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# INTRODUCTION

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Thank you for choosing the SUPER DAC 2496. The Super DAC is a professional external digital-to-analog (D/A) audio converter, conveniently packaged in a "half-rack" chassis. The SUPER DAC supports multiple digital audio formats, all bit widths from 16 to 24, and all sampling rates from 22kHz to 100kHz while outputting to balanced (XLR) or unbalanced (1/4") analog outs.

Connect the SUPER DAC 2496 to the digital outputs of computer digital I/O cards, digital mixers, DAT decks, MiniDiscs, DVDs or CD players. Your analog sound will receive an instant upgrade to professional, audiophile quality.

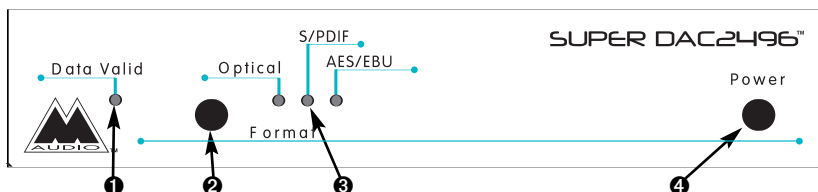
This manual assumes that you have a basic understanding of D/A conversion and digital audio. If after reading this manual you need additional technical support, or if you have comments or suggestions, we invite you to contact us by any of the following methods:

For additional help, technical support is available on our website at [www.m-audio.com](http://www.m-audio.com), where you can fill out our technical support form.

Alternatively, you can email us at [support@m-audio.com](mailto:support@m-audio.com), or contact us by phone at: (626) 633-9055. Technical support is available by telephone from 7am - 7pm PST.

# FEATURES

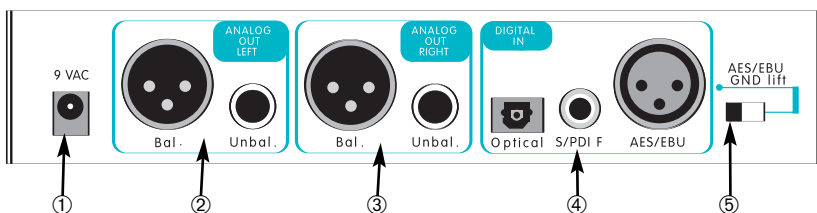
- High-performance stereo D/A converter in a standard half-rack package.
- D/A converter: 24-bit, 96kHz, 128x oversampling.
- Dynamic Range: 115 dB (A-weighted).
- Supports 16-, 18-, 20- and 24-bit data widths.
- Supports sample rates from 22kHz to over 100kHz.
- Front panel Format button selects between three rear inputs: TOSLINK optical, S/PDIF on RCA, or AES/EBU on XLR.
- Audio outputs: balanced on XLR, unbalanced on 1/4" (Tip-Sleeve) connectors. Both outputs are always active.
- Nominal output levels: +4dBu balanced, -10dBV unbalanced.
- Peak output levels: +20dBu balanced, +6dBV unbalanced.
- Sample rate automatically locks to that of incoming digital data.
- Front panel LEDs indicate current digital input selection.
- "D/A Valid" LED indicates valid incoming digital data.



## PANEL DESCRIPTION

### Front Panel

1. **Data Valid LED:** This LED indicates valid incoming digital data at the currently selected digital input (TOSLINK optical, S/PDIF or AES/EBU). This LED lights whenever the Super DAC recognizes and is locked to that data.
2. **Format Button:** This pushbutton selects which digital input (TOSLINK optical, S/PDIF or AES/EBU) is the input source to the D/A. Pressing this button cycles through the three options.
3. **Format LEDs:** These LEDs indicate which digital input has been selected by the Format button: TOSLINK optical, S/PDIF or AES/EBU.
4. **Power Switch:** When this button is pressed in (and the power adapter is properly plugged in), power is applied to the unit. When the switch is in the out position, power is switched off.



## Back Panel

1. **9V AC Jack:** This jack provides connection to the Super DAC's external "wall wart" power supply. The Super DAC uses a 9 Volt AC, 500 mA (or more) power supply.
2. **Analog Out Left:** The XLR (3 conductor) male connector outputs a balanced, +4 dB (professional) level signal. The 1/4" jacks output an unbalanced, -10 dB (semi-pro or consumer) line-level signal. Both signals are output simultaneously.
3. **Analog Out Right:** These XLR and 1/4" connectors output the right side of the stereo signal in the same fashion as the Analog Out Left connectors.
4. **Digital In:** Three digital inputs are present. AES/EBU is accepted at the single male XLR connector, S/PDIF at the RCA jack, and optical S/PDIF at the TOSLINK connector.
5. **AES/EBU GND lift:** This switch is used to lift the digital ground connection between the Super DAC and another AES/EBU device. Typically the AES/EBU cable is connected to ground at the source end, not the Super DAC end -- this prevents potential system ground loops; therefore the factory default position is with ground lifted, with the switch set to the left. Depending on the grounding configuration of the connected device, sometimes you may get better performance by not lifting the ground. The switch set to the right is the grounded setting, with a diagram of the signal being sent to ground.

## INSTALLATION

Along with this manual, your SUPER DAC 2496 contains a "wall wart" power adapter with the specific voltage requirements needed to power the unit. Using a different power adapter with different ratings could damage the unit and void your warranty.

Plug the appropriate end of the power adapter into the Super DAC's power jack and the other end into a wall socket or power strip. Check to make sure that the Super DAC and any other devices that you are about to connect are turned off until all connections are made.

Now take the digital outputs of your sound "source" and plug them into the

digital inputs of your SUPER DAC 2496. Take the analog outputs of the Super DAC and plug them into the analog inputs of your "target" device. For more information or suggestions for use, see the next section, "Typical Setup."

**NOTE: For best results, use good quality digital cable. Digital AES/EBU cable should be purchased in a professional audio store and has 110-ohm characteristic impedance. Good quality 75-ohm video cable will work for coaxial S/PDIF.**

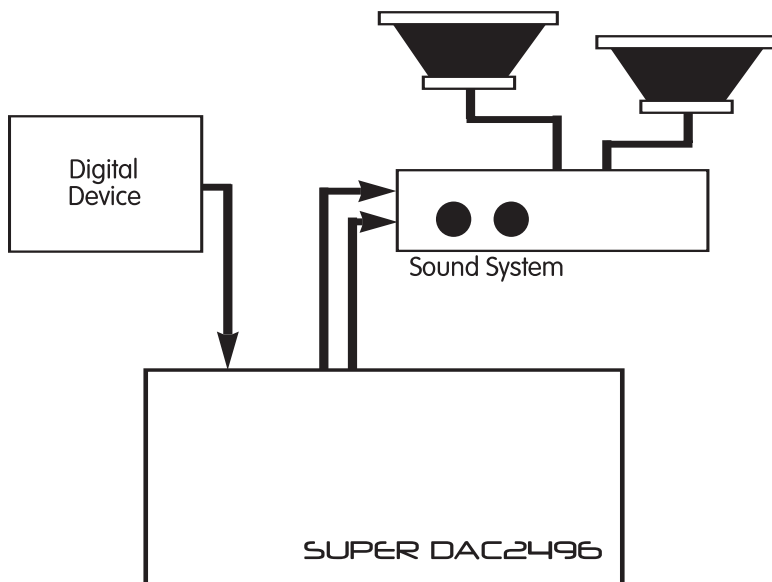
After all connections are made, power up your equipment. Start with your sound source, then the Super DAC, and then your audio target or sound system.

## TYPICAL SETUP

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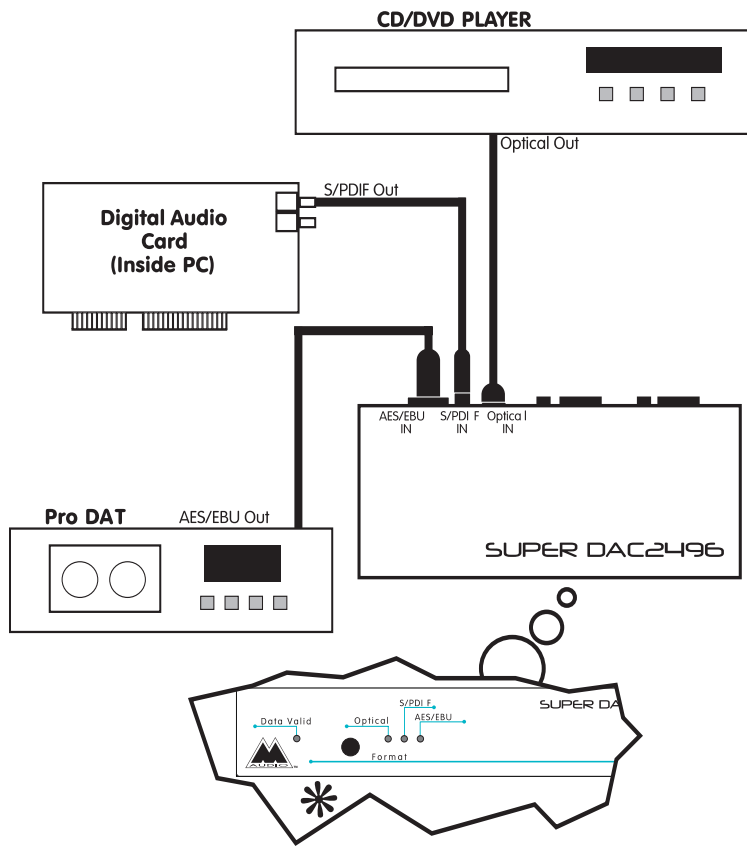
Your SUPER DAC 2496 is capable of receiving digital audio in three different formats, AES/EBU on an XLR connector, S/PDIF on coaxial (RCA), and TOSLINK on an optical connector. The source of this digital audio could be a professional DAT deck, a computer digital I/O card, digital mixer, hard disk recorder, consumer DATs, Mini Disc, DVD or CD player.

Typical Setup Fig. 1 shows any of these devices monitored through a sound system.



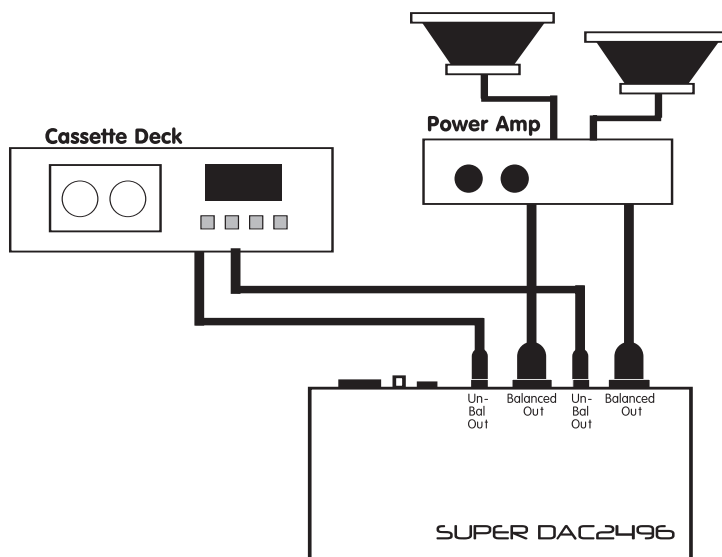
**Typical Setup Fig. 1**

Now let's go a little deeper. What if you have a few different pieces of digital audio gear? Let's say you have a pro DAT machine with AES/EBU digital out, a computer sound card with S/PDIF. Your CD Player actually has a TOSLINK optical out, and you think you could improve its sound quality by replacing its built-in D/A converters with something more "high end." The solution is to hook all three to the Super DAC's inputs, and use the front panel Format button as a convenient source selector.



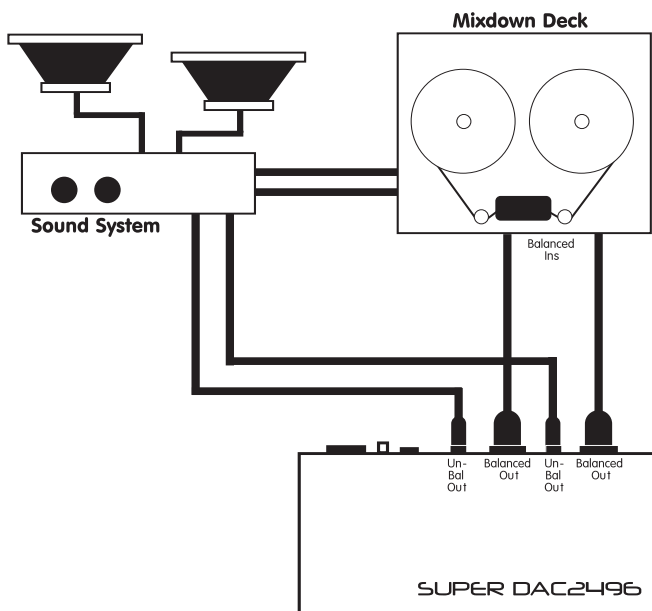
Typical Setup Fig. 2

Then there are the outputs. Both the balanced and unbalanced outs are always active, so let's use them. Perhaps you have a power amp with balanced inputs, and then a cassette recorder that you'd rather send a signal to directly.



**Typical Setup Fig. 3**

... or an analog mixdown deck with balanced ins, and a sound system that accepts  $\frac{1}{4}$  inch or RCA jacks. You could use this setup to "A/B" the mix deck with the source.



**Typical Setup Fig. 4**

# OPERATION

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The SUPER DAC 2496 is compatible with 24-bit, 20-bit, 18-bit, and 16-bit data. The more bits per data word, the better the dynamic range. Better dynamic range translates into higher audio quality.

The term "sampling rate" means the number of times that digital audio takes a "picture" of the analog signal. The more times per second you take a picture of the analog signal, the more accurate the digital representation is. Therefore, higher sample rates equate to better audio quality. Whichever sampling rate you send to the Super DAC, from 22 kHz to 100 kHz, the Super DAC automatically detects the sample rate and synchronizes to it. Once locked to the sample rate, the front panel "Data Valid" LED will light.

The Super DAC has three digital inputs. AES/EBU is regarded as a professional digital transmission protocol. Utilizing a three-conductor balanced "XLR" type cable, this transmission method is considered the most stable and runs the longest distances. S/PDIF and TOSLINK are essentially the same transmission protocol, one using a two-conductor "coaxial" cable with RCA connectors as the standard and the other a special "TOSLINK" type optical cable. S/PDIF and TOSLINK are used in many professional situations but are much more common in consumer equipment.

The front panel Format pushbutton selects the digital input that will feed the D/A converter. Only one digital input may be selected at a time. When the Super DAC recognizes valid data at the selected input, it decodes it to and converts it to stereo audio which goes to the internal output amplifiers that drive the balanced and unbalanced analog outputs.

The Super DAC balanced XLR outputs carry a professional-level audio signal (+4 dBu nominally) across a pair of conductors surrounded by a ground shield conductor. The two signal conductors are opposite polarity from each other and at the receiving end are subtracted from each other. This results in a signal that is twice as hot. More importantly though, any noise that is common to both signal conductors gets cancelled during the subtraction! This makes balanced signals more noise-immune than unbalanced signals. The noise immunity and "voltage doubling" help to make balanced signals run further distances than unbalanced ones.

The Super DAC 1/4" unbalanced outputs carry a consumer-level audio signal (-10 dBV nominally) across a single conductor surrounded by a ground shield conductor. Most consumer equipment operates with unbalanced connections. Although by definition not as quiet as the balanced signals, the unbalanced signals are still extremely quiet when used in a properly grounded system with short cable runs.



# TROUBLESHOOTING

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**Symptom:** When power is applied, there are no LED's lit on the Super DAC's front panel.

**Solution:** Make sure the correct power supply is properly plugged into the unit and also into a live wall source or power strip. Also make sure the unit's Power button is pushed (and latched) in.

**Symptom:** When the digital audio source changes sample rates, or I select a different digital input using the Format button, the audio is muted for a short period of time.

**Solution:** This is normal as it takes a small amount of time for a digital audio receiver to lock onto a digital audio source. In order to prevent spurious noise, the Super DAC mutes its analog outputs until it sees a valid digital signal for 200 milliseconds.

**Symptom:** When applying a digital signal to the Super DAC, the DAC's "Data Valid" LED lights erratically or not at all.

**Solution:** The digital signal being input may be invalid or the digital cable may be faulty.

**Symptom:** Valid digital data is coming into the Super DAC (the D/A Valid LED is lit), but there is no audible analog audio output.

**Solution 1:** Check your analog output connections from the Super DAC.

**Solution 2:** The digital data source may be sending valid data, but the data could be static (non-changing or DC). Verify that digital source material is actually valid.

**Solution 3:** The digital data source may be sending valid data, but the data could represent an extremely small waveform (one with very low volume) that you are unable to hear.

## **SPECIFICATIONS:**

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### **D/A CONVERTER:**

Dynamic Range: 115.5 dB (A-weighted)

THD+N @ 0dBFS: -100 dB (A-weighted)

SNR (idle channel noise): 117 dB (A-weighted)

Frequency response: 20Hz-20kHz, -0.1, -0.18 dB

Balanced Outputs: +4 dBu nominal, +20 dBu peak

Unbalanced Outputs: -10 dBV nominal, +6 dBV peak

### **PHYSICAL SPECS:**

Size: 8.5"W X 1.7"H X 4.5"D.

Power Supply: 9 volt AC, 500 mA or larger.

# **Warranty Terms and Registration**

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## **Warranty Terms**

M-Audio warrants products to be free from defects in materials and workmanship, under normal use and provided that the product is owned by the original, registered user. Visit [www.m-audio.com/warranty](http://www.m-audio.com/warranty) for terms and limitations applying to your specific product.

## **Warranty Registration**

Thank you for registering your new M-Audio product. Doing so immediately both entitles you to full warranty coverage and helps M-Audio develop and manufacture the finest quality products available. Register online at [www.m-audio.com/register](http://www.m-audio.com/register) to receive FREE product updates and for the chance to win FREE M-Audio gear.

