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## FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at your own expense.

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## Warranty Statement

Graham-Patten warrants that the equipment it manufactures is free from defects in workmanship and materials and meets applicable published specifications. Equipment that has been operated within published ratings and has not been subjected to abuse or modification, and which fails because of such defects, will be replaced or repaired at the Company's discretion if it is returned, freight prepaid, to Graham-Patten within seven years of receipt.

This warranty supersedes all other Warranties, express or implied. Graham-Patten is not liable for any consequential damages.

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# Table of Contents

<b>Table of Contents</b>	<b>ii</b>
<b>Introduction</b>	<b>1</b>
What are SoundPals? .....	1
Documentation Conventions .....	1
Signals and Values .....	1
Warnings .....	1
Unpacking and Inspection .....	2
Power Supply Note .....	2
<b>AEDM-4/SD-A</b>	<b>3</b>
About the AEDM-4/SD-A .....	3
AEDM-4/SD-A Installation .....	4
Connecting Power .....	4
Connecting the SDI Input .....	4
Connecting the SDI Output .....	5
Connecting AES Audio Outputs .....	5
Connecting Headphone Audio Output .....	5
AEDM-4/SD-A Operation .....	5
AEDM-4/SD-A Interconnection .....	6
HDTV-to-De-Embedded AES Audio Mixing .....	6
AEDM-4/SD-A Troubleshooting .....	7
AEDM-4/SD-A Specifications .....	8
Audio Specifications .....	8
Environmental Specifications and Dimensions .....	9
<b>Inside the Module</b>	<b>9</b>
In This Section .....	9
Before You Begin .....	9
Opening the Module .....	9
Closing the Module .....	10
<b>External Power</b>	<b>10</b>
About Power Supplies .....	10
CE Compliance .....	10
Portable Power Sources .....	10
Power Supply Specifications .....	10
Power Supply Sources .....	11



# Introduction

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## What are SoundPals?

Each Graham-Patten SoundPals module is essentially a digital audio *building block* that can be used independently, or interconnected to perform more advanced mixing and audio processing functions.

SoundPals can be used in both standalone and system configurations:

- In a “standalone” configuration, each SoundPals module is designed to perform a specific audio processing function such as ADAT-to-Analog conversion. In this way, each module functions as a perfect low-cost adjunct to larger mixing consoles (such as the Graham-Patten D/ESAM series) — for single-purpose processing tasks.
- In a “system” configuration, SoundPals can be *linked* to form more comprehensive digital audio tools. For field recording, studio applications, and workstation applications, SoundPals can be used to seamlessly perform functions that would otherwise require extensive peripheral gear. Best of all, SoundPals “systems” can be re-configured quickly and easily — to suit your changing audio production requirements.

All SoundPals modules are extremely compact, rugged, and identical in size for ease of installation, interconnection, and use. In addition, SoundPals support AES3id. This allows longer, more robust AES signal distribution using standard coaxial cable. Error free distances of 1000 feet can be attained using inexpensive coaxial cables.

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## Documentation Conventions

The following documentation conventions are used in this guide:

- Buttons, knobs, connectors, and switches are indicated in bold-faced capital letters. For example:

Adjust the left **GAIN TRIM** to ...

- Primary sections are listed in bold text, with a line above:

---

**Primary Section**

- Secondary sections are listed in bold text, with no line:

**Secondary Section**

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## Signals and Values

Note the following important information regarding audio signal level:

- AES3 = Balanced output with 2 channels of digital audio (left and right)
- AES3id = Unbalanced output with 2 channels of digital audio (left and right)

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## Warnings

Please observe the following important warnings:

- Heed all warnings on the unit and in the instructions.
- Do not use this product in or near water.
- Route power cords and other cables so that they are not likely to be damaged. Disconnect power before cleaning. Do not use liquid or aerosol cleaners; use only a damp cloth.

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## Unpacking and Inspection

When you receive your SoundPals modules, inspect the cartons for signs of damage. Contact your dealer and the shipper *immediately* if you suspect any damage has occurred during shipping. Check the contents of each box to be sure that all parts are included. If any items are missing, contact your dealer immediately.

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## Power Supply Note

SoundPals are delivered with a power connector *only*. A separate power supply must be obtained. Graham-Patten offers several power solutions for both domestic and international customers. Refer to “**External Power**” for detailed power specifications for users who wish to configure their own power source, rather than purchase one from Graham-Patten.

# AEDM-4/SD-A

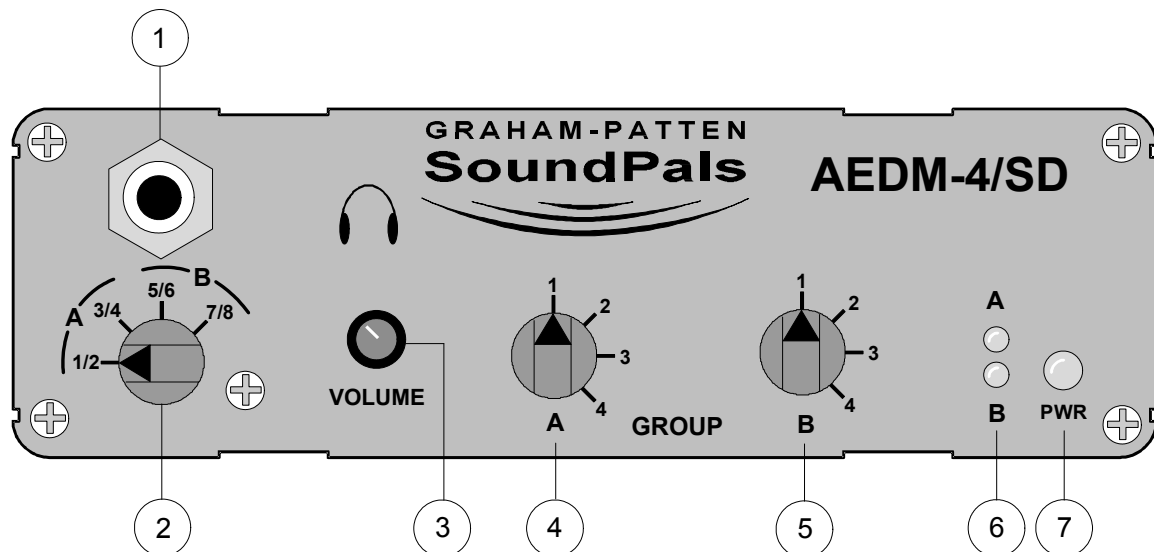
## About the AEDM-4/SD-A

The SoundPals AEDM-4/SD-A is an SDI audio de-embedder that separates any two 4-channel groupings in the SDI embedded data stream into eight channels of AES audio. It also has a selectable headphone output with separate volume control to monitor any one of the stereo pairs selected in the A and B groupings. The AEDM-4/SD-A provides an equalized cable input as well as an active looping output for the SDI data stream.

The unit offers the following features:

- Active looping SDI Input/Output.
- Four channels of AES3 balanced outputs (4 Phoenix connectors. 2 Channels of audio per connector).
- Four channels of AES3id unbalanced outputs (4 BNC connectors. 2 Channels of audio per connector).
- Selectable 2-channel analog headphone output with independent volume control.
- A and B Group Switch Knobs.
- Optional rack mounting tray (1RU)
- Compact size, rugged construction

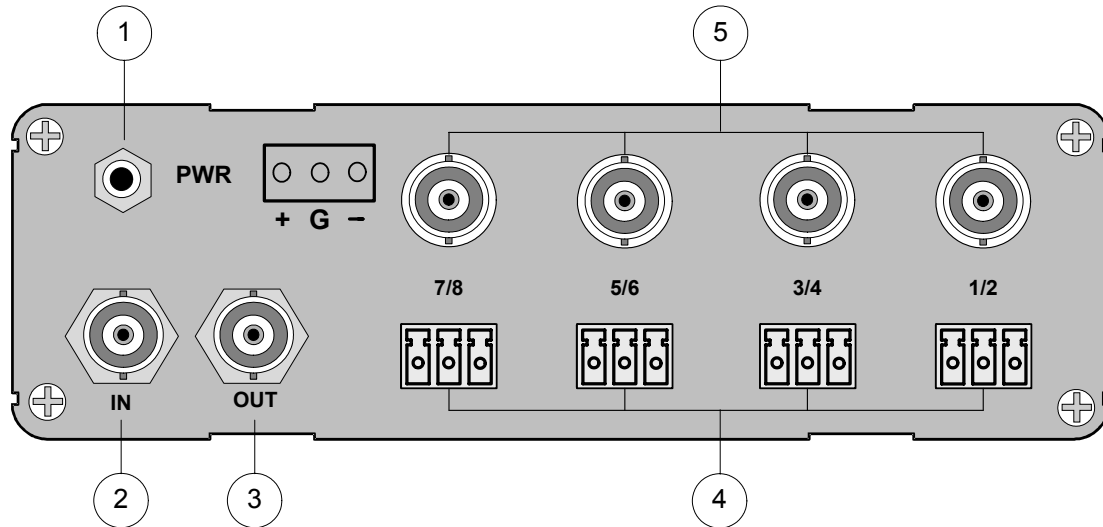
The figure below illustrates the AEDM-4/SD-A front panel:



- 1) **Headphone Output** — Connects to any set of ¼-inch TRS headphones.
- 2) **Headphone Channel Selection Switch** — Selects any stereo pair out of the selected A and B channel groupings. Channels 1-4 are always on the A Grouping while channels 5-8 are always on the B Grouping.
- 3) **Headphone Volume Knob** — Adjusts the headphone volume output from dunk to -12 dB (at -20 dBFS).
- 4) **A Group Switch** — Selects any one of four embedded 4-channel groupings to AES3 and AES3id outputs 1-4.

- 5) **B Group Switch** — Selects any one of four embedded 4-channel groupings to AES3 and AES3id outputs 5-8.
- 6) **Group Indicators** — The A and B green LEDs on the front light when the selected group is receiving a valid signal, flickers for signal present but wrong format, and mutes if off.
- 7) **Power LED** — The large green LED lights when system power is applied.

The figure below illustrates the AEDM-4/SD-A rear panel:



- 1) **Power Connector** — accepts the power jack from the 6VDC power supply. Refer to “**External Power**” section for more information regarding external power.
- 2) **SDI BNC Input** — Accepts SDI Serial Digital Input.
- 3) **SDI BNC Output** — Active SDI Serial Digital Output.
- 4) **AES3 Output Connectors** — Balanced AES Digital Outputs on 4 Phoenix Connectors. (2 channels of audio on each connector) Outputs 1-4 are dedicated to group A and outputs 5-8 are dedicated to Group B. AES3 and AES3id outputs may be used simultaneously.
- 5) **AES3id Output Connectors** — Unbalanced AES Digital Outputs on 4 BNC connectors. (2 channels of audio on each connector) Outputs 1-4 are dedicated to Group A and outputs 5-8 are dedicated to Group B. AES3 and AES3id outputs may be used simultaneously.

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## AEDM-4/SD-A Installation

This section provides instructions for connecting power, SDI Digital Serial Input and Outputs as well as the AES3 and AES3id digital audio balanced and unbalanced outputs.

### Connecting Power

Plug a 6VDC power supply (rated at **0.5 Amps** or greater) into the appropriate voltage outlet for *your specific country*, and connect the end of the cord into the AEDM-4/SD-A jack marked **PWR**. Secure the locking ring finger tight. The green **PWR** LED lights when power is applied.

### Connecting the SDI Input

Connect the SDI Serial Digital Signal at 270 MB either NTSC or PAL to the BNC marked **IN** on the rear of the unit.

## Connecting the SDI Output

Connect a BNC cable between the BNC on the rear panel marked **OUT** to another AEDM-4/SD-A or your video monitoring device. This output provides a regenerated copy of the SDI Digital Serial Signal placed on the **IN** BNC connector.

## Connecting AES Audio Outputs

There are four AES3 balanced digital audio signals available on four Phoenix connectors on the rear of the unit as well as four AES3id unbalanced digital audio signals on four BNC connectors. Between each set of Phoenix and BNC connectors the outputs are marked as **1/2**, **3/4**, **5/6** and **7/8**. (The same de-embedded AES digital audio exists on the AES3 Phoenix and AES3id BNC connectors for each channel pair) The audio on the Phoenix and BNC connectors marked **1/2** and **3/4** will be de-embedded using the **A Group** switch. Audio on the Phoenix and BNC connectors marked **5/6** and **7/8** will be de-embedded using the **B Group** switch. Cabling for professional AES3 balanced outputs on the Phoenix connectors looking from left to right as you view the unit from the rear is **+ to Pin 1, Ground to Pin 2 and – to Pin 3** and is clearly marked on the unit. The AES3id BNC connector **center** is the AES digital signal and **ground** is the outer casing. Four male Phoenix connectors are provided with the unit for easy wiring.

## Connecting Headphone Audio Output

The **Headphone** output is a ¼ inch **Tip/Ring/Sleeve** output. Wire the **Left Channel** to the **Tip**, **Right Channel** to the **Ring** and **Shield** to the **Sleeve**. The **Headphone Volume Knob** is used to adjust volume level.

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## AEDM-4/SD-A Operation

This section includes instructions for operating the AEDM-4/SD-A. See the “**AEDM-4/SD-A Specifications**” section for information concerning the audio outputs or video input and outputs.

To operate the AEDM-4/SD-A:

1. With SDI Video input connected, use either the **A GROUP** or **B GROUP** switches to select which set of the four channel groupings you want to de-embed. (The **A Group** will de-embed the audio to the AES audio outputs **1-4** while the **B Group** will de-embed the audio to the AES audio outputs **5-8**.)
2. Check the **A and B Group Indicator LED's**. If they are fully on, you are receiving a valid embedded signal. If they flicker, you have a signal applied at the wrong clock rate. If the LED's are completely out, you have an invalid input signal applied to the unit and the audio outputs will be muted.
3. Once you have the **Group Indicator LED's** fully lit, you will be de-embedding the audio present in the selected grouping on the proper outputs. (**1-4 Group A, 5-8 Group B**) You can listen to those audio outputs using your **Headphones**, selecting the stereo pair wanted from the **Headphone Channel Selection Switch**, while adjusting the volume using the **Headphone Volume Knob**. Remember that you can only listen to one stereo pair at a time of the two selected channel groupings.

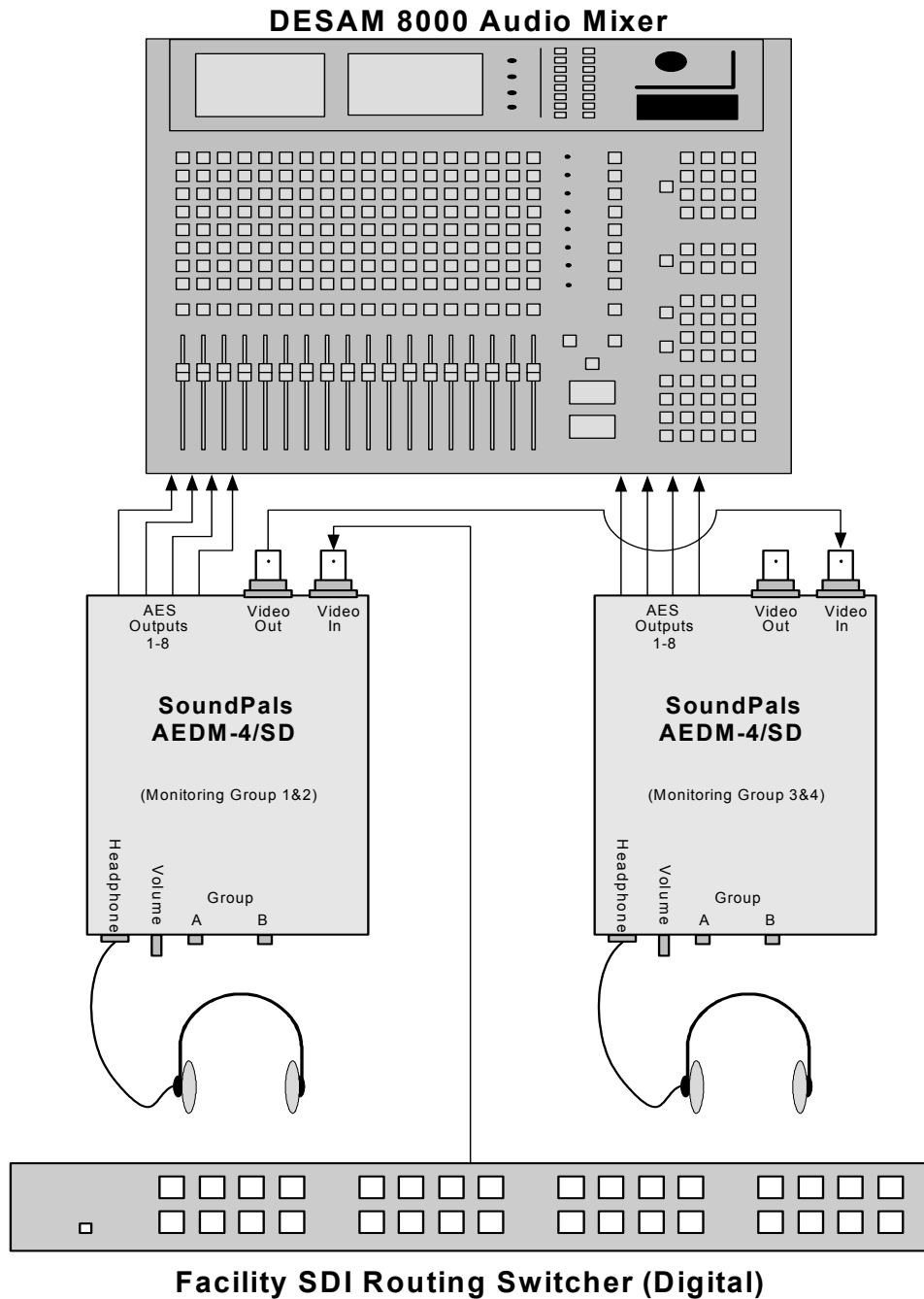
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## AEDM-4/SD-A Interconnection

This section provides an AEDM-4/SD-A interconnection diagram.

### SDI-to-De-Embedded AES Audio Mixing

There are many uses for SoundPals in music recording, radio or television broadcasting, DVD/CD/CR-ROM mastering, and video production and post-production.



In this application, the facility's SDI routing switcher is fed to the first AEDM-4/SD-A SoundPal, which is selected to monitor Group 1 & 2. These 4 AES data streams are then fed to the DESAM 8000 AES inputs. The video signal is then fed from the active video output connector to the second AEDM-4/SD-A SoundPal which is selected to monitor Group 3 & 4. These four AES data streams are also fed to the DESAM 8000 AES inputs making all 16 channels of embedded audio on the SDI signal path available for mixing. Both AEDM-4/SD-A SoundPals have a set of headphones connected to them, making it easy for the operator to monitor any stereo pair of the four groups.

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## AEDM-4/SD-A Troubleshooting

The table below lists AEDM-4/SD-A problems and solutions.

Problem	Procedure
No output.	<ul style="list-style-type: none"><li>• Check Power by Green LED.</li><li>• Check SDI Digital Serial input BNC is connected properly.</li><li>• Check A and B Group indicators for fully on condition.</li></ul>
Outputs are all silent.	<ul style="list-style-type: none"><li>• Check A and B Group indicators for fully on condition.</li><li>• Check to see you have the proper Group selected with the A and B Group Switches.</li></ul>

**NOTE** Please contact the GPS factory if the problem still exists after completing the above procedures.

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## AEDM-4/SD-A Specifications

This section provides audio and environmental specifications of the AEDM-4/SD-A SoundPals.

### Audio Specifications

AEDM-4/SD-A Specifications	
<b>Video Input</b>	
Video with embedded audio	SMPTE 259M
Impedance	75Ω
Amplitude	800 mV ± 10% (terminated)
Equalization	0-100m Belden 8281 or Equivalent
Data Rate	270 MB
Input Return Loss	<15 dB
Embedded format	SMPTE 272M
Video formats	NTSC, PAL SMPTE 259M, 125M
<b>AES Audio</b>	<b>AES Digital Out</b>
Sample Rate	48 KHz Synchronous to Video
Resolution	24 bits
AES3 balanced output on Phoenix connectors	110Ω, 3 to 4 volts p-p.
AES3id unbalanced output on BNC connectors	75Ω, 1 volt p-p.
Status Bits	All C, U and V Status Bits present on inputs are passed to the AES outputs.
<b>Analog Headphone out</b>	
Min Load	20Ω
Dynamic range	>91 dB
<b>Options</b>	
RT-2, 1RU rack tray for mounting up to 3 units	
Power supplies:	
<ul style="list-style-type: none"><li>PSU-1, 90-260V 50/60Hz in-line power supply with detachable IEC power cord</li></ul>	

**NOTE** All specifications listed above subject to change without notice.

## Environmental Specifications and Dimensions

Parameter	Specification
Dimensions (less connectors)	5.2W x 1.62H x 6.625D 13.2 x 4.1 x 16.8 cm
Power	<.45 Amp @ 6Vdc
Operating Temp	10 – 50 °C
Operating Humidity	10 – 90% RH non-condensing

## Inside the Module

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### In This Section

This section provides instructions for opening and closing the SoundPals AEDM-4/SD-A module to gain access to the internal circuit board.

**NOTE** There are no serviceable functions on the internal circuit board. This board should only be removed from the module if you are working with field service.

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### Before You Begin

Check the following items before opening the module and attempting to remove the internal circuit board:

- If required, remove the SoundPals module from the rack tray.
- Disconnect the power supply from the front of the product.
- Disconnect all input and output cables.
- Perform the remaining steps *only* in a static free environment. Make sure that *you and the product* are both grounded.

The following tools are required:

- #2 Philips screwdriver

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### Opening the Module

Use the following steps to open the AEDM-4/SD-A module:

1. On the front panel, remove the three knobs for the Headphone Channel Selection Switch and Group A and B Select switches.
2. Remove all five screws on the front panel using the #2 Philips screwdriver.
3. Once the front cover is off reach inside and remove the headphone connector from J2. Place the front panel off to the side.
4. On the rear panel remove just the four screws around the outer portion of the housing.
5. Slide the board out of the housing. Set the housing and all mounting hardware in a safe place.

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## Closing the Module

Use the following steps to close a SoundPals module:

1. Carefully slide the internal circuit board and rear panel assembly through the housing.
2. Start the four screws removed earlier but do not tighten yet.
3. Take the front panel with the Headphone jack and plug the headphone connector to J2 making sure to line up pins 1 (Brown wire on headphone connector to thick white line on silkscreen of J2).
4. Start all five screws on the front panel.
5. Now tighten all four screws on the rear panel followed by tightening all five on the front panel.

**CAUTION** Do not over tighten the screws.

6. On the front panel replace the three knobs removed earlier.

## External Power

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### About Power Supplies

An external power supply conforming to the specifications listed in the following “**Power Supply Specifications**” section *must be used* to guarantee that published SoundPals performance figures are met. Any power supply meeting these specifications will supply adequate power for a single SoundPals module. Although the specification is written for power supplies running from AC line inputs, DC (battery) sources may be used if they meet all of the listed requirements.

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### CE Compliance

For CE compliance, the power supply that you use *must comply* with the following requirements:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC
- EMC Directive 93/68/EEC
- The connector locking ring must be tight.

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## Portable Power Sources

For portable SoundPals power sources, sealed lead-acid, nickel cadmium or alkaline primary batteries may be used. However, the maximum voltage must *not* exceed 8.6 volts, and a minimum of 5.6 volts is required for normal operation. Maximum current drain will be 0.5 Amps.

The following specifications must be met over all anticipated operating conditions including AC power line range, temperature range, etc.

Parameter	Specification
Output voltage	5.6V minimum (measured at trough of ripple) at 500 mA constant current. 8.6V maximum (measured at peak of ripple) at 325 mA constant current.
Ripple voltage	2V p-p at 700mA constant current. 400mV p-p at 700mA constant current with external 2200 $\mu$ F capacitor.
Connector	Switchcraft 761K with center positive, sleeve negative.

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## Power Supply Sources

In addition to the GPS-supplied universal power supply, the following power supplies meet the SoundPals requirements:

Company	Model	Note
Stancor	STA-4860	120V AC, 60 Hz
Stancor	STAF-0797F	220V AC, 50 Hz with European wall plug (CE compliant).
Elpac	MI2007	95-250V AC, 47-63 Hz with IEC inlet (line cord required). Will power up to six units (CE compliant).