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# SMART

Devices, Inc.

TA250/TA450  
DUAL CHANNEL AMPLIFIERS

INSTALLATION AND  
OPERATION MANUAL

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SMART products are designed to deliver unsurpassed quality in workmanship and performance. The following information gives detailed instructions on the installation and operation of the SMART TATA250/450 amplifier. We strongly encourage new owners of the TATA250/450 to thoroughly read this entire manual before placing their new SMART product into service. This will ensure that the TATA250/450 will be operated properly to give the superior performance that it was designed to deliver.

For service or installation assistance, please call our  
Technical Support Department between the hours of  
8 a.m-5 p.m. E.S.T., Mon.-Fri.  
1-800-45-SMART

**LIMITED WARRANTY:** SMART products and accessories are warranted against malfunction or failure due to defects in workmanship or materials for a period of one year from the date of shipment. If a problem occurs during the warranty period, the unit will be repaired, or replaced at our option, without charge for materials or labor. If air freight is requested by the dealer, the difference between air and surface charges will be billed to the dealer. This limited warranty does not cover products that have been abused, altered, modified, or operated in other than specified conditions. Prior factory approval is required on all returns. Returned equipment or defective parts must be shipped freight prepaid to us by the dealer or customer.

Our limited warranty does not cover damages resulting from accident, misuse or abuse, lack of responsible care, or failures not attributable to manufacturing defects, except as provided herein. SMART Devices, Inc. makes no warranties, express or implied, including warranties of merchantability or fitness for a particular purpose.

**RETURN POLICY:** Factory authorization **MUST** be obtained before returning any product. A 15% restocking charge will be issued on unused equipment (in original box) that is returned for credit. Credit is issued to the dealers account. The credit may be used against future purchases and no cash transactions are offered. All returns must be shipped freight prepaid by the dealer. Equipment returned without a factory RA (Return Authorization) will be refused.

# Installation and Service Manual

## TA250/450 Power Amplifier

### Circuit Description

To assure absolute long term reliability, the output section of each channel incorporates multiple Motorola Power Transistors, which provide 3 times the amplifiers rated power in watts of dissipation per channel. The output stage is arranged in a full complimentary format for class AB/2 operation.

The bias current is evenly distributed among all output devices. Bias thermal compensation is accomplished by a thermally 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 provides the required separation of Ft break points for absolute stability. Full complimentary drive and loading is employed throughout. Only 20 dB of negative feedback is used to reduce forward transfer distortion to minimum levels. V1 type energy limiters are incorporated for short circuit protection of the amplifier. Due to the unusually large safe operating area of the output stage, the limiters do not activate until driving a forty-five degree reactive load 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 sheet steel stock. The entire package concept is directed toward maximum efficiency of space and structure, accounting for the unit's compact size and light weight.

### Installation

All SMART amplifiers are designed for mounting in a standard 19 inch equipment rack, or one of the many rack type portable cases available on the market. The amplifiers require 3-1/2 inches of vertical panel space, with 13-1/2 inches required behind the panel. Total

depth, including handles, is 14-3/4 inches. Front panels are machined from solid aluminum stock with a black textured finish and sturdy rack mount handles.

Placement of the amplifier is not critical for normal operating conditions, provided that sufficient air flow is allowed to reach the heat sink array. If the unit is to be placed on a shelf, or a similar unenclosed area, allow four inches clearance behind the heat sink to permit vertical air flow through the array. For installation in a cabinet, allow an additional two inches above and one inch below the amplifier to permit air to be drawn around the back of the unit. If the amplifier is to be mounted in an equipment rack or cabinet with other heat producing equipment, ensure environmental operating temperatures do not exceed 55C (131F). Should overheating occur because of inadequate ventilation, thermal protection circuitry will automatically protect the amplifier. When a safe operating temperature is restored, the amplifier will resume normal operation.

Because the amplifiers are capable of delivering high power from a relatively small physical package, considerable heat can build up in cabinets containing several instruments. A good rule of thumb to adopt is; "Provide forced air cooling in any enclosure containing four or more instruments."

### Power Connections

**SMART 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 an increase in output device case temperature sufficient to affect any amplifiers performance.

Should the heat sink reach 95C, thermal protection circuitry will automatically disconnect the amplifier's output stage from the load (loudspeaker) until the temperature decreases sufficiently. The action of removing the load eliminates output current, resulting in an immediate temperature drop. The thermal protection circuit will automatically reconnect the load when the temperature drops below 95C.

### Fan Assist Cooling

To provide continuous operation under adverse operating conditions, a Dual Fan Forced Air Cooling System has been added for extra protection.

Temperature is controlled automatically by a thermal switch which turns on the Cooling System when required.

### Controls/Connections

#### POWER SWITCH

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

#### POWER INDICATING LED

This LED indicates power is turned 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 amplifier has reached full power. If the amplifier is driven into a clip condition, a Softclip circuit is activated attenuating the input signal and preventing a Hard Clip condition where the amplifier's output saturates to a DC level.

#### 1/4" JACK INPUT CONNECTIONS

Balanced and Unbalanced inputs can be accepted via the 1/4" Jack. Balanced inputs: Tip = High, Ring = low, Sleeve = Ground.. Unbalanced inputs: Tip = High, Sleeve = Ground.

**Note:** The Unbalanced 1/4" Jack parallels the XLR connector for easy daisy chaining of amplifier inputs.

#### XLR INPUT CONNECTIONS

XLR input connectors are provided for balanced input signals. Please note; Pin 1: Ground, Pin 2; High, Pin 3: Low

#### GROUND/LIFT SWITCH

To eliminate ground loops between this amplifier and a preamplifier in certain installations, a GROUND/LIFT SWITCH is provided.

#### INPUT SIGNAL SELECTOR SWITCH

This switch is used to select one of three input configurations.

1) **PARALLEL:** The input signal is applied to Channel One only. Channel One and Two inputs are connected in parallel and the same signal at both Channel One and Channel Two outputs.

**NOTE:** Channel Two's input becomes a signal output for use in Daisy Chaining additional amplifiers.

2) **STEREO:** This is the amplifiers standard mode of operation where channel inputs and outputs corresponds (Chan. 1 in = Chan. 1 out and Chan. 2 in = Chan. 2 out.)

3) **BRIDGED:** 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 Bridged Mono Operation Pg. 9.

#### OUTPUT CONNECTIONS

Output connections are made via five-way binding posts. Polarity is indicated by red and black terminals. We suggest the use of dual banana plugs for convenient and reliable hook-up. They also allow quick connection changes, when reversing polarity, as required during test and calibration of multilevel biamplified and triamplified 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.

#### EXTREMELY IMPORTANT:

When making wire connections, Double Check that **NO** wire strands or ends touch an adjacent terminal, shorting the output.

#### CAUTIONS:

Never strap the two red output terminals together (in parallel).

Never connect either red output terminal to chassis ground.

#### 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 servicing to qualified personnel.

# TA250/450 Power Amplifier

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## AC POWER CORD

Plug the Power Cord into an AC outlet that delivers the proper voltage and current for amplifier operation.

## CAUTION:

The TA250 and TA450 amplifiers are a product of the most advanced technology and manufacturing techniques. The amplifiers are 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.

- 1) DO NOT PARALLEL THE TWO OUTPUTS OF EACH CHANNEL BY CONNECTING THEM TOGETHER OR PARALLEL THEM WITH ANY OTHER AMPLIFIER OUTPUT.
- 2) NEVER CHANGE A FUSE WITH AC POWER CONNECTED.
- 3) UNDER NO CIRCUMSTANCES SHOULD THE AMPLIFIER BE OPERATED WITH THE COVER REMOVED. THERE ARE NO USER SERVICEABLE COMPONENTS INSIDE THE AMPLIFIER. AVOID POTENTIALLY DANGEROUS SHOCK HAZARDS. REMEMBER TO KEEP THE COVER CLOSED AT ALL TIMES.

## BRIDGED MONO OPERATION

1. Set the INPUT SELECTOR SWITCH to BRIDGE.
2. Connect the input signal to Channel One's input jack.
3. Connect the speaker load to the two red terminals of each channel. Confirm the (+) terminal of the speaker to channel one and the (-) terminal 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 output using Channel One control and Set Channel Two level to "0"

## SPECIFICATIONS:

### Gain:

26 dB (per Channel)	TA250
28 dB (per Channel)	TA450

### Continuous Power:

145 watts per Ch. @ 8 ohms	TA250
240 watts per Ch. @ 4 ohms	TA250
200 watts per Ch. @ 2 ohms	TA250
400 watts bridged mono @ 8 ohms	TA250
300 watts bridged mono @ 4 ohms	TA250

270 watts per Ch. @ 8 ohms	TA450
425 watts per Ch. @ 4 ohms	TA450
290 watts per Ch. @ 2 ohms	TA450
765 watts bridged mono @ 8 ohms	TA450
600 watts bridged mono @ 4 ohms	TA450

### Frequency Response:

Plus/Minus 0.5 dB, 20 Hz to 20 KHz

### Distortion:

< 0.25% THD or IM, .01W to rated power, 20 Hz to 20 KHz (0.01% typical)

### Input Sensitivity:

1.0 Vrms standard with 0.775 Vrms and 1.5 Vrms internally selectable.

### Hum and Noise:

104 dB below rated output (unweighed 20 KHz bandwidth)

### Input Impedance:

15K ohms, nominal

### Transient Inter Modulation Distortion:

< 0.02%