



PA 400
PA 800
PA 1000
PA 1600X

USER'S MANUAL



In choosing a power amplifier from the LD Systems' PA series range, you have chosen a power amplifier designed using traditional, reliable technology with a conventional toroidal transformer power supply, but super-fast, latest generation high-performance bipolar transistors. With the exception of the PA400, all amplifiers operate in Class H mode, i.e., the operating voltage changes depending on signal level. This improves efficiency as the power amplifier gives off substantially less heat. The circuit is completely balanced with a feedback of only 20 dB, resulting in a very fast amplifier with only slight distortion. In particular, the rough, unpleasant sound associated with TIM distortion is suppressed. Of course the amplifiers feature all of the standard protection circuits including a clip limiter.

Design

Graded according to varying levels of performance, LD Systems PA amplifiers offer you a range from 2 x 200 W (8 ohms, 320 into 4 ohms) to 2 x 1500 W into 2 ohms (PA1600X). All of the units are housed in a 19" chassis that occupies two height units (2U). A 5mm thick aluminum front panel in conjunction with the rugged steel chassis and rear fastening points provides above average protection for the electronics and ensures permanently safe operation. The internal structure of the power amplifiers is based on a modular principle. Functional groups such as power supply and right and left channel with corresponding heat sinks are independent units and can simply be replaced by a technician if service is required. Each side of the power amplifier has its own fan, the speed of the fans is automatically controlled according to temperature. The electrical layout, i.e., the circuitry principle of the power amplifier, is strictly balanced and fully complementary.

Setup

The power amplifier is relatively easy to install. It is intended for installation in standard 19" racks. The minimum installation depth behind the front plate is 38 cm (15"); including the connectors, 43-45 cm (17"- 18") of space should be available. In addition to front mounting, it is absolutely advisable to fasten down the unit using the screw holes provided for this purpose in the sidepieces on the rear panel. The rack used must provide sufficient ventilation, e.g., removable rear cover, ventilation grille, etc. The ambient temperature at the place of use should not exceed 55°C. If the power amplifier is to be operated in a rack that is closed at the rear, then a minimum distance of 10cm to the rear wall must be maintained so that the flow of air is not impeded. If the power amplifier begins to overheat for lack of air circulation, the thermal protection switch shuts it down until it cools off by a certain amount. The protection switch resets automatically, i.e., once an appropriately lower temperature is reached, the power amplifier automatically switches on again.

Power Supply

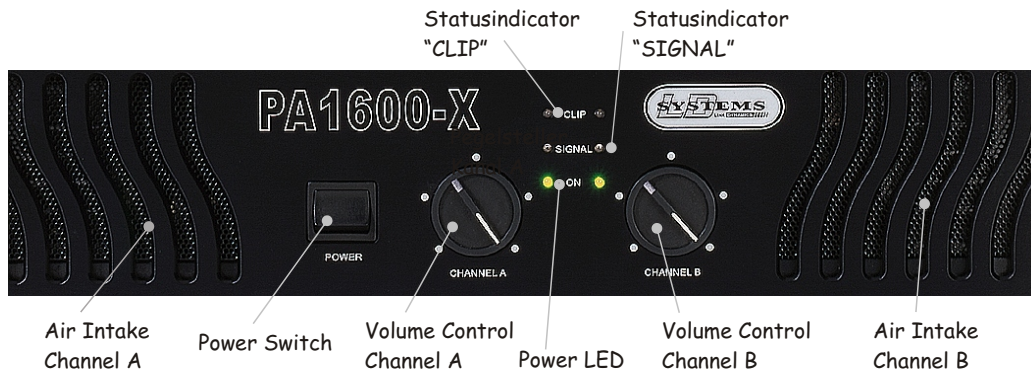
The power amplifier connects to the power supply system via a cable with a safety plug that is permanently attached to the unit. The power amplifier fulfills the requirements of Protection Class 1 and thus may only be operated when connected to a properly installed earthed-contact socket. The intended operating voltage is nominal 230 VAC at 13A maximum.

WARRANTY

Adam Hall Limited warrants this equipment to be free of all provable defects in material and workmanship for a period of twenty-four (24) months from purchase provided that it is used as intended. This warranty does not cover any damage caused by incorrect or improper operation. Third-party tampering will invalidate any and all warranty claims. As a rule, the warranty comprises free repair of the equipment. There is only a claim to an equivalent substitute if the equipment cannot be repaired.

The power amplifiers in the PA series were manufactured in compliance with the valid European directives on electromagnetic compatibility. They comply with Directives 89/336/EEC and 92/31/EEC as well as the Low-Voltage Directives 73/23/EEC and 93/68/EEC.

Front Panel



Air intake ports left and right

The fresh air required for cooling is drawn in here. Nothing may be permitted to block the influx of air. If the power amplifier is operated in an extremely dusty environment, the protective grilles may become clogged. As a precaution, therefore, they should be cleaned from time to time using a vacuum cleaner and a dry brush.

Power Switch

To turn the amplifier on, press the power switch. This activates an electronic circuit that gradually powers up the power amplifier (soft start) and thus prevents an excessively high current surge from tripping a circuit breaker. In addition, power-on noises are suppressed. The fans turn at minimum speed.

Status LEDs

A few seconds after power-on, the two green LEDs light up to indicate that the power amplifier is operational. If the other LEDs blink on momentarily, this is not a fault, but may occur for technical reasons due to non-stabilized electrical circuits during power-on.

Volume Controls Channels A & B

The input sensitivity of all power amplifiers is 0 dBV or 1 V respectively. Maximum output level is attained with this input voltage. In order to attain optimum system dynamics, the volume controls should be turned up all the way. This can, however, result in increased noise levels when certain signal sources are connected, especially if these sources, e.g., mixing boards, deliver output voltages far exceeding those required for maximum modulation. In this case it is more advantageous to turn back the volume controls so that the maximum desired volume is still attained. The volume controls are detent potentiometers with 41 detents.

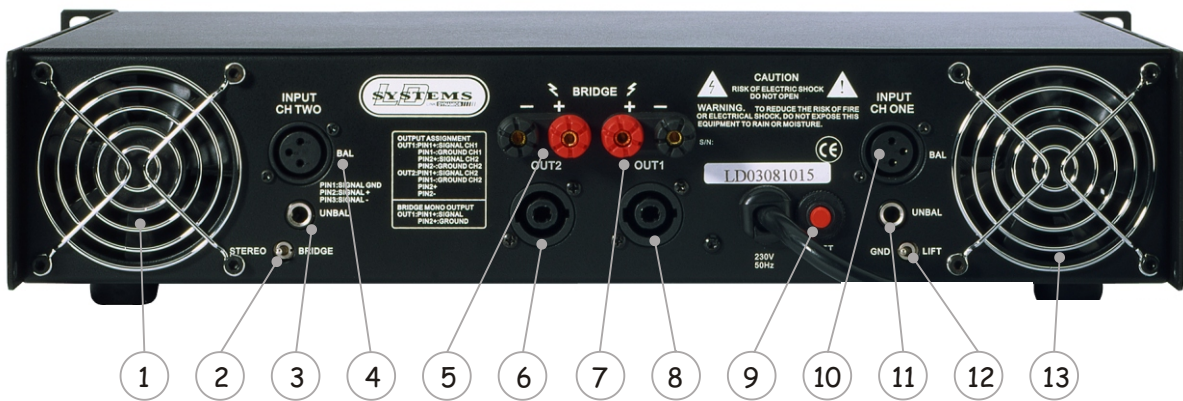
"SIGNAL" Status Indicator

Starting already at an output voltage of 20 dBu, which is equivalent to an output of 1.5 mW into 4 ohms, the blue indicator LED shows that there is a signal on the loudspeaker outputs. If you still do not hear any sound from the speaker cabinets, check the speaker cables, because the illuminated status LED clearly indicates that a signal is detected at the output stage.

"CLIP" Status Indicator

Starting at approx. 3 dB overload, the blue indicator LED goes off and the red "CLIP" LED lights up. Then, however, the limiter is also activated, which prevents the voltage from developing into a square wave. High amplitude square waves can damage both the power amplifier and the connected loudspeakers. This circuit is intended to prevent this. Thus the built-in limiter is consciously not designed to fulfill a dynamics reduction function. If the CLIP LED blinks on briefly, this is acceptable, since the human ear does not register such peaks as distortion. Under no circumstances, however, should the LED remain on, this would mean that the power amplifier had reached its performance limits, in this case turn down the volume controls.

REAR PANEL



1, 13. Air Outlets

The fresh air drawn from the front intake is exhausted here. A good circulation should be provided. (See "SETUP")

2. Switch for Stereo or Mono Bridge Mode. (See "Stereo/Mono Bridge Mode")

3, 11. Unbalanced jack socket channel "B" (3), unbalanced jack socket channel "A" (11)

4, 10. Balanced XLR input channel "B" (4), balanced XLR input channel "A" (10)

The power amplifier has 2 input sockets for each channel, unbalanced jack and balanced XLR. Both are connected in parallel and therefore can be used to link the signal through.

5, 6, 7, 8. Speaker Connectors.

For each channel there are two ways to hook up speaker cabinets. 5 and 7 are "Binding Posts". They allow direct connection of the speaker cable by clamping the speaker cable cores into the binding posts. If using this set-up ensure that all strands are well twisted and there is no loose wire or you will create a short circuit. In addition each channel has a Speakon connector (6,8). This is wired 1+ and 1-. Connector OUT 1 (8), the output of channel "A", additionally carries the signal of channel "B" wired to pins 2+ und 2-, so if you are using the power amplifier in conjunction with an active crossover you only have to use a single 4-wire speaker cable to hook up the speaker cabinet.

Caution! Speaker outputs never must be paralleled. Therefore never link the two red binding posts nor connect a red with a black binding post.

9. Fuse

The PA-series amplifiers are equipped with a reset-able fuse. In most cases there is a reason if the fuse trips. If this happens switch off the power, reset the fuse and switch on the power again. If the fuse repeats to trip, the unit is faulty and needs service by an authorized service department. Never try to restrain the reset knob.

12. Ground Lift Switch

In cases where two or more mains supplied appliances are linked together with a screened audio cable a ground loop may occur. The typical resulting effect is a deep humming noise. The ground lift switch disconnects the electronic earth and the chassis ground and in that way the hum is removed.

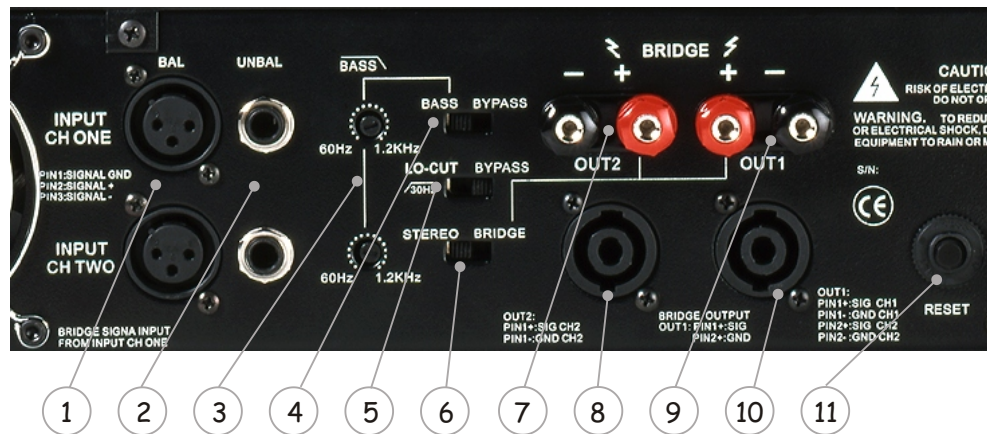
Stereo/Mono Bridge Mode

Switch (2) controls the operating mode of the amplifier.

Stereo: Both channels independently receive their signal from the corresponding input socket.

Mono Bridge Mode: To increase the total power output of the amplifier both channels are linked together in a special way. The input signal is fed exclusively via socket 10 or 11. The volume control of channel "A" sets the loudness. The speaker cabinets are connected to the red binding posts only. Channel "A" delivers the positive phase whereas channel "B" provides the negative one. None of them must be connected to ground. If you prefer the Speakon output, use a 4 pole connector and socket OUT1 (8). Connect in the following way: Positive pin 1+, negative pin 2+. **Please refer to the technical data sheet for minimum impedances in the Mono Bridge Mode.**

PA1600X Special Features



To date, the PA 1600X is the flagship of the series. Thus it was provided with a few special details when it comes to features.

Unless described in detail here, the elements are present in all power amplifiers and are explained on the preceding page.

1. Balanced XLR inputs for both channels

2. Unbalanced jack inputs for both channels

3+4. Low-pass filters

Each channel is equipped with an individually adjustable low-pass filter. Using the controls (3), the cutoff frequency is set separately between 60 Hz and 1200 Hz for each channel. The filter has a slope of 12 dB per octave. The BASS BYPASS switch (4) can be used to remove the filter from the signal path, in which case the filter is inactive. The purpose of this filter is that with the filter activated, the power amplifier can be used to drive a subwoofer directly without an external crossover. Because of its high output, the PA 1600 is especially suitable for driving bass systems.

5. LO-CUT, Low-Cut Filter

Extremely low frequencies at the bottom end of the audible range and below can easily damage the bass loudspeakers, especially when the power amplifier has high power reserves. Thus the PA 1600 was additionally equipped with a low-cut filter that filters out this extremely low range. The cutoff frequency is 30 Hz with a slope of 12 dB. The filter is inactive in the "BYPASS" position.

6. Switch for stereo or bridge mode

7+8. Loudspeaker connections for Channel 2

9+10. Loudspeaker connections for Channel 1

11. Resettable fuse

SPECIFICATIONS:

MODEL	PA400	PA800	PA1000	PA1600X
Power into 8 ohms	200W per channel	400W per channel	500W per channel	700W per channel
Power into 4 ohms	320W per channel	650W per channel	800W per channel	1100W per channel
Power into 2 ohms	-	-	-	1500W per channel
Mono Bridge 8 ohms	550W	1000W	1200W	1750W
Mono Bridge 4 ohms	-	-	-	2250W
Operating Class	AB	H	H	H
Frequency Response	20-20kHz, ± 0.25 dB	20-20kHz, ± 0.25 dB	20-20kHz, ± 0.25 dB	20-20kHz, ± 0.25 dB
Damping Factor	500:1 @1kHz	500:1@1kHz	500:1@1kHz	1000:1 @1kHz
Distortion	less than 0.1% THD	less than 0.1% THD	less than 0.1% THD	less than 0.1% THD
Signal to Noise	100dB	100dB	100dB	100dB
Input level nominal	0 dBV, 1V	0 dBV, 1V	0 dBV, 1V	0 dBV, 1V
Input Impedance	15kohms, bal./unbal.	15kohms, bal./unbal.	15kohms, bal./unbal.	15kohms, bal./unbal.
Fan Speed	2-speed	2-speed	2-speed	2-speed
Dimensions (mm)	483x395x88	483x395x88	483x395x88	483x395x88
Weight	15kg	17,5kg	19kg	21kg

Protections: Output Current Limiter, Short Circuit, Softstart, Thermal Overload, DC-Protect, Clip-Limiter
 PA1600X: Low Cut Filter 30Hz, Bypass-Switch
 Switchable Low Pass Filter each channel individually adjustable from 60Hz to 1200Hz.
 Mains: Reset-able Fuse.

Other Features:

Input Connector: XLR/f Pin 1 ground, Pin 2 hot, Pin 3 cold. TS-Jack 6.3mm, Tip: hot, Sleeve: shielding
 Loudspeaker Connectors: Binding Posts, Speakon 4 pole Pin 1+, Pin 1-.
 Channel "A" additionally: Pin 2+ and Pin 2- connected to channel "B". Bridge Mode: OUT 1 (channel "A")
 Wiring: 1+ positive Phase and 2+ negative Phase.

Housing: Front panel 5mm aluminium anodised, casing made from sheet metal.

The amplifiers in LD Systems' PA series are subject to permanent quality control. If LD Systems ascertains possibilities for improvement due to new technologies, then these will of course be incorporated in ongoing production. Thus we reserve the right to make minor changes in detail without necessarily noting them in the instructions for use.