

Installation and Service Manual

TA2050/3050 Power Amplifier

Introduction

The SMART model TA2050/3050 is a professional two channel amplifier featuring two full-range stereo channels. This compact (two rack unit) instrument features balanced input circuitry with a signal select for mono bridging and stereo operation, individual channel level control, soft clip speaker protection and two speed temperature activated internal D.C. fans to make sure your amplifier stays cool even when the music is hot. TA2050 delivers 330 watts per channel into 8 ohms, 550 watts per channel into 4 ohms and 600 watts per channel into 2 ohms. The TA3050 delivers 500 watts per channel into 8 ohms, 800 watts per channel into 4 ohms and 1050 watts per channel into 2 ohms.

Circuit Description

To assure absolute long term reliability, the output section of each channel incorporates multiple Motorola Power Transistors, which provide three times the amplifiers rated power in watts of dissipation per channel. The output stage is arranged in a fully complementary format for class AB/2 operation. The bias current is evenly distributed among all output devices. Bias thermal compensation is accomplished by thermally mating a bipolar semiconductor junction to the heat-producing output device. Triple diffused high power driver transistors are employed along with high speed, high voltage silicon annular devices for the predriver and inverter stages. Utilization of these components provide the required separation of Ft break points for absolute stability. Fully complementary drive and loading is utilized throughout. Only 20dB of negative feedback is used to reduce forward transfer distortion to minimum levels. VI type energy limiters are incorporated for short circuit protection of the amplifier. Due to the unusually large safe operating area of output stage, the limiters do not actuate until driving a forty-five degree reactive load of under 2 ohms at full power.

Construction

The amplifiers are designed on an all-modular concept permitting rigorous preassembly module testing and

maximum service accessibility. Each functional module is fully tested before final assembly. Although components of the highest quality are used throughout, each amplifier is burned in, prior to shipment, at the worst case operating point to eliminate any possibility of component malfunction. All chassis components are precision machined from high quality aluminum and 16 gauge sheet steel stock. The entire package concept is directed toward maximum efficiency of space and structure, accounting for the compact size and light weight.

Installation

All SMART amplifiers are designed for mounting in a standard 19-inch equipment rack, or many of the 19-inch rack type portable cases available. The TA2050/3050's require 3-1/2 inches of vertical panel space, with 15" inches required behind the panel. Total depth including the handles is 16-3/8" inches. Front panels are machined from solid aluminum stock, with a black powdercoat finish and sturdy rack mount handles.

Placement of the amplifier is not critical for normal operation, provided sufficient air flow is allowed to reach the heatsink array. If the unit is to be placed on a shelf, or a similar unenclosed area, allow four inches of clearance behind the fan air intake to permit air flow through the array. If the amplifier is to be mounted in an equipment rack or cabinet with heat producing equipment, be sure that environmental operating temperatures do not exceed 55 degrees C (131F). Should overheating occur because of inadequate ventilation, the temperature protection circuitry will automatically protect the amplifier. When a safe operating temperature is restored, the amplifier will return to normal operation.

Because the amplifiers are capable of delivering high power from a relatively small physical package, considerable heat can develop in cabinets containing several components. A good rule of thumb to adopt is to provide forced air cooling in any enclosure containing four or more electronic components.

Power Connections

The SMART TA2050/3050 power amplifiers are specified for operation from 120/240 Volt 50/60 Hz mains supply.

Equipment for domestic (USA) consumption includes a captive cord with a three pin polarized plug. **DO NOT REMOVE THE CENTER GROUNDING PIN!**

In new installations and portable sound systems, or any situation in which the mains power is suspect, it is wise to confirm appropriate voltage and line polarity **BEFORE** connecting the instrument to power sources.

Thermal Protection

Certain conditions of operation (restricted airflow cooling, sustained high power operation into-low impedance loads) can result in a rise in output device case temperature sufficient to affect the amplifiers performance.

Should the heatsink reach 95 C, the output will automatically be disconnected from the load (loudspeaker) and will remain disconnected until the temperature drops below 95 C. The action of removing the load has the effect of eliminating output current. This, in turn, results in an immediate and rapid drop in temperature. The load will automatically be reconnected when the temperature drops below 95 C.

Fan Assist Cooling

The SMART TA2050/3050 is equipped with three fans and a two level DC fan control circuit. The fan speed is determined by the amplifier heatsink temperature and the air flows from rear to front of the amplifier. At maximum speed, the triple fan system has a 125 CFM output to assure proper cooling under severe conditions.

Soft Clip Speaker Protection

The SMART TA2050/3050 incorporates Soft Clip Speaker circuitry. This circuitry prevents the amplifier from being driven into a hard clip state, which prevents speaker damage caused by the amplifier being over driven or into DC state.

Selectable Input Sensitivity

The SMART TA2050/3050 is equipped with selectable input sensitivity. The factory setting is 1 v for rated output, .775v and 1.5v are also available. If you would like to change the setting set by the factory you may contact the factory for instructions.

Front and Rear Panel Controls

POWER SWITCH

To turn the Amplifier ON or OFF, press the upper or lower portion of this switch rocker.

POWER INDICATING LED

This LED when illuminated, indicates that the amplifier is on.

LEVEL CONTROLS

Each channel has a separate low-noise, 41 click detent rotary level control. Rotate controls clockwise to increase level.

SIGNAL STATUS INDICATORS

Two green LED indicators are normally off with no signal present and illuminate when signal is present.

CLIP INDICATORS

Two red LED indicators illuminate when the input signal levels exceed 3 dB above clipping. Adjust the level control to minimize clipping.

1/4" JACK INPUT CONNECTIONS

Unbalanced inputs can be accepted via the 1/4" jack. These inputs take priority over the XLR input jacks.

BALANCED XLR INPUT CONNECTIONS

XLR input connectors are provided for the balanced input circuit. Please note that Pin 1: Ground, Pin 2: High, Pin 3: Low.

INPUT SIGNAL SELECT SWITCH

DUAL: This is the amplifiers standard mode of operation, where as channel inputs and outputs correspond directly.

MONO: This mode is used to obtain the highest power output levels possible from the amplifier. Both channels combine to form a single high power mono output. See Bridge Mono Operation. (p. 9)

GROUND LIFT SWITCH

The GROUND/LIFT is provided to eliminate ground loops, between this amplifier and a preamplifier, that can occur in certain installations.

AC FUSE HOLDER

The Fuse Holder contains the Primary AC FUSE. The fuse should only be replaced with one of the same type. If the fuse continues to blow out, stop replacing the fuse and refer to a qualified person for servicing.

OUTPUT CONNECTIONS

Output connections are via five-way binding posts, identified as to polarity with red and black terminals. We suggest the use of dual banana plugs as a convenient and reliable method of hook-up. They allow rapid removal for polarity reversals. This feature is often necessary in the check out and adjustment of multi-element biamplified and triamplified sound systems. Heavy Class 11 wire may be used by unscrewing the large plastic portion of the output terminal and inserting the wire into the hole provided. Note: It is extremely important when making wire connections that no wire stand or end touches an adjacent terminal!

AIR INTAKE

Three variable DC fans which operate at 125 cfm at maximum speed are provided. Fan guards are provided to protect from any large debris stopping the fans or getting inside the amplifier. Fan air filters may be purchased from the factory. NOTE: Air filters must be clean at all times to assure proper amplifier cooling. A periodic maintenance schedule is recommended depending on environmental conditions.

AC POWER CORD

The TA2050/3050 is prewired at the factory for the voltage indicated on the rear panel or on the power cord of the amplifier. Plug the power cord into a AC outlet that will deliver the proper voltage and current for amplifier operation.

CAUTION:

The TA2050/3050 amplifier is a product of the most advanced technology and manufacturing techniques and is fully protected against overheating, input overload and shorted or mismatched loads. As is the case with any precision instrument, some care should be taken in the unit's operation. The following precautions should be noted and adhered to. Damage resulting from their omission is not covered under the terms of the warranty.

DO NOT PARALLEL THE OUTPUTS OF ANY CHANNELS BY CONNECTING THEM TOGETHER OR PARALLELING THEM WITH ANY OTHER AMPLIFIER OUTPUT. UNDER NO CIRCUMSTANCES SHOULD THE AMPLIFIER BE OPERATED WITH THE COVER REMOVED. THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE. AVOID POTENTIALLY DANGEROUS SHOCK HAZARDS, KEEP THE COVER CLOSED AT ALL TIMES!

BRIDGED MONO OPERATION

1. Set the INPUT SELECTOR SWITCH to MONO.
2. Connect the input signal to Channel One input jack.
3. Connect the speaker load to the two red terminals of each channel. confirm the (+) terminal of the speaker to the channel one and the (-) to channel two.
4. DO NOT use the black terminals of either channel.
5. Assure the speaker impedance is 4 ohms or above.
6. Adjust the output level by using channel one level control and setting channel two level control to the "0" position.

SMART MODEL TA2050 SPECIFICATIONS**Type:**

Two Channel audio amplifier

Power Output: Continuous Average Power (120 VAC)

330 Watts per channel 8 ohms
550 Watts per channel 4 ohms
600 Watts per channel 2 ohms
900 Watts bridged mono 8 ohms
1000 Watts bridged mono 4 ohms

Gain:

33dB

Controls and Indicators:

(Front Panel) AC Mains Power Switch
Power-on LED Indicator, Channel One and Two Level Controls. Channel One and Two Signal Status Indicators (green active / red clip)
(Rear Panel) Dual/Mono Switch and Ground Lift Switch.

Turn-On Delay:

3 second, solid state activated

TA2050/3050 Power Amplifier

Special Feature:

"Soft Clip" speaker protection

Cooling:

Three two-speed temperature controlled fans with rear to front cooling.

Crosstalk:

-86 dB

Damping Factor:

1000:1 at 1 kHz

Slew Rate:

Closed-loop, greater than 40V per micro second

Frequency Response:

Plus/minus 0.25 dB
20 Hz-20kHz

Distortion:

No more than 0.1 percent THD or IM, 0.01W to rated output, 20 Hz to 20 kHz (typically 0.01 percent)

Hum and Noise:

101 dB below rated output (unweighed, 20kHz bandwidth)

Input Sensitivity:

Selectable, .775v, 1.0v, 1.5v, shipped at 1.0v for rated output

Input Impedance:

15k ohms nominal, balanced and unbalanced inputs

Input Connectors:

(2) 1/4" phone jacks (unbalanced); (2) XLR (balanced),

Output Connectors:

Dual 5-way binding posts

Mains Input:

1800W 15A/10A 100/240 VAC 50/60Hz

Dimensions:

3 1/2"H (8.89cm), 19"W (48.3cm), 15" (38.1cm) behind panel, 16 3/8" (41.6M) overall

Weight:

39 lbs. (17.7 Kg)

SMART MODEL TA3050 SPECIFICATIONS

Type:

Two Channel audio amplifier

Power Output: Continuous Average Power (120 VAC)

500 Watts per channel 8 ohms

800 Watts per channel 4 ohms

1050 Watts per channel 2 ohms

1300 Watts bridged mono 8 ohms 1650 Watts bridged mono 4 ohms

Gain:

33dB

Control and Indicators:

AC mains power switch, power on LED indicator, Channel One and Two level controls, an 11 LED "VU" output display for each channel, Input signal selectable, Balanced inputs, Ground Lift Switch.

Turn-On Delay:

3 second, solid state activated

Special Feature:

"Soft Clip" speaker protection

Cooling:

Three two-speed temperature controlled fans with rear to front cooling.

Crosstalk:

-86 dB

Damping Factor:

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