

Accuphase

DUAL CHANNEL POWER AMPLIFIER

PRO-3

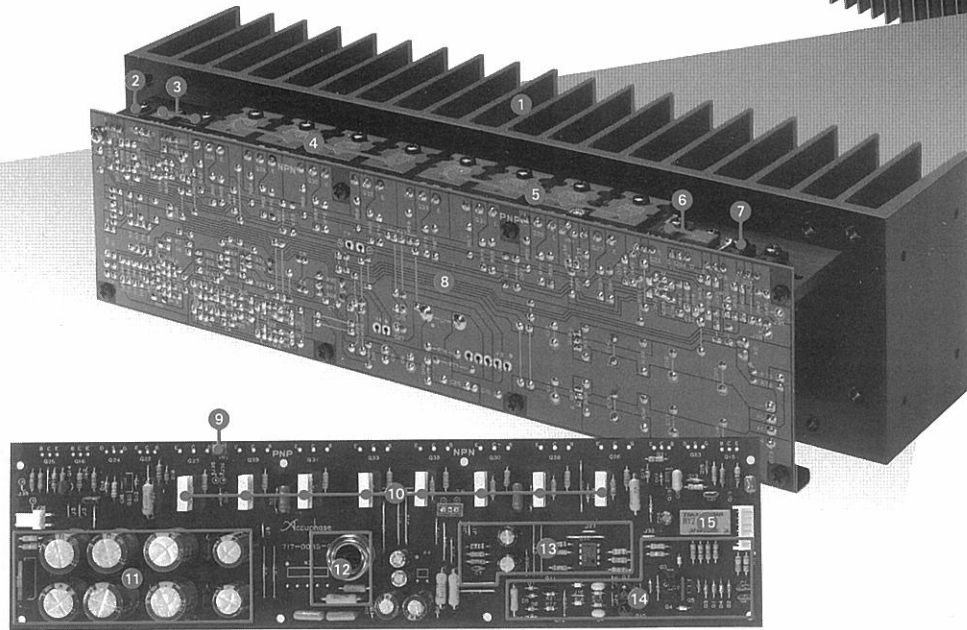
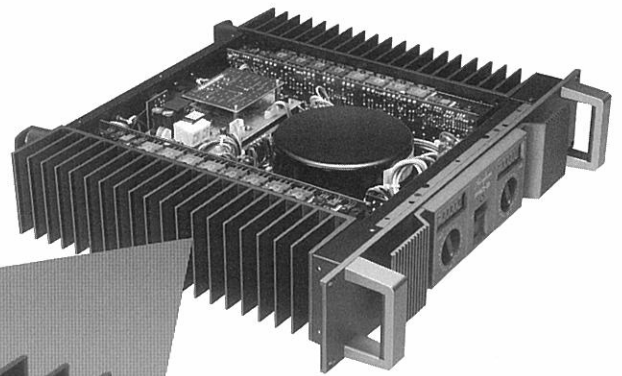
- Four-Parallel Push-Pull Output Stage
- Low-Impedance Setting
- Natural Air-Flow Cooling System for Noiseless Heat Protection via Giant Heat Sinks
- 480W at 4 Ohms for Monophonic Operation



Professional Series

All-Stage Push-Pull Configuration. Four-parallel Push-Pull Power Stage Ensures 150W/ch (8 Low Impedance Setting to Fully Drive 2-ohm Low-Impedance Speakers at 240W/ch Stereo.

The output transistors, the main heat source in an amplifier, are directly mounted over a wide surface area to large heat sinks that are exposed externally for efficient natural cooling. The photograph below shows the predrive board and output transistors of the amplifier unit for one channel.



- 1 Large heat sink for natural air-flow cooling
- 2 Transistors for class-A predriver
- 3 Cascode driver stage consisting of N channel MOS-FETs and transistors
- 4 NPN output transistor array for 4-parallel push-pulls
- 5 PNP output transistor array for 4-parallel push-pulls
- 6 Cascode driver stage consisting of P channel MOS-FETs and transistors
- 7 Transistors for class-A predriver
- 8 Driver circuit board
- 9 High stable semi-fixed VR for idling current
- 10 Emitter resistor array for output transistors
- 11 High-voltage stabilized power supply circuit for driver stage
- 12 Output phase compensator
- 13 Servo amplifier circuit
- 14 Pure complementary push-pull input amplifier circuits
- 15 Relay for bridge connection switching

The PRO-3 is the first among Accuphase's renowned Professional Series of power amplifiers to feature a natural air-flow cooling system that eliminates the fan noise present with forced-air cooling systems. The PRO-3 is thus ideal for sound studios, where any extra noise is a problem.

Developed as a compact, 2U-sized amplifier, the PRO-3 nevertheless can drive essentially any speaker by delivering 240W/channel into 2-ohm loads, 220W/channel into 4-ohm loads, and 150W/channel into 8-ohm loads. And when used as a bridged monophonic amplifier, the PRO-3 delivers 480W into 4-ohm loads; 440W into 8-ohm loads. The PRO-3 also uses the same "all-stage push-pull direct coupling circuit" technology as the upper-class PRO-10, PRO-6 and PRO-5 to ensure superior performance and natural, powerful, rich sound quality. The natural cooling system effectively cools internal circuits with large heat sinks to which the final-stage transistors are mounted. These heat sinks are exposed externally to ensure effective natural cooling.

XLR-3-31 (or an optional XLR-3-32) connector and balanced phone jacks are provided as input terminals, and an optional circuit board can replace the internal board to provide a built-in input filter circuit. The output terminals feature a 19-mm (3/4") pitch banana jack, or connection is possible through canon-type or other connectors. Based on long time experience in the development of high quality amplifiers, the PRO-3 has not only been developed to emphasize on superb sound quality, but to ensure stable and reliable performance for a long time of operation.



Output Stage with 4-Parallel Push-Pull Circuits Delivers 240W/ch into 2 Ohms; 150W/ch into 8 Ohms; and, as a Bridged Monophonic Amplifier, 480W into 4 Ohms

An ideal power amplifier, which drives speakers must have as low an output impedance as possible. This can

be realized by negative feedback (NFB), but it must be done in the output stage, where adequate current can be obtained. To achieve this, the output stage of the PRO-3 employs 4-parallel push-pull circuits for each channel, which consists of a total of 16 large, bi-polar transistors with a maximum power dissipation (P_c) of 150W. With a total collector current of 60A at maximum, the PRO-3 adequately handles low output impedance

The result is a continuous wide-range (20Hz-20kHz) output of 240W/channel into 2 ohms; 220W/channel into 4 ohms, and 150W/channel into 8 ohms and, when the rear-panel mono switch is set to monophonic operation, 480W into 4 ohms and 440W into 8 ohms as a bridged monophonic amplifier.



Natural Air-Flow Cooling System with Giant Exposed Heat Sinks

In a recording studio, absolute silence is required and even the noise from a forced-air cooling fan can be a disturbance. The PRO-3 thus uses a natural air-flow cooling system to silently dissipate heat. The high radiation and cooling efficiency is achieved through externally exposed, thick extruded aluminum heat sinks that are larger than those normally used for amplifiers of 150W/channel. The heat sinks keep inter-temperature rise to a minimum to ensure maximum reliability.



Ideal Balanced Differential Input Stage with Pure Complementary Push-Pull Configuration

The input stage, as shown in Fig. 1, employs an extravagant circuit in a balanced differential pure complementary push-pull configuration that feeds signals directly to the positive (non-inverted) and the negative (inverted) inputs to provide high-purity, balanced amplification. When an unbalanced signal is connected either to the positive or negative input can be used for grounding.

For monaural operation, as shown in Fig. 2, identical signals are input simultaneously to the positive input of one of the amplifier blocks and to the negative input

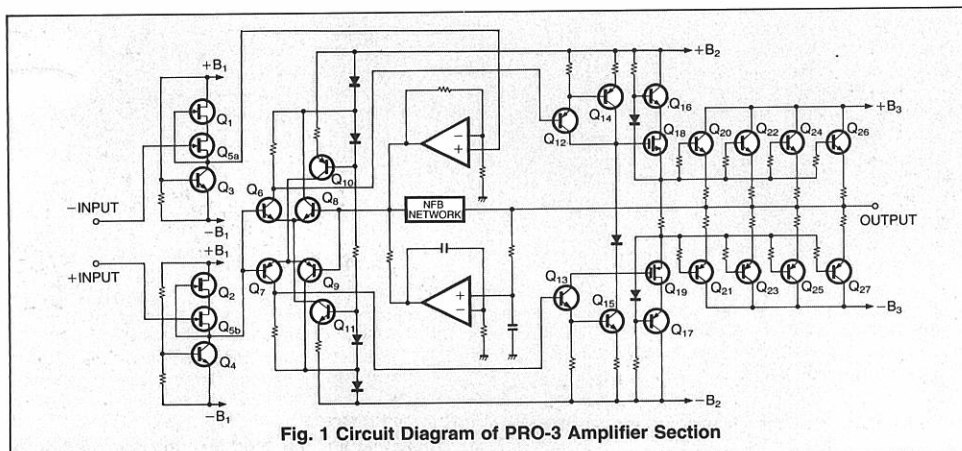


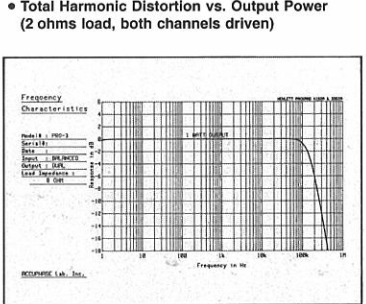
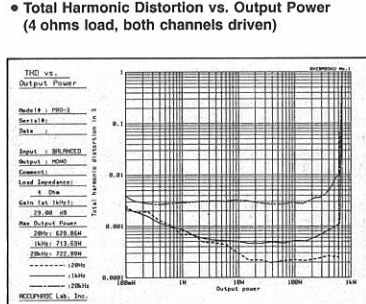
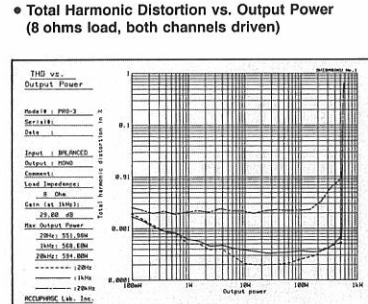
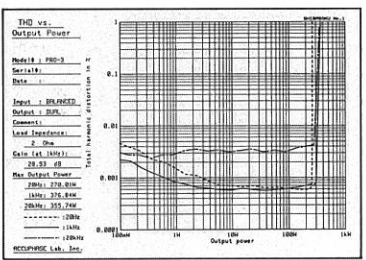
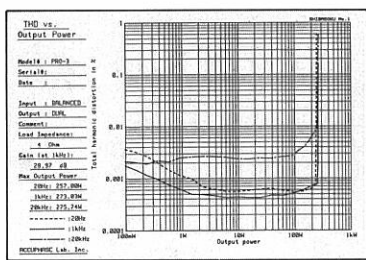
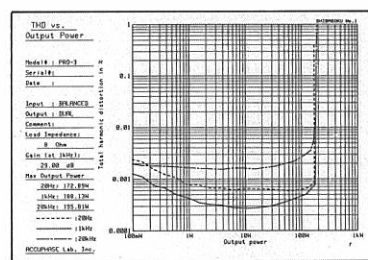
Fig. 1 Circuit Diagram of PRO-3 Amplifier Section

GUARANTY SPECIFICATIONS

- Performance Guaranty**
All Accuphase product specifications are guaranteed as stated.
- **Rated output (20 to 20,000Hz)**
Stereophonic operation (both channels driven)
240W/ch 2-ohm load
220W/ch 4-ohm load
150W/ch 8-ohm load
Monophonic operation (bridge connection)
480W 4-ohm load
440W 8-ohm load
 - **Total harmonic distortion (20 to 20,000Hz, 0.25W to rated output)**
Stereophonic operation (both channels driven)
0.05% 4- to 16-ohm load
Monophonic operation (bridge connection)
0.05% 4- to 16-ohm load
 - **IM distortion (SMPTE-IM)**
0.005%
 - **Gain**
29.0dB (stereophonic operation)
35.0dB (monophonic operation)
 - **Frequency response**
20 to 20,000Hz +0, -0.2dB
(Rated output, input attenuator at MAX)
0.5 to 150,000Hz +0, -3.0dB
(1W output, input attenuator at MAX)
0.5 to 120,000Hz +0, -3.0dB
(1W output, input attenuator at -6dB)
 - **Impedance**
16 ohms (stereophonic operation)
4 to 16 ohms (monophonic operation)
 - **Damping factor (8-ohm load at 50Hz)**
200 (stereophonic operation)
100 (monophonic operation)
 - **Input sensitivity (8-ohm load)**
1.00V 100W output (stereophonic operation)
0.50V 100W output (monophonic operation)
1.23V (+4dBm) Rated output (stereophonic operation)
 - **Input impedance**
20k ohms (unbalanced)
40k ohms (balanced)
 - **S/N ratio (A-weighted, input-shortcd)**
113dB (at rated output)

- **Output meters**
LED display (-13, -8, -3, 0, +3dB)
8-ohm load, 75W=0dB
- **Input attenuator**
0 to -20dB in 1dB steps, -∞
- **Input terminals**
Phone jacks: balanced
XLR (cannon) connector
PRO-3: XLR-3-31 or equivalent
PRO-3N: XLR-3-32 or equivalent
Pins: 1) ground, 2) non-inverted, 3) inverted
- **Output terminals**
Two-pole banana jacks (can be adapted for XLR-type connectors by installing optional board)
- **Cooling system**
Natural air-flow cooling system
- **Semiconductors**
57 transistors, 14 FETs, 8 ICs, 67 diodes
- **Power requirements and consumption**
100V, 117V, 200V, 220V, 240V, 50/60Hz
45W no signal
540W at rated output into 8-ohm load

- **Dimensions and weight**
482.5mm (19") width x 105mm (4-1/8") max. height x 398mm (15-11/16") depth (Refer to dimensional diagram.)
Panel height: Two units
Panel size: 482.5mm (19") (W) x 88mm (3-7/16") (H)
Rack mounting: Can be mounted on standard 19-inch rack
Weight: 14.5kg (32 lbs) net
19.0kg (41.9 lbs) in shipping carton



the other. This ensures high-fidelity monophonic amplification without any other additional circuits, such as a phase inverter, which can deteriorate sound quality.

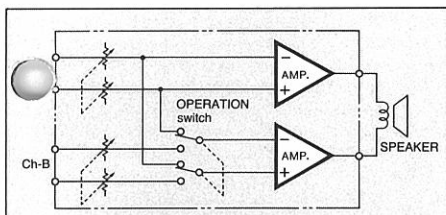


Fig. 2 Bridge Connection Circuit of PRO-3
(Balanced input: this switch position indicates the monophonic operation)

Improved Performance via MOS-FET Cascode Push-Pull Driver Stage

The driver stage which precedes the final output stage is required to have a high swing voltage and electric power. This stage is, to a great extent, crucial in determining the quality of sound reproduction. The PRO-3 employs Accuphase's original MOS-FET cascode push-pull circuits to deliver the same performance as a class A non-switching amplifier. This cascode configuration greatly improves high frequency characteristics. Thus ensuring stable, distortion-free operation over a wide output range, from extremely low to high.



DC Servo, Direct-Coupling Amplifier

A direct coupling system is employed to feed signals directly into the input stage. Large DC drift which might appear in equipment connected to such a direct-coupled amplifier would be amplified in the output and damage the speakers. This, however, is never a problem with the PRO-3, which employs Accuphase's original DC servo system to effectively cut out DC components. Moreover, DC drift caused by temperature fluctuations in the amplifier itself is also effectively stabilized with the servo system.

Two Pairs of Input Terminals and 2-Pole Banana Jack Output Terminals Optionally Convertible for XLR Outputs

A balanced phone input jack and XLR-3-31 connector are provided for each channel. Also, the XLR-3-31 connector can be optionally converted to a XLR-3-32. The polarity of the XLR connectors is 1) non-inverted signal, and 2) inverted signal.

The output terminals feature a standard 2-pole banana jack that can be converted to an XLR connector by replacing the mounted board with an optional conversion board.

Input Level Attenuators with 1-dB Precision

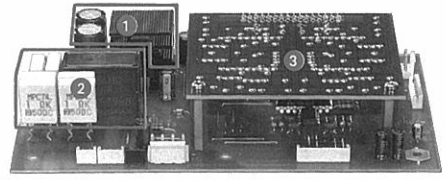
Input level attenuators are provided to adjust the gain from 0 to -20dB in increments of 1dB for precise level control. The control knob is inset in a thick molded frame to prevent the control knob from being accidentally turned.

5-part LED Output Meters

Each of the bar-graph output meters consist of a 5-part LED indicator with excellent environmental durability. Two scales are provided on the meters, one in decibels and the other in watts (calibrated for an 8-ohm load). In addition, an input signal indicator is provided to confirm the presence of an input signal.

Optional Circuit Board for Input Filter

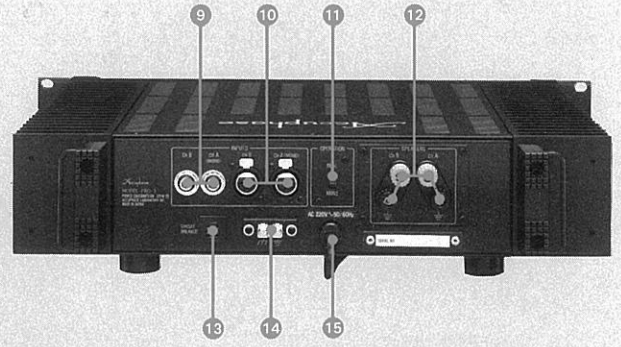
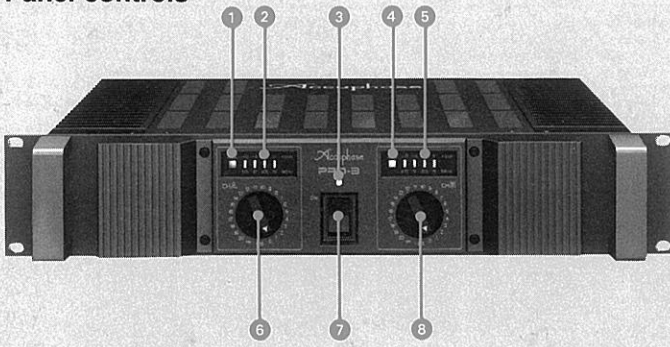
An optional circuit board is available that can be equipped with optional components to add an input filter. The circuit board designed by the user is easily plugged into the PRO-3 to create in the balanced input stage the desired lowpass, highpass or bandpass filters with a 18dB/octave filter slope achieved by a combination of feedback type 2-pole and 1-pole filters.



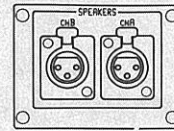
- ① Stabilized power circuit for protection circuit
 - ② Rash-current protection circuit (when the power is turned on)
 - ③ Optional circuit board (filter circuit can be mounted on this board)
- Input circuits mounted on optional circuit board**

Accuphase PRO-3

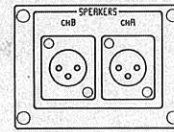
Panel controls



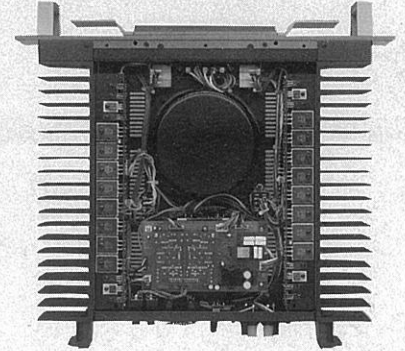
- 1 Input signal indicator for channel A
- 2 LED output meter for channel A
- 3 Power LED (indicates on power application)
- 4 Input signal indicator for channel B
- 5 LED output meter for channel B
- 6 Input attenuator for channel A (use this attenuator for monophonic operation)
- 7 Power switch
- 8 Input attenuator for channel B
- 9 Phone stereo jacks (balanced/unbalanced input)
- 10 PRO-3: XLR-3-31 input connectors (equivalent to XLR-3-12C)
PRO-3N: XLR-3-32 input connectors (equivalent to XLR-3-11C)
- 11 Bridge operation selector switch (MONO)
- 12 Speaker output terminals; 2-pole banana jacks as standard.
XLR (cannon)-type connectors available by installing an optional board (Refer to the right figures).
- 13 Circuit breaker
- 14 Ground terminal board (ground line selectable)
- 15 AC power cord



XLR-3-31 connectors



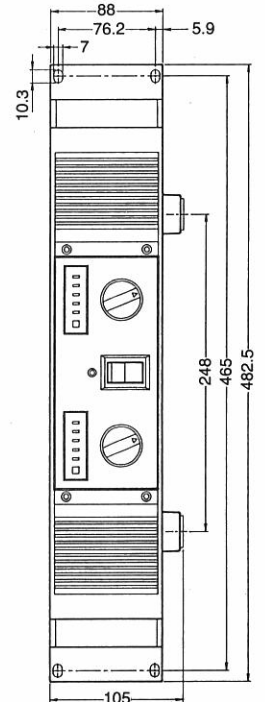
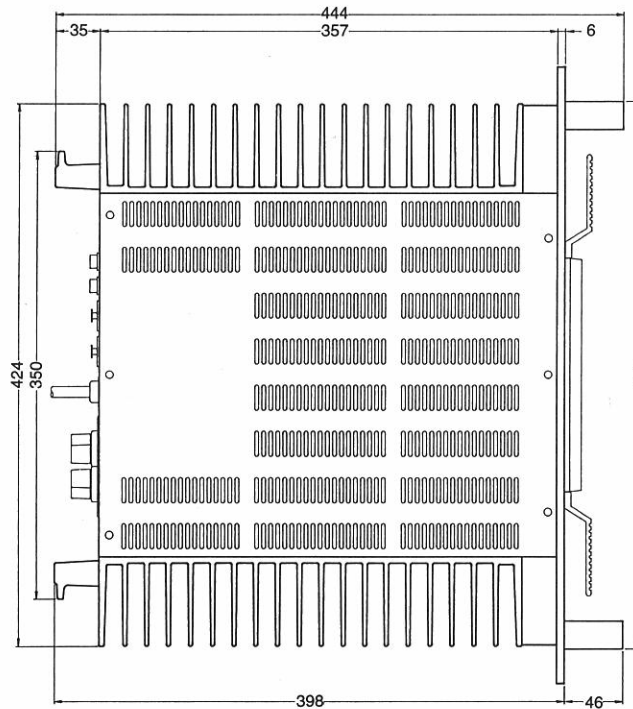
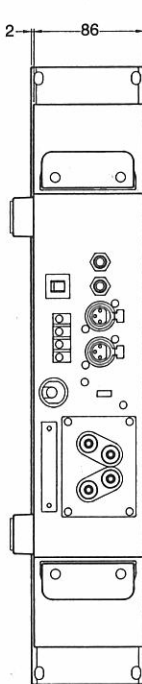
XLR-3-32 connectors



Simple internal layout

XLR-type output terminals (option)

Dimensions (Unit: mm)



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