# High resolution. Apogee quality.

## Multiple Interfaces, UV22HR & Soft Limit

The PSX-100 includes built-in interfaces for ADAT, TDIF, S/PDIF coax and optical plus multiple AES/EBU.

Other features include Apogee's newly-enhanced *UV22HR* word-length reduction system (which can be applied to either the A/D or the D/A) and *Soft Limit* for maximum A/D level without overs.

An auxiliary AES output allows a full-resolution output to be supplied, even when UV22HR is in use on the main outputs. The wide range of standard interfaces provided, including multiple AES I/O ports, allows the unit to be used for signal distribution and format conversion as well as for A/D and D/A applications. The inclusion of 88.2 and 96kHz sample rates makes the PSX-100 ideal for such applications as mastering high-resolution CDs utilizing 88.2kHz sampling, or for DVD-Audio masters sampled at 96kHz with 24-bit resolution. Meanwhile, the inclusion of UV22 to reduce the word length from 24 to 20 or 16 bits makes the unit equally suitable for traditional 16-bit CD mastering or for DVD-Video soundtracks requiring 20-bit signals sampled at 48 kHz.

## High Resolution on your MDM

Built-in Apogee Bit-Splitting (ABS) modes allow the two-channel 24-bit signal from the PSX-100 to be recorded and replayed using pairs of tracks of a 16-bit 44.1/48kHz sampling recorder, via ADAT, TDIF or AES/EBU. With Apogee's new *ABS-96* mode, you can even record stereo at 96kHz sampling on your existing 16-bit 8-track! An optional video sync card allows the PSX to lock to NTSC/PAL color and monochrome video.

## Instant Access

The PSX-100 matches Apogee's popular 8-channel AD-8000 in appearance, with a distinctive purple front panel inlaid into a solid aluminum extrusion, and large silver buttons allowing instant access to the unit's extensive feature set.

The two light-bar meters can be set to read either the A/D or D/A when the two units are passing different signals, and other functions are indicated by an array of LEDs. As a result, there is no need for a power-on indicator.

A multi-voltage linear power supply is incorporated, including a true toroidal transformer with comprehensive regulation and smoothing circuitry to minimize voltage spikes, transients and noise that can adversely affect converter performance. A generous exposed heat-sink keeps temperatures well under control.

Virtually the entire rear panel of the PSX-100 is occupied by interface connectors including two 2-channel AES inputs and outputs. Both connectors are used for 96kHz operation; at 44.1/48 kHz, they operate independently. A ten-way DIP switch allows the setting of system-wide defaults which are intended to be set once and then left alone. Capabilities include pro and consumer analog I/O levels; pin 2/3 hot; setting the OVER LEDs to two seconds or infinite hold; and how overs are defined (1-4 successive full-scale digital values). Bit-split signals may optionally be received on the AES/EBU inputs (for Sony PCM-800 users and others who wish to use bit-splitting on an AES/EBU device). Word clock output has two modes: it can follow the sample rate, or it can be set to generate 44.1/48 kHz even when the sample rate is set to 88.2/96kHz.

## Three Operating Modes

A central design feature of the PSX-100 is the inclusion of completely independent A/D and D/A sections. Three distinct operating modes allow them to be used separately and in combination in several ways *(see the block diagram opposite)*. The A/D and D/A sections of the PSX-100 may be clocked separately and can be configured to work together in different ways. The digital inputs and the A/D output are fed into a routing section which sends signals to the D/A and Aux output and/or to the main digital outputs, according to which of the three basic operating modes is selected.

The default is ***Confidence Monitor*** mode, in which the A/D and D/A are independently clocked (and can even run at different sample rates). The output of the A/D is available at all the digital outputs, and the D/A can receive its signal from any of the available digital inputs. The bargraph metering can be switched between A/D and D/A. In this mode, there are two separate signal paths through the unit, while the other modes utilize a single path.

***Digital Copy*** mode takes the selected digital input and provides it to all the PSX-100's outputs, digital and analog. Both clocks in this mode are synchronized to the digital input. This mode is ideal for format conversion, and simply copying digital media without having to re-patch your system.

In ***Analog Monitor*** mode, the A/D is fed to all the system outputs and to the D/A, which therefore monitors signals passing through the A/D. The main clock is used as the reference (locked to crystal or an external source), while the auxiliary clock is slaved to it.

## High sample rates, high resolution, high quality

To summarize, the PSX-100 is Apogee's first high density, high resolution converter, offering 24-bit A/D and D/A conversion at 88.2 and 96 kHz in addition to conventional sample rates. This makes the system ideal for stereo DVD and DVD-Audio mastering and as a front-end to high-resolution, high sample-rate editing systems, digital audio workstations and master recorders.

Exclusive self-balancing analog I/O; two patented Apogee Low-Jitter Clocks; and exceptional attention to detail in both the analog and digital aspects of the PSX-100 combine to make it capable of the finest audio performance available today. Once again, Apogee represents the heart of digital audio — and the heart of your system.

# The Apogee PSX-100 — Specifications

### ANALOG AND A/D CONVERTER

| *Parameter* | *Value* | *Units* |
|---|---|---|
| Resolution | 24 | bits |
| Sample Rate 44.1–48, 88.2–96 kHz | ±10% | |
| Input Impedance | | |
| Pro | 9K | Ω |
| Consumer | 15K | Ω |
| Relative THD+N | | |
| –0.1 dBFS | –110 | dB (unweighted) |
| | –112 | dB (A-weighted) |
| –20 dBFS | –91 | dB (unweighted) |
| | –93 | dB (A-weighted) |
| –60 dBFS | –56 | dB (unweighted) |
| | –58 | dB (A-weighted) |
| Dynamic range | | |
| –60 dB, Unweighted | 116 | dB |
| –60 dB, A-weighted | 119 | dB |
| Peak Spurious Component | –126 | dB (max) |
| Group Delay (in passband) | 34/Fs | seconds |
| Passband Ripple | ±0.001 | dB |
| Digital Filter Stopband | 0.5542Fs | kHz |
| Stop-band Attenuation | 117 | dB |
| Channel Separation | | |
| Left/right | 120 | dB (worst case) |
| Frequency Response (10 Hz–20 kHz) | | |
| Gain | ±0.025 | dB |
| Phase | < 0.01 | degrees |
| Common-Mode Rejection Ratio | | |
| 60 Hz | >> 100 | dB |
| 1 kHz | >> 80 | dB |
| Input Level, maximum (no gain) | | |
| Professional, balanced | 27 | dBu |
| Professional, unbalanced | 23 | dBu |
| Consumer, balanced | 16 | dBu |
| Consumer, unbalanced | 15 | dBu |
| Input Level, adjustment range | 20 | dBu |
| Crystal Oscillator accuracy | ±50 | ppm |
| Clock Jitter, 32kHz–106 kHz | << 22 | psec |

### D/A CONVERTER

| *Parameter* | *Value* | *Units* |
|---|---|---|
| Resolution | 24 | bits |
| Conversion system | Delta-Sigma | |
| Sample Rates | 32–106 | kHz |
| Relative THD+N, S/(N+D) | | |
| –0.5 dBFS input | –100 | dB |
| Dynamic range | | |
| –60 dB, Unweighted | 112 | dB |
| Channel Separation | >120 | dB |
| Frequency Response (10Hz–20 kHz) | | |
| Gain | ±0.15 | dB |
| Phase | << 1.0 | degrees |
| Maximum Output Level | 28 | dBu |

### DIGITAL SIGNAL PROCESSING

| | | |
|---|---|---|
| UV22HR Amplitude | | |
| 16 bits | –84 | dB |
| 20 bits | –108 | dB |
| Metering | | |
| Accuracy (CAL mode) | ± 0.1 | dB |
| Over Detection | 1–4 consecutive 0 dBFS readings | (user-definable) |

### SYSTEM

| | |
|---|---|
| AC line voltage | 100, 120, 220, 240 vac (set internally) |
| Fusing | 5 x 20 mm, 800mA (100–110v); 400 mA (220–240v) slow-blow |
| Power | 25 Watts |
| Size (w, h, d) | 19 in, 1.75 in (1U), 14.25 in |
| Weight | 12.5 lb (5.8 kg) |

*The Specifications above, and other information provided in this brochure, are subject to change without notice. Apogee Electronics Corporation reserves the right to make design changes without prior warning. Apogee, UV22, Soft Limit, AMBus, Clocked by Apogee, Apogee Bit-Splitting and the "96k" device are trademarks or registered trademarks of Apogee Electronics Corporation. Other trademarks are the property of their respective owners.*

**The heart of digital audio.**


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Photography by David Norwood
Created by Richard Elen
Printed in U.S.A.
PSX100v2/5M/1198


# The Apogee PSX-100 2-channel, 24-bit, 96kHz A/D-D/A conversion system...


**The heart of digital audio.**

ELECTRONICS
www.apogeedigital.com

# Apogee quality. At the Heart of Digital Audio.

# …The 2-channel conversion solution.

**APOGEE ELECTRONICS has a reputation for producing the very best sounding digital conversion products available. You might also think of us as being quick off the mark. But in fact, we think very carefully before we release a new product.**

That's how it was when we came to design our first 24-bit, 96kHz sampling-rate conversion system: the **PSX-100**.

Anyone can make 24 bits dance up and down 96,000 times a second. The question is, does it sound any better? In many cases, the answer is no — and to our engineers, there was no point without a significant improvement in the sound. So clock circuitry had to be even more rigorously designed to minimize jitter. Analog components required special characteristics to realize the performance we specified. And much more.

We wanted to give our first 96kHz system all the features needed to make it truly indispensable. AES, S/PDIF, ADAT and TDIF I/O for highest flexibility. Apogee Bit-Splitting for 24-bit, 96kHz mastering to 16-bit, 48kHz MDMs. UV22HR for flawless 16- and 20-bit output. Soft Limit for maximum level without overs. Digital copy, confidence and analog monitoring modes. Sync to word clock and optional video.

The result: a total stereo conversion solution. ***Fully independent A/D and D/A converters in a single 1U package.***

## The Apogee PSX-100 at a glance.

- **Two channels of Apogee's true 24-bit A/D and D/A conversion with 117 dB dynamic range**
- **Superb Apogee quality at 44.1, 48, 88.2 and 96 kHz**
- **All the most common interfaces built in: AES, ADAT, TDIF, S/PDIF (coax and optical)**
- ***Apogee Bit-Splitting*™ allows 16-bit recorders to be used to store 24-bit and even 24/96 kHz signals!**
- **Three flexible operating modes: *Confidence Monitor, Digital Copy, Analog Monitor.***
- **Apogee *Soft Limit*® helps you record at a higher level without overs**
- **Apogee's enhanced *UV22HR*™ translates 24-bit signals to 20 or 16 bits with minimal quality loss**
- **Easy-to-read 2-channel LED bar metering**
- **User-definable over detection (1-4 digital FS)**
- **AES/EBU distribution amplifier capability**
- **Balanced or unbalanced analog I/O**
- **Gold-plated XLR jacks for analog and AES/EBU I/O**
- **RCA jacks for S/PDIF in and out**
- **Two proprietary Apogee low-jitter master clocks**
- **Non-volatile storage of front panel settings**
- **Optional video sync module**
- **Exclusive active self-balancing analog I/O**

## Benefits of Outboard Conversion

The sole reason that Apogee Electronics Corporation exists is to make digital audio sound better.

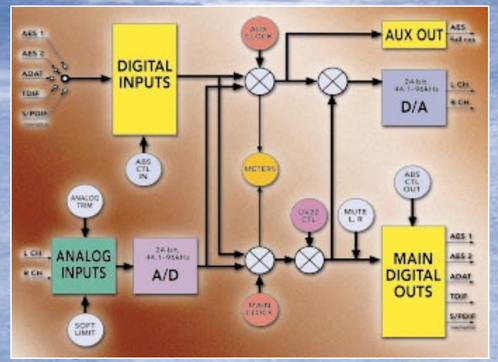
From the very beginning, we knew that digital audio was by no means free of problems: but we were sure that those problems could ultimately be solved.

The introduction of new, high sample rates for DVD-Video and DVD-Audio authoring and other applications has made digital audio more complex, and the manufacture of high-quality, high-resolution converters is now more challenging than ever before.

Apogee has risen to the challenge. We have taken every step necessary to produce a high-resolution 2-channel converter that is capable of delivering the promise of high-quality audio disc and mastering formats. And when you buy an Apogee, all your money goes into making that conversion meet the highest standards available today.

## Introducing… The Apogee PSX-100

The PSX-100 takes Apogee's digital audio conversion expertise to a new level of quality and performance. It represents our first high-sample-rate converter, offering 24-bit resolution at 88.2 and 96kHz sampling rates in addition to 44.1 and 48 kHz.




## PSX-100 Functional Block Diagram

*The PSX-100 consists of four main sections: Digital Inputs, Digital Outputs, A/D Converter and D/A Converter, plus additional functions such as aux outputs, UV22HR and Soft Limit. The way in which the main blocks are interconnected is determined by the current mode of operation.*

*In Confidence Monitor mode, the A/D and D/A are essentially separate, the D/A deriving its input from the digital inputs and the A/D driving all the main outputs.*

*Digital Copy takes the selected digital input and delivers it to all the unit's outputs, analog and digital. Ideal for digital copying and format conversion without repatching.*

*Analog Monitor mode takes the A/D output and feeds it to all system outputs and to the D/A, which therefore monitors the conversion carried out in the A/D section.*

***24-bit, 96kHz A/D-D/A conversion:*** The PSX-100 is Apogee's first high resolution, high sample-rate conversion system, featuring true 24-bit conversion and impressive technical specifications *(see back cover)*. Minimal THD+Noise. Stunning dynamic range. And a frequency response that's flat all the way across the band. And it's an Apogee — it sounds great!

***UV22HR Encoding:*** Apogee's exclusive and newly-enhanced UV22HR encoding process translates 24-bit signals flawlessly into the 20- or 16-bit domains. UV22 is standard in the vast majority of US mastering houses: over 80% of US hit records are made with UV22. Now any facility can enjoy the audible improvements offered by this unique process. (Not available at 88.2 & 96kHz sample rates).

***Soft Limit:*** Apogee's proprietary Soft Limit circuitry enables you to get maximum digital level without risking digital "overs".

***Apogee Bit-Splitting (ABS):**** In addition to direct 24-bit interfacing, you can also use the PSX-100 to store high resolution data on your existing 16-bit, 44.1/48kHz MDM. Use the PSX-100 to save 44.1/48kHz, 24-bit data on pairs of 16-bit tracks (PaqRat format) or even store 24-bit stereo at 88.2/96kHz sample rates!

***Multiple D/A Sources:*** Monitor the A/D output or select S/PDIF coax or optical; ADAT; TDIF or either of two AES inputs (one AES input at 88.2/96kHz sampling). Synchronize the D/A to digital in or to the A/D sync source.

***MDM Input Selection:*** When using the PSX-100 with modular digital multitracks, select the pair of tracks you want to listen to (or the set of tracks for replaying a bit-split source).


***Sample Rate & Sync Options:*** 44.1, 48, 88.2 and 96kHz sample rates make the PSX-100 a star performer, locking to ultra-stable crystal or external digital inputs or word clock. An optional video sync card allows the unit to lock to common video standards.

***Optical Output Selection:*** The built-in optical interfaces support both S/PDIF and ADAT protocols for maximum flexibility.

***Individual L-R Channel Muting:*** The PSX-100 allows you to mute either left or right channels at the touch of a button, instantly controlling the signal from the main digital outputs.

***Advanced Metering System:*** The PSX-100 includes easy-to-read light-bar metering, including "over" indication with 2-second/infinite hold. User-defined "over" setting (1-4 consecutive digital full-scale readings). Meter either the A/D or D/A in "confidence mode". Calibration mode with ±0.1 dB setup accuracy.

***Digital Copy:*** In this mode, the selected digital input is delivered to all the PSX-100's outputs, digital and analog. Ideal for format conversion, adding UV22 to existing program material, and for maximum D/A flexibility.

***Level Trim:*** easy screwdriver adjustment of A/D and D/A analog levels for instant calibration and gain-structure alignment.

***Analog Inputs & Outputs:*** The PSX-100 features line-level analog I/O on gold-plated XLR connectors for optimum quality. DIP switches allow the selection of pin 2 or 3 hot, and the inputs and outputs can be set separately for either professional or consumer level operation.

***Main AES/EBU inputs:*** Two inputs are provided and can be individually selected from the front panel. (Both connectors are used for 88.2/96 kHz operation.)

***Optical I/O:*** This interface can be front-panel selected to offer either ADAT or S/PDIF optical protocols. In ADAT mode, ABS track sets (including stereo at 96kHz on a 16-bit 48kHz machine!) may be output for recording and recombined for replay via the D/A or transfer to other digital outputs.

***Word Clock In & Out:*** BNC connectors allow word clock interfacing. In addition, the WC input socket can act as a video input when the video option card is installed.

***Comprehensive Option Selection:*** A 10-way DIP switch allows "set-once" parameters to be determined, such as analog input/output level; pin 2/3 hot; 2-second or infinite "over" indication; "over" definition (1-4 consecutive FS); ABS enable on AES input (for PCM-800 etc); and special sync parameters.

***Linear Power Supply:*** AC input is internally selectable and fused for international voltages. Power feeds a super-smooth linear power supply built around a true toroidal transformer, minimizing interference to either analog or digital circuitry and avoiding potential spikes and noise. A generously-specified exposed heat sink *(see cover)* effectively controls the temperature of the unit.


***AES/EBU Auxiliary Output:*** The Aux Out is a digital AES/EBU output providing a "clean feed" from the system. It can act as an additional parallel AES/EBU output for distribution purposes, or it can be used to record, for example, a full-resolution 24-bit mix while the other outputs are delivering 16- or 20-bit feeds with UV22.

***S/PDIF Coaxial Input:*** An industry-standard RCA connector provides S/PDIF coaxial input capability.

***Dual AES/EBU Outputs:*** Gold-plated XLR connectors deliver two main 2-channel AES/EBU outputs, ideal for making multiple masters or for signal distribution. (Both connectors are used for 88.2/96 kHz operation.)

***S/PDIF Coaxial Output:*** An industry-standard RCA connector provides S/PDIF coaxial output capability. At high sample rates (88.2/96kHz), this socket provides a 44.1/48kHz S/PDIF output derived from alternate samples.

***TDIF Interface:*** A DB-25 connector provides interfacing with TDIF devices such as Tascam modular digital multitracks, consoles, DAWs and digital audio PC cards which feature this kind of interfacing.

***Apogee Bit-Splitting for 96 kHz:** Apogee's new ABS-96 technique allows you to use your existing 16-bit, 8-track, 44.1/48 kHz MDM for stereo 96 kHz mastering, in addition to the existing 4/24 "PaqRat" mode which allows 24-bit signals to be recorded on pairs of 16-bit tracks.

# The PSX-100 2-channel, 96kHz, 24-bit converter.