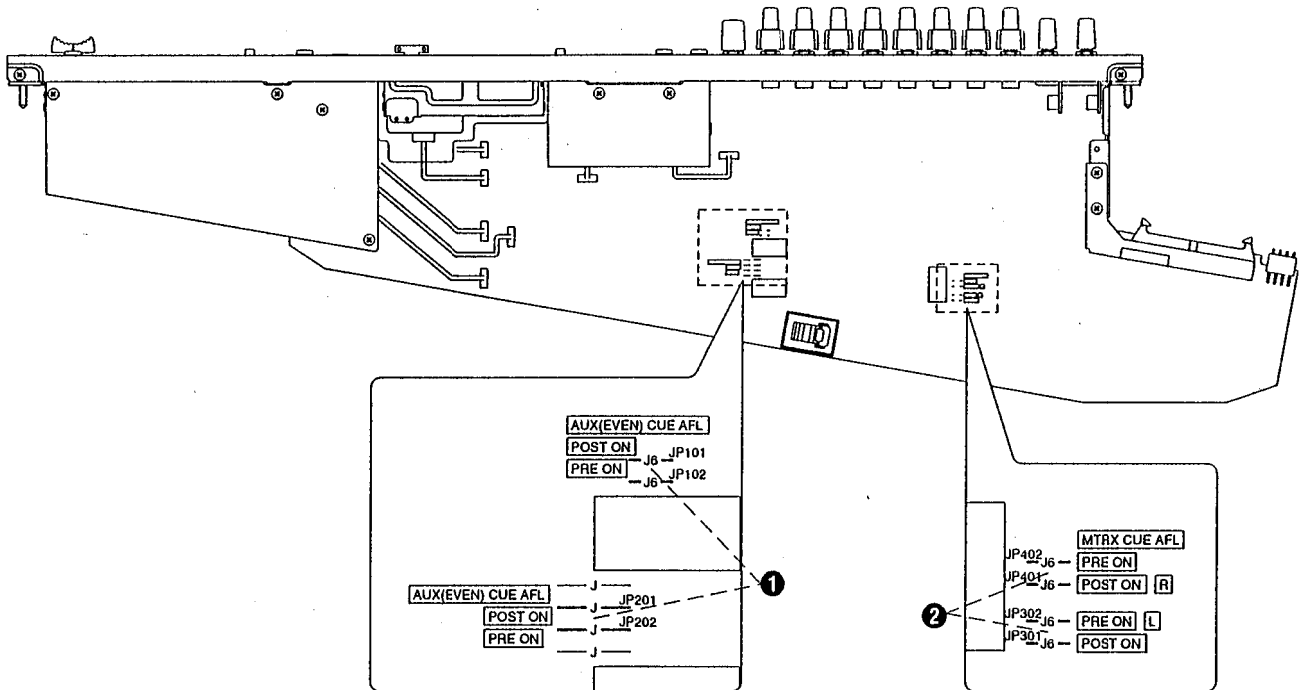
#### ③ R INSERT IN/OUTのPRE EQ/POST EQ

このスイッチにより、R側のINSERT IN/OUT端子の信号入出力位置をプリ・イコライザーにするか、ポスト・イコライザーにするかを選択できます。出荷時はポスト・イコライザーにセットされています。

#### ④ AUX1~8のPRE EQ/POST EQ

このスイッチにより、AUX (1~8) 信号の取出し位置を、プリ・イコライザーにするか、ポスト・イコライザーにするかを選択することができます。出荷時はポスト・イコライザーにセットされています。

**4 AUX Modules = Group Master Modules 1**  
 (AUXモジュール=Group Masterモジュール1)



The group master modules (1) can have the following settings changed (which affect the operation of the aux and matrix busses housed on the module) by switches or jumpers mounted on the module boards:

	Setting	Options	Factory setting
①	AUX CUE	pre-ON / post-ON	post-ON
②	Matrix CUE AFL	pre-ON / post-ON	post-ON

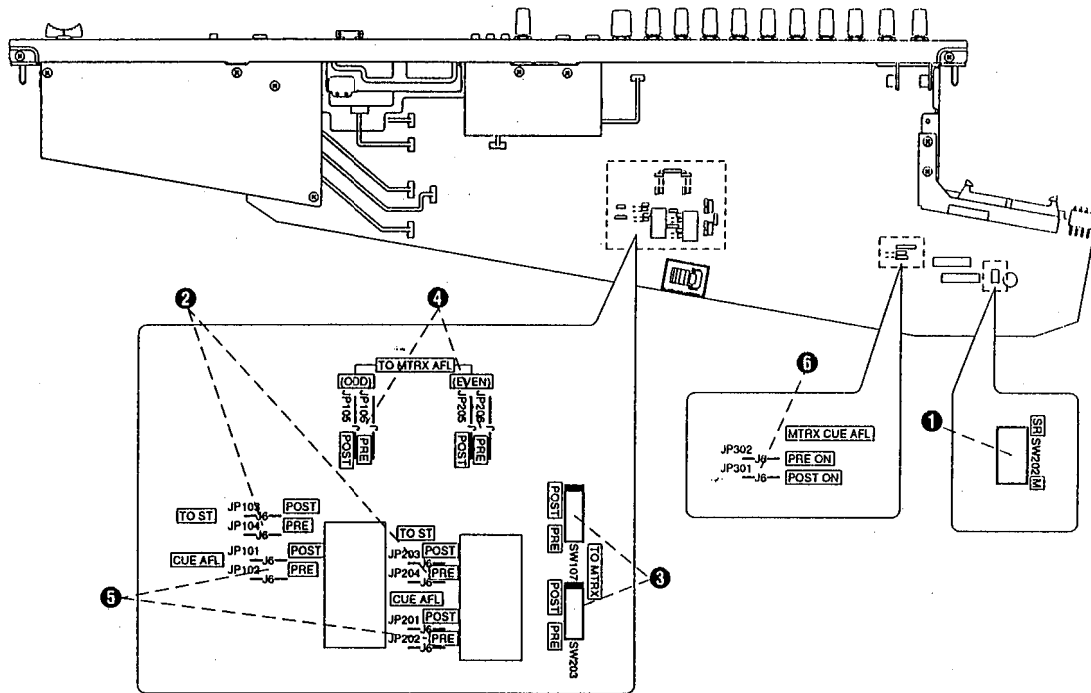
**①AUX CUEのPRE ON SW/POST ON SW**

このジャンパー線により、CUE L/Rに出力する信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

**②MATRIX CUEのPRE ON SW/POST ON SW**

このジャンパー線により、CUE L/Rに出力する信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

## 5 GROUP Modules = Group Master Modules 2 (GROUPモジュール=Group Masterモジュール2)



	Setting	Options	Factory setting
①	Group sum gain	0dB / +6dB	0dB (PM3500 = 0dB, PM3500M = +6dB)
②	Group to ST	pre-ON / post-ON	post-ON
③	Group to matrix	pre-fader / post-fader	post-fader
④	Group to matrix	pre-ON / post-ON	post-ON
⑤	Group CUE AFL	pre-ON / post-ON	post-ON
⑥	Matrix CUE AFL	pre-ON / post-ON	post-ON

### ①MODEL設定スイッチ

本モジュールはPM3500、PM3500Mに共通に使えます。ただし、レベルダイアグラムが異なるため、このスイッチでモデル設定 (SUM AMP GAINをSR : PM3500のとき0dB、M : PM3500Mのとき+6dBにセット) します。

### ②GROUP ODD/EVEN TO ST L/RのPRE ON SW/POST ON SW

このジャンパー線により、ST L/Rに出力するGROUP信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

### ③GROUP ODD/EVEN TO MATRIX ODD/EVENのPRE FADER/POST FADER

このスイッチにより、MTRIXに出力するGROUP信号をプリ・フェーダーにするか、ポスト・フェーダーにするかを選択することができます。出荷時はポストフェーダーにセットされています。

### ④GROUP ODD/EVEN TO MATRIX ODD/EVENのPRE ON SW/POST ON SW

このジャンパー線により、MTRIXに出力するGROUP信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

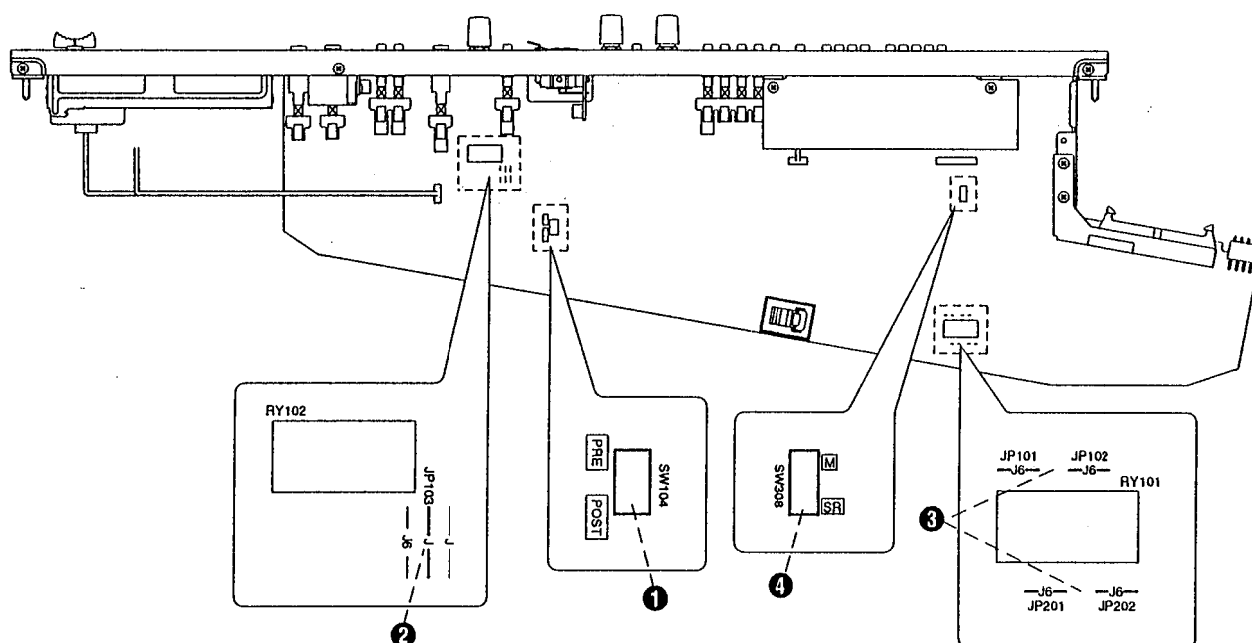
### ⑤GROUP CUEのPRE ON SW/POST ON SW

このジャンパー線により、CUE L/Rに出力するAFL信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

### ⑥MATRIX CUEのPRE ON SW/POST ON SW

このジャンパー線により、CUE L/Rに出力する信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

## 6 STEREO MASTER Module (ST MASモジュール)



The stereo master module can have the following settings changed by switches or jumpers mounted on the module board:

	Setting	Options	Factory setting
①	Stereo-to-matrix	pre-fader/ post-fader	post-fader
②	Stereo-to-matrix	pre-ON / post-ON	post-ON
③	Stereo CUE AFL	pre-ON / post-ON	post-ON
④	To GRP level	0dB / -6dB	0dB (PM3500 = 0dB, PM3500M = -6dB)

### ① ST L/R TO MATRIXのPRE FADER/POST FADER

このスイッチにより、MATRIXに出力するST L/R信号をプリ・フェーダーにするか、ポスト・フェーダーにするかを選択することができます。出荷時はポストフェーダーにセットされています。

### ② ST L/R TO MATRIXのPRE ON SW/POST ON SW

このジャンパー線により、MATRIXに出力するST L/R信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

### ③ ST CUE L/RのPRE ON SW/POST ON SW

このジャンパー線により、ST CUE L/Rに出力するST L/R信号をON/EDITスイッチ前にするか、ON/EDITスイッチ後にするかを選択することができます。出荷時はポストONスイッチにセットされています。

### ④ TO GROUP LEVEL の0dB/-6dB SW

本モジュールはPM3500、PM3500Mに共通に使えます。ただし、レベルダイアグラムが異なるため、このスイッチでモデル設定 (SR: PM3500のとき0dB, M: PM3500Mのとき-6dBにセット) します。

## ■ ERROR MESSAGES ON THE DISPLAY (エラーメッセージ)

The console will show error messages on the display in certain circumstances. Here is a list of the messages and their meaning:

Message on display	Meaning
R_er	MIDI data receive error
BUFF	The MIDI receive buffer is full – you may want to turn off the ECHOBACK function to clear this.
M_pr	An attempt has been made to store a scene memory while memory protection is on
Csum	A MIDI Bulk Dump has been received, but a checksum error has occurred
Low	The battery voltage has dropped below 2.5V
N_dt	An attempt has been made to recall a scene which contains no data
N_no	An attempt has been made to initialize all scene memories when no data has been stored
Er_*	A system error has occurred. The message will appear for five seconds.

### エラーメッセージ

エラーが発生したときは、MEMORYディスプレイにエラーの種類を表示します。  
一般的なエラーメッセージを次に示します。

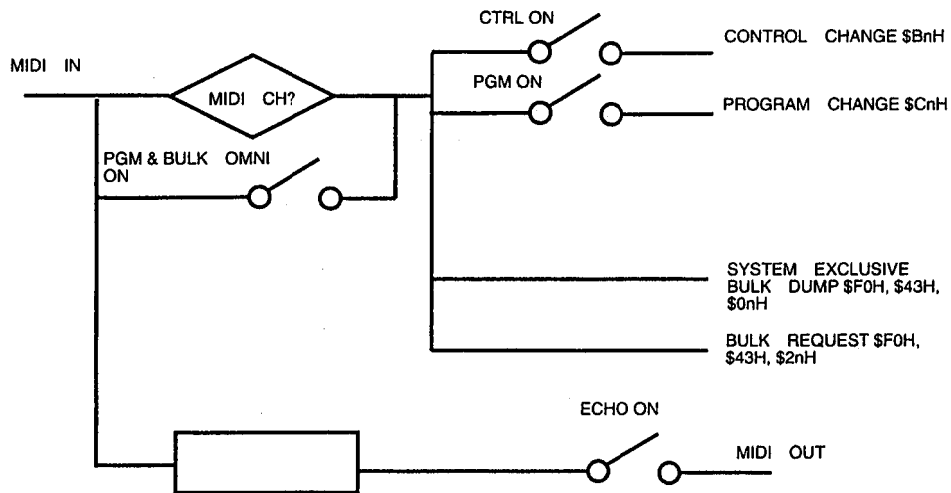
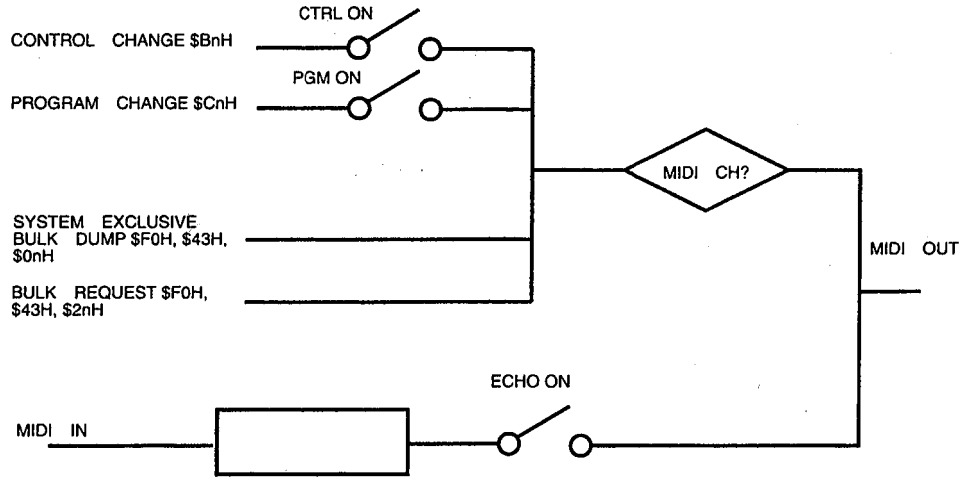
R_er	MIDI受信ERROR
Buff	MIDI送受信BUFFER FULL (送信時FULLになるのはECHO BACKのため)
M_pr	STORE時またはBULK DUMP受信時、MEMORY PROTECT ON
Csum	BULK DUMP CHECK SUM ERROR
Low	内蔵電池電圧が2.5V以下
N_dt	NO DATAなのにRECALL KEYを押した
N_no	MEMORY ALL INITIALIZEの時等SCENE MEMORY No.指定せずにSTORE、RECALL、CHECKをした
ER_*	SYSTEM ERROR No.*

本機の電源を入れると、CPUが関連するハードウェアに対して自動的にチェックを実行します。その結果エラーを検出すると、“ER\_\*”を表示後、LOCALモードとなります。また、立ち上げたときにバッテリーの電圧が足りないときはUTILITYの1に入り“Low”を表示し、そうでなければ、インプットモジュール数“28CH”“36CH”“44CH”“52CH”と表示します。



## ■ MIDI DATA FORMAT

### ● MIDI flowcharts (transmission and reception)



### ● MIDI bulk dump formats

BULK OUT data is transmitted and received in the following format:

Purpose of data	Binary value	Hex value	Explanation
Status	11110000	F0h	System Exclusive message
ID number	01000011	43h	Manufacturer ID (Yamaha)
Sub status	0000xxxx	0nh	n=0 through 15 (MIDI channel 1 through 16)
Format number	01111110	7Eh	Universal Bulk Dump
Byte count (high byte)	00000000	00h	34 (24 + 10) bytes – decimal – 22h
Byte count (low byte)	00100010	22h	

Purpose of data	Binary value	Hex value	Explanation
Data name	01001100	4Ch	'L'
	00101101	4Dh	'M'
	00100000	20h	[space]
	00100000	20h	[space]
	00111000	38h	'8'
	01000001	41h	'A'
	00110100	34h	'4'
	00110000	30h	'0'
	01001100	4Ch	'M'
	0xxxxxxx	mmh	mm= 0 through 127 (scene memory number)
Data (d01)	0000xxxx	0nh	ON/OFF data where 0=OFF, 1=ON for Control Change 4 through 1
Data (dnn)	...		
Data (d24)	0000vxxx	0nh	Memory validity flag (v) and ON/OFF data where 0=OFF, 1=ON for Control Change 95 through 93
Checksum	0xxxxxxx	eeh	ee=INVERT('L'+ 'M'+(d01 +... dnn + ...d24)+1) AND 07fh
EOX	11110111	F7h	End of Exclusive

MIDI Bulk Dump requests are transmitted and received in the following format:

Purpose of data	Binary value	Hex value	Explanation
Status	11110000	F0h	System Exclusive message
ID number	01000011	43h	Manufacturer ID (Yamaha)
Sub status	0010xxxx	2nh	n=0 through 15 (MIDI channel 1 through 16)
Format number	01111110	7Eh	Universal Bulk Dump
Data name	01001100	4Ch	'L'
	00101101	4Dh	'M'
	00100000	20h	[space]
	00100000	20h	[space]
	00111000	38h	'8'
	01000001	41h	'A'
	00110100	34h	'4'
	00110000	30h	'0'
	01001100	4Ch	'M'
	0xxxxxxx	mmh	mm= 0 through 127 (scene memory number)
EOX	11110111	F7h	End of Exclusive

YAMAHA [ Mixing Console ]  
 Model PM3500 MIDI Implementation Chart

Date:24-NOV-1994  
 Version : 1.0

Function ...	Transmitted	Recognized	Remarks
Basic Default	1 - 16	1 - 16	memorized
Channel Changed	1 - 16	1 - 16	
Mode Default	x	OMNI ON/OFF	memorized
Mode Messages	x	OMNI ON/OFF	
Mode Altered	*****	x	
Note Number : True voice	x *****	x x	
Velocity Note ON	x	x	
Velocity Note OFF	x	x	
After Touch Key's	x	x	
After Touch Ch's	x	x	
Pitch Bender	x	x	
Control Change 1 - 88	x	o	*1
Control Change : True #	0/127		
Prog Change : True #	o 1 - 128	o	*2
System Exclusive	o	o	Bulk Dump/Request
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	

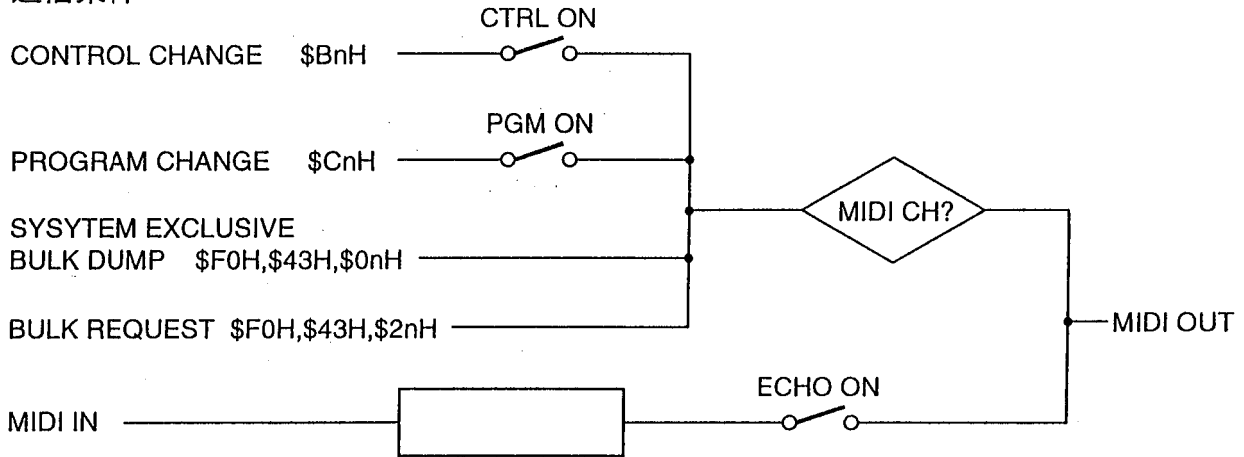
Notes: \*1 See Control Change chart.  
 \*2 For program 1 - 128, memory 1 - 128 is selected.

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

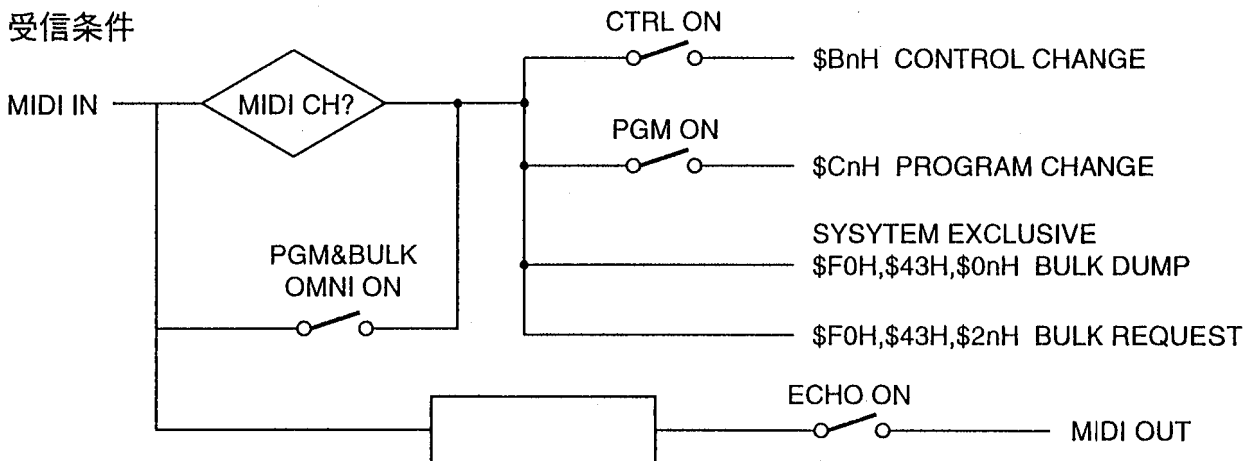
## ■ MIDIデータフォーマット

### 1 送受信条件

#### 送信条件



#### 受信条件



### 2 送受信信号

#### プログラムチェンジ

ユーティリティで送受信をON/OFFできます。  
 パネルでメモリーリコールがおこなわれたとき、そのNo.のプログラムチェンジを設定したMIDIチャンネルで送信します。  
 設定したMIDIチャンネルかOMNIで、プログラムチェンジを受信したとき、そのNo.のメモリーをリコールします。

#### コントロールチェンジ

ユーティリティで送受信をON/OFFできます。  
 コントロールチェンジチャートにSWと、コントロールチェンジナンバーが対応します。  
 パネルでON/OFFがおこなわれたとき、そのSWに対応したコントロールチェンジを設定したMIDIチャンネルで送信します。  
 設定したMIDIチャンネルでコントロールチェンジを受信したとき、それに対応したSWをON/OFFします。

#### システムイクスクルーシブメッセージ

送受信は常にONです。  
 バルクリクエストはユーティリティで、設定したMIDIチャンネルで送信できます。  
 バルクアウトはユーティリティで送信するか、もしくは設定したMIDIチャンネルかOMNIで、バルクリクエストを受信したとき、対応するメモリーの内容を設定したMIDIチャンネルで送信できます。  
 バルクアウトを受信したときは対応したメモリーの内容が変更します。

#### アクティブセンシング、MIDIリセット

アクティブセンシングの受信後300ms以上何も受信しなかったときか、MIDIリセット受信時に、ランニングステータスのクリアだけをおこないます。

### 3 ECHO BACK

アクティブセンシング (FEh)、未定義のシステム共通メッセージ (F4h、F5h)、1Kbyte以上のシステムイクスクルーシブルメッセージ、バルクアウトを送信するのに有効なバルクリクエスト、以上以外のメッセージを受信したとき、ユーティリティでECHOがONだと送信します。

受信メッセージは有効なデータ長が揃ったときに送信されますので、システムリアルタイムメッセージと順番が変わ

るときがあります。またランニングステータスもはたらかず、MIDIのアウトとインをループさせるとデータが無限に回ることになるのでONにするときは注意してください。

※本仕様書はPM3500に装備されるMIDIについて規定します。  
※電気的特性および信号はMIDI規格1.0に従います。

### BULK OUT,BULK DUMP REQUEST FORMAT

#### Scene Memory No. BULK OUT FORMAT

STATUS	1110000	F0h	System Exclusive Message
ID No.	01000011	43h	Manufacturer's ID No. (YAMAHA)
SUB STATUS	0000xxxx	0nh	n=0-15 (MIDI Channel 1-16)
FORMAT No.	01111110	7Eh	Universal Bulk Dump
BYTE COUNT (HIGH)	00000000	00h	34 (24+10) bytes
BYTE COUNT (LOW)	00100010	22h	
	01001100	4Ch	'L'
	01001101	4Dh	'M'
	00100000	20h	' '
	00100000	20h	' '
	00111000	38h	'8'
	01000001	41h	'A'
	00110100	34h	'4'
	00110000	30h	'0'
DATA NAME	01001100	4Ch	'M'
	0xxxxxxx	mmh	mm=0-127 (MEMORY No.1-128)
DATA	0000xxxx	d01	ON/OFF DATA assigned Control Change 4-1
	:	:	:
	0000vxxx	d24	: 95-93 v:MEMORY NO DATA FLAG
CHECK SUM	0xxxxxxx	eeh	ee=(INVERT('L'+ 'M'+...+d01+...+d24)+1) AND 7Fh
EOX	11110111	F7h	End of Exclusive

#### Scene Memory No. BULK REQUEST FORMAT

STATUS	1110000	F0h	System Exclusive Message
ID No.	01000011	43h	Manufacturer's ID No. (YAMAHA)
SUB STATUS	0010xxxx	2nh	n=0-15 (MIDI Channel 1-16)
FORMAT No.	01111110	7Eh	Universal Bulk Dump
	01001100	4Ch	'L'
	01001101	4Dh	'M'
	00100000	20h	' '
	00100000	20h	' '
	00111000	38h	'8'
	01000001	41h	'A'
	00110100	34h	'4'
	00110000	30h	'0'
DATA NAME	01001100	4Ch	'M'
	0xxxxxxx	mmh	mm=0-127 (MEMORY No.1-128)
EOX	11110111	F7h	End of Exclusive

Function ...	Transmitted	Recognized	Remarks
Basic Default	1 - 16	1 - 16	memorized
Channel Changed	1 - 16	1 - 16	
Mode Default	x	OMNI ON/OFF	memorized
Messages	x	OMNI ON/OFF	
Altered	*****	x	
Note	x	x	
Number : True voice	*****	x	
Velocity Note ON	x	x	
Note OFF	x	x	
After Key's	x	x	
Touch Ch's	x	x	
Pitch Bender	x	x	
1 - 88	x	o	*1
Control Change			
: True #	0/127		
Prog	o	o	*2
Change : True #	1 - 128		
System Exclusive	o	o	Bulk Dump/Request
System : Song Pos.	x	x	
: Song Sel.	x	x	
Common : Tune	x	x	
System :Clock	x	x	
Real Time :Commands	x	x	
Aux :Local ON/OFF	x	x	
:All Notes OFF	x	x	
Mes- :Active Sense	x	x	
sages:Reset	x	x	

Notes: \*1 See Control Change chart.  
 \*2 For program 1 - 128, memory 1 - 128 is selected.

## ■ INSPECTIONS

### 1 PREPARATIONS

- Connect the PM3500 and a PW4000 via the supplied DC power supply cable.
- Unless specified, the applied signal should be a sine wave of 1 kHz, -80 dBs and the impedance of the signal source should be 150 ohms. The load resistance of each output terminal should be as follows:

PHONES (L,R).....	8 $\Omega$ (5 W or more)
All INSERT OUT .....	10 k $\Omega$
Others .....	600 $\Omega$

Unless specified, controls and switches must be set as follows:

#### • CH INPUT (1-24, 32, 40, 48)

ASSIGN switch .....	ON during measurement only, OFF at all other times.
PAN switch.....	ON
PAN control.....	CENTER
+48V switch .....	OFF
GAIN trim.....	MAX (-70 dB)
30dB switch.....	OFF
φ switch.....	OFF (Positive phase)
EQ (HI, HI-MID, LO-MID, LO)	
LEVEL control.....	CENTER
FREQ control.....	MIN
Q control .....	CENTER
ON switch.....	OFF
(HI, LO)	
SHELF switch.....	OFF (PEAK)
INSERT ON switch.....	OFF
HPF FREQ control.....	MIN
HPF switch .....	OFF
AUX 1-8	
LEVEL control.....	MAX
ON switch .....	ON during measurement only, OFF at all other times.
PRE switch .....	OFF (POST)
ON/EDIT switch.....	ON during measurement only, OFF at all other times.
VCA GROUP (1-8) switch.....	OFF
CUE switch.....	ON for measuring channel only, OFF for all others.
Fader .....	MAX

#### • STEREO INPUT (1-4)

ASSIGN switch .....	ON during measurement only, OFF at all other times.
PAN switch.....	ON
L PAN control.....	L
R PAN control .....	R
GAIN trim.....	MAX (-30 dB)
L-MONO switch.....	OFF
φ switch.....	OFF (Positive phase)
EQ (HI, HI-MID, LO-MID, LO)	
LEVEL control.....	CENTER
FREQ control.....	MIN
Q control .....	CENTER
ON switch.....	OFF
(HI, LO)	
SHELF switch.....	OFF (PEAK)
INSERT ON switch.....	ON during measurement only, OFF at all other times.
HPF FREQ control.....	MIN
HPF switch .....	OFF

AUX 1-8

LEVEL control..... MAX  
 ON switch..... ON during measurement only, OFF at all other times.  
 PRE switch..... OFF (POST)  
 ST switch..... OFF (MONO)

ON/EDIT switch..... ON for measuring channel only, OFF for all others.  
 VCA GROUP (1-8) switch..... OFF  
 CUE switch..... ON for measuring channel only, OFF for all others.  
 Fader..... MAX

•MASTER

GROUP (1-8)

PAN control..... CENTER  
 GROUP TO ST switch..... ON during measurement only, OFF at all other times.  
 GROUP TO MATRIX switch..... ON during measurement only, OFF at all other times.  
 INSERT switch..... ON during measurement only, OFF at all other times.  
 Fader..... MAX  
 ON/EDIT switch..... ON during measurement only, OFF at all other times.  
 CUE switch..... ON during measurement only, OFF at all other times.

STEREO

ST TO MATRIX switch..... ON during measurement only, OFF at all other times.  
 INSERT switch..... ON during measurement only, OFF at all other times.  
 ON/EDIT switch..... ON during measurement only, OFF at all other times.  
 CUE switch..... ON during measurement only, OFF at all other times.  
 L Fader..... MAX  
 R Fader..... MAX

MATRIX (1-4)

SUB IN control..... MAX during measurement only, MIN at all other times.  
 MIX control..... MAX during measurement only, MIN at all other times.  
 PAN control..... CENTER  
 LEVEL control..... MAX  
 ON/EDIT switch..... ON during measurement only, OFF at all other times.  
 CUE switch..... ON during measurement only, OFF at all other times.

MATRIX (5-8)

SUB IN control..... MAX during measurement only, MIN at all other times.  
 MIX control..... MAX during measurement only, MIN at all other times.  
 LEVEL control..... MAX  
 ON/EDIT switch..... ON during measurement only, OFF at all other times.  
 CUE switch..... ON during measurement only, OFF at all other times.

AUX

INSERT switch..... ON during measurement only, OFF at all other times.  
 Fader..... MAX  
 ON/EDIT switch..... ON during measurement only, OFF at all other times.  
 CUE switch..... ON during measurement only, OFF at all other times.



MONITOR A

- PFL TRIM control ..... CENTER
- VCA CUE TRIM control..... CENTER
- SELECT switch ..... ON during measurement only, OFF at all other times.
- L MONO switch..... OFF
- R MONO switch..... OFF
- LEVEL control..... MAX
- ON switch..... ON during measurement only, OFF at all other times.
- PHONES level control ..... MAX during measurement only, MIN at all other times.

MONITOR B

- SELECT switch ..... ON during measurement only, OFF at all other times.
- LEVEL control..... MAX
- ON switch..... ON during measurement only, OFF at all other times.

TALKBACK

- ASSIGN switch..... ON during measurement only, OFF at all other times.
- OUT switch ..... ON during measurement only, OFF at all other times.
- OSC OUT switch ..... OFF
- OSC switch..... OFF
- OSC FREQ control..... MIN
- SWEEP switch..... OFF
- OSC LEVEL control ..... MAX
- TB LEVEL control ..... MAX
- ON switch..... ON during measurement only, OFF at all other times.

CTRL

- SOLO switch ..... ALL OFF
- SOLO SELECT switch..... ALL OFF
- CUE MODE SELECT switch..... LAST CUE

Others

- VCA MASTER Fader (1-8)..... MAX
- VCA MUTE (1-8) switch ..... ON during measurement only, OFF at all other times.
- VCA CUE switch..... ON during measurement only, OFF at all other times.
- METER SELECT switch..... MATRIX
- PHANTOM MASTER switch ..... OFF
- VCA CONTROL switch..... MASTER
- FAN LOW/HIGH switch ..... LOW
- LAMP DIMMER control..... MIN

MEASURING EQUIPMENT

- \* The balanced output type oscillator is to be used.
- \* The output impedance of the oscillator should be less than 10 ohms.
- \* The input impedance of the oscilloscope and the level meter should be more than 100 kohms.
- \* Noise level should be measured using a 12.7 kHz, -6 dB/oct. low-pass filter.
- \* We recommend that balanced input type measuring instruments are to be used.

**2 GAIN**

In status 1, the output level should be within the range given in Tables 2-1 to 2-10.

Table 2-1 Input Terminal [INPUT CH 1 to 24, 32, 40, 48]

Units: dBs

INPUT LEVEL	GAIN CTRL	30dB PAD	INSERT OUT	DIRECT OUT	GROUP OUT (1 to 8)	STEREO OUT (L, R)	MONI A OUT (L, R)
-80	MAX	OFF	-6 ±2	+4 ±2	+14 ±2	+14 ±2	+14 ±2 *2
-50	MAX	ON	----	----	+14 ±2 *1	----	----
-30	MIN	OFF	----	----	+14 ±2 *1	----	----

\*1 Measuring can be performed at either one of the output terminals of GROUP OUT (1 to 8).

\*2 Channel CUE switch should be turned ON.

Operate the PFL trim, and check that the output level changes from -14 dB to +6 dB, with the level when the PFL is set at center as reference.

When only one of the VCA GROUP switches (1 to 8) in an INPUT module is turned on, and the VCA CUE switch of the selected VCA MASTER is turned on, and the VCA CUE trim is operated, check that the same output is obtained.

When the VCA PRE PAN switch is turned on, check that the output level does not change by operating the PAN control of the INPUT module.

- The difference in level between INPUT (CH 1 to 24, 32, 40, 48) of each output should be less than 2 dB.
- The difference in level between GROUP OUT (1 to 8), STEREO OUT (L, R), and MONI A OUT (L, R) should be less than 2 dB.

Table 2-2 Input Terminal [INPUT CH 1 to 24, 32, 40, 48]

Units: dBs

INPUT LEVEL	GAIN CTRL	30dB PAD	PRE/POST SW	AUX OUT (1 to 8)
-30	MIN	OFF	POST	+20 ±2
-30	MIN	OFF	PRE	+10 ±2

- The difference in level between AUX OUT (1 to 8) should be less than 2 dB.

Table 2-3 Input Terminal [ST IN 1 to 4 (L, R)] \*1

Units: dBs

INPUT LEVEL	GAIN CTRL	L MONO SW	INSERT OUT	GROUP OUT (1 to 18)	STEREO OUT (L, R)	MONI A OUT (L, R) *4
-40	MAX	OFF	-6 ±2	+14 ±2	+14 ±2	+4 ±2
-40	MIN	OFF	----	+14 ±2 *2	----	----
-40	MIN	ON	----	+14 ±2 *3	----	----

\*1 Apply a signal to STEREO INPUT (L), then the output is obtained at the 1, 3, 5, 7 channels of the GROUP output and the L channel of the STEREO OUT and MONI A OUT.

Apply a signal to STEREO INPUT (R), then the output is obtained at the 2, 4, 6, 8 channels of the GROUP output and the R channel of the STEREO OUT and MONI A OUT.

At either time, no output is obtained at the opposite side.

\*2 Measure the output at the GROUP OUT (1, 2).

\*3 Apply a signal to STEREO INPUT (L), set the L-PAN control at center, then measure the output at the GROUP OUT (1, 2). At this time, the signal applied from the STEREO INPUT (R) is not output at any output.

\*4 Turn the CUE switch on.

- The difference in level between STEREO INPUT (1, 2) (L, R) and INPUT (CH 1 to 24, 32, 40, 48) of each output should be less than 2 dB.
- The difference in level between GROUP OUT (1 to 8), STEREO OUT (L, R), and MONI A OUT (L, R) should be less than 2 dB.

Table 2-4 Input Terminal [ST IN 1 to 4 (L, R)] \*1 Units: dBs

INPUT LEVEL	L MONO SW	GAIN CTRL	PRE SW	ST SW	AUX OUT (1 to 4)	AUX OUT (5 to 8)
-50	OFF	MAX	OFF	OFF	+13 ±2	+13 ±2
-50	OFF	MAX	ON	OFF	+3 ±2	+3 ±2
-50	ON	MAX	OFF	OFF	+10 ±2 *2	+10 ±2 *3
-50	OFF	MAX	OFF	ON	---	+10 ±2 *4

- \*1 Apply the same signal to the STEREO INPUT L and R inputs.
- \*2 Measuring can be performed at either one of the output terminals of AUX OUT (1 to 4).
- \*3 Measure at AUX OUT (5, 6) outputs.
- \*4 Apply a signal to STEREO INPUT (L), then the output is obtained at the AUX OUT (5, 7).  
When the signal is applied to STEREO INPUT (R), the output is obtained at the AUX OUT (6, 8).
- The difference in level between AUX OUT (1 to 8) should be less than 2 dB.

Table 2-5 Input Terminal [TB IN] Units: dBs

INPUT TERMINAL	INPUT LEVEL	GROUP OUT(1 to 8)	STEREO OUT (L, R)	AUX OUT (1 to 8))	MONI B (L, R)	TB OUT
TB IN	-60	+14 ±2	+14 ±2	+14 ±2	+14 ±2 *1	+4 ±2

- \*1 Turn on the TB switch of the MONI B.
- The difference in level between each output should be less than 2 dB.

Table 2-6 Output Terminal [MONITOR A] Units: dBs

INPUT TERMINAL	SELECT SW	INPUT LEVEL	L MONO	R MONO	OUTPUT LEVEL
2TR IN 1 (L, R)	2TR IN 1	+4.0	OFF	OFF	+14 ±2 *4
2TR IN 2 (L, R)	2TR IN 2	+4.0	OFF	OFF	+14 ±2 *4
2TR IN 2 (L, R)	2TR IN 2	+4.0	ON	OFF	+14 ±2 *1
2TR IN 2 (L, R)	2TR IN 2	+4.0	OFF	ON	+14 ±2 *2
2TR IN 2 (L, R)	2TR IN 2	+4.0	ON	ON	+17 ±2 *3

- \*1 The output is obtained when a signal is applied to the 2TR IN (L).
- \*2 The output is obtained when a signal is applied to the 2TR IN (R).
- \*3 Apply the same signal to the 2TR IN (L, R).
- \*4 When the TB and TB ON switches are turned on, the output level is -6 dB, with the level when the switches are off as reference.
- The difference in level between MONI A OUT (L, R) should be less than 2 dB.

Table 2-7 Output Terminal [MONITOR B] Units: dBs

INPUT TERMINAL	SELECT SW	INPUT LEVEL	OUTPUT LEVEL
2TR IN 1 (L, R)	2TR IN 1	+4.0	+14 ±2
2TR IN 2 (L, R)	2TR IN 2	+4.0	+14 ±2
---	MON A *1	---	+14 ±2

- \*1 Set the MONI A at a condition described in the Table 2-6.
- The difference in level between MONI B OUT (L, R) should be less than 2 dB.

Table 2-8 Input Terminal [INSERT] Units: dBs

INPUT TERMINAL	INPUT LEVEL	GROUP OUT (1 to 8)	STEREO OUT (L, R)	AUX OUT (1 to 8)
CH (1 to 24, 32, 40, 48)	-6	+14 ±2 *1	---	---
ST IN (1 to 4) (L, R)	-6	+14 ±2 *2	---	---
GROUP (1 to 8)	+4	+14 ±2	---	---
STEREO (L, R)	+4	---	+14 ±2	---
AUX (1 to 8)	+4	---	---	+14 ±2

- \*1 Measuring can be performed at either one of the output terminals of GROUP OUT (1 to 8).
- \*2 Measuring can be performed at either two (ODD, EVEN) of the output terminals of GROUP OUT (1 to 8).
- The difference in level between INPUT (CH 1 to 24, 32, 40, 48) of each output should be less than 2 dB.
- The difference in level between STEREO INPUT (CH 1 to 4) (L, R) of each output should be less than 2 dB.
- The difference in level between GROUP OUT (1 to 8), STEREO OUT (L, R), AUX OUT (1 to 8) and MATRIX OUT (1 to 8) should be less than 2 dB.

Table 2-9 Input Terminal [SUB IN]

Units: dBs

INPUT TERMINAL	INPUT LEVEL	GROUP OUT (1 to 8)	STEREO OUT (L, R)	AUX OUT (1 to 8)	MATRIX 1 to 4 (L, R)	MATRIX 5 to 8	MONI A (L, R)
GROUP (1 to 8)	+4	+14 ±2	+24 ±2 *1	---	+24 ±2 *2	+24 ±2 *2	+24 ±2 *4
STEREO (L, R)	+4	----	+14 ±2	---	----	----	+24 ±2 *4
AUX (1 to 8)	+4	----	----	+14 ±2	----	----	+24 ±2 *4
MATRIX (L, R)	+4	----	----	----	+14 ±2	+14 ±2	+24 ±2 *4
CUR (L, R) *3	+4	----	----	----	----	----	+14 ±2

- \*1 Turn on the GROUP TO ST switch. When the PAN control is rotated fully counterclockwise or clockwise, the both output levels of the L and R channels should be +3 dB, with the level when the PAN control is set at center as reference.
- \*2 Turn on the GROUP TO MATRIX switch.
- \*3 Turn on either one of the CUE switches.  
Check that the mode is set at PRE FADER when the MASTER CUE PRE switch is on.  
Check that the ODD is assigned to the L channel and the EVEN is to R of AUX (1 to 8) and GROUP (1 to 8), when the mode is set to ST.
- \*4 Switch on each CUE switch of the MASTER CUE.
- The output of +4 ±2 dBs is obtained at each INSERT OUT.
- The difference in level between GROUP OUT (1 to 8), STEREO OUT (L, R), AUX OUT (1 to 8), MATRIX OUT (1 to 8) and CUE (L, R) should be less than 2 dB.

Table 2-10

MONI A OUT (L, R)	PHONES (L, R)
+4 dBs	0 ±2 dBs

The PHONES output given in Table 2-10 should be obtained when the output level of MONI A OUT is rated value. The difference in level between PHONES L and R outputs should be less than 2 dB.

### 3 FREQUENCY CHARACTERISTICS

If the applied signal frequencies are 20 Hz, 20 kHz in the status 1, the output level of each output should be within 0 +1/-3 dB with the level at 1 kHz used as reference.

When the applied signal frequency is 20 Hz, the PHONES output level should be within -2 ±2 dB.

### 4 EQ CHANGE CHARACTERISTICS

When each of the EQ controls of a Monaural INPUT and STEREO INPUT modules are operated in status 1, the output level of GROUP OUT (1) of each frequency should fall within the range given in Table 4-1 to Table 4-4, with the output level when the control is set in the middle as reference.

If an output level is more or less than the rated range, vary the frequency of the applying signal within ±20 %. If this output level is within the rated value given in Tables, then it is acceptable.

- The output should be measured at GROUP OUT (2) when the signal is applied to the STEREO INPUT (R).

Table 4-1 [HI] Units: dB

GAIN	FREQ	Q	SHELF	1 kHz	5 kHz	20 kHz
MIN	MIN	MIN	OFF	-15 ±2	----	----
MAX	MAX	MIN	OFF	----	+1 ±2	+15 ±2
MAX	MAX	MIN	ON	----	----	+12 ±2
MAX	MAX	MAX	OFF	----	+10 ±2	+15 ±2

Table 4-2 [HI-MID] Units: dB

GAIN	FREQ	Q	400 Hz	2 kHz	8 kHz
MIN	MIN	MIN	-15 ±2	----	----
MAX	MAX	MIN	----	+1 ±2	+15 ±2
MAX	MAX	MAX	----	+10 ±2	+15 ±2

Table 4-3 [LO-MID] Units: dB

GAIN	FREQ	Q	80Hz	400Hz	1.6kHz
MIN	MIN	MIN	-15 ±2	----	----
MAX	MAX	MIN	----	+1 ±2	+15 ±2
MAX	MAX	MAX	----	+10 ±2	+15 ±2

Table 4-4 [LO] Units: dB

GAIN	FREQ	Q	SHELF	30 Hz	160 Hz	600 Hz
MIN	MIN	MIN	OFF	-15 ±2	----	----
MAX	MAX	MIN	OFF	----	+1 ±2	+15 ±2
MAX	MAX	MIN	ON	----	----	+12 ±2
MAX	MAX	MAX	OFF	----	+10 ±2	+15 ±2

**5 HPF CHANGE CHARACTERISTICS**

In status 1, if the HPF switch is switched on and HPF-f controls of the Monaural INPUT and STEREO INPUT are operated, the output level of GROUP OUT (1) should be within the range given in Table 5, with the level when HPF is off as reference.

Table 5

HPF FREQ	20 Hz	400 Hz
MIN	-3 ±2	----
MAX	----	-3 ±2

- The output should be measured at GROUP OUT (2) when the signal is applied to the STEREO INPUT (R).

In status 2, if a signal is applied to the TB IN connector, the output level of GROUP OUT (1) should be within the range of -3 ±2 dB, with the level when the frequency of the signal is 80 Hz and HPF is off as reference.

**6 SEPARATION**

In each of the Monaural INPUT and STEREO INPUT modules, switch on the PAN and Assign (1, 2), rotate the PAN control counterclockwise in status 1. At this time, if the output level of GROUP OUT (1) is set at +20 dBs, the leakage level to GROUP OUT (2) should be less than -50 dBs.

Rotate the PAN control clockwise, and adjust the output level obtained at the GROUP OUT (2) to +20 dBs, the leakage level to GROUP OUT (1) should be less than -50 dBs.

Inspection of the separation of the STEREO OUT (L, R) can be performed in a similar manner.

- In performing the inspection of the STEREO INPUT, apply the same signal to the STEREO INPUT (L, R), and measure the output when the PAN control is rotated clockwise and counterclockwise.

## 7 VCA MUTING

In status 1, apply a signal of -50 dBs to each input terminal of INPUT (CH 1 to 24, 32, 40, 48) and minimize the FADER control, and check that the output level of each DIRECT OUT should be less than -76 dBs. (120 dB)

Next, apply a signal of -10 dBs to each input terminal of the STEREO INPUT (1 to 4) (L, R) and minimize the FADER control, and check that the output level of each GROUP OUT (1, 2) should be less than -76 dBs. At this time, the FADER of the GROUP module must be set at nominal position.

If the signal is applied to the STEREO INPUT (L), measuring must be performed at the GROUP OUT (1).

When the signal is applied to the STEREO INPUT (R), measuring must be performed at the GROUP OUT (2).

## 8 METER, PEAK & Σ PEAK LED LIGHT-UP LEVEL

Apply signals to each of the Monaural INPUT and STEREO INPUT in status 1, each LED should light up within the range given in Table 8.

When you check the Σ PEAK LED, the signal must be applied to the SUB IN.

INSERT OUT	SIGNAL	NOMINAL	PEAK	Σ PEAK
OUTPUT LEVEL	-16 ±2	+4 ±2	+23.5 ±2	+23.5 ±2

Check that the PEAK LED lights up at the same level even when only the PEAK EQ is turned on and the EQ 1KHz is set at maximum.

When the EQ is turned off and INSERT is on, and the signal is applied to the INSERT IN shortened with an 150 Ω resistor, LEDs will light up at the same level. But this time, the SIGNAL and NOMINAL LED remain off.

## 9 DISTORTION FACTOR

Minimize the GAIN control and set each of FADER and level controls in a Monaural INPUT and a STEREO INPUT at the nominal position in status 2. When a +14 dBs output is obtained at each output terminal, the distortion factor should be less than 0.01 %. Measuring can be performed at either one of the output when the frequency of the input signal is 20 Hz and 20 kHz.

Apply a signal to the TB IN and check that the distortion factor at the TB OUT is less than 0.1 % in a similar manner.

Check that when 0 dBs output is obtained at each terminal of PHONES (1, 2) L, the distortion factor obtained at each terminal should be less than 0.7 %. Check the output at the PHONES (1, 2) R in the same manner.

## 10 MAXIMUM OUTPUT

When +24 dBs output is obtained at each output terminal in status 9, check that the distortion factor should be less than 1 %. While this check is being performed, the GAIN control of the STEREO INPUT must be set at the maximum position. Also, check that the distortion factor should be less than 1 % when +3 dBs is obtained at each output terminal of PHONES (1, 2) (L, R). Measuring of the PHONES must be performed at each output.

## 11 VU Meter

When +4 dBs output is obtained at each output of GROUP OUT (1 to 8), STEREO OUT (L, R), AUX OUT (1 to 8), MATRIX OUT (1 to 8), TB OUT and OSC OUT in status 1, the indication on each VU meter should be within  $0 \pm 0.1$  VU. At this time, the output level of the MINI A OUT should be +14 dBs.

When the METER SELECT switch is changed over to each output, the VU meter indication should be within  $0 \pm 0.1$  VU.

- If the VU meter indication is not within the rated value, adjust the trimmer potentiometer on the MT board so that the indication should be within  $0 \pm 0.1$  VU.

Also, check that the red PEAK LED lights up when the output level is within  $+23.5 \pm 2$  dBs.

## 12 NOISE LEVEL

When the HOT, COLD of each input terminal of the STEREO MASTER is shortened with an 150 ohm in status 1, check that the noise level at GROUP OUT (1) should be less than -34 dBs. When the TB IN is shortened, the noise level should be less than -54 dBs.

- If the noise level is more than the rated value, find the noise level by input conversion.  
If this noise level is less than -128 dBs, then it is acceptable.
- The noise level of the STEREO INPUT must be less than -50 dBs under the same inspection.
- When the STEREO INPUT (R) is connected with an 150 ohm resistor, the noise level must be measured at the GROUP OUT (2).

## 13 RESIDUAL NOISE

Set the FADER and AUX controls of all Monaural INPUT and STEREO INPUT at the minimum position and turn Assign switches off, in status 1, and turn the ON switch of each output of MASTER on.

In this state, set the MASTER FADER and MASTER level controls at the maximum or minimum position, check that the noise level should fall within the levels shown in Table 13.

Table 13 Residual Noise Units: dBs

GROUP, ST, AUX FADERS & AUX, CUE LEVEL CONTROLS	GROUP OUT (1 to 8)	STEREO OUT (L, R)	AUX OUT (1 to 8)	MATRIX OUT (1 to 8)	MONI A OUT (L, R)	MONI B OUT (L, R)	TB OUT
MAXIMUM	-75	-74	-71	-82	-73 *1	-90	---
MINIMUM	-98	-98	-98	-98	-98	-98	-90

\*1 Turn on the MATRIX CUE switch.

## 14 PHASE

The signal phase applied to each input terminal and the signal phase obtained at each output terminal should be the same in status 1.

And check that the applied signal to each input terminal and the signal obtained at each output terminal should be in negative phase when the PHASE ( $\phi$ ) switch of the Monaural INPUT or STEREO INPUT is switched on.

\* Pin polarity of balanced type input / output terminal

(XLR type)	(PHONE type)
PIN 1:..... GND	T:.....HOT (+)
PIN 2:..... HOT (+)	R:.....COLD (-)
PIN 3:..... COLD (-)	S:.....GND

## 15 OSCILLATOR

Turn on TB OUT, OSC OUT and "10kHz" switches in status 1, the output levels of TB OUT and OSC OUT are  $+14 \pm 2$  dBs. Check for the same at "1kHz", "100Hz" and "PINK".

At this time, check that the distortion rates of "10kHz", "1kHz" and "100Hz" should be less than 1 %.

Check that the output levels and frequencies of TB OUT and OSC OUT are within the range given in Table 15, when the SWEEP switch and OSC FREQ control are changed.

Table 15

OSC SW	OSC FREQ CTRL: MIN		OSC FREQ CTRL: MAX		SWEEP SW. OFF
	LEVEL (dB)	FREQ. (Hz)	LEVEL (dB)	FREQ. (Hz)	
10 kHz	$+14 \pm 2$	2 kHz $\pm 20\%$	$+14 \pm 2$	20 kHz $\pm 20\%$	10 kHz $\pm 20\%$
1 kHz	$+14 \pm 2$	200 Hz $\pm 20\%$	$+14 \pm 2$	2 kHz $\pm 20\%$	1 kHz $\pm 20\%$
100 Hz	$+14 \pm 2$	20 Hz $\pm 20\%$	$+14 \pm 2$	200 Hz $\pm 20\%$	100 Hz $\pm 20\%$

The OSC ON LED indicator should be lighting until the OSC switch is turned off.

**16 VCA CONTROL**

When only one of the VCA GROUP switches (1 to 8) in each of the Monaural INPUT and STEREO INPUT is turned on under condition in status 1, the output level of GROUP OUT (1) is  $+10 \pm 2$  dB with the level when the switch is off as reference, while the input signal to the STEREO INPUT is -40 dB.

Check that when all of VCA MASTER (1 to 8) faders are minimized and only one of the VCA GROUP switches (1 to 8) in each INPUT and STEREO INPUT is turned on, the output level of GROUP OUT (1) is less than -80 dB, with the level when the switch is off as reference. Check that the same result is obtained when the VCA MASTER faders (1 to 8) are set at the nominal position and the VCA MUTE switch is turned on.

The NOMINAL LED should light up within the range of  $0 \pm 1$  dB on the panel scale.

**17 EXTERNAL VCA CONTROL**

When VCA CONTROL switch is set at MASTER, and each of the VCA MASTER faders (1 to 8) is operated, the output within the range given in Table 17 should be obtained at each VCA BUS terminal of the EXTERNAL CONTROL connector.

Check that the output in the range of  $0 \pm 0.5$  V can be obtained, regardless of the VCA MASTER fader when the VCA CONTROL switches are turned to SLAVE.

Table 17

VCA MASTER FADER	VOLTAGE
MAX	$+0.5 \pm 0.05$ V
MIN	less than -9 V

**18 PHANTOM**

Connect a load resistance (10 kohms, 1 W or greater) between the input connector pins 1 and 2 of each INPUT, STEREO INPUT and TB IN, and short pins 2 and 3.

When the PHANTOM MASTER is switched on, and +48V switch of each INPUT module is turned on, a voltage of  $+35 \pm 3$  V should be obtained at both ends of the load resistance.

**19 LAMP POWER SUPPLY**

When the load resistance (3 kohms, 5 W or greater) is connected between the Lamp XLR connector pins 3 and 4, and the LAMP DIMMER is operated, the voltage at both ends of the load resistance should be within the range given in the Table 19.

Table 19

LAMP DIMMER	VOLTAGE
MAX	$+11 \pm 1$ V
MIN	$+2 \pm 1$ V

**20 FAN SPEED SWITCH**

When the FAN switch is switched to LOW/HIGH, the operating speed of the mounted cooling fans is set at LOW/HIGH.

**21 POWER INDICATOR**

Check that +12V, +19V, -19V and +48V LED indicators light up green in status 1. When the PHANTOM MASTER is turned on, the color of the +48V LED should change to red.

Check that when the POWER switch is turned on, the PW CAUTION LED lights up red just a second, and then goes right back off.

**22 POWER SUPPLY VOLTAGE FLUCTUATION**

Even a fluctuation of  $\pm 10\%$  in the rated power supply voltage should pose no problems in the operations.