



THE API

A²D

**DUAL 312 MIC PREAMPS
WITH DIGITAL OUTPUT**



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A BASIC OVERVIEW OF THE API A²D MIC PREAMP

Thank you for choosing the API A²D Microphone Preamp.

The A²D represents a landmark achievement for API; it is the first product ever produced by the company with an integrated digital output. Recognizing the desire for a high quality solution to raise microphone signals to a workable line level, we engineered one of our most popular mic preamp designs into an enclosure with our new proprietary analog to digital converter. The result is a complete package - a pair of superb mic preamps feeding an A/D section with a set of standard digital interface outputs, multiple sample-rate choices, and internal or external clock options. Precise control of both the analog gain as well as the level feeding the digital section means that the mic signal can be maintained super-clean if desired, or driven harder on the analog side for that whallop and impact that can only be achieved by driving the transformer into saturation for that historic API sound!

The A²D analog section consists of the circuitry contained in two API 312 mic preamps, or one half of the popular 3124 quad mic preamp rack product. A level control pot with an expanded 20-segment metering system shows precise mic gain levels. Control switches include polarity, 48v phantom power, input pad, 2:1 transformer routing, and Mic/Line select. Each analog input contains a balanced low-level XLR connector and a high-level line input on a 1/4 inch jack.

The Digital section of the A²D includes two level pots to adjust the feed to the A/D converters, each with a corresponding 20-segment calibrated meter. A multi-position switch selects the desired sample frequency. The External Sync LED will light when an external clock signal is used.

Rear panel Analog connectors include an XLR input and output for each channel, as well as a balanced 1/4" TRS insert to the A/D converter. This allows the A²D to have external analog processing devices inserted in the audio chain (EQ, compression, etc.)

Digital interface connectors provided are SPDIF single ended RCA connector and AES digital out on XLR. A coaxial BNC accepts external "Reference Clock" which will illuminate the front panel EXT SYNC LED when locked.

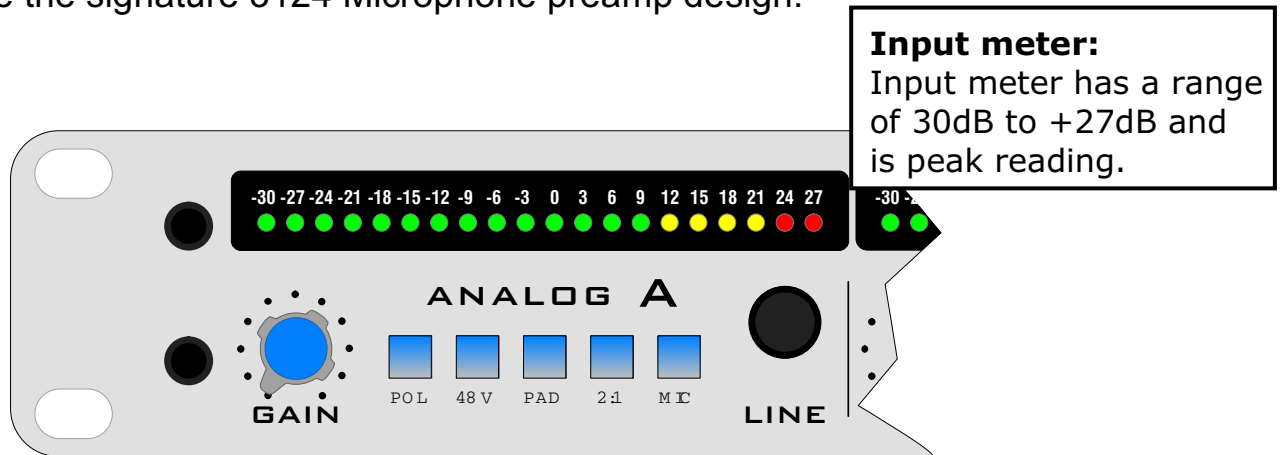
*NOTE: The word "Reference or Super Clock" is used to indicate the use of a clock reference that is between 20 and 26 MHz - **not** a clock from a specific manufacturer. Generally, the use of a sample or word clock will not output the higher reference frequency clock signal required. In some cases the use of a sample or word clock will illuminate the SYNC indicator, but the unit will not sync to it because it is too slow of a clock. The clock input **MUST** be between 20 and 26 MHz for the A²D to work correctly.*

In addition, a Word Clock Input and Output Panel allows the use of external work clock, which is then up-sampled to match the A²D's required reference clock.

A pair of 9-pin D-sub connectors allow the linking of multiple A²D units, all operating off the **first** sample-rate clock in the chain.

Analog Mic/Line Input Section - (Analog A and B)

There are two identical sections **Analog A** and **Analog B**.
Each have the signature 3124 Microphone preamp design.



GAIN:

The GAIN pot sets the input signal gain and has a minimum gain of +34dB and a max of +65dB. Microphone input impedance is 1500ohms.

POL:

Changes the polarity of the microphone input only (not the line input).

48V:

Applies Positive 48v to the microphone input to power condenser-type mics.

PAD:

Input attenuation Pad of 20dB

2:1:

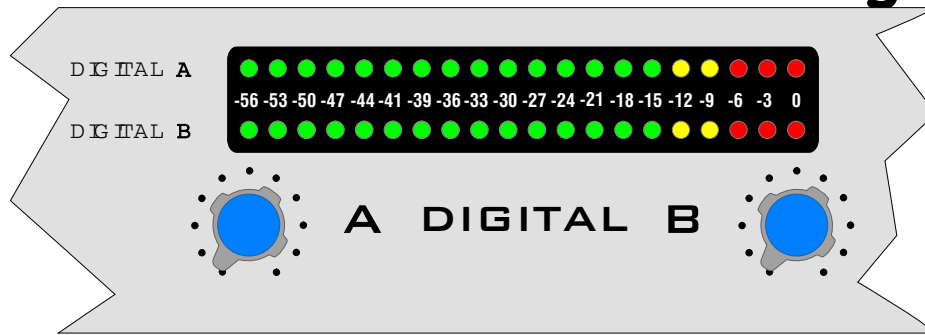
Attenuation of -10dB by tap selection on the Microphone preamp output transformer. This reduces the amount of gain created by the output transformer itself, and allows the 2520 amplifier to be operated at higher gain, if desired.

MIC: When selected (Lit), the Microphone input on the rear panel is the active input.

LINE:

Direct Input with High Z - [impedance]

Digital Section



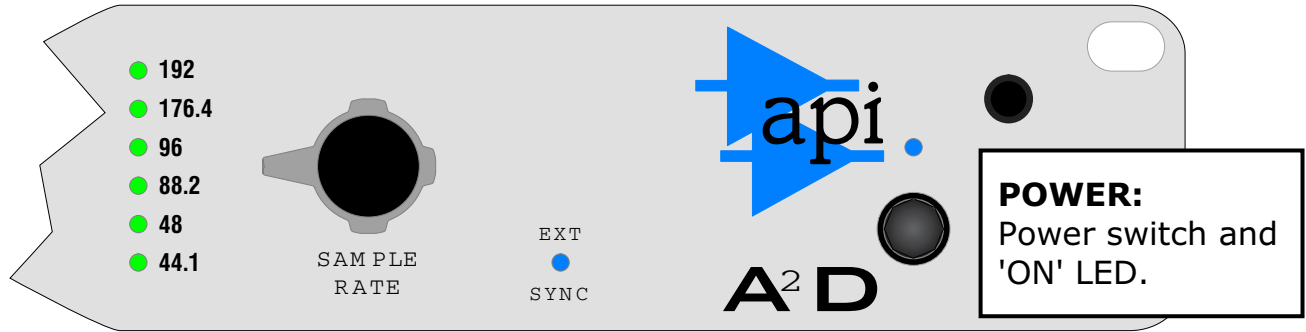
LEVEL:

There are two digital input level controls. The range of the pot is infinity to unity. They are completely independent of each other, and are fed from their respective Analog A or B gain stage. If you are feeding the Digital section with a calibrated level, the inputs at unity will deliver the same calibrated level to the A/D converter.

METERS:

Range is infinity to unity. The meters have a fast attack peak reading characteristic with a 0dBFS full scale range. The LED's are yellow at -12 and -9 and red at -6, -3 and 0 to allow plenty of headroom warning as the input limit of the A/D section is approached.

Digital Section



Sample Rate select knob:

192, 176.4, 96, 88.2, 48, 44.1 (KHz) LED will indicate the current sample rate selected.

External Sync / Lock:

This LED will be lit when the A²D is receiving an external clock signal and is locked to that external signal, OR when the A²D is linked as a slaved unit in a chain.

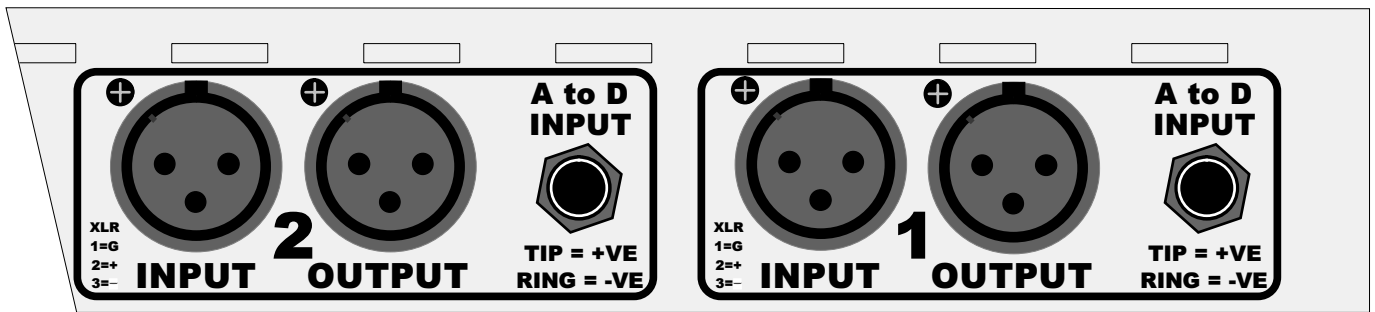
NOTE:

When the A²D is slaved, the Sample frequency LED's do NOT light. This is because the master unit is providing both the sample frequency and the indication.

When Reference Clock (Sync) input is used, the Ext Sync LED will be lit, but the actual A/D sample frequency is selected via the Sample Rate switch.

Please see additional clock info on pages 7 and 8.

Rear Panel Audio Section



INPUT:

This is a microphone input - XLR type. The connector is wired pin 2 'hot' or positive.

OUTPUT:

This is a line-level output of the mic preamp - XLR type. The setting of the front-panel 'GAIN' pot will vary this output level as it simultaneously feeds the A/D side of the A²D. This connector is also wired pin 2 'hot' or positive.

A to D INPUT:

Analog Line Input 1/4" connector. This connector is an "insert" direct to the Analog to Digital converters. The XLR Output signal is normalized to the inputs of the jack. This is a balanced input and can accept input signals of up to +30dB.

NOTE on INSERTING:

The INPUT 1/4" connector acts as the 'insert return' jack as would be found on a console. It is an INPUT connector only and is a balanced 1/4" input. The XLR OUTPUT jack acts as the insert send. A typical configuration would be to take the mic pre OUTPUT and connect it to the input of an external signal processor (compressor, EQ, effect unit, etc.). Then take the output of the external processing device and return it to the A to D INPUT jack, which will then send the return signal directly to the A²D's converters.

Rear Panel Digital Section



SPDIF OUTPUT:

Sony Phillips Digital Interface Format single ended RCA connection.

AES/EBU OUTPUT:

Single wire AES standard digital interface.

SYNC IN JACK AND FRONT SAMPLE RATE SELECTION OPERATION:

The SYNC IN jack on the rear panel is for a Super Clock reference signal. This reference clock is typically either 22.579MHz for sampling rates of 44.1kHz, 88.2kHz, or 176.4kHz, or 24.576MHz for sampling rates of 48kHz, 96kHz, or 192kHz. When using the SYNC IN signal, the EXT SYNC LED on the front panel will light when a valid signal is seen.

You still must select the sampling rate range using the front selector switch.

Please note that you will only be able to get one set of sampling rates, the rates that are the multiple of the Super Clock reference signal that you are feeding in the back.

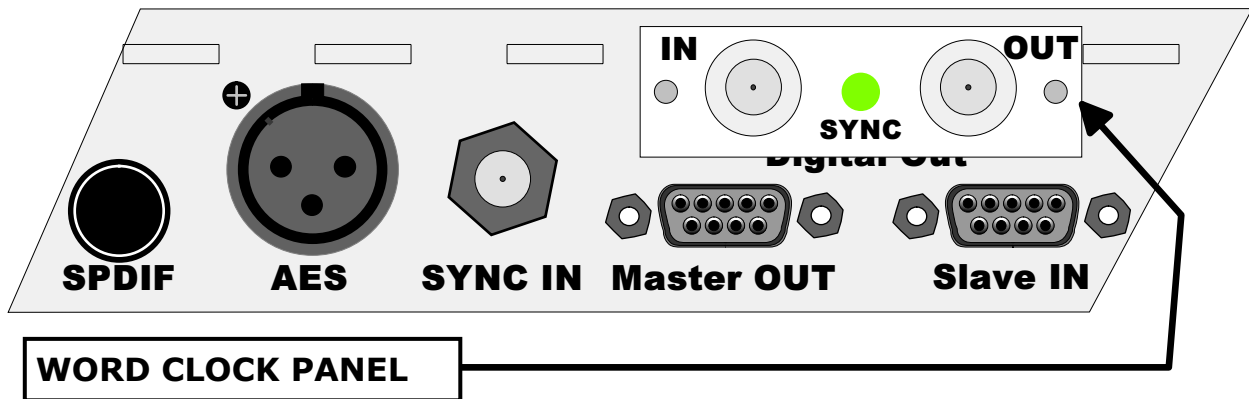
What this means is if you are feeding in 22.579MHz, you will only get the sample rates 44.1kHz, 88.2kHz, or 176.4kHz. If you select the 48kHz rate on the front panel, it will be shifted to the 44.1kHz sample rate.

Same for the 96kHz rate, it will be shifted to 88.2kHz, and 192kHz will be shifted to 176.4kHz. The opposite is true if you feed in a 24.576MHz signal. Selecting either 44.1kHz or 48kHz on the front selector will get you a 48kHz sample rate, selecting either 88.2kHz or 96kHz will get you 96kHz, and selecting either 176.4kHz or 192kHz will get you 192kHz.

MASTER OUT/SLAVE IN CONNECTORS:

D-Sub connection to couple multiple A²D units. The FIRST unit in the chain will become the master unit and all linked units will receive digital clock from the master. **A STRAIGHT THROUGH 9-pin cable must be used to link A²D units.**

Rear Panel Digital Section - continued



WORD CLOCK FUNCTION:

Similar to the Super Clock, and different than the traditional Word Clock input, the Word Clock Input provides a reference clock for the converter. When using the Word Clock Input, the EXT SYNC LED on the front panel will light when a valid signal is received. **The front panel sample rate selector is still active!!** The sample rates available are only the multiples of the Word Clock reference signal that is being used.

What this means is if you are feeding in 44.1kHz (or 88.2kHz, or 176.4kHz) into the Word Clock Input jack, you will only get the sample rates 44.1kHz, 88.2kHz, or 176.4kHz. If you select the 48kHz rate on the front panel, it will be shifted to the 44.1kHz sample rate. Same for the 96kHz rate, it will be shifted to 88.2kHz, and 192kHz will be shifted to 176.4kHz. The opposite is true if you feed in a 48kHz (or 96kHz, or 192kHz) signal. Selecting either 44.1kHz or 48kHz on the front selector will get you a 48kHz sample rate, selecting either 88.2kHz or 96kHz will get you 96kHz, and selecting either 176.4kHz or 192kHz will get you 192kHz.

WORD CLOCK OUTPUT JACK:

Using no external clock signal, the Word Clock Output jack is outputting the sample rate selected on the front panel. When using the Word Clock Input jack, the Word Clock Output jack will output the front panel selected **multiple** of the Word Clock Input reference signal, **NOT the exact Word Clock Input signal.**

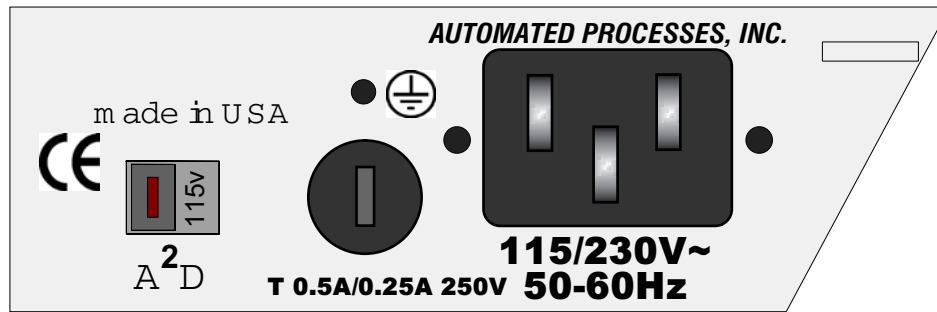
Because of this, we recommend that if you are using a Word Clock master in a clock chain configuration (OUT of A to IN of B, then OUT of B to IN of C, then OUT of C to IN of D, etc.) that you place the A2D at the end of your chain.

Alternatively, you can use the A2D with a Word Clock if the A2D is sent a **direct line** from a Word Clock generator. (Spider configuration - no OUT)

NOTE:

Do NOT connect to both the SYNC IN and WORD CLOCK IN connectors at the same time, that would be "BAD" (says Engineering). You could burn up the driver on the Word Clock board and it could quit working, (which would be BAD).

Rear Panel Power



VOLTAGE SELECT:

Slide switch to select input AC voltage.

FUSE:

AC line fuse.

Only replace with the proper fuse for the appropriate AC input.

AC POWER PLUG:

IEC-type grounded AC input plug.

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Specifications

Analog:

Input Impedance:	1500 Ohms Mic 470K Ohms Un-Balanced, HI-Z in
Output Impedance:	Less than 75 Ohms
Nominal Channel Output Levels:	XLR +4dBu
Output Clipping Level:	XLR: better than +28dBm
Frequency Response:	+0, -5, 10Hz to 20kHz (-.5 at 10Hz)
Noise EIN:	-129 Mic, -125 Un-Bal. Actual
Measured Noise:	Better than -91dBm / below Nominal +4
Distortion:	All Outputs at +4 out, .03%, at +22, .09% Max
Gain Range:	150 Ohms Input 10dB Min., 65 dB Max (inc. PAD). Un-Bal. Input 14dB Min., 50 dB Max
VU Meter:	Calibrated for XLR Outputs, OVU=+4dBu
Controls:	GAIN, POL (polarity), 48Volts, PAD (20dB), 2:1 trans. attenuation, MIC (mic/unbal)

Current draw:	130mA AC
Weight:	10lbs
Size:	19" X 8" x 1RU

Specifications

Digital: Input test signal is a 1 kHz sine wave; measurement bandwidth is 10 Hz to 20 kHz.

48K Performance

Dynamic Range	A-weighted	120dB
	unweighted	117dB
THD+N	-1dB	-110dB
	-20dB	-97dB
	-60dB	-57dB
Total Group Delay	250us	

96K Performance

Dynamic Range	A-weighted	120dB
	unweighted	117dB
THD+N	-1dB	-110dB
	-20dB	-97dB
	-60dB	-57dB
Total Group Delay	94us	

192K Performance

Dynamic Range	A-weighted	120dB
	unweighted	117dB
THD+N	-1dB	-110dB
	-20dB	-97dB
	-60dB	-57dB
Total Group Delay	26us	

Input Impedance	30K (ohms)
Interchannel isolation - all modes	110dB
Analog input CMRR	100dB
Phase Deviation @20hz	10Deg
Gain Drift - DC accuracy	+/-100ppm/°C

Housekeeping:

Here is a great place to write down the serial number of your A²D and your purchase date, just in case you need that information someday in the future. It's nothing but frustrating to have to unrack your equipment and search for the serial number years after a purchase.

(and serial numbers are so easy to forget)

API A²D serial number _____

Purchase date: ____ / ____ / ____



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