

D-1 DAC User Guide



HDR-A[®]
HIGH DYNAMIC RANGE / AUDIO

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Introduction

Many years ago, I became aware of an **A-to-D** converter designed by the distinguished German company, Salzbrenner. What set this ADC apart was its ingenious use of multiple parallel processing paths. Employing multiple paths allowed the designer to achieve ADC dynamic range in excess of **150dB**, equivalent to more than 25 bits. Salzbrenner says they have shipped over 100,000 channels of their multi-path ADC.

One morning in 2013, I awoke from a dream in which I “saw” **D-to-A** conversion architecture using similar parallel processing paths. That morning, I sketched the basic ideas on my white-board. Over the next months, the immense engineering hurdles became clear: *multi-path D/A topology is a wicked hard problem*.

But we kept working. From 2013 to 2025, we pushed design engineering into myriad unexplored regions. This led to foundational patents in parallel D-A conversion, multi-path audio power amplification, and PDM multi-parallel processing (U.S. Pat No’s 9,590,648, 9,871,530, 10,256,782 and foreign counterparts). More patents are currently in process.

We shipped our first **imersiv** D-1 beta-test units in late 2023, achieving **28-bits of dynamic range, 170dB of linearity, and -146dBu (40nV) of broadband self-noise**. This is a **100X** improvement over today’s best audio engineering – a fundamental paradigm shift. We call this profound advance **HDR-A®** or High Dynamic Range Audio. Today’s best recording, mixing, and mastering engineers joined our one-year beta test, over 40 professionals in total. You can read their comments on the [imersiv website](#).

Beyond DACs, our bold mission is to apply 170dB **HDR-A** processing to microphones, preamps, ADCs, and power amplifiers. With performance gains **100 times** greater than today’s elite audio gear, **imersiv** parallel technology surpasses the capabilities of modern measurement tools. **HDR-A** is poised to become the next generation of audio signal-path design.

A number of industry luminaries agree, and have joined our Advisory Board (see [website](#)).

I speak for everyone here at Millennia Music & Media Systems in wishing you a lifetime of musical excellence, enjoyment, and inspiration.

– John La Grou, 2025

HDR-A®
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Safety

Congratulations on your purchase of the **immersiv** D-1 DAC

FCC Notice Information for the User

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 this 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 his or her own expense.

Safety Precautions

For your safety and the safety of others, be sure to read and understand all safety and operational instructions before attempting to use the D-1.



WARNING: Carefully observe all warnings, precautions, and instructions on the D-1 and as described in the instructions supplied with the unit.

Water, Moisture, and Spillage – Do not attempt to use the D-1 in, near, or around water or in unusually moist environments, such as near a sink or swimming pool. Prevent liquids or any other materials or objects from spilling or falling into the D-1 unit.

Heat & Ventilation – Be sure to allow adequate ventilation on both sides of the D-1.

Power Sources & Power Cord Protection – The D-1 Power Supply should be connected to a power source only of the type described in the operating instructions or as marked on the Power Supply. Route the power cord so that it is not likely to be walked on or pinched by having objects placed on it. Pay particular attention to plugs, receptacles, and the point where the AC power cord exits the Power Supply.

Grounding – For your safety, it is extremely important that the grounding pin of the 3-wire power cable (included with Power Supply) be inserted into a grounding type 3-pin power outlet. If you are unable to insert the plug into an existing outlet, contact an electrician to install a properly grounded 3-pin power outlet.

Damage Requiring Service – This unit should be repaired or serviced by qualified personnel whenever:

- The AC power cord has been damaged, or
- Objects have fallen or liquid has spilled into any D-1 unit, or
- The unit does not function properly or exhibits a marked change in performance, or
- The unit has been abused, dropped, or damaged, or
- The unit has been exposed to rain or moisture.

Safety

Servicing – The user should not attempt to repair or service this unit. All servicing and/or repairs should be referred to Millennia. The Power Supply module is not user-serviceable.



The D-1 is shipped with gain preset to a low level. Do not increase gain until your audio system is up and running with the DAC in place. All current settings are recalled upon power cycle.

If, after reading all instructions, precautions, and warnings, you have remaining questions, please contact Millennia directly before attempting to use your D-1.



Any changes or modifications not expressly approved by MILLENNIA MEDIA, SPC (Millennia) could void your authority to operate this equipment under the EC, ICAN, or FCC rules.

Copyright – You acknowledge that no title to the intellectual property in the D-1 is transferred to you.

Inspection – Inspect packing box(es), D-1, power supply, and cable(s) for damage, unusual marks, or shortages. It is your responsibility to report damage, shortage, or mis-shipments in a timely manner. Millennia and/or its dealers will not be responsible for claims arising from damage in shipping, nor will claims for shortage or mis-shipments be honored, more than 10 days after ship date.

Read this manual carefully and completely before attempting to use the D-1. Improper operation could result in damage to product. It is the user's responsibility to understand the safe use and operation of this device.

The shipping box of the D-1 system will include:

- Quick Start Guide
- UL approved power cord (110-120V countries only except Japan)
- UL approved power supply, type IPS-01

The material contained in this manual consists of information that is property of Millennia and is intended solely for use by the purchasers of the equipment described in this manual. Without express written permission, Millennia prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation and/or maintenance of the equipment described in this manual. This manual may not be duplicated in whole or in part without the written consent of Millennia.

The D-1 serial number is located on the bottom of each unit. We suggest that you record the serial number in the space provided below. Refer to it whenever you call an authorized Millennia repair facility or the manufacturer. Make sure that you register your Millennia product(s) online.

Features and specifications subject to change without notice.

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Rear Panel



Power

Power Switch – Turns D-1's power on/off.

Inputs

AES – XLR jack for AES format digital audio.

12VDC – Connection for provided type IPS-01 power supply. Do not use a power supply that is not approved by Millennia. It can damage the unit. It is suggested to insert the 12V DC connector first, then connect AC power to the external power block, then turn-on power switch.

Dante – optional professional networking option.

USB/B – USB connection from computer. Requires USB-2 or higher. Use with MacOS 10.13 / Windows 10, or later.

SPDIF-1, SPDIF-2, SPDIF-3 – BNC connections for SPDIF format digital audio. Use included adaptors for RCA.

Optical – PCM

Outputs

Balanced XLR – Left and Right

Single-ended RCA (utility, only) – Left and Right

Rear Panel

Output Terminations



Published specifications are achieved at the differential-balanced 3-pin XLR outputs. The XLR outputs must be terminated with a true differential-balanced 3-pin receiver (power amp, ideally). The RCA unbalanced outputs are not performance-specified.

The D-1 differential-balanced output is unique and quite sensitive — an integral part of the patented **immersiv HDR-A** process. To achieve ideal performance levels, your destination device (power amp, etc.) must be a true differential-balanced receiver.

The receiver can be electronically-balanced or transformer-balanced. See FAQ for a lengthy discussion.

Quality audio equipment built in the last 25 years is almost always true diff-bal. However, audio gear from the 1975 - 2000 era sometimes used "quasi-balanced" receivers. This is a single-ended input with the other pin tied to a resistive "balancing" load. This will not work properly with the sensitive D-1 output topology, and will sometimes result in noise on softer program material.

If the receiver's 3-pin XLRs are not differentially-balanced, or if either XLR pin-2 or pin-3 is tied to the receiver's ground, performance will be reduced, sometimes significantly. It is *generally* suggested to connect pin-1 of the XLR cables at the receiver and float cable pin 1 at the **immersiv** D-1 XLR outputs. See FAQ for more details.

Similarly, the unbalanced RCA-phono outputs exhibit reduced performance relative to the differential-balanced XLR outputs. XLR 3-pin outputs and RCA-phono outputs cannot be used simultaneously. Use only the 3-pin XLR outputs *or* the RCA-phono outputs, but not both.

Splitting ("Y-ing") the 3-pin XLR outputs into *both* differential-balanced and unbalanced destinations will result in reduced or unstable performance. An **immersiv** breakout box (model SBB) is available to drive two destinations from the D-1 XLR outputs (sub-woofer, etc.) See FAQ, or contact the factory for details.

In all cases, when any I/O change is made (cable, receiver, headphone, etc.), always do a new calibration cycle.

Front Panel



Headphone Jack

1/4" (6.35mm) jack for 30–600-ohm headphones

Input Button

Toggles Between Input Menu and Home

Setup Button

Toggles Between Setup Menu and Home

Select Button

Selects Value

Filter Button

Toggles between Filter Menu and Home

Mute Button

Toggles between Mute and Unmute

Knob

Changes Gain level in 1dB steps. Hold the Setup button while changing gain for 0.1 dB steps. If level is not changing, check the Pro Menu Level Lock. When in Setup, Scrolls through Setup Menu Items

Home Screen

H	L	-21.0dB	R	F3
P		USB 192KHz		M

All Possible Sample Rates:

32 kHz	176.4 kHz	DSD-64
44.1 kHz	192 kHz	DSD-128
48 kHz	352.8 kHz	DSD-256
88.2 kHz	384 kHz	
96 kHz		

Upper middle section indicates level in relative decibels. A setting of 0dB is equivalent to +22dBu (10Vrms) output at digital full-scale.

Lower middle section indicates the active input format and sample rate. If the D-1 isn't source-locked within 5 seconds, the bottom line will indicate "Unknown".

"H" ... Headphone output is active.

"P" ... Polarity is inverted.

"M" ... Mute is active.

"R" ... Resampling is active.

"L" ... Low Latency processing is active.

"F#" ... Active Filter:

F0 Fast Roll-off Linear Phase (default)
 F1 Slow Roll-off Linear Phase
 F2 Apodizing Fast Roll-off Linear Phase
 F3 Fast Roll-off Minimum Phase
 F4 Slow Roll-off Minimum Phase
 F5 Hybrid Fast Roll-off Minimum Phase

Input Selection



Press the Input button to choose which input is active. The knob scrolls through all the choices. Press Select to activate that input.

AES XLR

SPDIF-1 BNC (Default)

SPDIF-2 BNC

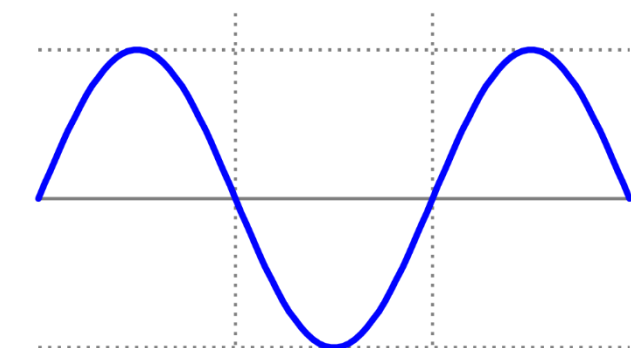
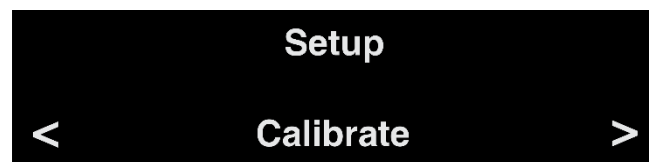
SPDIF-3 BNC

SPDIF Optical

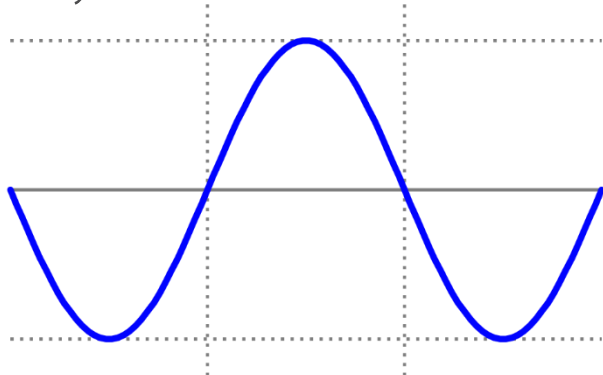
USB Audio

 **Dante**™ (optional 32-bit / 64-ch pro networking input)

Setup Menu



Polarity Normal



Polarity Inverted

D-1 DAC

Calibrate (main XLRs) and Calibrate HP (headphones)

Run Calibrate (line outputs) and Calibrate HP (headphones) upon initial installation. Calibrate optimizes the sensitive output stages of the D-1 to the electrical characteristics of the device it is connected to. If your destination device, headphones or cables are changed, run a new Calibrate cycle.

All controls are locked while the D-1 is calibrating. The display will show either Calibration Successful or Calibration Failed when the D-1 is finished. Press any button to continue. If calibration fails, the D-1 will revert to the last successful calibration values.

Restore Defaults

Clears the D-1's memory and restores the factory default settings.

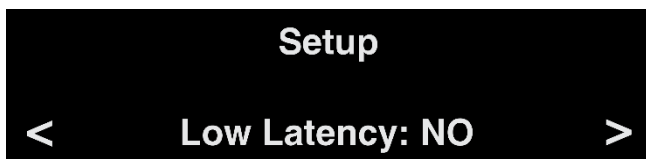
Polarity Invert

Yes/No – the signal is inverted when "YES" is selected (see diagram).

Power Off

Sleep – D-1 goes into sleep mode. Press any button or turn the knob to wake. For a cold reboot, use the rear-panel power switch.

Setup Menu



Firmware Version

Displays the firmware version.

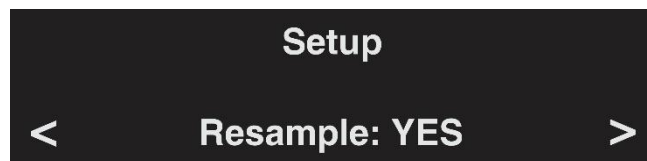
Main Menu (Home Screen)

Normal/Logo/None – When the D-1 returns to the home screen you can choose (a) the two-line display showing Level and Input, (b) **immersiv** logo, or (c) all-display off.

Low Latency

Yes/No – Normal multi-path processing requires a look-ahead period of around 20mS (Low-Latency = “NO”). In most home entertainment and pro applications, this latency will be unnoticed. In certain applications, such as video post or Foley, 20mS latency might be an issue. In such applications, select “YES” – the D-1's "Low Latency" setting (<1mS). You should not hear any audible difference between Normal and Low settings. See FAQ for a deeper dive.

Setup Menu



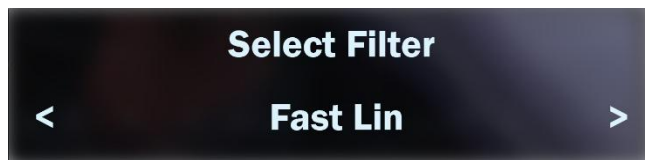
Resample

Yes/No – When Resample is selected (“YES”), a small “R” will appear in the upper right corner. When selected, all incoming signals between 32kHz and 176.4kHz are immediately up-sampled to 192kHz sample rate and all signal processing/conversion is done at 192kHz. When Resample is not selected (“NO”), processing and conversion is carried out in the signal’s native sample rate. See FAQ for a deeper dive.

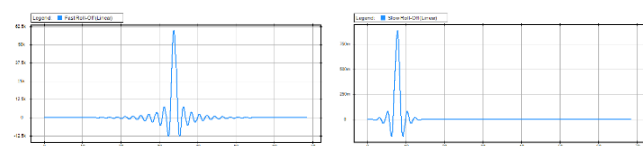
Headphone Exclusive

Yes/No – When Headphone Exclusive is not selected (“NO”), both the headphone jack and the XLR output are simultaneously active. When Headphone Exclusive is selected (“YES”), the headphone output is active and the XLR output is disabled. When selected, a small “H” will appear in the upper left corner.

Filter Selection

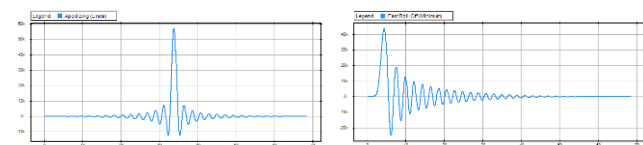


Press the Filter button to choose which filter is active. The knob scrolls through all the choices. Press Select to activate that input.



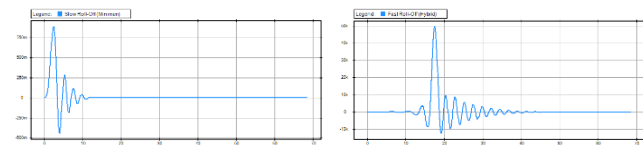
Fast Lin (F0)

Slow Lin (F1)



Apod Fast Lin (F2)

Fast Min (F3)



Slow Min (F4)

Hybrid Min (F5)

F0 - Fast Lin - Fast Roll-off Linear Phase (default)

F1 - Slow Lin - Slow Roll-off Linear Phase

F2 - Apod Fast Lin - Apodizing Fast Roll-off Linear Phase

F3 - Fast Min - Fast Roll-off Minimum Phase

F4 - Slow Min - Slow Roll-off Minimum Phase

F5 - Hybrid Min - Hybrid Fast Roll-off Minimum Phase

Remote Control

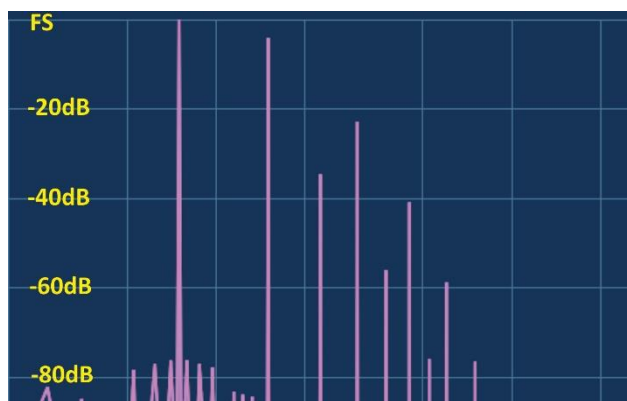
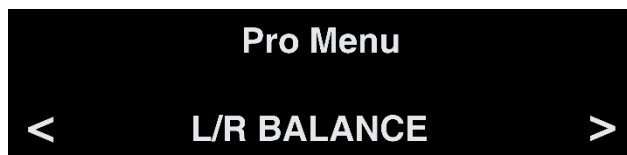


The remote control gives you direct access to many of the D-1's parameters. It also allows you to turn the illuminated panel indicators on or off ("OLED Off"). The green power button puts the D-1 into Sleep Mode. It does not turn off the incoming 12V power (12V main power is switched on rear panel).

When changing level using the remote, the large dB setting is briefly displayed making it easier to see from a distance.

The 'R' buttons are reserved for future use.

Extras – Pro Menu



Typical harmonic generation sequence.
Preset "E" shown.

Pro Menu

Access by pressing Setup (hold) and Select buttons. Note: Pro Menu actions are *not* shown on the Home Screen.

L/R Balance (fine balance)

Adjusts left channel level in 0.01dB/step increments, up to +/-6dB.

Mid Balance (M/S)

"Mid-Side" function. Adjusts "mid" level in 0.1dB/step increments, up to +/-12dB.

Level Lock

Locks the current level. Level control (knob and remote) is locked out. Commonly used in mastering rooms where gain is precisely fixed.

Harmonic Distortion (3 settings)

Various "flavors" of harmonic coloration, for adding "warmth" and "richness" and "body" to pop music program. Select a harmonic pre-set ("A", "B", etc.) then use the front-panel encoder knob to dial-in the effect amount desired (0-10). See FAQ for a lengthy discussion on harmonic coloration setup and use.

Main Menu

Exit Pro Menu and return to Home Screen

World Wide Warranty

We will repair our products, free of charge, in the event of defect of materials or workmanship for two (2) years following date of purchase.

This limited warranty covers failures due only to defects in materials and workmanship which occur during normal, intended use and does not cover damage which occurs in shipment or failures which are caused by products not supplied by Millennia Media.

This limited warranty does not cover failures which arise from accident, misuse, abuse, neglect, mishandling, misapplication, faulty installation, improper adjustment, alteration or modification of product, incompatibilities, line-power surges, lightning strikes, acts of God, or service performed by anyone other than Millennia Media or its authorized agent.

Limits and Exclusions – There are no express warranties except as listed above. Millennia shall not be liable for special, subsequent, incidental, consequential, or punitive damages, including, but not limited to: damage to recordings, broadcasts, microphones, mixing consoles, or any associated equipment, downtime costs, loss of goodwill, or claims of any party dealing with purchaser for such damages resulting from the use of this product. All warranties express and implied, including the warranties

of merchantability and fitness for a particular purpose are limited to the applicable warranty period set forth above. Vacuum tube and bulb failures are not covered under warranty. Shipping costs to/from factory are not covered under this warranty. International warranty law may vary from country to country, and Millennia will abide by the law of each country from which the product was initially sold. Specifications are subject to change without notice.

For North American repairs and service, contact Millennia (tech at imersiv dot com) to obtain a Return Authorization number. Please include your shipping address, daytime phone number and description of the problem. Outside of North America, please contact your local Millennia Distributor.

Discarding Units

In the event that any Millennia equipment must be discarded, return it to Millennia, at our headquarters in California, USA. Please contact the distributor in your country or Millennia directly for instructions. We will make arrangements to have the equipment shipped to us at no cost to you, and we will dispose of it in a manner that complies with whatever regulations are in existence at that time.

Rev j1062025