

Technical Specifications: X1201 / P1201

Amplifier at rated conditions, 8Ω output load, unless otherwise specified.

	X1201 / P1201		
Load Impedance	8 Ω	4 Ω	2 Ω
Maximum Midband Output Power THD = 1%, 1kHz	750 W	1200 W	1600 W
Rated Output Power THD < 0.2%, 20Hz ... 20kHz	500 W	1000 W	-----
Max. Single Channel Output Power Dynamic-Headroom, IHF-A	850 W	1450 W	1700 W
Maximum RMS Voltage Swing THD = 1%, 1kHz		86 V	
Voltage Gain at 1kHz		33 dB	
Slew Rate at 1kHz		40 V/μs	
Power Consumption at 1/8 maximum output power @ 4Ω		870 W	
Input Sensitivity at rated output power @ 4Ω, 1kHz		1.4 V	
THD at rated output power, MBW = 80kHz, 1kHz		< 0.05 %	
IMD-SMPTE 60Hz, 7kHz		< 0.08 %	
DIM30 3.15kHz, 15kHz		< 0.03 %	
Frequency Response -1dB, ref. 1kHz		13 Hz ... 45 kHz	
Power Bandwidth THD = 1%, ref. 1kHz, half power @ 4Ω		10 Hz ... 50 kHz	
Input Impedance 20Hz ... 20kHz, balanced		20 kΩ	
Damping Factor at 100Hz / 1kHz, 8Ω		> 300 / > 200	
Signal to Noise Ratio A-weighted, non internal summing mode		106 dB	
Power Requirements	240V, 230V, 120V, 100 V, 50Hz ... 60Hz, factory configured		
Protection	Audio limiters, High temperature, DC, HF, Back-EMF, Peak current limiters, Inrush current limiters, Turn-on delay		
Cooling	Front-to-rear, 3-stage-fans		
Safety Class	I		
Dimensions (W x H x D), mm	483 x 132.5 x 426		
Weight	17 kg		
Optional			
Input transformer		NRS 90208 (121 641)	
Rear-rackmount 15,5“		NRS 90235 (112 733)	
Rear-rackmount 18“		NRS 90223 (112 701)	

MEASURED DATA	X1201 / P1201
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The measured data apply to the following appliances:

Unit Model	Unit Number	Mains Voltage	Mains Frequency
X1201	112 736	230V	50 - 60 Hz
X1201		240V	50 - 60 Hz
X1201		100V	50 - 60 Hz
X1201		120V	50 - 60 Hz
P1201	170 149	230V	50 – 60 Hz
P1201	170 148	120V	50 – 60 Hz
P1201	170 148	100V	50 – 60 Hz

MEASURED DATA: X1201 / P1201

Printed boards name and corresponding EDP numbers:

Printed boards EDP numbers			
100V	120V	230V	240V
81344	81344	81344	81344
84199	84199	84194	

Printed board parts 84194 / 84199	Index
Amplifier - PCB	84194/1 / 84199/1
Bus - PCB	84194/2 / 84199/2
Main - PCB	84194/3 / 84199/3
LED - PCB	84194/4 / 84199/4

Testing Conditions – unless differently stated:

- Measuring tolerance: $\Delta X = \pm 1.5\text{dB}$
- Measuring frequency: $f = 1\text{kHz}$
- Stated level values referred to: $U = 775\text{mV (0dBu)}$
- XLR – socket pin-assignment:
 - PIN 1 = GROUND/SHIELD
 - PIN 2 = + INPUT
 - PIN 3 = - INPUT
- Source impedance for signal-feed via XLR – socket: $R(Q) = 50\Omega$
- The printed board assembly 84194 / 84199 offers **service connectors**.

84194/2 / 84199/2 CNS1X		84194/2 / 84199/2 CNS2X		84194/1 / 84199/1 CN10 / CN11	
PIN	Assignment	PIN	Assignment	PIN	Assignment
1	-Vcc	1	LIM Switch	CN10	
2	BIAS +HOT	2	-15V	1	FLOAT. Voltage
3	BIAS -HOT	3	SYMMETRY	2	GNDA
4	FAN Voltage	4	+15V	3	GNDA
5	+Vcc	5	GNDA	CN11	
6	BIAS +COLD	6	Speaker A	1	LIM Switch
7	BIAS -COLD	7	Relay/Protect	2	-15V
8	TEMP Heat sink	8	n.c.	3	-15V

1. Operating Voltage:

U(B) = 230V 50Hz ... 60Hz / U(B) = 120V 50Hz ... 60Hz

2. Operating Voltage Deviation Range: -30% +10%**3. Power Consumption**- Driven with sine signal $f = 1\text{kHz}$

	X1201 / P1201	Output Power
Idling Power Consumption	50 - 70 W	
Maximum Power Consumption ($R_L=4\Omega$)	1870 W	1200 W
Nominal Power Consumption ($R_L=4\Omega$)	1730 W	1000 W
Standard Power Consumption ($R_L=4\Omega$)	590 W	100 W
Power Consumption at 1/8 of the Max. Output Power	720 W	156 W
Power Consumption at 1/8 of the Max. Output Power at 10 % Mains Overvoltage	870 W	180 W

4. Settings/Adjustments**4.1. IDLING CURRENT ADJUSTMENT**

Connect a DC-voltmeter to the BIAS measuring points (on the printed board assembly 84194/2 / 84199/2, see service connectors) and adjust the idling current via the trimmers VR101 / VR301 (on the printed board assembly 84194/1 / 84199/1). Adjustment has to be performed for HOT / COLD $U(\text{DC}) = 7.5\text{mV}$ and at normal room temperature. If the power amplifier has previously been operated, it has to be given several hours of time for regaining normal temperature.

4.2. FLOATING - SYMMETRY

Checking and setting the floating voltage symmetry has to be performed immediately after adjusting the idling current.

Operate the power amplifier in idling condition. Measuring between the measuring points CNS1X.1 / CNS2X.5 and CNS1X.5 / CNS2X.5 with a DC-voltmeter, set the floating voltage symmetrical to GROUND via VR1 on the printed board assembly 84194/1 (84199/1).

The absolute voltage value is not critical but the symmetry of the \pm floating voltage over GROUND.

Checking the set floating voltage is possibly by use of a DC-voltmeter and measuring between on the service connector between CNS2X.3 and CNS2X.5 on the printed board assembly 84194/2 (84199/2) as well as on the pin terminal between CN10.1 and CN10.2/3 on the printed board assembly 84194/1 (84199/1).

The measured DC voltage value should be 0 volts.

4.3. VCA - OFFSET

Rhythmically open and short-circuit the pin contacts CNS2X.1 and CNS2X.2 on the printed board assembly 84194/2 (84199/2). Use VR100 to adjust the power amplifier output to their minimum offset value (with oscilloscope to minimal peak value or to the audible minimum volume of the interfering pulse).

5. Function Test**5.1. OUTPUT – Offset Voltage**

DC-measurement at the loudspeaker outputs with $U(\text{DC}) \leq \pm 10\text{mV}$.

5.2. LIMITER**5.2.1. Attenuation Test**

Power amplifier driven with a 1 kHz signal up to $U(A) = 69\text{ V}$ (without load). Increase the input voltage by 10dB. The LIMITER LED lights and the output voltage ascends by approximately 2dB to approximately 85 V while slightly clipping. The distortion rate of the limited signal is at THD = 1.0 ... 1.5%. Further increasing the input signal up to a value of +21dBu should not result in remarkably higher clipping.

5.2.2. Attack and Release Times

Test has to be performed without load resistors connected.

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

2.) Monitor the output signal via oscilloscope. After 3 to 4 signal periods, the limiter has controlled the high distortion level down to a minor residual distortion (THD = 1% 1.5%).

Attack time: 3-4 ms Release time: 30-40 ms

5.3 POWER-ON DELAY

Make sure that the signal is present at the power amplifier input. Switch the power amplifier via the Power-ON switch on. Approximately 2 seconds after switching the power on, the signal will be present at the output.

5.4 FAN CONTROL

Upon switching the power amplifier's power on, the fans will run for approximately 2 seconds and stop when the power amplifier has regained "normal" temperature. In idling condition (Power-ON, no signal present) the fans are switched between SLOW and OFF mode, depending on the heat sink's temperature.

Removing the connector CN5 lets the fans run in FAST mode.

The fan voltage is measured between pin CNS2X.4 and pin CNS1X.4: SLOW ca. 17.5 V FAST ca. 29.0 V

5.5. SOAR-PROTECTION TEST

Drive the power amplifier up to 69 V in 4 Ω . Parallel-connect a 1 Ω resistor. The protection circuit reacts and continuously tries to re-start! The protect-LED lights. Repeat the test with a 2 Ω resistor. The power amplifier should not switch off.

Caution: If the SOAR-protection does not react in case of mains undervoltage, repeat the test with parallel-connecting a 0.5 Ω resistor instead of a 1 Ω .

5.6. SHORT-CIRCUIT CURRENT-LIMITING TEST

- drive each channel with a burst signal ($f = 1\text{kHz}$, 1-3 cycles, rate $\approx 1\text{ sec.}$), with $U(E) = 0\text{dB}$
- connect a 1 Ω load resistor
- the short-circuit current-limiter limits the output voltage at the load resistor symmetrically (monitor via oscilloscope) to a peak voltage value of 40 V (approximately 40 A maximum Peak Output Current).

5.7. DC-VOLTAGE PROTECTION TEST

- feed a test signal ($f = 5 - 7\text{ Hz}$) to the power amplifier without load resistor connected.
- starting at an input voltage of approximately 5 V_{eff}, the protection circuit reacts and continuously tries to re-start!
The protect-LED blinks in the same frequency.
- repeat the test with $f = 14\text{Hz}$. The power amplifier should not switch off.

5.8. HF-PROTECTION TEST

Caution: Perform tests without load resistor connected to the power amplifier only.

Feed a +20dBu sine burst signal $f = 100\text{kHz}$ (40ms ON, 960ms OFF) to the power amplifier input.

The protection circuit has to react. The power amplifier continuously tries to re-start.

The PROTECT-LED blinks in the same frequency.

Repeat the test with $f = 50\text{kHz}$. The power amplifier should not switch off.

5.9. INDICATOR TEST

Feed a 1kHz sine signal while slowly increasing it.

At approximately -26dBu the SIGNAL-LED starts lighting and at approximately +8dBu the LIMIT-LED lights.

6. Level

6.1. VOLTAGE AMPLIFICATION

Unit	Input	U(E)	Measuring point	U(A)	U(A)	Gain	Load Resistor	Test frequency
X1201/ P1201	CH. A or B	+5.8dBu	OUTPUT	+39dBu	69.2V	33.2		1kHz
X1201/ P1201	CH. A + B	-0.2dBu	OUTPUT	+39dBu	69.2V	39.2		1kHz

6.2. MAXIMUM INPUT LEVEL: $U(E) = +21\text{dBu}$

7. GROUND LIFT-switch

The circuit ground (at the input or output connector) is measured against the enclosure ground (contact on the ground-screw on the rear of the appliance or ground contact on the mains plug).

Switch set to GROUNDED : $R = 0\Omega$

UNGROUNDED : $R = 5\Omega$

8. Amplitude – Non-Linearity

- measured with a 8Ω load resistor connected

- MBW = 80kHz

Test	At nominal output power	Remarks
THD+N ($f = 1\text{kHz}$)	<0.05%	
IMD-SMPTE	<0.08%	60Hz, 7kHz
DIM 30	<0.03%	3.15kHz, 15kHz

9. Frequency Response

Linear Frequency Response (mind border frequencies)

	Lower border frequency	Upper border frequency
-3dB	$f_u < 10\text{Hz}$	$f_o = 85\text{kHz}$
-1dB	$f_u = 13\text{Hz}$	$f_o = 45\text{kHz}$

10. Noise Interference

- $U(F)$ = extraneous voltage non-weighted with $B = 22\text{ Hz} \dots 22\text{ kHz}$, effective value (IEC 268-1)

- $U(G)$ = noise voltage, frequency-weighting filter according to CCIR-468-3, quasi peak-weighted (IEC 268-1)

- $U(A)$ = interference voltage A-weighted, dB(A), effective value (IEC 268-1)

- S/N ratio ref. to max. output voltage into 4 ohms = 55.1 V (+37 dBu) and interference voltage A-weighted

Power Amp	Output	U(F) dBu	U(G) dBu	U(A) dBu	GAIN dB	IN(A) dBu	S/N-R. dB	Remarks
Input Channel A & B operated. (as shipped)								
X1201 / P1201	SPEAKER OUT	- 63	- 51	- 65	33	- 98	> 104	INPUT A&B $R(Q) = 50\Omega$
Only channel A operated. Remove the resistors R291 / R292 off the printed board assembly 84194/2.								
X1201 / P1201	SPEAKER OUT	- 65	- 54	- 67	33	- 100	> 106	INPUT A $R(Q) = 50\Omega$

11. Heat Sink Temperature

DC-voltages measured between CNS1X.8 and CNS2X.5 (GNDA)

Heat sink temperature	25°C	40°C	60°C	80°C	100°C	120°C	130°C
	1.5 V	3.0 V	6.0 V	9.0 V	12.0 V	13.0 V	13.8 V

The switch-off point is at approx. 130 °C. The power amplifier enters Protect-Mode.

12. SLOT-Specification

The power amplifier X1201 (P1201) is capable of providing a maximum current of $\pm 300\text{mA}$ for individual modules with $\pm 15\text{V}$ operating voltage.

- measured at 10 % mains undervoltage.

	Power consumption:
Xi-11 / Xi-21 – Input modules	Approx. 18 mA
V – Front modules	Approx. 70 mA
I-1 Input module	Approx. 18 mA
MRx-Front modules	Approx. 70 mA

13. Dimensions and Weight

Power amplifier	Weight	Dimensions in mm
X1201 / P1201	17kg	483 x 132.5 x 385.5

14. Input Connector Pin-Assignment - CN7 and Module Slot Connectors - CNSLA

CN7		CNSLA		CNSLA	
PIN	Assignment	PIN	Assignment	PIN	Assignment
1	-15V	1a/1b	n.c.	9a	KA1 (Module ID)
2	GNDA	2a/2b	n.c.	9b	KA2 (Module ID)
3	Sensout A	3a/3b	n.c.	10a/10b	+15V
4	Return A	4a/4b	n.c.	11a/11b	AMPA2 (alt. Output 1in2)
5	Sensin A	5a	KA4 (Module ID)	12a/12b	LIMINA (Limiter Input)
6	Signal A	5b	KA5 (Module ID)	13a/13b	BUSREFA
7	GNDA	6a/6b	-15V	14a/14b	SIGNALA1 (Signal Out)
8	GNDA	7a	GNDA	15a/15b	SWA1 (Select)
9	Signal B	7b	KA3 (Module ID)	16a/16b	SIGNAL M (Signal In)
10	Sensin B	8a/8b	GNDA		
11	Return B				
12	Sensout B				
13	GNDA				
14	+15V				

15. Remote Control Connector Pin-Assignment CNRC / CNRC5V

PIN	CNRC Assignment	PIN	CNRC Assignment	PIN	CNRC5V Assignment
1	AMPA2	18	n.c.	1	GND-D
2	+5V	19	HTSNKTMP	2	GND-D
3	COLDCUR+	20	n.c.	3	POWER-ON
4	+5V	21	HOTCUR- (68Ω/⊥)	4	GND-D
5	COLDCUR-	22	n.c.	5	GND-D
6	KA1	23	HOTCUR+ (68Ω/⊥)	6	+5V
7	LIM-OUTA	24	n.c.	7	+5V
8	KA2	25	AMPB2 (68Ω/⊥)	8	LED-STANDBY
9	n.c.	26	GND-D		
10	KA3	27	GND-D		
11	POWER-ON	28	GND-D		
12	KA4	29	GND-D		
13	STBYLED	30	AID5 (10Ω/⊥)		
14	KA5	31	AID4		
15	TIMER	32	AID3		
16	n.c.	33	AID2		
17	RELAYDRV	34	AID1		

16. Amplifier-ID

AID1:	1	MSB
AID2:	1	↓
AID3:	1	↓
AID4:	1	↓
AID5:	0	LSB

Bin: 11110 Hex: 1E