

# HDDM-8/A

## User Guide

HD Audio De-embedder





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## Printing History

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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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## Company Address



**GRAHAM-PATTEN SYSTEMS, INC.**  
**119 East McKnight Way, Unit A**  
**Grass Valley, California 95949**  
Telephone: (888) 622-4747, (530) 477-2984  
Fax: (530) 477-2986  
e-mail: [info@isis-group.com](mailto:info@isis-group.com)  
World Wide Web: [www.gpsys.com](http://www.gpsys.com)

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# 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:

- 0dBu = 0.778Vrms

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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.

# HDDM-8/A

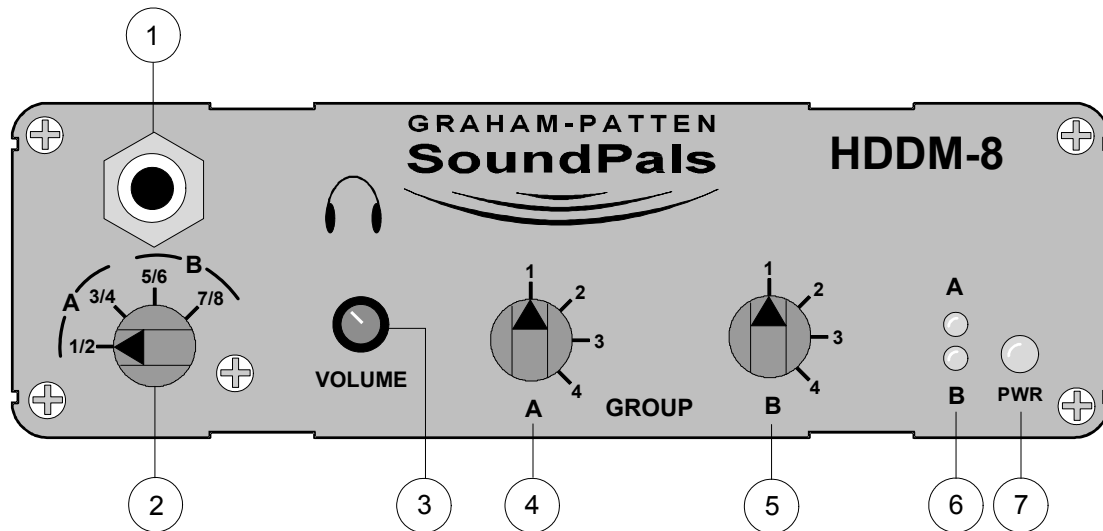
## About the HDDM-8/A

The SoundPals HDDM-8/A is an HDTV audio de-embedder that separates any two 4-channel groupings in the HDTV embedded data stream into eight channels of analog 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 HDDM-8/A provides an equalized cable input as well as an active looping output for the HDTV data stream.

The unit offers the following features:

- Active looping high definition Input/Output.
- Eight analog -1dB to +4dB line-level outputs (at -20dBFS).
- Selectable 2-channel headphone output with independent volume control.
- A and B Group Switch Knobs.
- Optional rack mounting tray (1RU)
- Compact size, rugged construction

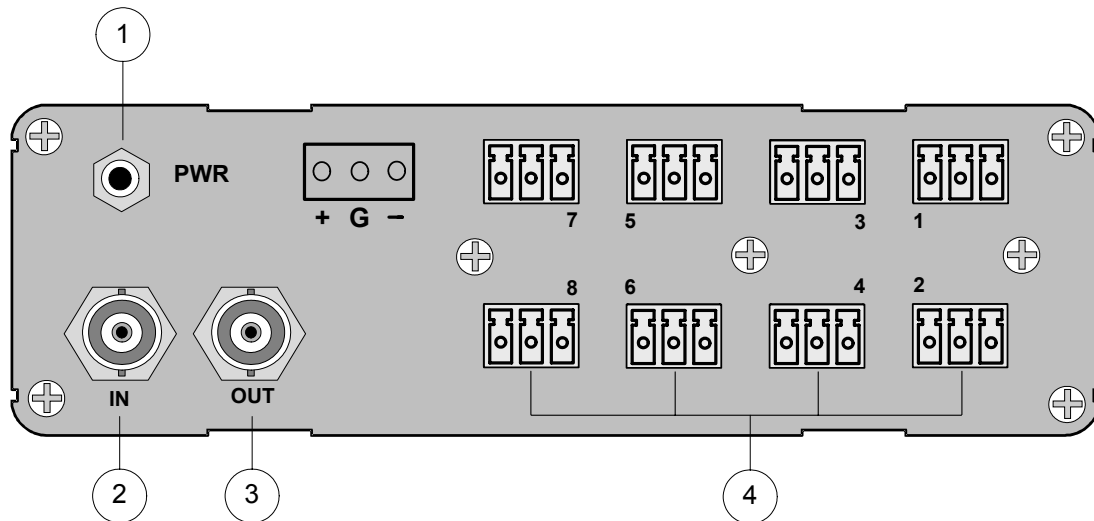
The figure below illustrates the HDDM-8/A front panel:



- 1) **1/4" Headphone Output** — Connects to any set of 1/4-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 analog outputs 1-4.

- 5) **B Group Switch** — Selects any one of four embedded 4-channel groupings to analog outputs 5-8.
- 6) **Group Indicators** — The A & B green LEDs on the front panel 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 HDDM-8/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) **HDTV BNC Input** — Accepts HDTV Serial Digital Input.
- 3) **HDTV BNC Output** — Active HDTV Serial Digital output. (One meter or less cable length)
- 4) **Analog Output Connectors** — Eight analog Phoenix output connectors. Outputs 1-4 are dedicated to Group A and outputs 5-8 are dedicated to Group B.

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## HDDM-8/A Installation

This section provides instructions for connecting power, HDTV Digital Serial Input and Outputs as well as the audio balanced or unbalanced outputs.

### Connecting Power

Plug a 6VDC power supply (rated at **1.1 Amps** or greater) into the appropriate voltage outlet for *your specific country*, and connect the end of the cord into the HDDM-8/A jack marked **PWR**. Secure the locking ring finger tight. The green **PWR** LED lights when power is applied.

### Connecting the HDTV Input

Connect the HDTV Serial Digital Signal at either 1.485 GB or 1.485/1.001 to the BNC marked **IN** on the rear of the unit. Check the A and B group indicator LEDs for a steady ON condition indicating a valid HDTV Serial Digital signal.

## Connecting HDTV Output

Connect a BNC cable between the BNC on the rear panel marked **OUT** to another HDDM-8/A or your video monitoring device. This output provides a regenerated copy of the HDTV Digital Serial Signal placed on the **IN** BNC connector. Using cable length of more than one meter may degrade the HDTV signal.

## Connecting Analog Audio Outputs

There are eight independent analog audio Phoenix connectors on the rear of the unit marked **1-8**. The audio on the Phoenix connectors marked **1-4** will be de-embedded using the **A Group** switch. Audio on the Phoenix connectors **5-8** will be de-embedded using the **B Group** switch. Cabling for professional balanced outputs 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. For Consumer level unbalanced outputs, again looking from left to right as you view the rear panel **+ to Pin 1 and Ground to PIN 2**. No connection is made to the **– Pin 3**. Eight 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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## HDDM-8/A Operation

This section includes instructions for operating the HDDM-8/A. See the “**HDDM-8/A Specifications**” section for information concerning the audio outputs or video input and outputs.

To operate the HDDM-8/A:

1. With HDTV 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 audio outputs **1-4** while the **B Group** will de-embed the audio to the 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 applied an invalid source frequency which the HDDM-8/A does not support. If the LED's are completely out, you have an invalid input signal applied to the unit and the audio outputs will be muted or the selected groups are not present. (Remember that the unit accepts either 1.485 Gb or 1.485/1.001)
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.

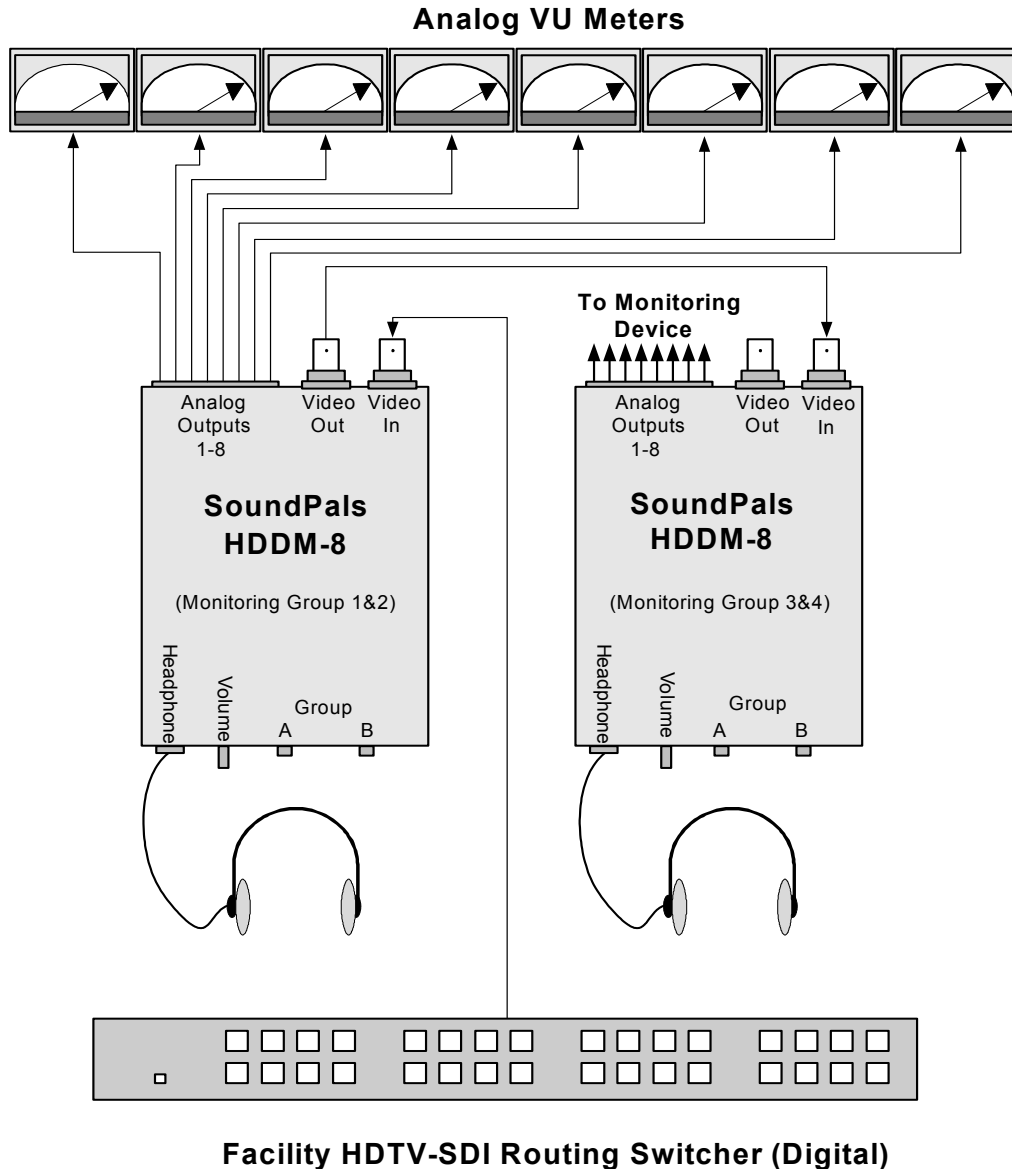
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## HDDM-8/A Interconnection

This section provides an HDDM-8/A interconnection diagram.

### HDTV-to-De-Embedded Analog Audio Monitoring

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 HDTV-SDI routing switcher is fed to the first HDDM-8/A SoundPal, which is selected to monitor Group 1 & 2 and drive the eight Analog Meters. The video signal is then fed from the active video output connector to the second HDDM-8/A SoundPal which is selected to monitor Group 3 & 4. The eight analog audio signals are then fed to a monitoring

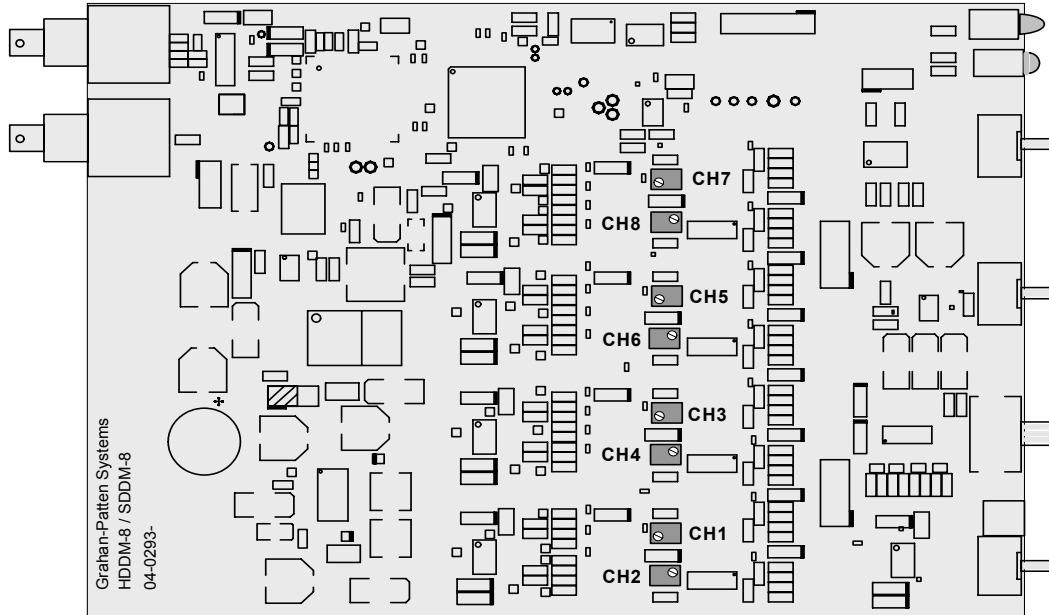
device. Both HDDM-8/A SoundPals have a set of headphones connected to them, making it easy for the operator to monitor any stereo pair of the four groups.

## HDDM-8/A Internal Analog Channel Level Adjustments

This section provides information about adjusting HDDM-8/A analog output levels.

**NOTE** For detailed instructions on opening and closing the HDDM-8/A, see “**Inside the Module.**”

The figure below shows the HDDM-8/A internal analog channel level adjustment locations:



The HDDM-8/A has individual internal potentiometers for adjusting the output levels. Above is a location diagram with highlighted potentiometers and channel number legends to aid you in adjusting your HDDM-8/A. From the factory your output levels are adjusted for +4 dBu with a -20 dBFS signal applied. The output levels can be adjusted from -1 dBu to a little above +4 dBu, again with -20 dBFS applied. Use caution when trying to adjust above +4 dBu with -20dBFS applied; if the input signal goes to 0 dBFS the analog input will go into clipping.

## HDDM-8/A Troubleshooting

The table below lists HDDM-8/A problems and solutions.

Problem	Procedure
No output.	<ul style="list-style-type: none"> <li>• Check Power by Green LED.</li> <li>• Check HDTV 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.

## HDDM-8/A Specifications

This section provides audio, remote, and environmental specifications, plus a table of HDDM-8/A channel routing.

### Audio Specifications

HDDM-8/A Specifications	
<b>Video Input</b>	
Video with embedded audio	SMPTE 292M
Impedance	75Ω
Amplitude	800 mV ± 10% (terminated)
Equalization	0-100m Belden 8281 or Equivalent
Data Rate	1.485 Gbps or 1.485/1.001 Gbps
Input Return Loss	<15 dB
Embedded format	SMPTE 299M
Video formats	1080i, 1080p, 720p, 1125/60, SMPTE 274M, 296M, 260M
<b>Audio</b>	
Sample Rate	48 KHz Synchronous to Video
Resolution	24 bits before D to A conversion
<b>Digital</b>	
<b>Audio</b>	
<b>Analog out</b>	
Impedance, balanced	30Ω
Impedance, unbalanced	15Ω
Level, balanced	+4 dBu at -20 dBFS Adj -1dBu to +5dBu
Level, unbalanced	-2 dBu at -20 dBFS. Adj -8dBu to -1dBu`
Max output	+24 dBu, bridging load +22 dBm, 600Ω load
THD+N	-86 dB at max output
Dynamic range	>96 dB
Frequency response	+0, -0.2 dB 20Hz to 20KHz
<b>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	<1.1 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 HDDM-8/A module to gain access to the internal circuit board.

**NOTE** The internal circuit board should only be removed from the module if you want to adjust the analog audio levels.

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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 HDDM-8/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 1.1 Amps.

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### Power Supply Specifications

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 1.1 Amp constant current. 8.6V maximum (measured at peak of ripple) at 700 mA constant current.
Ripple voltage	2V p-p at 700 mA constant current. 400mV p-p at 700mA constant current with external 2200µF 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).