

SPECIFICATIONS: PowerMate 1000/1600 and PSX 1000/1600

measuring standards : IEC 268, IHF-A

level : 0 dBu = 775 mV (RMS)

frequency : 1 kHz

measuring conditions

1. Nominal setting:

gain controls at UNITY GAIN - 0 dB (20 dB MIC), all faders down (0-position), master fader at +6 dB, all

other potentiometer controls at their center position

2. Equivalent input noise

input	source impedance	gaincontrol
LINE	50 ohms	unity gain (20dB)
MIC	150 ohms	maximum gain

3. Generally, distortion is distinguished as THD+noise. The bandwidth (MBW) is 80 kHz. The mixer is set to nominal output power.

DUT	U(E) at the corresponding input	U(A) at the measured output	frequencies
LINE	+10 dBu	+ 16 dBu	1 kHz, 10 kHz
MIC	- 10 dBu	+ 16 dBu	1 kHz, 10 kHz
Power Amplifier	+ 6 dBu	250 watts / 8 ohms	20 Hz 20 kHz

4. Measurement of the frequency response at 20 dB below maximum level.

5. Crosstalk and attenuation at nominal setting U (A) - 16 dBu with band pass filter, variable.

6. Common mode rejection CMRR (selective with band pass filter, variable).

Input	U(E)	output	gain control
LINE	+ 16 dBu	Main Out	Unity Gain (20dB)
MIC	- 50 dBu	Main Out	Gain max.

POWER SUPPLY

1. current:

AC

2. nominal mains supply:

230 volts (PSX 1000/1600 : 120 volts)

3. nominal mains frequency:

50 - 60 Hz

4. maximal permissible deviation: -30 % ... +10 %

5. power consumption (both channels outputting a 1 kHz sine signal, respectively VDE-noise)

power consumption at RL - 4 ohms	PM/PSX 1000/1600
power consumption, no load	80 ... 120 watts
nominal power consumption	1600 watts
standard power consumption	520 watts
maximum power consumption (THD - 1 %)	1600 watts
power consumption at 1/8 of the maximum output	600 watts
power consumption at 1/3 of the maximum output	850 watts

INPUT CHARACTERISTICS

Mixer at nominal setting, nominal output levels, input sensitivity, gain, channel faders and master faders at maximum.

INPUT	nominal input level (dBu)	input sensitivity	max. input level (dBu)	input impedance	input wiring
MIC	-60 ... -10	-74 dBu (155 μ V)	+11	1.8 k ohms	balanced
MONO LINE	-40 ... +10	-44 dBu (4.9 mV)	+30	18 k ohms	balanced
STEREO LINE	-20 ... +10	-34 dBu (15.5 mV)	+30	18 k ohms	balanced
INSERT RET. CHANNEL	0	-	+20	>3.3 k ohms	unbalanced
INSERT RET. MASTER	-6	-	+20	>2.2 k ohms	unbalanced
EQ IN	+6	-	+20	>8 k ohms	balanced
POWER AMP	+6	+6 dBu (1.55 V)	+20	18 k ohms	balanced
2TRACK RET.	+4	-	+14	>8 k ohms	unbalanced
STEREO RET.	0	-	+14	>15 k ohms	balanced

OUTPUT CHARACTERISTICS mixer

OUTPUT	nominal output level (dBu)	max. output level (dBu)	output impedance	output wiring
INSERT SEND CHANNEL	0	+ 20	75 ohms	unbalanced
INSERT SEND MASTER	- 6	+ 20	75 ohms	unbalanced
MAIN OUT	+ 6	+ 20	75 ohms	GND-sense
EQ OUT	+ 6	+ 20	75 ohms	GND-sense
MONO OUT	+ 6	+ 20	75 ohms	GND-sense
AUX ½ SEND	0	+ 20	75 ohms	GND-sense
AUX 3 SEND	0	+ 20	75 ohms	GND-sense
REC. SEND	- 7,8 (-10 dBV)	+ 16	1 k ohm	unbalanced
PHONES	-2 / 200 ohms	+ 18 / 200 ohms	47 ohms	unbalanced
LAMP	12 V DC/2.4 watts	---	---	---

OUTPUT CHARACTERISTICS power amplifier

nominal input voltage at Power Amp In	nominal load impedance	nominal output power, single channel THD < 0.1 %	max. output power, single channel THD = 1 %	max. single channel output power) ¹	nominal output voltage	max. output voltage, no load	max. output voltage THD = 1 %
+ 6 dBu	8 ohms	250 watts	340 watts	360 watts	44.7 V	58 V	53.6 V
+ 6 dBu	4 ohms	500 watts	570 watts	680 watts	44.7 V	58 V	47.7 V

)¹ measured with a Dynamic Headroom test signal, according IHF-A: 1 kHz Burst, 20 ms On, 480 ms Off

STABILIZING of the power amplifier

Single channel, standard output voltage

	8 ohms	4 ohms
stabilizing	0.57 %	1 %
stabilizing level	0.05 dB	0.09 dB

FREQUENCY RESPONSE

amplification frequency response (–3 dB dropped below the level of the standard frequency 1kHz):

input	output	f (u) at –3 dB	f (o) at –3 dB
POWER AMP IN	SPEAKER L&R	30 Hz	54 kHz
MIC	MAIN OUT L&R	15 Hz	90 kHz
LINE	SPEAKER L&R	15 Hz	60 kHz
others	all other outputs	15 Hz	80 kHz

distortion-limited transmission range (effective bandwidth) of the power amplifier:

Input	f (u)	f (o)	notes
Power Amp Input	25 Hz	50 kHz	THD –0.4 %, 1/2 nominal output capacity at 4 ohms, MBW – 500 kHz

NON-LINEAR AMPLITUDES (single channel)

power amplifier input = Power Amp In	power amplifier R(L) = 8 ohms	power amplifier R(L) = 4 ohms	notes
nominal overall distortion	< 0.03 % / 0.1 %	< 0.05 % / 0.2 %	MBW=80 kHz, f=1kHz / 10 kHz
standard overall distortion	< 0.03 % / < 0.03 %	< 0.05 % / < 0.05 %	MBW=80 kHz, f=1kHz / 10 kHz
IMD-SMPTE	< 0.01 %	< 0.015 %	60 Hz, 7 kHz
DIM 30	< 0.01 %	< 0.015 %	3.15 kHz, 15 kHz
DIM 100	< 0.01 %	< 0.015 %	3.15 kHz, 15 kHz

mixer section	distortion f = 1 kHz	distortion f = 10 kHz	notes
LINE Input -> MAIN OUT	< 0.006 %	< 0.02 %	
LINE Input -> MONO OUT	< 0.006 %	< 0.02 %	
LINE Input -> AUX SEND	< 0.01 %	< 0.02 %	
LINE Input -> EQ OUT	< 0.006 %	< 0.02 %	
MIC Input - INSERT SEND	< 0.002 %	< 0.002 %	
MIC Input - MAIN OUT	< 0.006 %	< 0.02 %	
2TRACK -> MAIN OUT	< 0.006 %	< 0.015 %	
STEREO RET. -> MAIN OUT	< 0.006 %	< 0.015 %	

CROSSTALK AND ATTENUATION

	f = 1kHz	f = 10 kHz	notes
fader attenuation			
MONO CHANNEL	> 80 dB	> 80 dB	
STEREO CHANNEL	> 80 dB	> 80 dB	
MASTER	> 80 dB	> 80 dB	
MONO	> 80 dB	> 80 dB	
AUX/FX	> 80 dB	> 80 dB	
rotary control attenuation			
AUX	> 80 dB	> 65 dB	
PAN (BAL)	> 60 dB	> 60 dB	
2 TRACK RETURN	> 90 dB	> 90 dB	
STEREO RETURN	> 90 dB	> 80 dB	
power-off attenuation			
STANDBY	> 90 dB	> 80 dB	
PFL	> 80 dB	> 70 dB	
crosstalk			
Endstufe L/R	> 100 dB	> 80 dB	Power Amp In
Kanal - Kanal	> 70 dB	> 70 dB	
common mode rejection			
CMRR MIC	> 80 dB	> 60 dB	
CMRR LINE	> 40 dB	> 40 dB	
CMRR STEREO LINE	> 40 dB	> 40 dB	
CMRR MASTER Inputs	> 40 dB	> 40 dB	

NOISE

- U (F) = extraneous voltage, unweighted with B = 22 Hz ... 22 kHz, eff. value (IEC 268-1)
- U (G) = noise voltage, frequency weighting filter according to CCIR-468-3, quasi-peak-rated (IEC 268-1)
- U (A) = interfering voltage A-weighted, dB (A), eff. value (IEC 268-1)
- S/N ratio in relation to maximum output at 4 ohms – 47.7 volts (+35.8 dBu) and interfering voltage A-weighted

measurement	U(F)	U(A)	U(G)	EIN (A)	S/N-Ratio (A)	output	notes
power amplifier	-67 dBu	-69 dBu	-56 dBu	-----	104 dB	SPEAKER OUT	Power Amp In, R(Q) = 50 Ω
residual noise	-90 dBu	-92 dBu	-79 dBu	-----	100 dB	MAIN OUT	MASTER at minimum
total noise							
MASTER PM 1000	-87 dBu	-88 dBu	-75 dBu	-----	-----		MASTER at 0 dB, channel at minimum
PM 1600	-85 dBu	-86 dBu	-73 dBu	-----	-----		
typical mixer noise							
PM	-81 dBu	-83 dBu	-68 dBu	-----	-----		all faders at 0 dB, Unity Gain

1000 PM 1600	-79 dBu	-81 dBu	-67 dBu	-----	-----		
MIC (150 ohms)	-67.5 dBu	-69.5 dBu	-56.5 dBu	130 dBu		INSERT	Gain max.
LINE (50 ohms)	-57 dBu	- 59 dBu	- 46 dBu	100 dBu			Gain max.

power amp **ATTENUATION FACTOR** >200

power amp **SLEW RATE** >20 V/μs

INDICATORS

PEAK (channel)	: 6 dB below maximum level
SIGNAL (channel)	: 25 dB below PEAK-indication
MAIN 10-segment	: 27 dB ... +6 dB (measured in dB at the MAIN OUT)
PEAK (FX 1/2)	: 6 dB below maximum level

PHANTOM POWER : 24 volts, commonly switched

SOUND CONTROLS

	LO (shelving)	MID (peaking)	HI (shelving)
MONO (MIC) INPUT	±15 dB / 60 Hz	±15 dB 100 Hz ... 8 kHz Q = 1	±15 dB / 12 kHz
STEREO INPUT	±15 dB / 60 Hz	±12 dB / 2.4 kHz Q = 0.7	±15 dB / 12 kHz

GRAPHIC EQUALIZER (master section)

2 x 7 band: 80 Hz, 250 Hz, 630 Hz, 2.5 kHz, 4 kHz, 8 kHz, 16 kHz; ±10 dB, Q = 1.4

FILTER

LO-CUT; f = 80 Hz; 18 dB/oct. (monaural inputs)

VOICING FILTER (monaural inputs)

FEEDBACK FILTER (AUX3) controllable 80 Hz ... 7.7 kHz / notch / -9 dB

FX-SECTION 2 separately controllable stereo FX-units, 18 bit, UP/DOWN-keys, each with 99 program presets (delay, reverb, modulation, and mixed programs)

DIMENSIONS AND WEIGHT

	PM/PSX 1000 desktop model	PM/PSX 1000 rack mount model	PM/PSX 1600 desktop model
Width	508.5 mm	483 mm	667.5 mm
Height	210.3 mm	443.7 mm (10 H.E.)	210.3 mm
Depth	478.7 mm	195.2 mm	478.7 mm
Weight	20 kg	21.5 kg	24 kg

EXTENSION KITS

NRS 90 220	19" rack-mount-ears for the PM 1000 No. 112 698
DCN 112700	gooseneck lit-light, 12 volts/2.4 watts, 12", XLR-connector
DCN 110693	foot switch FS11

NOTE when mounting the PM 1000 / PSX 1000 in a rack shelf system
To protect the appliance against thermal overload, a space of at least 2 HU has to be left directly below and above the PM 1000 which can be covered using dummy plates. In case the rack shelf is equipped with front and rear covers, these have to be detached.

MEASUREMENT DATA PM/PSX 1000/1600, complete

measuring conditions:

measurement tolerance:	$\Delta X = \pm 1.5 \text{ dB}$
test frequency:	$f = 1 \text{ kHz}$
reference level:	$U = 775 \text{ mV (0dB)}$
source impedance LINE:	$R(Q) = 50 \Omega$
source impedance MIC:	$R(Q) = 150 \Omega$
load impedance mixer outputs:	$R(L) = 100 \text{ k}\Omega$
load impedance headphones:	$R(L) = 2 \times 200 \Omega$
load impedance power amplifier:	$R(L) = 4 \Omega, 8 \Omega,$
EQ, PAN, BAL controls:	center position
FADER:	0 dB-position
gain controls:	Unity Gain = 0 dB (MIC 20 dB)
AUX, LEVEL controls:	center position
measurement standards:	IEC 268, IHF-A
protection class:	I
test voltage IEC65:	3000 Vrms
U (F) = extraneous voltage	unweighted with B = 22 Hz ... 22 kHz, eff. value (IEC 268)
U (G) = noise voltage	frequency weighting filter according to CCIR-468-3, quasi-peak-rated (IEC 268)
U (A) = interfering voltage	A-weighted, dB (A), eff. value (IEC 268)

• The printed board assembly is provided with service terminals. The assignment of these terminals complies to the following table:

CNSERV 1	Belegung	CNSERV 2	Belegung
1	-Vcc	1	LIM L
2	BIAS + R	2	-15V
3	BIAS - R	3	LIM R
4	FAN-Voltage	4	+5V
5	+Vcc	5	+24V
6	BIAS + L	6	+15V
7	BIAS - L	7	TEMP -Heatsink
8	Temp +Heatsink	8	GND

1. operating voltage:

$U(B) = 230 \text{ V} / 50 \text{ Hz} \dots 60 \text{ Hz}$

2. critical tolerance (operating voltage):

- 30% +10%

3. power consumption (both channels driven):

	power consumption	current
no load	80....120W	-----
nominal operation (RL = 4 ohms) @ 2 x 470 watts	1600 W	8 A

4. adjustments:**4.1 IDLE-CIRCUIT CURRENT ADJUSTMENT:**

A DC-voltammeter has to be connected to the BIAS test points to adjust the idle-circuit current via the trimmer on the printed board assembly 84169. Adjustment of both power amplifier channels L&R.

Adjustment	test point 1	test point 2	U (DC)	BIAS-trimmer
BIAS L	CNSERV1.6	CNSERV1.7	4 mV	VR301
BIAS R	CNSERV1.2	CNSERV1.3	4 mV	VR501

Adjustment of the idle-circuit current has to be performed under normal room temperature conditions. If the power amplifier had been operated before, the appliance has to rest for several hours to cool off.

4.2 VCA - OFFSET:

You have to rhythmically open and short-circuit the CNSERV2.1 and CNSERV2.2 for the left channel respectively the CNSERV2.3 and CNSERV2.2 for the right channel, that are located on the printed board assembly 84169, and adjust the power amplifier output signals for minimal offset, using VR300 respectively VR500 (using an oscillograph it has to be set for minimal peak or for audibly minimal loudness of the interference pulse).

5. function test:

5.1 OUTPUT - offset voltage

DC-voltage measurement at the speaker outputs CHANNEL L/R with $U(\text{DC}) < \pm 10 \text{ mV}$.

5.2 LIMITER:

5.2.1. attenuation test

Drive each channel with a 1 kHz signal until $U(A) = 50 \text{ volts}$ (no load). Increase the input voltage by 10 dB. The LIMITER LED will light and the output voltage is increased by about 1 dB to 57 volts. The signal is slightly driven into clipping with a distortion rate of the limited signal: $\text{THD} = 1.0 \% \dots 1.5 \%$. Further increasing the input signal up to +20 dBu should not result in excessive higher clipping.

5.2.2. Attack and release

- test the amplifier channels separately: testing should be performed without load resistors.

1.) Drive the power amplifier inputs with a burst signal ($f = 1 \text{ kHz}$, 10 cycles, rate: $_ 0.5 \text{ sec.}$) and $U(E) = +16 \text{ dBu}$.

2.) Observe the outputted signal via an oscilloscope. After 3 - 4 signal periods, the limiter attenuated the "heavy" distortion in the beginning to a minor rest distortion (THD of $1.0 \% \dots 1.5 \%$).

attack time: 3 - 4 ms

release time: 30 - 40 ms

5.3 CUT-IN DELAY:

After turning on the appliance using the power-on switch, it takes about 2 seconds until the input signal is present on the power amplifier's outputs. The relay E2 on the printed board assembly 85266 bridges the NTC-resistor for limiting the inrush current.

5.4 FAN CONTROL:

When switching the power amplifier on, the internal fan coolers will run for approximately 2 seconds.

Afterwards, they stop, provided that the power amplifier is "cold". During the power amplifier is operated with no load (power on, no input signal), the ventilators switch back and forth between SLOW-mode and OFF-mode, depending on the heat sinks' temperature. When unplugging the CN14 connector, the fans will run on FAST speed. Ventilator-voltage -27 volts DC , measured between CNSERV1.4 and CNSERV2.8.

5.5 SOAR PROTECTION CIRCUIT TEST:

Drive each channel up to 45 volts with a load of $4 _$. Connect a $1 _$ resistor parallel. The protection circuit responds and tries to re-activate continuously! The protect-LED lights. Repeat the test with a load of $2 _$. The power amplifier has to stay in operation.

5.6 SHORT-CIRCUIT CURRENT-LIMITING TEST:

Test the power amplifier channels separately, without load:

- drive the power amplifier inputs with a burst signal ($f = 1 \text{ kHz}$, 10 cycles, rate: $_ 0.5 \text{ sec.}$) and $U(E) = +6 \text{ dBu}$.

- include an $1 _$ load resistor.

- the short-circuit current-limiting circuitry attenuates the output voltage at the load resistor symmetrically (observe on the oscilloscope) to a peak voltage of $25 \text{ V} - 27 \text{ V}$ (approx. $25 \text{ A} - 27 \text{ A}$ maximum peak current).

5.7 DC-VOLTAGE PROTECTION CIRCUIT TEST:

This test can only be performed when measuring single printed board assemblies.

Test the power amplifier channels separately:

- drive each channel of the power amplifier with a test signal ($f = 4 \text{ Hz}$) applied to the FET Q316 respectively Q516 Drain, without load.

- when reaching an input voltage of approximately 10 dBu, the protection circuit responds and tries to re-activate

continuously! The protect-LED lights.

- Repeat the test using a test signal of $f = 14 \text{ Hz}$. The power amplifier has to stay in operation.

5.8 HIGH FREQUENCY PROTECTION CIRCUIT TEST:

Caution: Operate the power amplifier under all circumstances without load resistors connected. Apply to one power amplifier channel at the time a sine burst of $f = 80 \text{ kHz}$ (40 ms ON, 960 ms OFF) with +20 dBu. The protection circuit has to respond and the power amplifier tries to re-activate continuously. The PROTECT-LED blinks rhythmically. Repeat the test with $f = 50 \text{ kHz}$. The power amplifier has to stay in operation.

6. Level

All level controls within the signal path fully open.

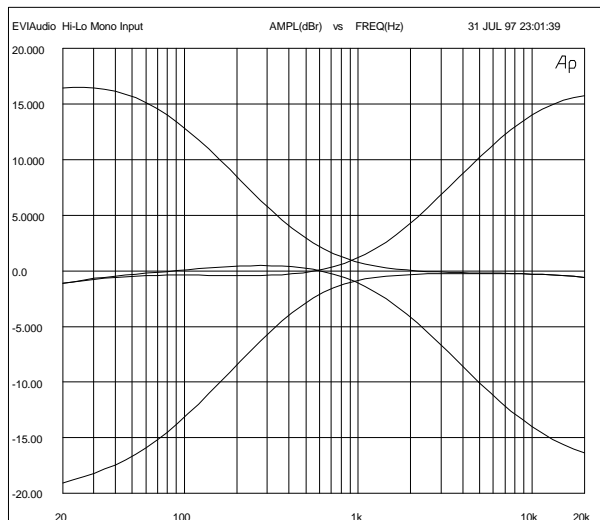
Input	U(E)	Output	U(A)	remarks
MIC Mono	-60 dBu	INSERT Mono	0 dBu	Gain max.
LINE Mono	-54 dBu	SPEAKER L&R	44.7 V	EQ Bypass
INSERT RETURN Mono	-14 dBu	SPEAKER L&R	44.7 V	
MIC Stereo	-60 dBu	MAIN INSERTS	+4 dBu	
LINE Stereo L/Mono	-34 dBu	MAIN OUTPUT L&R	+6 dBu	
LINE Stereo R	-34 dBu	MAIN OUTPUT R	+6 dBu	
STEREO RET. L/Mono	-24 dBu	EQ OUTPUT L&R	+2 dBu	EQ ON
STEREO RET. R	-24 dBu	EQ OUTPUT R	+2 dBu	EQ ON
2 TRACK RET.	-24 dBu	MONO OUTPUT	0 dBu	
LINE Mono	-44 dBu	REC. SEND	0 dBu	
2 TRACK RET.	-20 dBu	AUX3 SEND	-12 dBu	
LINE Mono	-60 dBu	AUX1 SEND	+20 dBu	
LINE Mono	-60 dBu	AUX2 SEND	+20 dBu	
LINE Mono	-60 dBu	AUX3 SEND	+5 dBu	AUX3 PRE
LINE Mono	-60 dBu	AUX3 SEND	+15 dBu	AUX3 POST
LINE Stereo L/Mono	-44 dBu	AUX3 SEND	+0 dBu	AUX3 PRE
LINE Stereo L/Mono	-44 dBu	AUX3 SEND	+8 dBu	AUX3 POST
LINE Stereo L/Mono	-44 dBu	AUX1 SEND	+13 dBu	FX1 off
LINE Stereo L/Mono	-44 dBu	AUX2 SEND	+13 dBu	FX2 off
LINE Mono	-44 dBu	PHONES L&R	+8 dBu	PFL CHANNEL engaged
LINE Stereo L/Mono	-24 dBu	PHONES L&R	+8 dBu	PFL CHANNEL engaged
LINE Stereo L/Mono	-24 dBu	PHONES L&R	+18 dBu	PFL MASTER engaged
LINE Stereo L/Mono	-34 dBu	PHONES L&R	+11 dBu	PFL AUX3 engaged /AUX3 PRE
POWER AMP INPUT L&R	+ 6 dBu	SPEAKER L&R	44.7 V	no distortion

7. Amplitudes and non-linearity

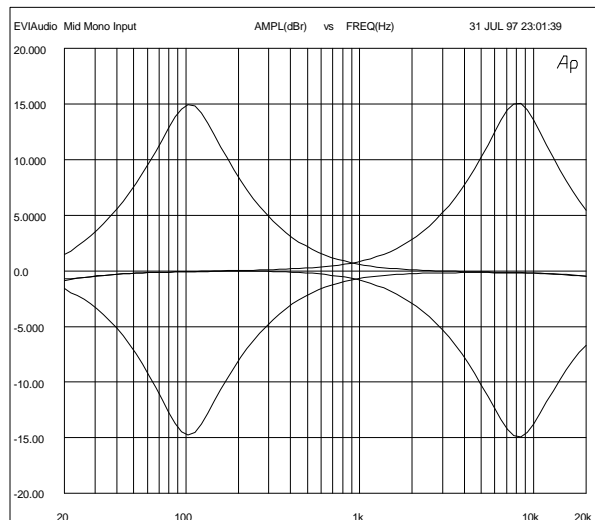
- measurement of the power amplifier with an 8 Ω load resistor, one channel driven.
- MBW = 80 kHz,
- DIM 30: 3.15 kHz, 15 kHz
- SMPTE: 60 Hz, 7 kHz, 4:1

input	output	THD+N @ 1 kHz	THD+N @ 10 kHz	DIM 30	SMPTE	remarks
MIC Mono/Stereo	EQ OUTPUT L&R	<0.005 %	<0.02 %	<0.01 %	<0.01 %	U(A) = 16dBu
LINE Mono	EQ OUTPUT L&R	<0.005 %	< 0.02 %	< 0.01 %	< 0.01 %	U(A) = 10 dBu
LINE STEREO	EQ OUTPUT L&R	<0.005 %	< 0.02 %	< 0.01 %	< 0.01 %	U(A) = 10 dBu
POWER AMP IN	SPEAKER OUT L&R	< 0.03 %	< 0.1 %	< 0.01 %	< 0.01 %	Pab = 250W

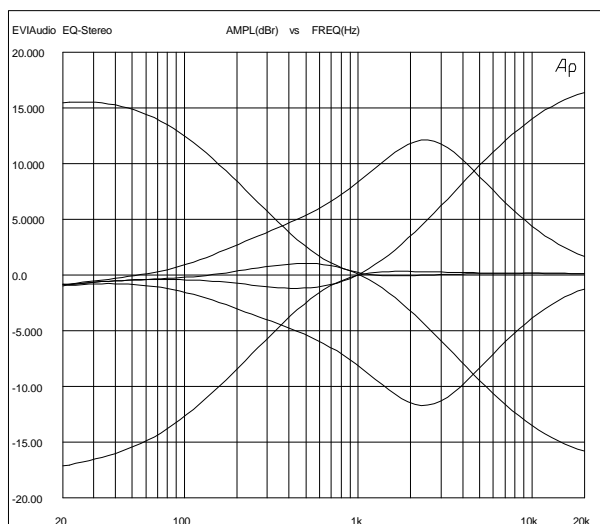
8. Frequency response



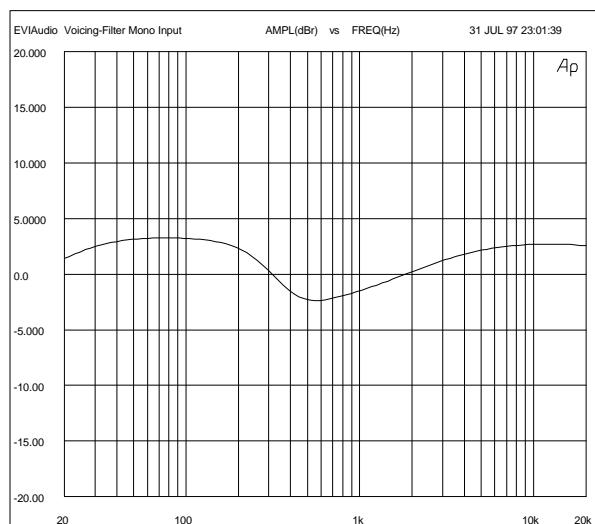
EQ Mono Input HI/LO



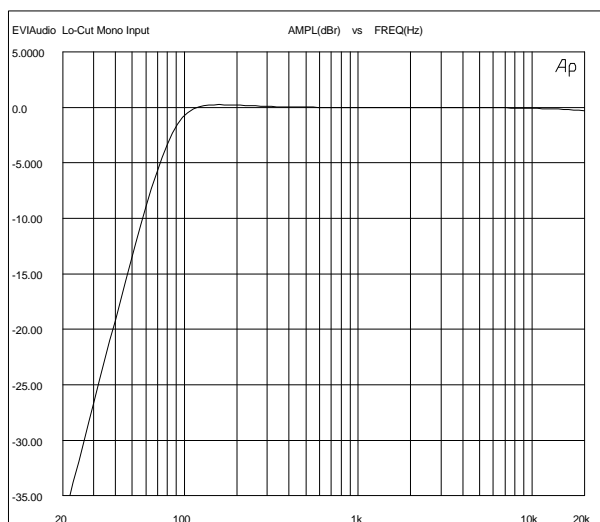
EQ Mono Input MID



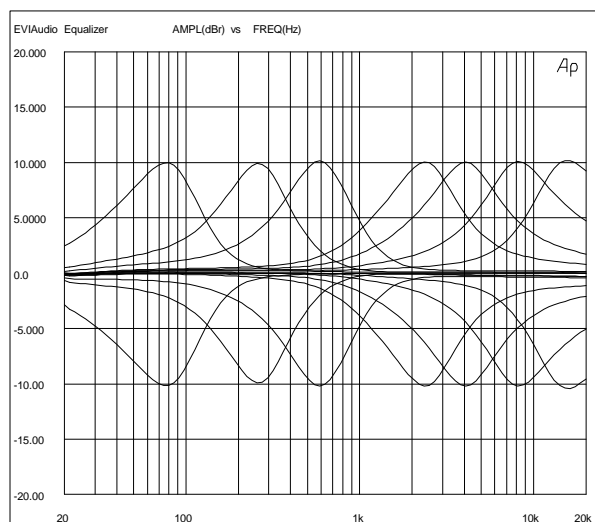
EQ Stereo Input



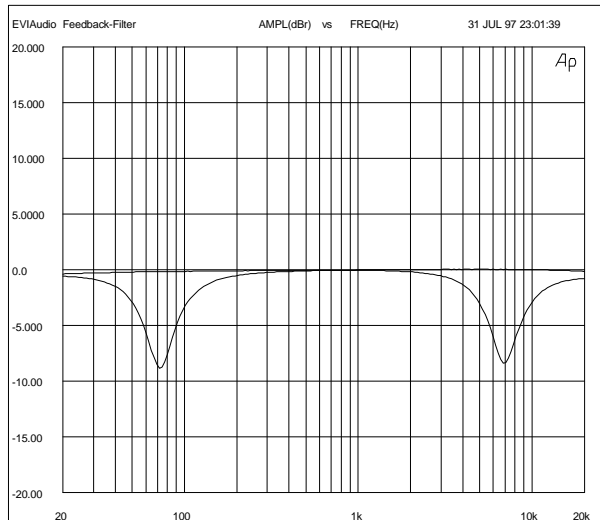
VOICING FILTER Mono Input



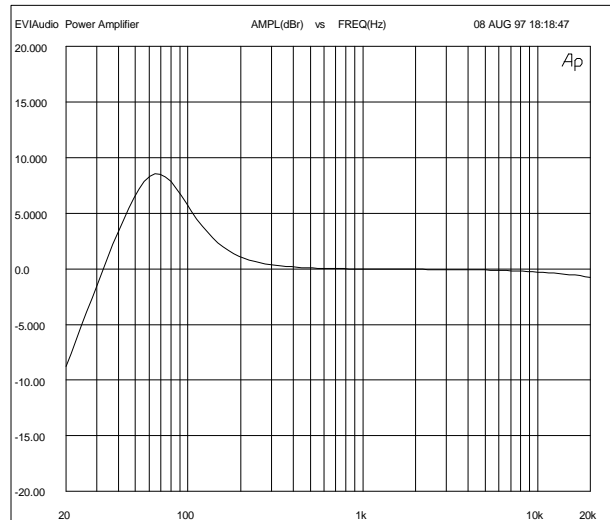
LO-CUT Mono Input



7-BAND EQUALIZER MASTER



FEEDBACK FILTER AUX3



Power Amplifier

8.2 Limit frequencies –3 dB @ 1 kHz

All level controls within the signal path fully open.

Input	Output	f(u)	f(o)
MIC Mono	SPEAKER L&R	40 Hz	45 kHz
MIC Stereo	SPEAKER L&R	40 Hz	45 kHz
LINE Mono	SPEAKER L&R	40 Hz	40 kHz
LINE Stereo	SPEAKER L&R	30 Hz	28 kHz
Power Amp In	SPEAKER L&R	30 Hz	50 kHz
LINE Stereo	AUX3	10 Hz	33 kHz
LINE Stereo	AUX2	12 Hz	33 kHz
LINE Stereo	AUX1	12 Hz	33 kHz
LINE Stereo	MONO OUT	8 Hz	33 kHz
LINE Stereo	REC.SEND	8 Hz	30 kHz
MIC Mono	INSERT SEND	50 Hz	100 kHz

9. Interference noise

- U (F) = extraneous voltage, unweighted with B = 22 Hz ... 22 kHz, eff. value (IEC 268-1)
- U (G) = noise voltage, frequency weighting filter according to CCIR-468-3, quasi-peak-rated (IEC 268-1)
- U (A) = interfering voltage A-weighted, dB (A), eff. value (IEC 268-1)
- S/N ratio in relation to maximum output at 4 ohms – 47.7 volts (+35.8 dBu) and interfering voltage A-weighted

Input	Output	U(F) dBu	U(G) dBu	U(A) dBu	GAIN dB	EIN(A) dBu	S/N- R. dB	Remarks
Power Amp In	SPEAKER L&R	-67	-56	-69	29.2	---	104	Power Amp In R(Q) = 50 Ω
----	EQ OUT	-78	-67	-80	---	---	---	master up, EQ by-pass, channel down
----	EQ OUT	-90	-79	-92	---	---	---	master down, EQ by-pass, channel down
----	EQ OUT	-88	-77	-90	---	---	---	master down, EQ on, channel down
MIC Mono	MAIN	-47	-36	-49	81	130	---	MASTER, CHANNEL and GAIN up, R (Q) = 150 Ω

MIC Mono	MAIN	-74	-63	-75	30	105	---	MASTER, CHANNEL and GAIN down, R (Q) = 150 Ω
MIC Stereo	MAIN	-46	-35	-48	82	130	---	MASTER, CHANNEL and GAIN up
MIC Stereo	MAIN	-71	-60	-73	31	104	---	MASTER and CHANNEL up, GAIN down
LINE Stereo	MAIN	-45	-34	-47	41	88	---	MASTER, CHANNEL and GAIN up
LINE Stereo	MAIN	-71	-60	-73	11	84	---	MASTER and CHANNEL up, GAIN down
LINE Mono	MONO	-62	-51	-64	24	88	---	MONO, MASTER and CHANNEL up, GAIN down
PM1000 PM1600	AUX1	-64 -58	- 53 -52	-66 -63	---	---	---	AUX 1, CHANNEL down
PM1000 PM1600	AUX2	-64 -58	- 53 - 52	-66 -63	---	---	---	AUX 2, CHANNEL down
PM1000 PM1600	AUX3	-71 -67	-60 -56	-73 -69	---	---	---	AUX 3, CHANNEL down, PRE / POST
---	2 TRACK	-94	-84	-96	---	---	---	CHANNEL down

10. operation voltages and service test points

voltage measured at the corresponding pin referred to GND CANSERV2.8

84169	Power Amp	measured in idle condition	interfering voltage and ripple-voltage U (F) rms
CANSERV 1	assignment		
1	-Vcc	-82Vdc	70 mVrms
2-3	BIAS R	4 mV	-----
4	FAN-Voltage	stage 0: 0 volts stage I: 11 volts stage II: 27 volts	-----
5	+Vcc	+82Vdc	70 mVrms
6-7	BIAS L	4 mV	-----
8	Temp +heatsink	variable *1	-----
CANSERV 2			
1	LIM L	-----	-----
2	-15V	-15.5Vdc	250 μ Vrms
3	LIM R	-----	-----
4	+5V	+5Vdc	40 μ Vrms
5	+24V	+25Vdc	120 μ Vrms
6	+15V	+15.5Vdc	250 μ Vrms
7	TEMP -heatsink	variable *1	-----
8	GND	GND	-----
CN2			
20	LAMP	12.5Vdc	1.5 mVrms

* see also paragraph 11

11. Temperature and heat sink

DC-voltage measured at the corresponding pin referred to GND (CANSERV2.8)

heat sink temperature	25 °C	40°C	60°C	80°C	100°C	120°C	140°C
Udc CANSERV1.8 (+) respectively CANSERV2.7 (-)	2.5 V	4.5 V	7 V	9.5V	11 V	13 V	14V

The critical shut-off point is reached at approx. 130°C; the power amplifier enters the protection mode.

12. Phantom power

When the +24 volts-button is engaged, the measured DC-voltage on pin 2 referred to pin 1, respectively on pin 3 referred to pin 1 of the corresponding XLR-type input connector has to be between +24 ... +26 volts.

13. FX unit

13.1 Level

- AUX1/FX1 respectively AUX2/FX2, AUX3, channel fader, AUX1/FX1 Send respectively AUX2/FX2 Send, FX1 to AUX3 respectively FX2 to AUX3, AUX3 fader, master L&R-fader fully up.
- FX1 ON-switch respectively FX2 ON-switch set to ON. Selected FX-preset 0/0.

Input	U(E)	Output	U(A)	Remarks
MIC MONO	-40 dBu	MAIN OUTPUT L&R	+18 dBu	Gain min.
MIC MONO	-40 dBu	AUX 3 SEND	+15.5 dBu	Gain min. AUX3 PRE.
MIC STEREO	-40 dBu	MAIN OUTPUT L&R	+15 dBu	Gain Mic min.
MIC STEREO	-40 dBu	AUX 3 SEND	+12.5 dBu	Gain Mic min. AUX3 PRE.
Line STEREO L / MONO	-20 dBu	MAIN OUTPUT L&R	+15 dBu	Line Trim min.
Line STEREO L / MONO	-20 dBu	AUX 3 SEND	+12.5 dBu	Line Trim min. AUX3 PRE.
Line STEREO R	-20 dBu	AUX 3 SEND	+6.5 dBu	Line Trim min. AUX3 PRE.
Line STEREO R	-20 dBu	AUX 3 SEND	+6.5 dBu	Line Trim min. AUX3 POST

13.2 Interference noise

- U (F) = extraneous voltage, unweighted with B = 22 Hz ... 22 kHz, eff. value (IEC 268-1)
- U (G) = noise voltage, frequency weighting filter according to CCIR-468-3, quasi-peak-rated (IEC 268-1)
- U (A) = interfering voltage A-weighted, dB (A), eff. value (IEC 268-1)

Output	U(F)	U(G)	U(A)	Remarks
MAIN OUTPUT L&R	-58 dBu	-49 dBu	-60 dBu	MASTER + FX1 respectively FX2 faders max. Prog. 0
AUX 3 SEND	-60 dBu	-52 dBu	-64 dBu	AUX3-fader, FX1 respectively FX2 to AUX3 max. Prog. 0
MAIN OUTPUT L&R	-59 dBu	-49 dBu	-60 dBu	MASTER + FX1 faders max. Prog. 5
MAIN OUTPUT L&R	-58 dBu	-49 dBu	-60 dBu	MASTER + FX2 faders max. Prog.55

13.3 Functioning test

Drive the FX 1 and the FX 2 units. Listen to the signal while switching the presets.

7-segment LED-Display: All bars have to light at the same intensity.

The FX-unit should not introduce extreme digital interference or extensive noise to the audio signal.

During the (ON/OFF) switching of the FX1/2 units, no switching noise should occur.

Switch the FX unit via foot switch.

14. Lit-light connector

Connect a 40 ohms / 10 watts resistor to the pins 2 and 3 of the LAMP-connector. The measured voltage should indicate 12 volts DC.

15. Displays

At the mentioned input-voltage the LED starts lighting. Gain and AUX1/2 controls set to their maximum with a tolerance of ± 2 dB.

Display	Input	U(E) / dBu
SIGNAL of a monaural channel	LINE Mono	- 52
PEAK of a monaural channel	LINE Mono	- 26
SIGNAL of a stereo channel	LINE Stereo L/Mono	- 32
PEAK of a stereo channel	LINE Stereo L/Mono	- 6
PEAK FX1 / FX2	LINE Mono	- 65

The display within the master section indicates the corresponding output level at the MAIN OUT; in dBu. Check the indicated display-value of the MAIN OUT for every LED.