



**FAX250 250-Watt Power Amplifier
Installation and Service Instructions**

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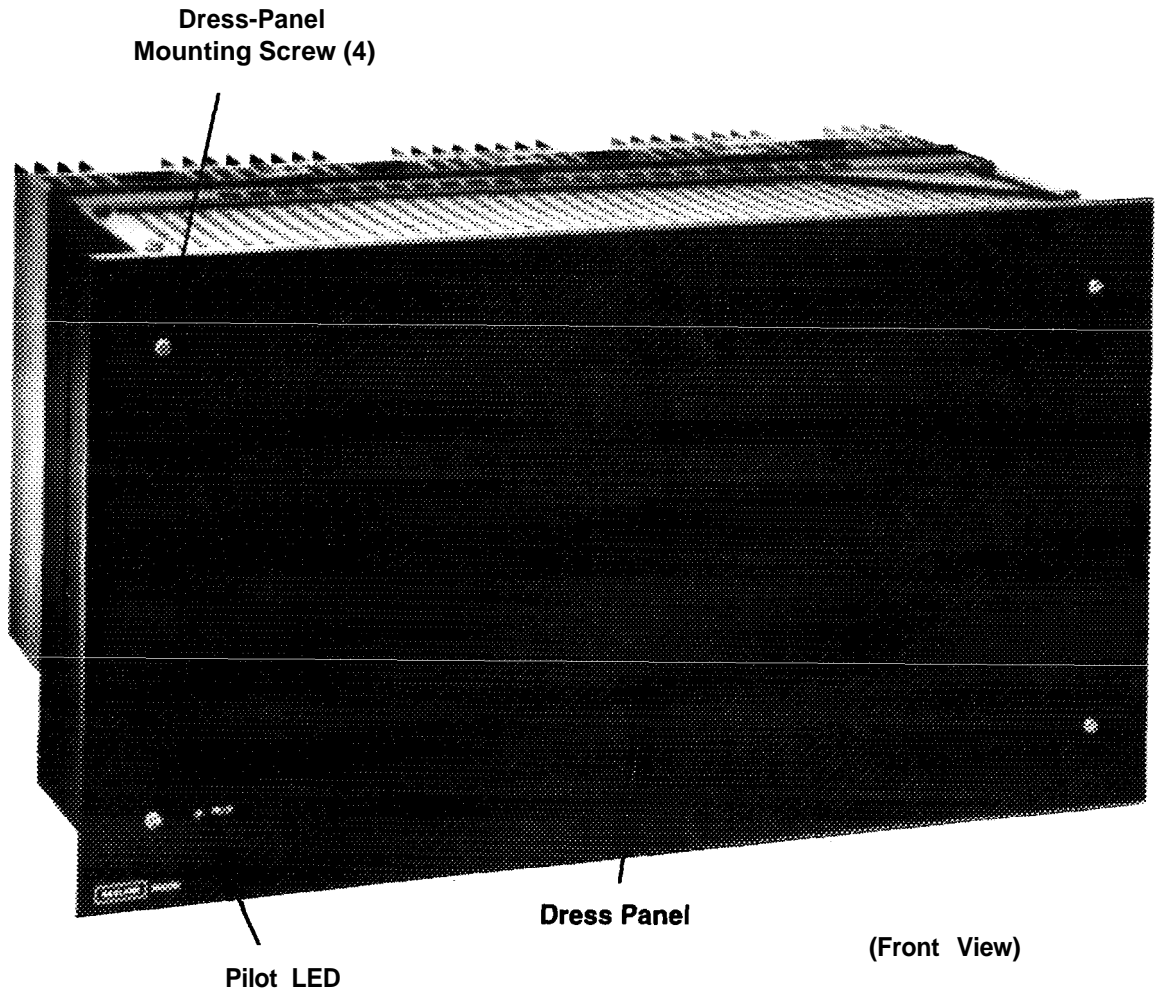


Figure 1. Model FAX250 Amplifier with its Dress Panel Mounted

Description

The Rauland FAX250 Amplifier is designed for continuous operation in safety, paging, and professional sound systems. Its rugged construction has enabled it to pass the rigorous testing of Underwriters Laboratories for UL-1711 fire-protective signainging systems.

The FAX250 delivers 250 watts of power when operated from 120 VAC. It also has connections that enable it to function from 24-VDC batteries during a power failure. Its ruggedness, versatility, and wide frequency response make the FAX250 well-suited to institutional and commercial alarm, paging, and sound-reinforcement systems.

Unpacking

The factory thoroughly checked this amplifier. Inspect it, the enclosed pans, and the container for signs of improper handling during shipment. In case of damage, place a claim at once: with the dealer or distributor from whom you purchased the unit or-if it was shipped directly to you-with the carrier.

The following parts are included with the amplifier:

Qty.	Description	Rauland Part No.
8	Rack-Mounting Screws for tapped holes (# 10-32 x ½" slotted pan-head machine).	WA1 52
8	Rack-Mounting screws for untapped holes (#10 x ½" hex washer-head thread-forming).	WA25
8	#10 "U" type Speed Nuts for untapped rack-mounting holes.	AB1 889
8	# 10 External-tooth Lock Washers for rack-mounting.	WJO 105
1	Front Panel.	AN0963
4	Panel-Mounting Screws (X6-32 x ⅜" black pan-head Phillips machine).	WA1 37
4	#6 "U" type Speed Nuts, for mounting the front panel.	AB 1268
4	#6 flat stainless-steel panel-mounting washers.	WJO074
1	LED Cartridge.	JLO079

Installation

Location and Ventilation

Mount the FAX250 in a 19-inch rack (e.g., Rauland Models RP1100B, RP1101B, RP1102B, or RP1103B) and install a blower (e.g., the Rauland Model JN0010A). To accommodate its weight and its high power-handling, mount the amplifier at the bottom of the rack. Leave at least 3% inches of clearance at the bottom, to help provide proper ventilation and easy access for servicing.

Caution

Failure to provide adequate ventilation could result in overheating that could damage the equipment or create a fire hazard.

Mechanical Installation

Step 1. If the rack's mounting holes are untapped, push the eight #10 "U" nuts onto them, with the flat sides toward the front (the "U" nuts may not fit on some extruded holes).

Step 2. Mount the amplifier to the rack, using the #10 lockwashers, nuts, and screws provided (use the machine screws for threaded mounting holes, and the thread-forming screws for untapped mounting holes).

Step 3. Install the four smaller "U" nuts on the panel-mounting holes on the front of the amplifier; the flat sides of the "U" nuts should face outwards.

Step 4. Carefully push the cartridge LED, lead-end-first, through the front of the Pilot hole in the front panel. The LED should click into place when it is properly seated.

Step 5. Identify the positive lead of the LED by finding the "+" that is molded onto the rear of the cartridge. Connect the cable for the LED (see Figure 2) so that the orange wire is connected to the "+" lead, and the black wire is connected to the other (negative) lead.

Step 6. Carefully secure the front panel to the amplifier, using the four flat washers and the four #6 machine screws provided.

Warning

Do not connect AC or DC power to the amplifier until all of the necessary input and output connections have been completed.

Opening the rear cover of the amplifier can expose you to an electrical shock hazard. Only a qualified technician should make internal connections or adjustments to this amplifier.

Electrical Connections

DC Power Connections

An optional battery back-up can be installed, to allow the amplifier to continue operating during an AC power failure. All of the installation steps are given below. How-

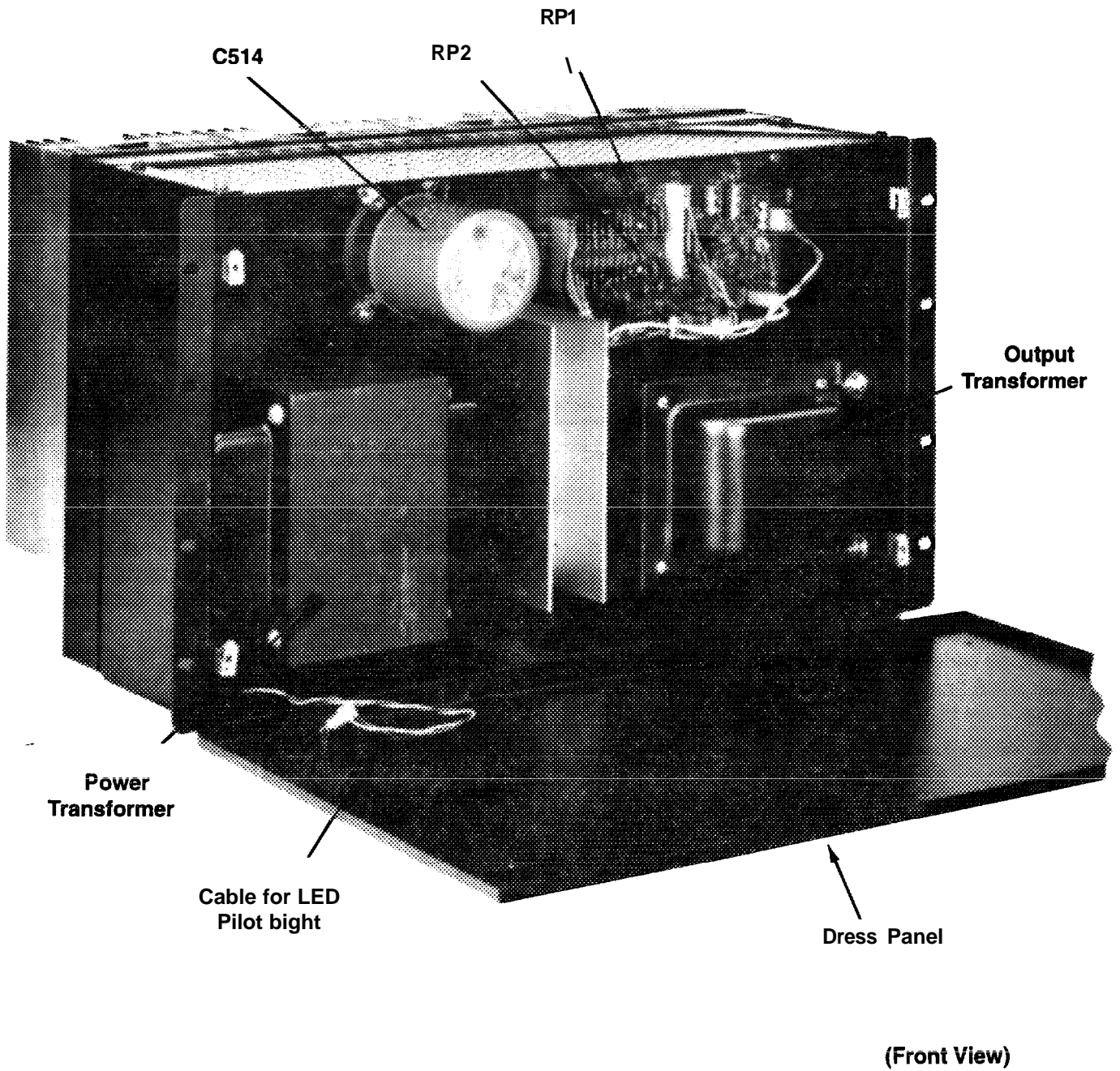
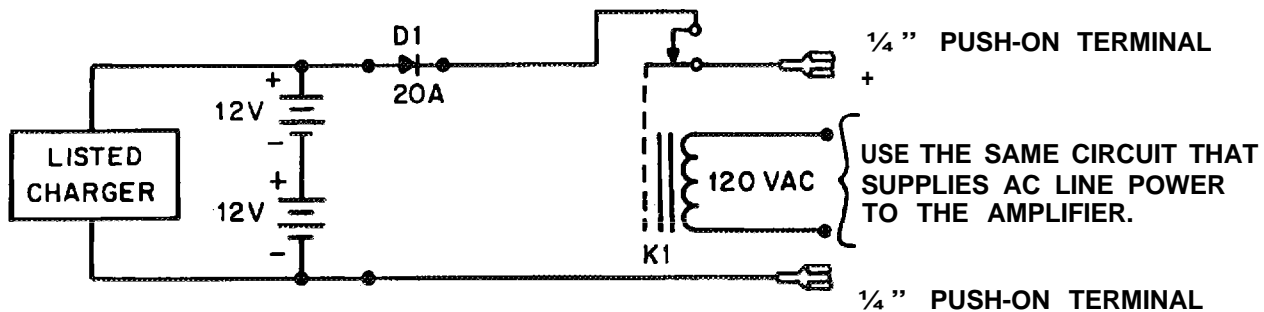


Figure 2. FAX250 Amplifier with its Front Panel Removed.

NOTES:

1. THE RATING OF DIODE D1 MUST BE AT LEAST 20 AMPERES.
2. THE CONTACTS OF RELAY K1 ARE SHOWN IN THE DE-ENERGIZED POSITION.



CAUTION: CONNECT THE AC POWER BEFORE CONNECTING THE BATTERY CABLES.

CONNECTING A BACKUP BATTERY TO THE FAX250

KM0800 

ever, only the internal connections need to be completed before the audio connections are made.

Step 1. Make sure that no power—neither batteries nor AC—is connected to the amplifier. Then remove the three top screws from the rear top of the unit (see Figure 3) and gently open and lower the hinged rear panel (it’s heavy).

Step 2. Bring in the DC power cable (at least 14-gauge—check the local codes) through the conduit knockout hole in the rear panel (marked *External DC Access*, near the AC power cord—see Figure 3).

Step 3. Attach ¼-inch push-on terminals to the cable ends and connect them to the mating ½-inch “+” and “-” spade terminals on the upper right section of the amplifier, near Capacitor C514 (see Figure 4).

Important: The *External DC Access* terminals are for a battery: this amplifier does *not* supply any DC power for auxiliary equipment.

Important: The DC input terminals must be wired with the correct polarity to prevent personnel danger, battery damage, and amplifier damage.

Step 4. Carefully swing the rear panel shut and resecure it with the three screws you removed in Step 1. You may now either install the external components of the battery back-up or go on to the audio connections.

Step 5. Refer to KM0800, above, to complete the battery back-up installation.

Input Connections

An input of 0.3 volts is needed to drive the FAX250 to its rated power output. Either balanced or unbalanced inputs may be used. In either case, keep the input leads away from the output leads and the AC power cables. If

the signal source has a high output impedance, keep the signal leads shorter than ten feet. See Figure 3 for the location of the input terminals.

Balanced Input: Connect the audio source to the *Bal. Input* terminals with a twisted-pair, low-capacity shielded cable. This input configuration requires the installation of a plug-in transformer in chassis socket *TI* (S501—see Figure 3). Use the Rauland R1006 Balancing Transformer for a balanced input, or the Rauland R1008 Bridging Transformer for a balanced bridging input. Each transformer has a 1:1 turns ratio and comes with a mounting bracket and screw.

Hi-Z Unbalanced Input: Use the Hi-Z input connectors for a high-impedance (50,000-ohm) unbalanced input. Use a single-conductor, low-capacity shielded wire for the input connection.

Grounding: In a sound-reinforcement or reproduction system, it is necessary that the audio common be connected to the equipment chassis ground at some point. For best results, only one such connection should be made in the entire system. Generally, the best place for this ground connection is on the preamplifier chassis; all Rauland preamplifiers are supplied with this connection. Accordingly, the FAX250 amplifier is shipped with no direct connection between its audio common and the chassis ground. If the preamplifier lacks such a connection, the connection can be made at the FAX250, either by jumpering its *Corn* to its chassis at the intersection of C503 and C504, or externally.

Output Connections

The output terminal block is located on the left rear side of the amplifier chassis (see Figure 3). Make sure that all power to the amplifier, AC and DC, is turned off, then

remove the two #6 hex nuts and the cover. After completing the connections, replace the cover

Important: To prevent shorting to the cover, insulate any wire or spade lug that extends from the terminal block.

The output transformer has a balanced and isolated multiple-tap secondary. For an unbalanced output, install an optional jumper, J500 (not supplied), to connect **Com** and **Com Out** on the output terminal block; this jumper would reference one side of the transformer secondary to the circuit common. For isolated (balanced) operation, do not install this jumper.

The 25-volt output winding of the output transformer is center-tapped. If it is necessary to ground this tap, place a jumper between it and a chassis ground.

Connect the speakers and their associated matching transformers to the 8-ohm, the 25-volt (2.5-ohm), or the 70-volt (20-ohm) terminal and **Com Out**.

Com Out is for Speakers.

Always connect speakers to the **Com Out** (output common) terminal. The **Com** terminal is the amplifier common, so connecting a speaker here will result in no audio to the speakers (unless **Com** has been jumpered to **Com Out** for unbalanced output).

Selecting the Proper Outputs

The 8-ohm output is generally used when the wires running to the speakers are relatively short and the line loss is less than 0.5 dB. For best performance, make sure that the nominal impedance of the total speaker load is 8 ohms. Use series or parallel speaker arrangements as needed to obtain the proper impedance match.

The 25- and 70.7-volt outputs are for speakers designed for constant-voltage lines. Each speaker must have a line-matching transformer, and the speakers must be connected

Important!

Both the National Electrical Code (NEC) and UL Standard 1711 require that power-limited fire-protective signaling conductors (e.g., the amplifier **input** wires) be separated from all signaling conductors originating from “nonpower-limited” circuits, such as the amplifier outputs and other Class I circuits.

Field-wiring circuits connected to any audio output on this amplifier must be treated as “nonpower-limited” circuits, as defined by the NEC and applied in **UL-1711**.

The installer should consult the documentation for the system in which the amplifier will be used and the NEC for further details.

in parallel. The impedance taps on the primaries of the line-matching transformers indicate how much power will be taken from the line.

Good practice suggests adding speakers as required until the total wattage absorbed by all of the transformers equals 80% to 85% of the maximum rated power output of the amplifier. This would mean operating the amplifier with a load between 200 and about 215 watts.

AC Power Connections

After all of the other connections have been made and the system is ready for operation, plug the power cord into a 120-V, 60-Hz, three-wire grounded outlet that can provide 590 watts of power. The ground connection automatically grounds the chassis, minimizing hum pickup and shock hazard. Check the local regulations before installing permanent AC lines and plugging in the equipment.

To avoid draining the external 24-VDC battery, do not connect it until after the AC power has been connected.

Operation

Turn on the FAX250 by plugging its AC power cord into a three-wire grounded outlet or by connecting it to a 24-VDC auxiliary power source. The pilot LED then lights steadily to indicate that the amplifier is powered and ready for use.

Fuse

An excessive current surge during operation will cause Fuse F501 to open. If this happens, disconnect all power to the amplifier (DC first, if there is a battery) and determine the cause of the failure. After correcting the problem, replace the fuse with one of the same type and value (10-A

normal-blow) and reconnect the power to the amplifier (if a battery is used, connect it last).

Input Level Control

The *Input Level* control (RPI01) is recessed in the rear panel (see Figure 3). This control can be adjusted with a standard ¼-inch screwdriver.

Lo-Cut Switch

This switch, located on the rear of the amplifier, attenuates the low frequencies enough to provide protection for speakers. Always turn this low-cut filter on when horns and speakers with transformers are used; otherwise, it is not necessary to have this switch on. This switch rolls off the lower frequencies when it is in the left (“On”) position; it

FAX250 250-Watt Power Amplifier

provides flat (normal) performance in the right ("Off") position.

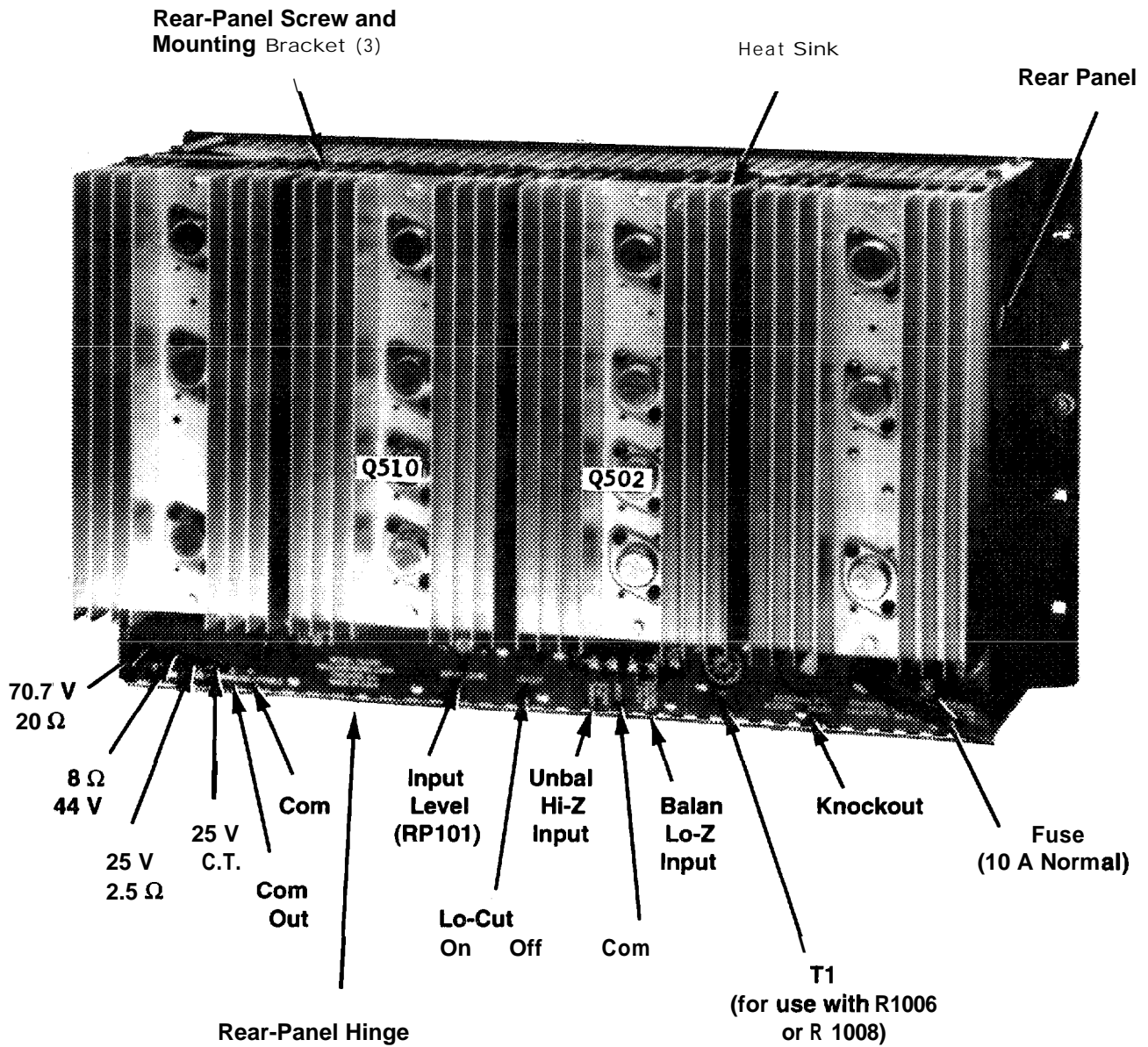


Figure 3. Rear View of FAX250

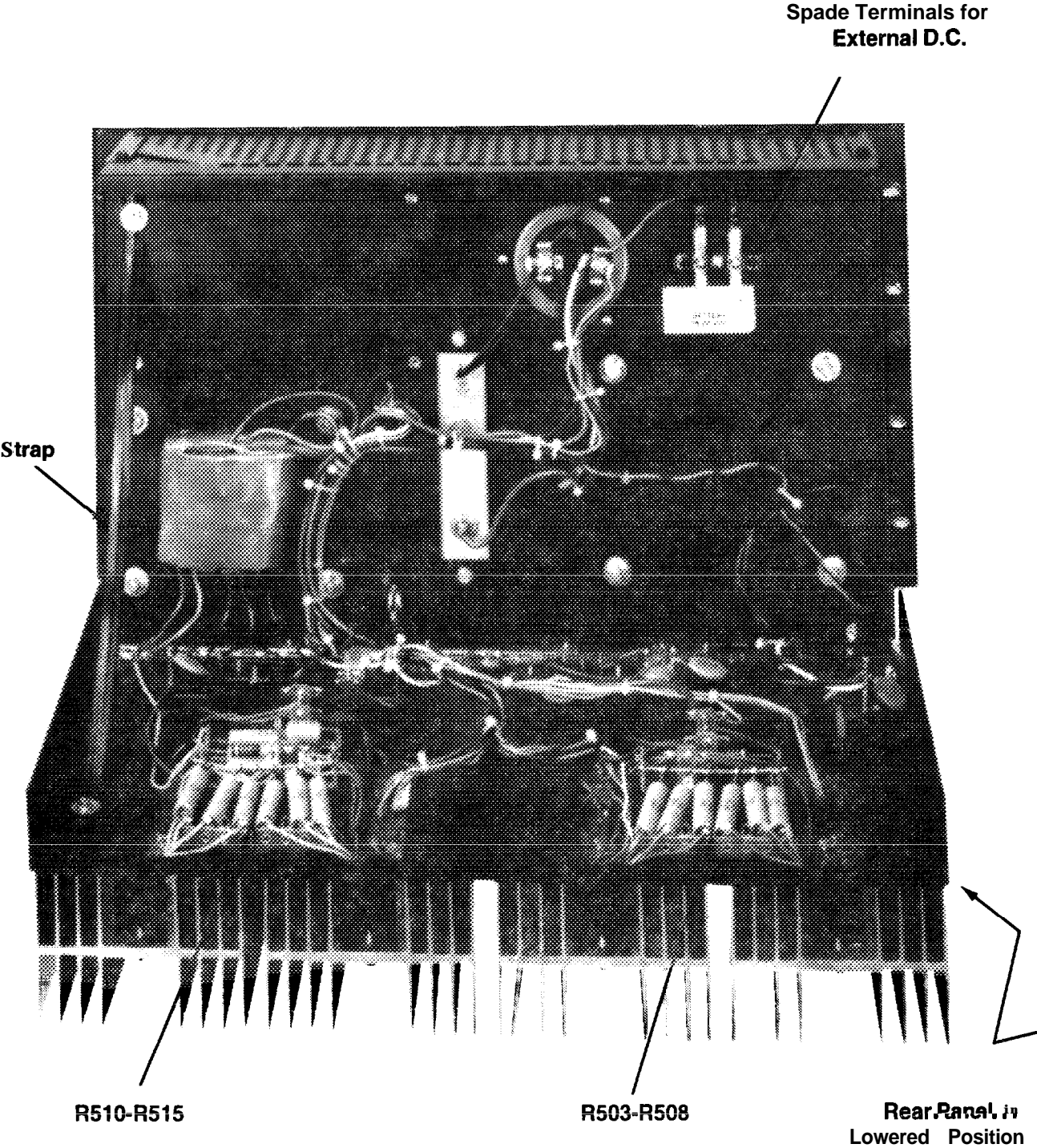


Figure 4. Rear View of FAX250 with its Rear Panel Lowered

FAX250 Specifications

Rated Power Output: 250 watts RMS, 50 Hz to 15 kHz, THD+N 12%.

Frequency Response: ± 2 dB, 30 Hz to 20 kHz (at -3 dB ref. RPO).

Bandwidth per UL-1711: 800 Hz to 4 kHz (250 watts, THD+N $\leq 20\%$, operating at 20.4 VDC).

Hum and Noise: 80 dB below rated output.

Regulation: Better than 2 dB from Full Load to No Load.

Input Sensitivity: 0.3 V for RPO.

Input Impedance: 50 kilohms nominal.

Controls and indicators: Input-level control.
Low-cut On-Off switch.
Power On LED.

Output Terminals: 8 ohms (44 volts).
25 volts (2.5 ohms).
Center Tap (used only for 25-volt balanced output).
70.7 volts (20 ohms).
Common Out (part of the output transformer winding).

Common (connected to the input common; can be jumpered to *Common Out* for unbalanced output).

AC Power Consumption:

At rated *output*: 590 watts.
No *Signal*: 60 watts.

DC Current Consumption (for 24 VDC):

At rated *output*: 17 Amps.

No *Signal* 600 milliamps.

AC Line Fuse:

1 0-Ampere, Normal-blow.

Circuit Protection:

Thermal cut-out; electronic overload circuit; AC fuse.

Dimensions:

Width: 19" (48.3 cm) panel; 17" (43.2 cm) body.

Depth: 9.5" (24.1 cm).

Height: 10.5" (26.7 cm).

Panel Finish:

Charcoal gray baked enamel.

Weight:

60 lbs. (27.2 kg.).

Associated Equipment:

R1006 600 Ω Balancing Transformer.

R1008 20-kilohm Balancing Transformer.