

MIXING CONSOLE

PM3500M

SERVICE MANUAL

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The PM3500M is essentially the same as a PM3500.  
MONITOR INPUT modules are installed instead of Monaural INPUT  
and STEREO INPUT modules.  
You must have a PM3500 service manual [011260] before servicing  
this unit. This service manual describes only about the MONITOR  
INPUT module.

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PM3500Mの基本的仕様は、PM3500と同様です。PM3500Mでは、イン  
プットモジュールが、全てMONITOR INPUTモジュールとなっています。  
PM3500Mのアフターサービス実施時には、本サービスマニュアルと共に、  
PM3500のサービスマニュアル [011260] をご準備下さい。  
本サービスマニュアルは、MONITOR INPUTモジュールに関連した部分に  
ついてのみ記載しています。

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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 principal-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 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 board. 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 ma 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

PM3500M mixing console general specifications

Total Harmonic Distortion (Master Output)	< 0.1% (THD+N)	20Hz – 20kHz @ +14dBu, 600Ω
	<0.01% (2nd to 10th harmonics)	20Hz – 20kHz @ +14dBu, 600Ω
Frequency response (Master Output)	0±1/3dB	20Hz – 20kHz @ +4dBu, 600Ω
Hum and Noise (20Hz – 20kHz) Rs=150Ω Input gain = Max Input PAD = OFF Input sensitivity = -70dB Hum and noise ^a (20Hz – 20kHz) 48ch	-128dB	Equivalent input noise
	-98dB	Residual output noise
	-54dB (58dB S/N)	GROUP OUT Master fader and one channel fader at nominal
	-84dB (88dB S/N)	STEREO OUT Master fader at nominal and all channel assign switches off and all group to stereo switches off
	-81dB (85dB S/N)	AUX OUT Master fader at nominal and all channel AUX mix switches off
	-92dB (96dB S/N)	MATRIX OUT Master level control at nominal and all Matrix mix controls at minimum
	-81dB (85dB S/N)	GROUP OUT Master fader at nominal and all group mix switches off
Crosstalk	-80dB @ 1kHz, -70dB @ 10kHz	adjacent inputs
	-80dB @ 1kHz, -70dB @ 10kHz	input to output
Maximum voltage gain	74dB	CH IN to CH INSERT OUT
	90dB	CH IN to AUX OUT (pre-fader)
	100dB	CH IN to AUX OUT (post-fader)
	84dB	CH IN to MONITOR OUT (INPUT CUE)
	64dB	TALKBACK IN to TALKBACK OUT
	10dB	SUB IN to OUT
	10dB	2TR IN to MONITOR OUT
	74dB	CH IN to DIRECT OUT
	90dB	CH IN to GROUP OUT (pre-fader)
	100dB	CH IN to GROUP OUT (post-fader)
	100dB	CH IN to STEREO OUT (CH to ST)
	110dB	CH IN to STEREO OUT (GROUP to ST)
110dB	CH IN to MATRIX OUT (GROUP to MATRIX)	
Mono Input PAD switch	30dB	
Mono Input gain control	50dB variable	
VCA cue gain trim	20dB (-14dB to +6dB)	
PFL (Input cue) gain trim	20dB (-14dB to +6dB)	

PM3500M

Input high-pass filter	12dB/octave roll-off	below 20 – 400Hz at –3dB point
Channel equalization ±15dB max	1kHz – 20kHz	HIGH (shelving/peaking, Q= 0.5 – 3)
	400Hz – 8kHz	HIGH MID (peaking, Q= 0.5 – 3)
	80Hz – 1.6kHz	LOW MID (peaking, Q= 0.5 – 3)
	30Hz – 600Hz	LOW (shelving/peaking, Q= 0.5 – 3)
Talkback high-pass filter	12dB/octave roll-off	80Hz at –3dB point
Oscillator/noise	Sine wave @ 100Hz, 1kHz, 10kHz or pink noise	Sweepable from 0.2 to 2 times nominal frequency; less than 1% THD @ + 4dB output
Phantom power	+48V DC applied to balanced inputs	via 6.8kΩ current-limiting isolation resistors. Rear-panel PHANTOM MASTER switch turns all on or off. When Master is ON, individual channels' phantom power may be switched with channels' PHANTOM switches
Channel Indicators	Built into each monaural and stereo input module (two each per stereo module)	
PEAK	Red	Turns on when pre- or post-EQ level reaches 3dB below clip level
NOMINAL	Orange	Turns on when post-EQ level reaches nominal level
SIGNAL	Green	Turns on when post-EQ level reaches 20dB below nominal level
Σ Peak Indicators	Red	In each GROUP, AUX and STEREO bus turns on when pre-fader level reaches 3dB below clip level
Scene memories	Direct Recall	Memories 1 through 8
	Switchable recall	Memories 1 through 128
VU meters	2 large, 12 smaller	All switchable, all illuminated, with true VU ballistics
VU meter peak indicators	In each meter (red LED)	Turns on when level reaches 3dB below clip level
Dimensions		
Height	335mm (13.2in)	all models
Depth	900mm (35.4 in)	all models
Width	1822mm (71.7 in)	44-channel, center master model
	2062mm (81.2 in)	52-channel, center master model
Weight	129kg (283.8 lb)	44-channel, center master model
	145kg (319 lb)	52-channel, center master model
Supplied accessories	PW4000 power supply	
	Umbilical cable for power supply	
	Label (ST,CH)	

a. Hum and noise are measured with a 6dB/octave filter @ 12.7kHz; equivalent to a 20kHz filter with infinite dB/octave attenuation

• Input characteristics

Connection	PAD	Gain Trim	Actual load impedance	For use with nominal	Input level ^a			Connector in Mixer ^b
					Sensitivity ^c	Nominal	Max. before clip	
CH IN (1 through ch# ^d)	0	-70	3k Ω	50 Ω – 600 Ω mics and 600 Ω lines	-96dB (12 μ V)	-70dB (245 μ V)	-48dB (3.09mV)	XLR-3-31 type
	30				-66dB (388 μ V)	-40dB (7.75mV)	-18dB (97.6mV)	
	0	-20			-46dB (3.88mV)	-20dB (77.5mV)	+2dB (976mV)	
	30				-16dB (123mV)	+10dB (2.45V)	+32dB (30.9V)	
TALKBACK IN			3k Ω	50 Ω – 600 Ω mics	-70dB (245 μ V)	-50dB (2.45mV)	-28dB (30.9mV)	XLR-3-31 type
2TR IN (1, 2) [L,R]			10k Ω	600 Ω lines	-6dB (388mV)	+4dB (1.23V)	+26dB (15.5V)	XLR-3-31 type
GROUP (1 through 8) SUB IN			10k Ω	600 Ω lines	-6dB (388mV)	+4dB (1.23V)	+26dB (15.5V)	XLR-3-31 type
STEREO [L, R] SUB IN								
AUX (1 through 8) SUB IN								
MATRIX [L, R] SUB IN								
CUE [L, R] SUB IN								
CH (1 through ch#) INSERT IN			10k Ω	600 Ω lines	-22dB (123mV)	+4dB (1.23V)	+26dB (15.5V)	Phone jacks (TRS) ^e
GROUP (1 through 8) INSERT IN								
STEREO [L, R] INSERT IN								
AUX (1 through 8) INSERT IN								

- In these specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V_{rms}
- All XLR connectors are balanced
- Sensitivity is the lowest level that will produce an output of +4dB (1.23V) or the nominal output level when the unit is set to maximum level
- 44 channels or 52 channels
- All phone jacks are balanced (T=hot, R=cold, S=Gnd)

• Output characteristics

Connection	Actual Source Impedance	For use with nominal	Output level ^a		Connector in mixer
			Nominal	Max before clip	
GROUP (1 through 8) OUT STEREO [L,R] OUT AUX (1 through 8) OUT STMATRIX (1 through 4) [L, R] OUT MATRIX (1 through 4) OUT MONITOR (A, B) [L, R] OUT TALKBACK OUT OSC OUT	150Ω	600Ω lines	+4dB (1.23V)	+24dB (12.3V)	XLR-3-32 type ^b
CH DIRECT OUT (1 through ch ^c)	150Ω	600Ω lines	+4dB (1.23V)	+24dB (12.3V)	Phone jack (TRS) ^d
CH (1 through ch ^c) INSERT OUT GROUP (1 through 8) INSERT OUT STEREO [L, R] INSERT OUT AUX (1 through 8) INSERT OUT	150Ω	10kΩ lines	+4dB (1.23V)	+24dB (12.3V)	Phone jack (TRS) ^d
PHONES (1, 2) [L, R] OUT	15Ω	8Ω phones	75mW	150mW	Stereo phone jack ^e
		40Ω phones	65mW	150mW	

- a. In these specifications, when dB represents a specific voltage, 0dB is referenced to 0.775V_{rms}
- b. All XLR connectors are balanced
- c. 48 channels or 52 channels
- d. Phone jacks are balanced (T=hot, R=cold, S=Gnd)
- e. Stereo phone jacks are unbalanced

■ 総合仕様

Total Harmonic Distortion (Master Output)	<0.1%(THD+N), 20Hz~20kHz @ +14dB 600ohms <0.01%(2nd~10th), 20Hz~20kHz @ +14dB 600ohms
Frequency Response (Master Output)	+1, -3dB 20Hz~20kHz @ +4dB 600ohms
Hum & Noise (52CH) (20Hz~20kHz) Rs=150ohms Input Gain=Max. Input Pad=OFF Input sensitivity=-70dB	-128dB Equivalent Input Noise -98dB Residual Output Noise -54dB(58dB S/N)GROUP OUT Master fader and one Ch fader at nominal level. -84dB(88dB S/N)STEREO OUT Master fader at nominal level and all Ch assign SW's off and all G to ST SW's off. -81dB(85dB S/N)AUX OUT Master fader at nominal level and all Ch Aux mix SW's off. -92dB(96dB S/N)MATRIX OUT Master level control at nominal level and all Matrix Mix controls at minimum level. -81dB(85dB S/N)GROUP OUT Master fader at nominal level and all Ch Group mix SW's off.
*Hum and noise are measured with a 6dB/octave filter @12.7kHz; equivalent to a 20kHz filter with infinite dB/octave attenuation	
Maximum Voltage Gain	74dB CH IN to CH INSERT OUT 90dB CH IN to AUX OUT (Pre Fader) 100dB CH IN to AUX OUT (Post Fader) 84dB CH IN to MONITOR OUT (INPUT CUE) 64dB TB IN to TB OUT 10dB SUB IN to OUT 10dB 2TR IN to MONITOR OUT 74dB CH IN to DIRECT OUT 90dB CH IN to GROUP OUT (Pre Fader) 100dB CH IN to GROUP OUT (Post Fader) 100dB CH IN to STEREO OUT (CH to ST) 110dB CH IN to STEREO OUT (GROUP to ST) 110dB CH IN to MATRIX OUT (GROUP to MATRIX)
Channel Equalization	±15dB maximum HIGH 1k~20kHz (shelving/peaking, Q=0.5~3) HI-MID 0.4k~8kHz (peaking, Q=0.5~3) LO-MID 80~1.6kHz (peaking, Q=0.5~3) LOW 30~600Hz (shelving/peaking, Q=0.5~3)
Input High Pass Filter	12dB/octave roll-off below 20~400Hz at -3dB point.
Crosstalk	-80dB @ 1kHz, -70dB @ 10kHz adjacent inputs. -80dB @ 1kHz, -70dB @ 10kHz input to output.
Oscillator/Noise	Switchable sine wave @ 100Hz, 1kHz or 10kHz (×0.2~×2.0, Less than 1% T.H.D @ +4dB output), or pink noise.
TB High Pass Filter	12dB/octave roll-off 80Hz at -3dB point.
Mono Input PAD SW	30dB
Mono Input Gain control	50dB variable
VCA Cue Gain trim	20dB (-14~+6dB) variable
PFL Gain trim (Input Cue)	20dB (-14~+6dB) variable
Channel Peak Indicators	LED (red) built into each CH input module turns on when pre-EQ level or post-EQ level reaches 3dB below clipping.

Ch Nominal Indicators	LED (orange) built into each CH input module turns on when post-EQ level reaches nominal level.
Ch Signal Indicators	LED (green) built into each CH input module turns on when post-EQ level reaches 20dB below nominal level.
Σ Peak Indicators	LED (red) built into each GROUP, AUX and ST Buss turns on when pre-Fader level reaches 3dB below clipping.
Scene Memory	Direct Scene Memory recall switches (1~8) Switchable Scene Memory recall (1~128)
VU Meters	(OVU = +4dB output @ 600ohms load) 2 large, illuminated meters; STEREO L, R 12 smaller, illuminated meters; all switchable. # 1; GROUP 1/MTRX1 L/AUX1 # 2; GROUP 2/MTRX1 R/AUX2 # 3; GROUP 3/MTRX2 L/AUX3 # 4; GROUP 4/MTRX2 R/AUX4 # 5; GROUP 5/MTRX3 L/AUX5 # 6; GROUP 6/MTRX3 R/AUX6 # 7; GROUP 7/MTRX4 L/AUX7 # 8; GROUP 8/MTRX4 R/AUX8 # 9; CUE L/MTRX5 # 10; CUE R/MTRX6 # 11; TB OUT/MTRX7 # 12; OSC OUT/MTRX8
VU Meter Peak Indicators	LED (red) built into each VU meter turns on when output signal is above the level 3dB lower than clipping level.
Phantom Power	+48V DC is applied to balanced inputs (via 6.8kohms current-limiting/isolation resistors) for powering condenser microphones; may be turned ON or OFF via rear-panel phantom Master switch. When Master is ON, individual channels may be turned ON or OFF via +48V switches on each input module.
Dimension	Height 335mm Depth 900mm Width 44ch: 1822mm 52ch: 2062mm
Weight	44ch: 129kg 52ch: 145kg
Supplied Accessories	PW4000 power supply 電源用多芯ケーブル ラベル (ST CH)
オプション	モノラルインプットモジュール: MN3500 モノラルインプットモジュール: MN3500M グループマスターモジュール1: GRM3500-1 グループマスターモジュール2: GRM3500-2 ステレオマスターモジュール1: STM3500 モニターモジュール: MON3500 コントロールモジュール: CNT3500 ブランクモジュール: BL3500 モノラルインプットリアパネル: MNRP3500 ステレオインプットリアパネル: STRP3500 入力トランス: IT3500 照明ランプ: LA1800

■入力仕様

コネクション	PAD	GAIN Trim	実効入力インピーダンス	ソースインピーダンス	入力レベル**			使用コネクタ**
					感度**	ノミナルレベル	MAX(クリップ時)	
CH IN **1~*ch	0	-70	3k Ω	50~600 Ω Mics & 600 Ω Lines	-96dB(12 μ V)	-70dB(245 μ V)	-48dB(3.09mV)	XLR-3-31type
	30				-66dB(388 μ V)	-40dB(7.75mV)	-18dB(97.6mV)	
	0	-20			-46dB(3.88mV)	-20dB(77.5mV)	+2dB(976mV)	
	30				-16dB(123mV)	+10dB(2.45V)	+32dB(30.9V)	
SUB IN			10k Ω	600 Ω Lines	-6dB(388mV)	+4dB(1.23V)	+26dB(15.5V)	XLR-3-31type
TALKBACK IN			3k Ω	50~600 Ω Mics	-70dB(245 μ V)	-50dB(2.45mV)	-28dB(30.9mV)	XLR-3-31type
2TR IN 1,2 (L,R)			10k Ω	600 Ω Lines	-6dB(388mV)	+4dB(1.23V)	+26dB(15.5V)	XLR-3-31type
INSERT IN								
CH**1~*ch			10k Ω	600 Ω Lines	-22dB(61.6mV)	+4dB(1.23V)	+26dB(15.5V)	Phones Jack(TRS)
GROUP (1~8) STEREO (L,R) AUX (1~8) CUE (L,R) MTRX (L,R)			10k Ω	600 Ω Lines	-6dB(388mV)	+4dB(1.23V)	+26dB(15.5V)	Phones Jack(TRS)

*1 PM3500M -44C:44ch, -52C:52ch

*2 規定出力レベル (+4dB=1.23V) の出力を得るために必要な最小の入力レベル

*3 全てのXLRコネクタおよびフォンジャックはバランスタイプ (T=+, R=-, S=GND)

*4 0dB=0.775Vrms

■出力仕様

コネクション	実効ソースインピーダンス	ノミナルレベル時	出力レベル**		使用コネクタ**
			ノミナルレベル	MAX(クリップ時)	
GROUP OUT (1~8) STEREO OUT (L,R) MTRX OUT (1~4) ST MTRX L,R OUT (1~4) AUX OUT (1~8) MONITOR A,B OUT (L,R) TALKBACK OUT OSC OUT	150 Ω	600 Ω Lines	+4dB (1.23V)	+24dB (12.3V)	XLR-3-32type
CH DIRECT OUT** 1~*CH	150 Ω	600 Ω Lines	+4dB (1.23V)	+24dB (12.3V)	Phone Jack(TRS)
CH INSERT OUT** 1~*CH GROUP INSERT OUT (1~8) STEREO INSERT OUT (L,R) AUX INSERT OUT (1~8)	150 Ω	10k Ω Lines	+4dB (1.23V)	+24dB (12.3V)	Phone Jack(TRS)
PHONES L,R OUT (1,2)	15 Ω	8 Ω Phones 40 Ω Phones	75mW 65mW	150mW 150mW	Phones Jack(Stereo)

*1 PM3500M -44C:44ch, -52C:52ch

*2 全てのXLRコネクタおよびフォンジャックはバランスタイプ (T=+, R=-, S=GND)

*3 0dB=0.775Vrms

■ INSPECTIONS

1 PREPARATIONS

- Connect the PM3500M 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 Ω (5 W or more)
All INSERT OUT.....	10 k Ω
Others	600 Ω

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

• CH INPUT (1-44, 52)

+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)
ST switch.....	OFF (MONO)
GRP 1-4	
LEVEL control.....	MAX
ON switch	ON during measurement only, OFF at all other times.
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
GRP 5-8	
LEVEL control.....	MAX
ON switch	ON during measurement only, OFF at all other times.
PRE switch.....	OFF (POST)
ST	
LEVEL control.....	MAX
PAN control	CENTER
ON switch	ON during measurement only, OFF at all other times.
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 150 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 2-8.

Table 2-1 Input Terminal [INPUT CH 1 to 44, 52]

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	-6 ±2	+20 ±2	+20 ±2	+14 ±2 *2
-50	MAX	ON	----	----	+20 ±2 *1	----	----
-30	MIN	OFF	----	----	+20 ±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 stereo PAN control of the INPUT module.

- The difference in level between INPUT (CH 1 to 44, 52) 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 44, 52]

Units: dBs

INPUT LEVEL	GAIN CTRL	30dB PAD	PRE/POST SW	ST SW	GRP OUT (1 to 4)	AUX OUT (1 to 8)
-30	MIN	OFF	POST	OFF	+20 ±2	+20 ±2
-30	MIN	OFF	PRE	OFF	+10 ±2	+10 ±2
-30	MIN	OFF	POST	ON *1	+17 ±2	+17 ±2

*1 Set the PAN control at CENTER.

- The difference in level between AUX OUT (1 to 8), GROUP OUT (1 to 4) should be less than 2 dB.

Table 2-3 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 2-4 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 2-5 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 2-4.
- The difference in level between MONI B OUT (L, R) should be less than 2 dB.

Table 2-6 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 44, 52)	-6	+20 ±2 *1	----	----
GROUP (1 to 8)	+4	+14 ±2	----	----
STEREO (L, R)	+4	----	+14 ±2	----
AUX (1 to 8)	+4	----	----	+14 ±2

- *1 Turn the INSERT switch of each INPUT module on.
Measuring can be performed at either one of the output terminals of GROUP OUT (1 to 8).
- The difference in level between INPUT (CH 1 to 44, 52) 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 2-7 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.
 - *4 Check that the mode is set at PRE FADER when each 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.
- 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 2-8

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 an INPUT module is 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.

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 INPUT is 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

In status 1, 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 INPUT modules, turn on the ST and ON switches of the AUX(1 to 8) and GROUP(1 to 4), 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 AUX OUT(1,2),(3,4),(5,6),(7,8), GROUP OUT(3,4), STEREO OUT (L, R) can be performed in a similar manner.

7 VCA MUTING

In status 1, set the GAIN control to minimum and adjust the level of an input signal to 0 dBs, which are applied to each input terminal of INPUT (CH 1 to 44, 52).

Minimize the FADER control and set the MASTER FADER to NOMINAL position and check that the output level of the GROUP OUT (1) should be less than -70 dBs.

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

Apply signals to each of the 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.

Table 8

				Units: dBs
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 the PEAK EQ is turned on and the gain control of the EQ 1KHz is set at maximum.

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

9 DISTORTION FACTOR

Minimize the GAIN control and set each of FADER and level controls in an 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 %.

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.

Apply a signal to the 2TR IN (L). Then, check that when 0 dBs output is obtained at each terminal of PHONES (1, 2) L, the distortion factor should be less than 0.7 %. Check the output at the PHONES (1, 2) R in the same manner with the input signal applied to the 2TR IN (R).

Measuring can be performed when the frequency is 1 kHz.

10 MAXIMUM OUTPUT (1kHz)

When +24 dBs output is obtained at each output terminal in status 9, check that the distortion factor should be less than 1 %. 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).

11 VU Meter

When +4 dBs output is obtained at each output of the MATRIX OUT (1 to 8) in status 1, the indication on each VU meter should be within 0 ± 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 ± 0.1 VU.

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

When +4 dBs output is obtained at each output of the GROUP OUT (1 to 8), STEREO OUT(L, R), MATRIX OUT (1 to 8), TB OUT, OSC OUT and +14 dBs output is obtained at the MONITOR A OUT, and switch the METER SELECT to each output, the indication on each VU meter should be within 0 ± 0.1 VU.

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 -28 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.

13 RESIDUAL NOISE

Set the FADER and level controls of all INPUT at the minimum position and turn the ON 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
FADERS & LEVEL CONTROLS	GROUP OUT (1 to 8)	STERE O 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	PHONES OUT 1,2 (L, R)
MAXIMUM	-71	-74	-71	-82	-73 *1	-90	---	---
MINIMUM	-98	-98	-98	-98	-98	-98	-90	-80

*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 (ϕ) switch of the 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 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.

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 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 ± 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 ± 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 and shorten 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.

■ ADJUSTMENTS

■ MONITOR INPUT MODULE

1 PREPARATIONS

- 1) Connect the PM3500M and a PW4000 via the supplied DC power supply cable.
- 2) Unless specified, the applied signal should be a sine wave of 1 kHz, -70 dBs.
- 3) The signal level referred to in this specifications is 0 dBs = 0.775 V.
- 4) Unless specified, controls and switches must be set as follows:

+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.....	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)
GRP 1-8	
LEVEL control.....	MAX
ON switch.....	ON during measurement only, OFF at all other times.
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
ST L/R	
LEVEL control.....	MAX
PAN control.....	CENTER
ON switch.....	ON during measurement only, OFF at all other times.
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
Internal switch.....	Set at the "▼" mark (POST) = SW119, SW121, SW122 (PRE) = SW120

Unless specified, internal switches must be set as follows:

[S1]-[S2]..... OFF

MEASURING EQUIPMENT

- * 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.

2 VCA STANDARD VOLTAGE ADJUSTMENT

Adjust the trimmer potentiometer VR401 on the MI3 circuit board so that the voltage of -0.5 ± 0.01 V is obtained at test point T401, under the conditions given in status 1.

Table 2

MEASURE AT	VOLTAGE	TRIMMER POT.
TP401 or CN403-1 on MI3 board	-0.5 ± 0.01 V	VR401 on MI3 board
CN108-1 on MI1 board	-0.5 ± 0.01 V	VR401 on MI3 board

3 VCA ADJUSTMENT

Set the GAIN at minimum and set SW102 to POST FADER position and perform the adjustment in status 1. The measuring point and trimmer potentiometers are located on the MI1 circuit board.

3-1 VCA MINIMUM ADJUSTMENT

Set the fader to "0", apply a signal and adjust the level so that the output becomes +20 dBs.

Set the fader to " ∞ ", and adjust the trimmer potentiometer VR124 so that the output level becomes minimum. At this time, the output level must be less than -90 dBs.

3-2 VCA OFFSET ADJUSTMENT

Set the fader to " ∞ ", apply no signal. The voltage obtained at the test point TP101 is the voltage VO as reference.

3-2-1 VCA OFFSET A ADJUSTMENT (When GAIN is 0 dB.)

Set the fader to "0", apply no signal, and adjust the trimmer potentiometer VR120 so that the voltage obtained at the test point TP101 falls to the voltage VO.

3-2-2 VCA OFFSET B ADJUSTMENT (When GAIN is +20 dB.)

Set the fader to "10", and turn on the VCA GROUP ASSIGN 1 switch. Adjust the trimmer potentiometer VR123 so that the voltage obtained at the test point TP101 falls to the voltage VO.

Repeat the adjustment to both OFFSET A and OFFSET B until the difference in both adjusted values is within the $VO \pm 25$ mV.

3-3 DISTORTION ADJUSTMENT

Adjust the level of the input signal so that the output obtained at the DIRECT OUT is +19 dBs when the fader was operated.

3-3-1 DISTORTION ADJUSTMENT (When GAIN is 0 dB.)

Set the fader to "0", adjust the trimmer potentiometer VR121 so that the distortion rate is the best value at the DIRECT OUT.

3-3-2 DISTORTION ADJUSTMENT (When GAIN is +20 dB.)

Set the fader to "10", and turn on the VCA GROUP 1 switch, and then adjust the trimmer potentiometer VR122 so that the distortion rate is the best value at the DIRECT OUT.

Repeat the adjustment so that the distortion rate is 0.01% or less when GAIN is 0 dB and also when GAIN is +20B. Check that the distortion is less than 0.01 % at 20 kHz when the GAIN is 0 dB and the output level is +14 dBs.

*** Reset SW120 to PRE FADER position after the adjustments have been performed.**

■ 検査

1 準備

- ・コンソール本体と電源 (PW4000) を付属接続ケーブルによって接続する。
- ・指定のない場合、印加する信号は 1 kHz, -80 dBs 正弦波、信号源インピーダンス 150 Ω とする。また、各出力端子の負荷抵抗は下記の指定に従うこと。

PHONES (L,R).....	8 Ω (5 W以上)
全ての INSERT OUT.....	10 kΩ
その他出力.....	600 Ω

※本仕様書において取り扱う信号レベルは 0 dBs = 0.775 V である。

- ・特に指定のない場合、ツマミ類は以下のように設定すること。

•CH INPUT (1-44, 52)

+48V switch.....	OFF
GAIN trim.....	MAX (-70 dB)
30dB switch.....	OFF
φ switch.....	OFF (正相)
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.....	測定時のみ ON、他は OFF
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
GRP 1-4	
LEVEL control.....	MAX
ON switch.....	測定時のみ ON、他は OFF
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
GRP 5-8	
LEVEL control.....	MAX
ON switch.....	測定時のみ ON、他は OFF
PRE switch.....	OFF (POST)
ST	
LEVEL control.....	MAX
PAN control.....	CENTER
ON switch.....	測定時のみ ON、他は OFF
ON/EDIT switch.....	測定CHのみ ON、他は OFF
VCA GROUP (1-8) switch.....	OFF
CUE switch.....	測定CHのみ ON、他は OFF
Fader.....	MAX

•MASTER

GROUP (1-8)

PAN control.....	CENTER
GROUP TO ST switch.....	測定時のみ ON、他は OFF
GROUP TO MATRIX switch.....	測定時のみ ON、他は OFF
INSERT switch.....	測定時のみ ON、他は OFF
Fader.....	MAX
ON/EDIT switch.....	測定時のみ ON、他は OFF
CUE switch.....	測定時のみ ON、他は OFF

STEREO

ST TO MATRIX switch 測定時のみ ON、他は OFF
 INSERT switch 測定時のみ ON、他は OFF
 ON/EDIT switch 測定時のみ ON、他は OFF
 CUE switch 測定時のみ ON、他は OFF
 L Fader MAX
 R Fader MAX

MATRIX (1-4)

SUB IN control 測定時のみ MAX、他は MIN
 MIX control 測定時のみ MAX、他は MIN
 PAN control CENTER
 LEVEL control MAX
 ON/EDIT switch 測定時のみ ON、他は OFF
 CUE switch 測定時のみ ON、他は OFF

MATRIX (5-8)

SUB IN control 測定時のみ MAX、他は MIN
 MIX control 測定時のみ MAX、他は MIN
 LEVEL control MAX
 ON/EDIT switch 測定時のみ ON、他は OFF
 CUE switch 測定時のみ ON、他は OFF

AUX

INSERT switch 測定時のみ ON、他は OFF
 Fader MAX
 ON/EDIT switch 測定時のみ ON、他は OFF
 CUE switch 測定時のみ ON、他は OFF

MONITOR A

PFL TRIM control CENTER
 VCA CUE TRIM control CENTER
 SELECT switch 測定時のみ ON、他は OFF
 L MONO switch OFF
 R MONO switch OFF
 LEVEL control MAX
 ON switch 測定時のみ ON、他は OFF
 PHONES level control 測定時のみ MAX、他は MIN

MONITOR B

SELECT switch 測定時のみ ON、他は OFF
 LEVEL control MAX
 ON switch 測定時のみ ON、他は OFF

TALKBACK

ASSIGN switch 測定時のみ ON、他は OFF
 OUT switch 測定時のみ ON、他は OFF
 OSC OUT switch OFF
 OSC switch OFF
 OSC FREQ control MIN
 SWEEP switch OFF
 OSC LEVEL control MAX
 TB LEVEL control MAX
 ON switch 測定時のみ ON、他は OFF

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.....測定時のみ ON、他は OFF
- VCA CUE switch.....測定時のみ ON、他は OFF
- METER SELECT switch.....MATRIX
- PHANTOM MASTER switch.....OFF
- VCA CONTROL switch.....MASTER
- FAN LOW/HIGH switch.....LOW
- LAMP DIMMER control.....MIN

測定器

- ・ 発振器はバランス出力型で出力インピーダンスは 150 Ω 以下のこと。
- ・ オシロスコープ・レベル計などの入力インピーダンスは 100 kΩ 以上のこと。
- ・ ノイズレベルは 12.7 kHz・6 dB/OCT LOW PASS FILTER を用いて測定すること。
- ・ 測定器は、バランス入力型を用いること。

2 利得

1 項の状態 で 各出力端子には (表 2-1~表 2-8) の範囲内の出力レベルが得られること。

表 2-1 入力端子 [INPUT CH1-44, 52] [単位 : dBs]

入力 レベル	GAIN VR	30dB	INSERT OUT	DIRECT OUT	GROUP OUT(1-8)	STEREO OUT(L,R)	MONI A OUT (L,R)
-80	MAX	OFF	-6 ±2	-6 ±2	+20 ±2	+20 ±2	+4 ±2 *2
-50	MAX	ON	----	----	+20 ±2 *1	----	----
-30	MIN	OFF	----	----	+20 ±2 *1	----	----

- *1 GROUP OUT (1-8) いずれか一つの出力端子にて測定すること。
- *2 CH CUE switch を ON すること。このとき PFL trim により出力レベルが、センターを基準にして -14 dB から +6 dB まで変化することを確認すること。
また VCA GROUP switch のいずれか一つを ON し、その選んだ VCA MASTER の VCA CUE を ON した場合も同様の出力が得られ、この場合は VCA CUE trim が上記と同様の働きをするのを確認すること。さらに VCA PRE PAN SW を ON したときには INPUT の ST PAN control によって出力レベルが変化しないことを確認すること。
- ・ 各出力の INPUT (CH1-44, 52) 間のレベル差は、2 dB 以内のこと。
- ・ GROUP OUT (1-8) 間、STEREO OUT (L,R) 間、および MONI A OUT (L,R) 間のレベル差は、2 dB 以内のこと。

表 2-2 入力端子 [INPUT CH1-44, 52] [単位 : dBs]

入力 レベル	GAIN VR	30dB SW	PRE SW	ST SW	GRP OUT (1-4)	AUX OUT (1-8)
-30	MIN	OFF	POST	OFF	+20 ±2	+20 ±2
↑	↑	↑	PRE	↑	+10 ±2	+10 ±2
↑	↑	↑	POST	ON *1	+17 ±2	+17 ±2

- *1 PAN control は、センターにすること。
- ・ AUX OUT (1-8), GROUP OUT (1-4) 間のレベル差は、2 dB 以内のこと。

表 2-3 入力端子 [TB IN] [単位 : dBs]

入力端子	入力 レベル	GROUP OUT(1-8)	STEREO OUT(L,R)	AUX OUT (1-8)	MON.B (L,R)	TB OUT
TB IN	-60	+14 ±2	+14 ±2	+14 ±2	+14 ±2 *1	+4 ±2

- *1 MONI B の TB switch を ON すること。
- ・ 各出力間のレベル差は、2 dB 以内のこと。

表 2-4 出力端子 [MONITOR A] [単位：dBs]

入力端子	SELECT SW	入力レベル	L MONO	R MONO	出力レベル
2TR IN 1(L,R)	2TR IN 1	+4.0	OFF	OFF	+14 ±2 *4
2TR IN 2(L,R)	2TR IN 2	↑	↑	↑	↑
↑	↑	↑	ON	↑	↑ *1
↑	↑	↑	OFF	ON	↑ *2
↑	↑	↑	ON	ON	+17 ±2 *3

- *1 2TR IN L からの信号が、出力されること。
- *2 2TR IN R からの信号が、出力されること。
- *3 2TR IN L,R に同じ信号を印加すること。
- *4 MONI B. の TB switch と TB ON switch の両方を ON したとき、出力レベルは OFF 時より -6 dB 小さくなる。
 - ・ (L,R) 間のレベル差は、2 dB 以内のこと。

表 2-5 出力端子 [MONITOR B] [単位：dBs]

入力端子	SELECT SW	入力レベル	出力レベル
2TR IN 1(L,R)	2TR IN 1	+4.0	+14 ±2
2TR IN 2(L,R)	2TR IN 2	↑	↑
----	MON A *1	----	↑

- *1 MONITOR A を表 2-4 のいずれか一つの状態にすること。
 - ・ (L,R) 間のレベル差は、2 dB 以内のこと。

表 2-6 入力端子 [INSERT] [単位：dBs]

入力端子	入力レベル	GROUP OUT(1-8)	STEREO OUT(L,R)	AUX OUT(1-8)
CH(1-44,52)	-6	+20 ±2 *1	----	----
GROUP (1-8)	+4	+14 ±2	----	----
STEREO (L,R)	↑	----	+14 ±2	----
AUX (1-8)	↑	----	----	+14 ±2

- *1 各 IN モジュールの INSERT SW を ON すること。GROUP (1-8) のいずれか一つの出力端子で測定すること。
 - ・ 各出力の INPUT (CH1-44,52) 間のレベル差は、2 dB 以内のこと。
 - ・ GROUP (1-8) 間、STEREO (L,R) 間、AUX (1-8) 間、MATRIX (1-8) 間のレベル差は、2 dB 以内のこと。

表 2-7 入力端子 [SUB IN] [単位：dBs]

入力端子	入力レベル	GROUP OUT(1-8)	STEREO OUT(L,R)	AUX OUT (1-8)	MATRIX (1-4)L,R	MATRIX (5-8)	MONI A (L,R)
GROUP (1-8)	+4	+14 ±2	+24 ±2 *1	----	+24 ±2 *2	+24 ±2 *2	+24 ±2 *4
STEREO (L,R)	↑	----	+14 ±2	----	----	----	+24 ±2 *4
AUX (1-8)	↑	----	----	+14 ±2	----	----	+24 ±2 *4
MATRIX (L,R)	↑	----	----	----	+14 ±2	+14 ±2	+24 ±2 *4
CUE (L,R) *3	↑	----	----	----	----	----	+14 ±2

- *1 GROUP TO ST switch を ON すること。PAN control を回しきったとき、出力レベルが 3 dB 上がること (L,R 共)。
- *2 GROUP TO MATRIX switch を ON すること。
- *3 いずれかの CUE switch を ON すること。
- *4 それぞれの MASTER CUE PRE を ON したときは、Pre Fader になることを確認する。ST モードにした場合、AUX(1-8)、GROUP(1-8)は、ODD は L そして EVEN は R から出力されることを確認すること。
 - ・ 各 INSERT OUT には、+4 ±2 dBs の出力レベルが、得られること。
 - ・ GROUP (1-8) 間、STEREO (L,R) 間、AUX (1-8) 間、MATRIX (1-4)(5-8) 間、CUE (L,R) 間のレベル差は、2 dB 以内のこと。

表 2-8

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

- ・ MONI A OUT に指定出力レベルを得たときの PHONES の出力レベルを規定する。
- ・ L, R 間レベル差は 2 dB 以内のこと。

3 周波数特性

1 項の状態で印加信号周波数を 20 Hz・20 kHz としたとき、各出力端子の出力レベルは、1 kHz を基準として、0+1, 0-3 dB の範囲内にあること。

ただし PHONES の 20 Hz は -2 ±2 dB の範囲内にあること。

4 EQ変化特性

1 項の状態で、IN モジュールの LO, LO-MID, HI-MID, HI をそれぞれ動かしたとき、GROUP OUT(1) に得られる各周波数における出力レベルはセンタークリック位置の出力レベルを基準として（表4-1～4-4）の範囲内であること。

指定周波数で出力レベルが下表の範囲内に入らない場合、周波数を変化させ下表の出力レベルが得られることを確認すること。このとき周波数変化は、指定周波数の ±20 % の範囲内のこと。

表 4-1 [HI] [単位：dB]

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

表 4-2 [HI-MID] [単位：dB]

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

表 4-3 [LO-MID] [単位：dB]

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

表 4-4 [LO] [単位：dB]

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

5 HPF変化特性

1 項の状態で、HPF SW を ON し、IN モジュールの HPF f controlを動かしたとき、GROUP OUT(1) の出力レベルは、SW OFF 時のレベルを基準として（表 5）の範囲内であること。

表 5

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

1項の状態、TB IN から GROUP OUT(1) に出力させているとき、周波数を 80 Hz にし、HPF SW が OFF 時を基準として、ON したときのレベルが -3 ± 2 dB であることを確認すること。

6 セパレーション

1項の状態、IN モジュールで、AUX(1-8)、GROUP(1-4) の ST switch および ON switch を ON し、PAN control を反時計方向にまわしきり、GROUP OUT(1) の出力レベルを +20 dBs としたとき、GROUP OUT(2) への漏れレベルは -50 dBs 以下のこと。

また、PAN control を時計方向にまわしきり、GROUP OUT(2) の出力レベルを +20 dBs としたとき、GROUP OUT(1) への漏れレベルは -50 dBs 以下のこと。

AUX(1,2),(3,4),(5,6),(7,8), GROUP(3,4), STEREO OUT(L,R) 間の漏れについても、同様に検査すること。

7 VCA絞リ切り

1項の状態、INPUT CH1-44, 52 の各モジュールの GAIN control を MIN にし、入力レベルを 0 dBs にセットする。そして CH FADER の位置を MIN、MASTER FADER を NOMINAL に合わせたとき、GROUP OUT(1) の出力レベルは -70 dBs 以下のこと。

8 LED (METER, PEAK, Σ PEAK) 点灯レベル

1項の状態、IN および ST-IN の各モジュールの入力に信号を印加したとき、各 LEDが点灯する入力レベルは (表 8) の範囲内であること。ただし Σ PEAK は各 SUB IN より入力すること。

表 8

INSERT OUT	SIGNAL	NOMINAL	PEAK	Σ PEAK
出力レベル	-16 ± 2	$+4 \pm 2$	$+23.5 \pm 2$	$+23.5 \pm 2$

PEAK LED チェック時のみ、EQ を ON して EQ 1kHz の GAIN control を MAX にした場合も、同じレベルで点灯すること。また、EQ OFF で INSERT を ON にし、INSERT IN を 150 Ω でショートした場合でも同じレベルで点灯すること。(ただし、この場合 SIGNAL、NOMINAL は点灯しない)

9 歪率

2項の状態、GAIN control を MIN にして、IN および MASTER の各 VR, FADER を Nominal Position とし、各出力端子に +14 dBs の出力が得られたときの歪率は 0.01 % 以下のこと。CH の歪率は、どれか一つの OUT で行うこと。

TB OUT については、入力端子を TB IN として同様に検査すること。ただし歪率は、0.1 % 以下のこと。

PHONES(L,R),(1,2) 端子については、入力端子を 2TR IN として片チャンネルずつ入力すること。その時の出力レベルが 0 dBs のときの歪率は、0.7 % 以下のこと。(1 kHz のみ)

ただし、PHONES の測定は各端子ごとに行うこと。

10 最大出力 (1 kHz のみ)

9項の状態、各出力端子に、+24 dBs、歪率 1 % 以下の出力が得られること。

PHONES(L,R),(1,2) 端子に +3 dBs 歪率 1 % 以下の出力が得られること。

11 VU METER

1項の状態、MATRIX OUT (1-8) の出力レベルを +4dBs としたとき、各 VU METER の指示は、 0 ± 0.1 VU 以内であること。VU METER の指示が範囲内でない場合、MT シート内の半固定 VR によって VU METER の指示が 0 ± 0.1 VU 以内となるように調整すること。

また、PEAK LED (赤) は、出力レベル $+23.5 \pm 2$ dBs の範囲内で点灯すること。

GROUP OUT(1-8), STEREO OUT(L, R), AUX OUT(1-8), MATRIX OUT(1-8), TB OUT, MONITOR A OUT, OSC OUT の各出力レベルを +4dBs とし (ただし MONITOR A OUT は +14 dBs)、METER SELECT switch を各出力に切り替えたときも、各 VU METER の指示は 0 ± 0.1 VU 以内であること。

12 ノイズレベル

1 項の状態では IN および ST-MASTER (TB IN) モジュールの入力端子を 150 Ω で短絡したとき、GROUP OUT(1) で得られるノイズレベルは、INのときは -28 dBs 以下で、TB IN のときは -54 dBs 以下のこと。

- ・ノイズレベルが上記の値以上の場合は、入力換算でのノイズレベルを求め、それが -128 dBs 以下であれば良い。

13 残留ノイズ

1 項の状態ですべての IN モジュールの FADER, LEVEL control を MIN、ON SW. を OFF する。MASTER モジュール各出力の ON SW. を ON する。

このとき、MASTER FADER, MASTER VR. を最大または最小にしたときのノイズレベルは (表 13) のレベル以下のこと。

表 13 残留ノイズレベル

[単位 : dBs]

FADER & VOLUME	GROUP OUT (1-8)	STEREO OUT (L,R)	AUX OUT (1-8)	MATRIX OUT (1-8)	MONI A OUT (L,R)	MONI B OUT (L,R)	TB OUT	PHONES OUT 1,2 (L,R)
MAX (最大)	-71	-74	-71	-82	-73 *1	-90	---	---
MIN (最小)	-98	-98	-98	-98	-98	-98	-90	-80

*1 MATRIX CUE switch を ON すること。

14 位相

1 項の状態ですべての入力端子に印加された信号と各出力端子で得られる信号は、同相であること。

また、IN モジュールの f switch を ON したときは逆相になること。

- ・バランス型入出力端子のピン配置

キャノン	フォーン
pin 1..... GND	T..... + (HOT)
pin 2..... + (HOT)	R..... - (COLD)
pin 3..... - (COLD)	S..... GND

15 発振器

1 項の状態では TB OUT SW, OSC OUT SW および "10kHz" SW を ON したとき TB OUT および OSC OUT 端子には出力レベル +14 ±2 dBs の信号が得られること。

("1kHz", "100Hz", "PINK" も同様)

このとき "10kHz", "1kHz", "100Hz" の歪率は、1% 以下であること。

また SWEEP SW ON, OSC FREQ volume を変化させたとき、TB OUT および OSC OUT の出力レベルと周波数は (表 15) の範囲内であること。

表 15

OSC SW	OSC FREQ volume				SWEEP SW. OFF
	MIN		MAX		
	レベル(dB)	周波数(Hz)	レベル(dB)	周波数(Hz)	
10kHz	+14 ±2	2 kHz ±20 %	+14 ±2	20 kHz ±20 %	10 kHz ±20 %
1kHz	+14 ±2	200 Hz ±20 %	+14 ±2	2 kHz ±20 %	1 kHz ±20 %
100Hz	+14 ±2	20 Hz ±20 %	+14 ±2	200 Hz ±20 %	100 Hz ±20 %

- ・ OSC SW を "OFF" にしない限り、OSC ON LED が点灯していること。

16 VCA CONTROL

1 項の状態、各 IN モジュールの VCA GROUP SW 1~8 のうち一つだけ ON したとき、GROUP OUT(1) 端子の出力レベルは OFF 時を基準として、それぞれ +10 ±2 dB の範囲内のこと。

また VCA MASTER FADER 1~8 を全て MIN とし、各 IN の VCA GROUP SW 1~8 を一つだけ ON したとき、GROUP OUT(1) 端子の出力レベルは OFF 時を基準として、それぞれ -80 dB 以下のこと。

VCA MASTER FADER 1~8 を NOMINAL にし、VCA MUTE switch を ON したときも同様のこと。

また "NOMINAL" LED は パネル目盛の 0 ±1 dB の範囲内で点灯すること。

17 EXTERNAL VCA CONTROL

VCA CONTROL SW MASTER 側にセットし、各 VCA MASTER FADER(1-8) を変化させたとき、リアパネルの EXTERNAL CONTROL の VCA BUSS の各端子には (表 17) の範囲内の電圧が得られること。

SLAVE 側にセットしたときは、VCA MASTER FADER に無関係に 0 ±0.5 V の範囲内であること。

表 17

VCA MASTER FADER	電圧
MAX	+0.5 ±0.05 V
MIN	-9 V 以下

18 PHANTOM (+48 V)

各 IN の 入力コネクタのピン①-②間に負荷抵抗 10 kΩ (1 W 以上) を接続し、ピン②-③間を短絡する。

PHANTOM MASTER SW を ON し、各 IN モジュールの +48V SW. を ON したとき、負荷抵抗両端に +35 ±3 V の電圧が得られること。

19 ランプ出力 (44CH - 4ヶ所, 52CH - 5ヶ所)

ランプ出力コネクタ ピン③-④間に負荷抵抗 3 kΩ (5 W 以上) を接続し、LAMP DIMMER control を変化させたとき、抵抗の両端の電圧は (表 19) の範囲内であること。

表 19

LAMP DIMMER	電圧
MAX	+11 ±1 V
MIN	+2 ±1 V

20 ファンスイッチ

FAN SW を HIGH/LOW に切り換えたとき FAN の回転が HIGH/LOW に切り替わること。

21 パワーインジケータ点灯確認

1 項の状態、+12V, +19V, -19V, +48V の LED が緑色で点灯すること。

このとき、PHANTOM MASTER を ON すると +48V の LED が橙色に変わること。

また、電源 ON 時には PW CAUTION の LED が一瞬赤色で点灯し、すぐに消灯するのを確認すること。

22 電源電圧変動

電源電圧を規定の ±10 % 変化させても動作に異常のないこと。

■ 調整

■ MONITOR INPUT モジュール [VS393700] の調整

1 準備

- ・ 指定のない場合、印加する信号は 1 kHz、-70 dBs の正弦波とする。
- ※ 本仕様書において取り扱う信号レベルは 0 dBs = 0.775 V である。
- ・ 特に指定のない場合、ツマミ類は以下のように設定すること。

• CH INPUT (1-44, 52)

+48V switch.....	OFF
GAIN trim.....	MAX (-70 dB)
30dB switch.....	OFF
f switch.....	OFF (正相)
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.....	測定時のみ ON、他は OFF
HPF FREQ control.....	MIN
HPF switch.....	OFF
AUX 1-8	
LEVEL control.....	MAX
ON switch.....	測定時のみ ON、他は OFF
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
GRP 1-8	
LEVEL control.....	MAX
ON switch.....	測定時のみ ON、他は OFF
PRE switch.....	OFF (POST)
ST switch.....	OFF (MONO)
ST L/R	
LEVEL control.....	MAX
PAN control.....	CENTER
ON switch.....	測定時のみ ON、他は OFF
ON/EDIT switch.....	測定CHのみ ON、他は OFF
VCA GROUP (1-8) switch.....	OFF
CUE switch.....	測定CHのみ ON、他は OFF
Fader.....	MAX
INTERNAL SW.....	目印側 (POST) SW119, SW121, SW122 (PRE) SW120

- ・ 特に指定のない場合、検査用スイッチは以下のように設定すること。
- [S1]-[S2]..... OFF

測定器

- ・ 発振器の出カインピーダンスは 10 Ω 以下のこと。
- ・ オシロスコープ・レベル計などの入カインピーダンスは 100 kΩ 以上のこと。
- ・ ノイズレベルは 12.7 kHz・6 dB/OCT LOW PASS FILTER を用いて測定すること。

2 VCA 基準電圧調整

1 項の状態 で [MI3 シート] 内の VR401 を調整して、テストポイント TP401 の電圧を -0.5 ± 0.01 V にセットする。
テストポイントの位置は、[MI3 シート] 内ならば TP 401 と (CN403-1)、[MI1 シート] 内ならば (CN108-1) である。

3 VCA 調整

1 項の状態 で、GAIN trim を MIN にして調整を行うこと。また、SW120 を POST FADER にセットすること。調整 VR、テストポイントは [MI1 シート] 内にある。

3.1 絞り切り調整

FADER の位置が "0" のときの出力レベルが +20dBs になるように、信号を印可したら FADER の位置を " ∞ " に合わせ、VR124 を調整して出力レベルを最小に調整する。このとき出力レベルは、-90 dBs 以下のこと。

3.2 OFFSET 調整

信号は印加しないで調整すること。

FADER の位置が " ∞ " のとき、TP101 で得られる電圧を V[v] とする。

3.2.1 OFFSET A 調整 (GAIN 0 dB 時)

FADER の位置を 0 目盛りに合わせる。VR120 を調整して TP101 の電圧を V[v] に近づくように調整する。

3.2.2 OFFSET B 調整 (GAIN 20 dB 時)

FADER の位置を 10 目盛りに合わせ、VCA GROUP SW1 を ON する。

VR123 を調整して TP101 の電圧を V[v] に近づくように調整する。

3.2.1 と 3.2.2 の両方が $V[v] \pm 25$ mV を満足するまで、繰り返し調整すること。

3.3 歪率調整

Fader の位置に係わらず、DIRECT OUT の出力レベルが +19 dBs になるように、Fader を動かす度に入力レベルを調整すること。

3.3.1 GAIN 0 dB 時の歪率調整

FADER の位置を 0 目盛りに合わせ、VR121 を調整して DIRECT OUT の歪率を最良点に調整する。

3.3.2 GAIN 20 dB 時の歪率調整

FADER の位置を 10 目盛りに合わせ、VCA GROUP SW1 を ON する。

VR122 を調整して DIRECT OUT の歪率を最良点に調整する。

3.3.1 と 3.3.2 の歪率が共に 0.01 % 以下になるまで繰り返し調整すること。

最後に、GAIN が 0 dB で、出力レベルが +14 dBs のときの 1 kHz と 20 kHz の歪率が 0.01 % 以下であることを確認すること。

検査終了後、SW120 を PRE FADER にセットすること。

Notes)

- Circuit Board: MI1 (VS077100) XP410B0
1. IC
 - IC 101: 917090 (XK866A00) HA(balanced)
 - IC 102,103,110: NE5532P (IG102500) OP AMP
 - IC 105: 911308 (XK867B00) PEQ
 - IC 107: NJM2041D-D (IG069200) OP AMP
 - IC 108: 917089 (XK868C00) VCA
 - IC 109: UPC78L05J (XC349A00) REGULATOR +5V
 - IC 111,112: NJU201AD (XG206A00) ANALOG SW
 2. Transistor
 - Q 101-103,106, 109,112,114, 117,118: 2SC1815 Y,GR (IC1815M0)
 - Q 113: 2SB647 C,D (IB064730)
 - Q 104,105,107, 108,110,111, 116: 2SA1015 O,Y (IA101590)
 - Q 115: 2SD667 C,D (ID066700)
 - Q 119,120,123-125: 2SC1815 Y,GR (IC1815M0)
 3. Diode
 - D 101-111,114-119: 1SS133,1SS176 (VB941200)
 - D 112,113: 1SR35-100A 52 (VE170000)
 4. LED
 - LD 101,118: GL2PR6 RE (VH325200) +48V,PEAK
 - LD 102,105-111: GL2HY6 YE (VJ471200) 30dB,AUX1/2,AUX3/4, AUX5/6,AUX7/8,GRP1/2, GRP3/4,GRP5
 - LD 103,104,120: GL2EG6 GR (VH325300) EQ,HPF,SIGNAL
 - LD 112-119: GL2HY6 YE (VJ471200) GRP6,GRP7,GRP8,INSERT, ϕ ,ST,PEAK,NOMINAL
 5. Mylar Capacitor
 - C 123,124: 0.1200 50V J (UA655120)
 - C 141,142,149: 0.0470 50V J (UA654470)
 - C 170,171: 0.1000 50V J (UA655100)
 6. Ceramic Capacitor
 - C 104,105: B 470P 50V K (VD842200)
 - C 106,108,112,153, 186,192: B 100P 50V K (VD841300)
 - C 113,119: SL 68P 50V J (VD841100)
 - C 114: SL 33P 50V J (VD840700)
 - C 116,117,166, 167,187,188, 194,195,197: F 10000P 25V Z (VS751300)
 - C 118,125,152, 155,191: SL 47P 50V J (VD840900)
 - C 122,181,182: B 1000P 50V K (VD842600)
 - C 151,154,190: B 220P 50V K (VD841800)
 - C 185: X 3300P 16V N (VD84320)
 - C 198: F 10000P 25V Z (VS751300)
 7. Electrolytic Cap.
 - C 101: 47.00 50.0V (UJ867470)
 - C 102,103: 10.00 50.0V (VJ097400)
 - C 107: 1000 6.3V (UJ819100)
 - C 109,115,120,121,128,137,138,157,158: BP 47.00 25.0V VP (VN321100)
 - C 110,111,172, 174,177,178: 100.00 25.0V (UJ848100)
 - C 126,127,173, 175: 10.00 25.0V (UJ847100)
 - C 133,134,156: 100.00 BP 25.0V VP (VN452100)
 - C 139,140,150, 160,161,189: BP 4.7 25.0V (UK846470)
 - C 143,196: 100.00 16.0V (UJ838100)
 - C 159,162,163, 164,165,193: BP 47.00 25.0V VP (VN321100)
 - C 176: 47.00 16.0V (UJ837470)
 - C 179: BP 10.00 25.0V (VN509600)

8. Carbon Resistor
 - R 103,115,125-127,131,134, 135,140: 100.0K 1/4 J (HF758100)
 - R 108,109,178, 184,215: 10.0 1/4 J (HF754100)
 - R 110,114: 470.0 1/4 J (HF755470)
 - R 117,147,221, 222: 1.0K 1/4 J (HF756100)
 - R 120: 2.2M 1/4 J (HF759220)
 - R 121,124,130: 39.0 1/4 J (HF754390)
 - R 141,143,145, 150,152,155, 159,160,162: 100.0K 1/4 J (HF758100)
 - R 142,144,151, 212: 47.0K 1/4 J (HF757470)
 - R 146,163,170: 4.7K 1/4 J (HF756470)
 - R 148: 20.0K 1/4 J (HF757200)
 - R 149: 30.0K 1/4 J (HF757300)
 - R 156,223,227, 229,231: 12.0K 1/4 J (HF757120)
 - R 157: 220.0K 1/4 J (HF758220)
 - R 158: 22.0K 1/4 J (HF757220)
 - R 161: 11.0K 1/4 J (HF757110)
 - R 164,165,166, 168,169,171, 172,205,206: 100.0K 1/4 J (HF758100)
 - R 167: 4.7M 1/4 J (HF759470)
 - R 173,175,179, 181,211,213: 220.0 1/4 J (HF755220)
 - R 174,180: 18.0K 1/4 J (HF757180)
 - R 207,224,228, 230,232: 100.0 1/4 J (HF755100)
 - R 216,220,236, 238,240,241, 242,251,252: 100.0K 1/4 J (HF758100)
 - R 235,237,239: 33.0K 1/4 J (HF757330)
9. Flame Proof Carbon Resistor
 - R 243,244: 10.0 1/4 J (HV754100)
 - R 249: 390.0 1/4 J (HV755390)
10. Metal Film Resistor
 - R 101,102: 6.8K 1/4 F (VB067300)
 - R 104,105: 2.0K 1/4 F (VB066200)
 - R 106: 510.0 1/4 F (VB064200)
 - R 107,129: 4.7K 1/4 F (VA074100)
 - R 111,113: 2.2K 1/4 F (VB066300)
 - R 112: 27.0 1/4 F (VB061100)
 - R 116: 910.0 1/4 F (VB065000)
 - R 118,176,182: 8.2K 1/4 F (VB067400)
 - R 119: 20.0K 1/4 F (VB068000)
 - R 122,123,245, 246: 10.0K 1/4 F (VA074400)
 - R 128,136: 2.4K 1/4 F (VB066400)
 - R 137,138,139: 3.0K 1/4 F (VB066600)
 - R 177,183,250: 15.0K 1/4 F (VA074600)
 - R 185-192,197: 18.0K 1/4 F (VB067900)
 - R 193,194: 25.5K 1/4 F (VS721500)
 - R 198-204,209, 210: 18.0K 1/4 F (VB067900)
 - R 208: 330.0 1/4 F (VB063700)
 - R 214: 1.2K 1/4 F (VB065700)
 - R 218,219: 560.0 1/4 F (VB064300)
11. Trimmer Potentiometer
 - VR 120,122: B 22.0K 3P RHE (VA788100) OFFSET A,THD 20dB adj
 - VR 121,123: B 100.0K 3P RHE (VA788400) THD 0dB,OFFSET B adj
 - VR 124: B 220 3P RHEOA (VA787300) - ∞ adj

12. Rotary Variable Resistor
 VR 101: 2K & 5K RK163121 (VN015900)
 GAIN
 VR 102,104,106,
 108: C50K EVU E35 FK3 (VS135900)
 HI Q,HI-MID Q,LO-MID Q,LO Q
 VR 111,112,113,
 114: B20K RK11K112 (VT044300)
 GRP5,GRP6,GRP7,GRP8
 VR 110: C100K&C50K (VS136200) HPF
 VR 103,109: C50K*3 W50K&DMY (VP610100)
 HI FREQ,LO FREQ
 VR 105,107: C50K*2 W50K&DMY (VP609900)
 HI-MID FREQ,LO-MID FREQ
 VR 115: AC20K+C20K&DMY (VT017900)
 ST LVL/PAN
13. Slide Switch
 SW 119: SSSF04 (VQ545700)
 INSERT PRE/POST
 SW 120-122: SSS212 (KA401270)
 D OUT PRE/POST,
 GROUP PRE/POST,
 AUX PRE/POST
14. Push Switch
 SW 101,103,104,
 111-115: SPUJ12 2/2 (VN016900)
 +48V,EQ,HPF,GRP5,GRP6,
 GRP7,GRP8,INSERT
 SW 102: SPUJ12 (VA258200) 30dB
 SW 105-110,123: SPUJ12 4/2 (VN017000)
 AUX1/2,AUX3/4,AUX5/6,
 AUX7/8,GRP1/2,GRP3/4,ST
 SW 116-118: SPUJ12 2/2 (VN016900) LO,HI, ϕ
15. LC Filter
 EM 101: LS MT Y223NB (FZ006970)
16. IC Protector
 CP 101-103: ICP-F10 (VF963600)
17. Relay
 RY 101,102: DC RY 12W-OH-K (VM640200)
18. Test Pin
 TP 101: IRS-1169 (VE340300)
19. Header
 CN 101: HIF3BAG40PA-2.54 (VR633100)
20. Base Post Connector
 CN 102: VR-4P SE (VS182100) (VS18210)
 CN 103: PH- 9P TE (VB390500)
 CN 104,109: PH- 5P TE (VB390100)
 CN 105: PH- 6P TE (VB390200)
 CN 106: PH- 3P TE (VB389900)
 CN 107: PH- 4P TE (VB390000)
 CN 108: PH-13P TE (VF283100)
 CN 123,125: PH-10P TE (VB390600)
 CN 124: PH- 8P TE (VB390400)
21. Connector Assembly
 CN 111,112,113,
 117: PH&SAN :PM3500M (VS461600)
 CN 114: 5P 70mm B&C 2mm (VB711600)
 CN 115: 5P 100mm B&C 2mm (VB711700)
 CN 116: 9P 120mm B&C 2mm (VB718600)
 CN 118: 6P 70mm B&C 2mm (VB713300)
 CN 119: 3P 70mm B&C 2mm (VB708200)
 CN 120: SUM GND (VS463000) (VS46300)
 CN 126,127: I-GND 500L (VT605400)
22. Jumper Wire
 JP 101-103: 0.55 (VA078900)
- Circuit Board: MI4 (VS078500)
 MI2 (VS078400)
1. IC
 IC 104: 911306 (XK872C00) INS(balanced)
 IC 106: 917040 (XK871B00)
 EBO(balanced)
2. Ceramic Capacitor
 C 183,184: B 470P 50V K (VD842200)
3. Electrolytic Cap.
 C 129,130,136: 47.00 BP 25.0V VP (VN321100)
 C 131,132,135,
 146: BP 10.00 25.0V (VN509600)
 C 144,145: BP 220.00 25.0V VP (VL049300)
 C 147,148: 10.00 25.0V (UJ847100)
4. Carbon Resistor
 R 132,133: 100.0K 1/4 J (HF758100)
 R 153,154: 22.0K 1/4 J (HF757220)
5. Flame Proof Carbon Resistor
 R 247,248: 10.0 1/4 J (HV754100)
6. Phone Jack
 JK102: 2P,ST HLJ2337 (VN327000)
 INSERT IN,OUT
 JK103: 1P, ST HLJ2307 (VN326800)
 DIRECT OUT
7. XLM Connector
 JK101: XLM-3-31PCH-L (VM651800)
 INPUT
8. Connector Base Post
 CN 110: PH-10P SE (VB858900)

Notes)

- Circuit Board: MI3 (VS077200) XP411B0
- 1. IC
 - IC 401,402: NJM2041D-D (IG069200) OP AMP
 - IC 403: PM25 LZ95300 (XP451A00) INTERFACE
- 2. Transistor
 - Q 401-405,409: 2SC1815 Y,GR (IC1815M0)
 - Q 406-408: 2SA1015 O,Y (IA101590)
- 3. Diode
 - D 401-416: 1SS133,1SS176 (VB941200)
- 4. Zener Diode
 - ZD 401: MTZJ5.6B 5.6V (VQ313000)
- 5. LED
 - LD 401-408: GL2HY6 YE (VJ471200)
VCA GROUP10-80
 - LD 409,411: GL5HY40 YE (VP155700)
ON/EDIT,CUE
 - LD 410: GL2EG6 GR (VH325300) CHECK
- 6. Mylar Capacitor
 - C 401: 0.0470 50V J (UA654470)
 - C 402: 0.1000 50V J (UA655100)
- 7. Ceramic Capacitor
 - C 403-406,410,411: F 10000P 25V Z (VS751300)
 - C 407,412: B 1000P 50V K (VD842600)
 - C 413: B 100P 50V K (VD841300)
- 8. Semiconductive Cera. Cap.
 - C 408,409: 0.1000 25V Z (VC694800)
- 9. Carbon Resistor
 - R 402: 1.0K 1/4 J (HF756100)
 - R 403,413: 15.0K 1/4 J (HF757150)
 - R 404,420: 33.0K 1/4 J (HF757330)
 - R 409,411: 100.0 1/4 J (HF755100)
 - R 410,412: 12.0K 1/4 J (HF757120)
 - R 414,415: 4.7K 1/4 J (HF756470)
 - R 416,433: 10.0K 1/4 J (HF757100)
 - R 417-419: 100.0K 1/4 J (HF758100)
 - R 421-423: 47.0K 1/4 J (HF757470)
 - R 424: 56.0 1/4 J (HF754560)
 - R 425: 3.9K 1/4 J (HF756390)
 - R 427-432: 9.1K 1/4 J (HF756910)
- 10. Flame Proof Carbon Resistor
 - R 426: 10.0 1/4 J (HV754100)
- 11. Metal Film Resistor
 - R 401,406,407: 10.0K 1/4 F (VA074400)
 - R 405: 270.0K 1/4 F (VB070600)
 - R 408: 30.0K 1/4 F (VA074700)
- 12. Resistor Array
 - RA 401: EXB-F11E104F (VN467900)
- 13. Trimmer Potentiometer
 - VR 401: B47.0K 3P RHE (VA788300) VCA adj
- 14. Rotary Variable Resistor
 - VR 402-407: ACB20K+C20K&DMY (VT017800)
GRP3/4,GRP1/2,AUX7/8,AUX5/6,
AUX3/4,AUX1/2 LVL/PAN
- 15. Push Switch
 - SW 401: SPUJ8 4/2*8 (VS167300) VCA GROUP10-80
 - SW 402: SPUJ12 2/2 (VS167200) ON/EDIT
 - SW 403: SPUY12 4/2 NS.NL (VS739600) CUE
 - SW 404-408,410,412: SPUJ12 2/2 (VN016900)
GRP8,GRP7,GRP6,GRP5,
GRP1/2/3/4 ST,AUX5/6/7/8 ST,
AUX1/2/3/4 ST
 - SW 409,411,413: SPUJ12 (VA258200) GRP1/2/3/4 PRE,AUX5/6/7/8 PRE,AUX1/2/3/4 PRE

- 16. Test Pin
 - TP 401: IRS-1169 (VE340300)
- 17. Connector Base Post
 - CN 401: PH- 8P SE (VB858700)
 - CN 404: PH- 9P SE (VB858800)
- 18. Connector Assembly
 - CN 402: 5395&5480 4P 60 (VA340200) (VA34020)
 - CN 403: SAN&PH 13P 100L (VT604800)
 - CN 405: 4P 70mm B&C 2mm (VB709900)
 - CN 406,408: 10P 70mm B&C 2m (VB720100)
 - CN 407: 8P 70mm B&C 2mm (VB716700) (VB71670)
- 19. Jumper Wire
 - JP 401: 0.55 (VA078900)