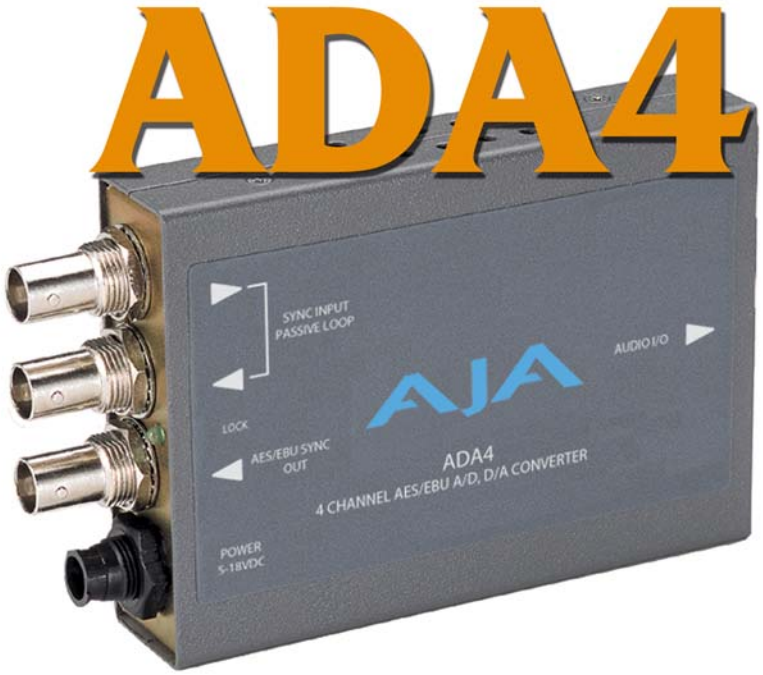
ADA4
4-Channel Bi-directional Audio A/D and D/A Converter User Manual



AJA VIDEO SYSTEMS

October 30, 2008 P/N 101662-01
For ADA4 Serial Number H43000 or Later

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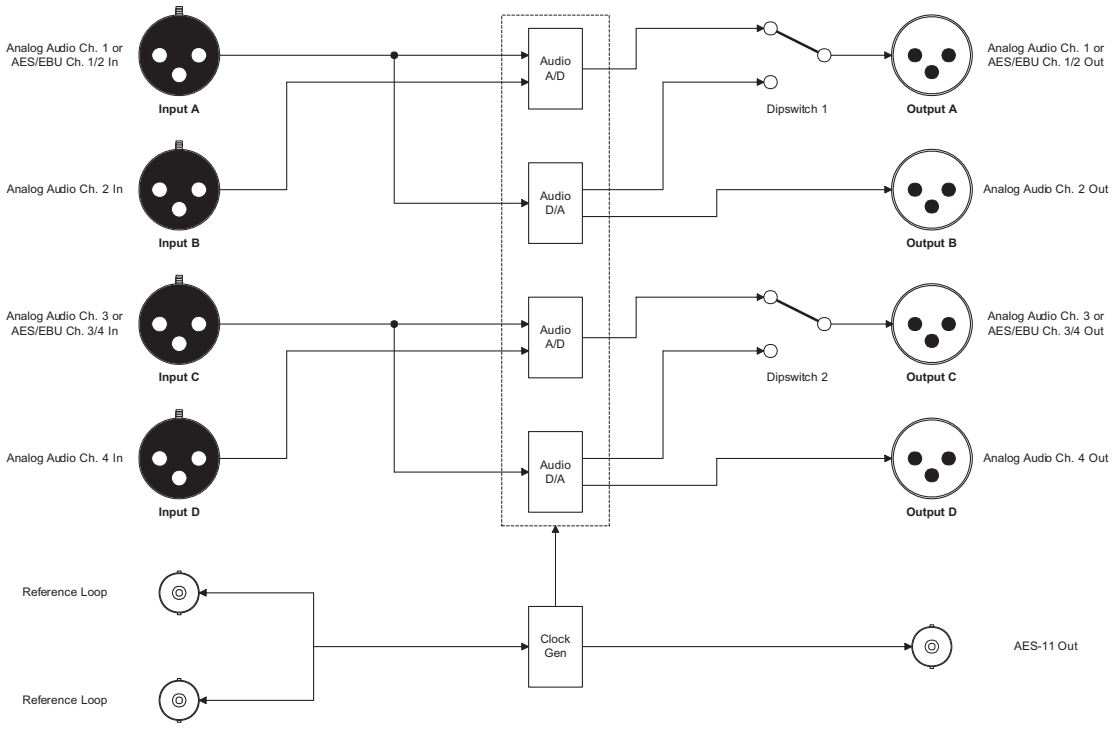
Introduction

The ADA4 is a 4 channel converter which can be configured as a 4 channel A/D, a 4 channel D/A, or 2 channel A/D and 2 channel D/A. The ADA4 can accept a AES11, wordclock, or video sync/color black reference input for synchronization. Reference input and synchronization is automatic. Audio levels are configurable via dipswitch control.

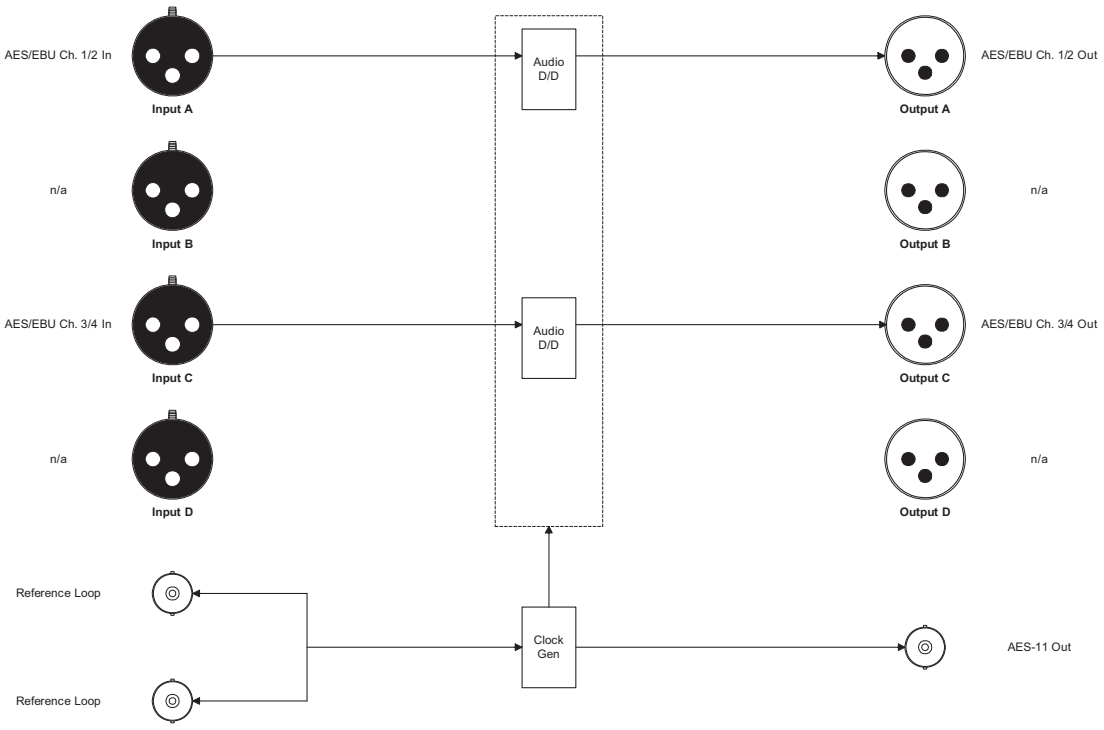
Features

- Simultaneous A/D and D/A, or AES Synchronizer
- Full-time AES11 low jitter reference output
- Up to 4 channels of balanced analog to AES/EBU audio
- Up to 4 channels of AES/EBU to balanced analog audio
- Supplied XLR breakout cable
- AES11/Wordclock/Tri-level Sync/Color Black Reference Loop
- Adjustable Audio Levels
- Sample Rate Conversion Between 96KHz and 48KHz
- Dipswitch configuration
- 5-18VDC Power

Block Diagrams

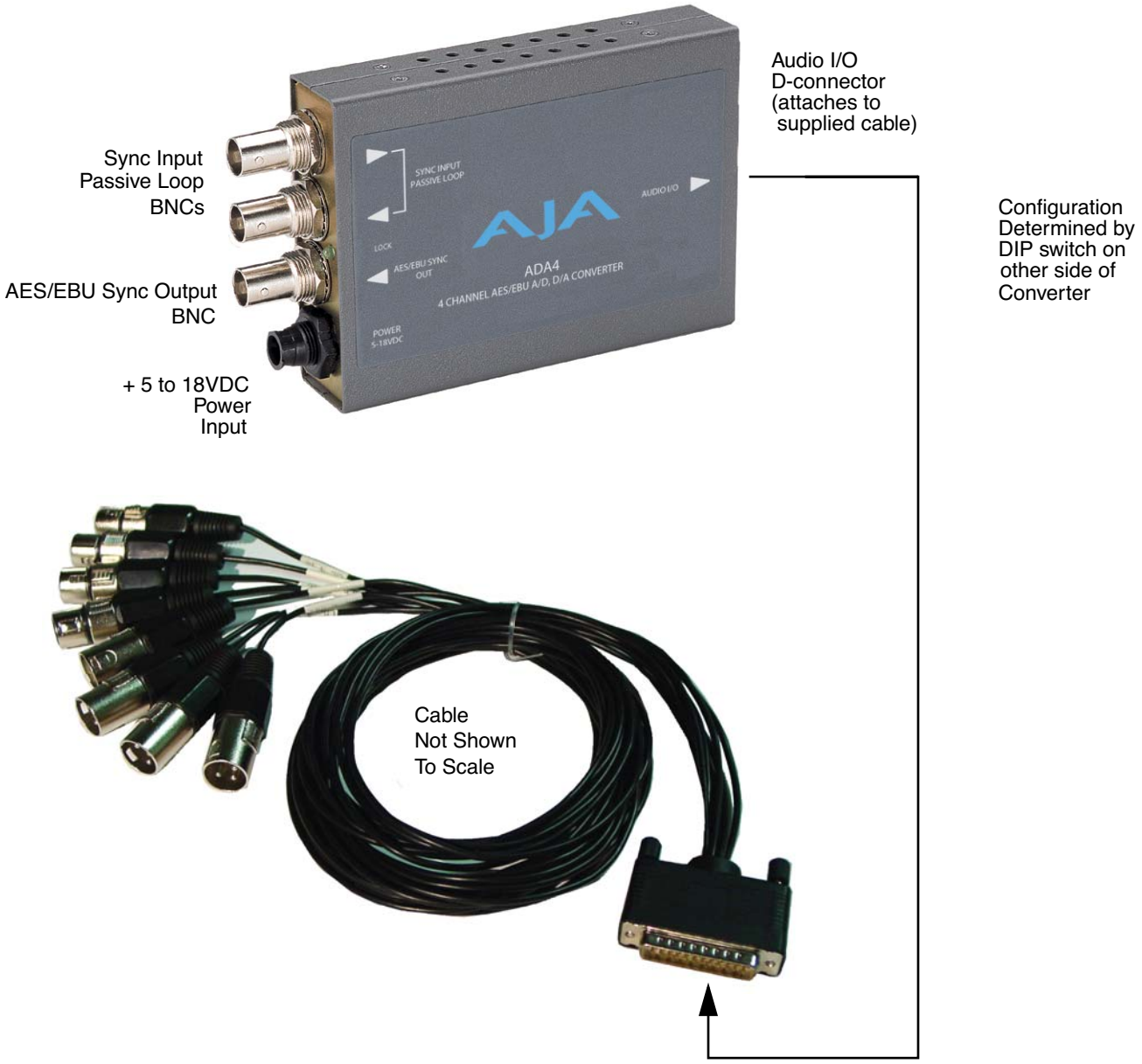


ADA4, Normal Mode Block Diagram (Jumper 2 Installed), A/D or D/A



ADA4, Synchronizer Mode Block Diagram (Jumper 2 Removed), D/D

I/O Connections



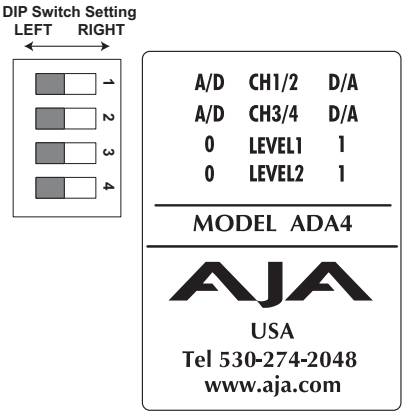
ADA4 and Cable, Side View

User Controls

The user interface for the ADA4 is a 4-switch DIP accessible through a cut-out in the bottom of the unit, and an internal 3-position jumper block accessed by removing the ADA4 cover (secured by 4 screws). Use the jumper to configure the mode of operation (*Normal* or *Synchronizer*).Then use the DIP switches—if necessary— to configure channels and audio levels.

The exact function of the jumper settings and each DIP switch are described on the following pages.

Factory default switch settings are all in the leftmost position.



Normal Mode (Jumper #2 Installed)

Normal mode is the default operating mode of the ADA4 as shipped from the factory. In Normal mode, the ADA4 performs A/D or D/A audio conversion as configured by the 4 DIP switches. In the factory Normal configuration, the internal jumper #2 is installed and no jumper changes are required. DIP switch settings are discussed below:

Switch 1 (CH1/2: A/D or D/A)—Select type of conversion for channels 1 and 2

LEFT	RIGHT
Select Analog to Digital Conversion	Select Digital to Analog Conversion

Switch 2 (CH3/4: A/D or D/A)—Select type of conversion for channels 3 and 4

LEFT	RIGHT
Select Analog to Digital Conversion	Select Digital to Analog Conversion

Switches 3 and 4 (LEVEL)—Controls audio levels (see matrix below)

Note: Professional audio equipment has much higher levels than consumer equipment: a 0 VU reading corresponds to +4 dBu. Connecting a professional +4 dBu device to a consumer audio input -10dBV (-7.8 dBu) may cause overloading, whereas the output of a consumer device probably does not have sufficient power to drive a professional audio input. With consumer and semi-professional audio equipment, a VU reading of 0 dB is typically referenced to -10 dBV. 0 dBu = 0.775 VRMS.

Output Level Selection Matrix For Switches 3 and 4

The following table shows the combinations of DIP switch settings required to configure the audio output levels shown.

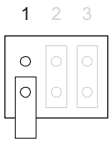
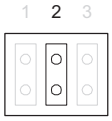
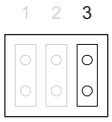
DIP Switch #4 (LEVEL 2)	DIP Switch #3 (LEVEL 1)	Output Level
0	0	Pro USA: 0dBFS → +24dBu
0	1	Pro Europe: 0dBFS → +18dBu
1	0	Pro Germany: 0dBFS → +15dBu
1	1	Consumer: 0dBFS → +12dBu

48 KHz/96KHz Output Mode (Jumper 1)

Jumper#1 selects how the AES outputs and the AES11 reference output run. If Jumper 1 is installed, they run in 48 KHz mode. If Jumper 1 is removed, they run in 96 KHz mode.

Synchronizer Mode (Jumper #2 Removed)

Synchronizer mode is an alternative operating mode where no audio A/D or D/A conversion takes place. Instead, it allows for an AES input to be sample rate converted and reclocked to reveal an AES output that is low jitter, and—when a reference signal is applied—locked to reference. In this mode the DIP switches are ignored and all configuration options are set via a 3-position jumper located inside the ADA4 case. To access this jumper, remove the four phillips screws securing back side of the ADA4 case (the side having the DIP switch access hole in it). Once the case cover is removed, you can easily identify the jumper by its appearance. Jumper positions 1 through 3 are clearly marked on the circuit board next to the jumper. Refer to the following diagram for jumper settings and their meaning.

Jumper 1:		Example: 96kHz output mode selected (jumper effectively removed).	Meaning: Jumper 1 installed—48kHz: Any AES outputs and the AES-11 reference output are running in 48kHz mode. Jumper 1 removed—96kHz: Any AES outputs and the AES-11 reference output are running in 96kHz mode.
Jumper 2:		Example: Normal mode selected.	Meaning: Jumper 2 installed—Normal Mode: Switches 1 and 2 independantly define A/D or D/A mode for their respective pair of channels. Switches 3 and 4 are used together to define the audio level. Jumper 2 removed—Synchronizer Mode: Switches 1-4 have no effect. The ADA4 is in D/D mode, with the output re-timed to the reference signal, when applied. Without a reference signal applied, the ADA4 re-clocks the output based on its stable free-running local oscillator.
Jumper 3:		Note: Jumper 3 is not used, but is provided as a spare.	Meaning: n/a: Jumper 3 is not used.

ADA4, Internal Jumper Settings

Jumper 3

Jumper#3 is currently unused.

Lock LED

An LED is located next to the BNC connectors which shows the type of signal locked (if any). Here are the meanings of the LED colors:

- Red = HD lock
- Green = SD lock
- Amber = AES-11 lock or Word Clock lock

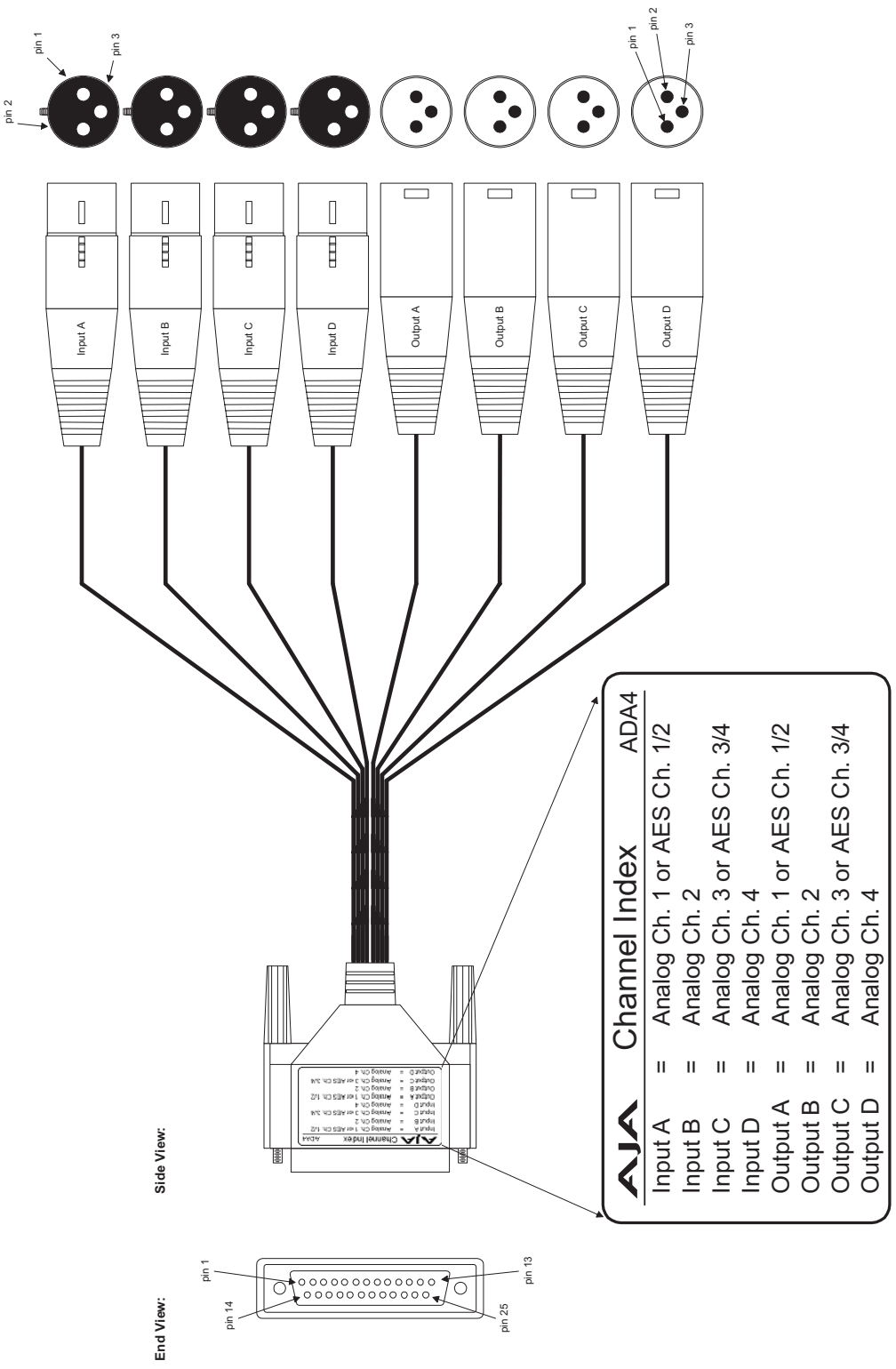
Installation

Typically, ADA4 installation consists of the following:

1. disconnect +5VDC from the converter
2. configure the DIP switch for the desired equipment configuration
3. connect video equipment to the converter BNCs
4. apply +5VDC power to the converter (AJA power supply model DWP)

Specifications

Item	Specification
Analog Audio I/O	Balanced, XLR. One Channel per XLR connector.
AES Audio I/O	Balanced 110 ohm, XLR. Two Channels per XLR connector.
Analog Audio Levels (with Respect to Full Scale Digital)	+24dBu (SMPTE RP155), +18dBu (EBU R68), +15dBu (Germany), +10dBV (consumer +12.2 dBu)
Audio Converters	24 bit, 48/96 KHz
User Controls	External Dipswitch: Channel 1/2: A/D, D/A Channel 3/4: A/D, D/A Audio Level 1 Audio Level 2
Size	5.8" x 3.1" x 1 (147 x 79 x 25mm)
Power	5-18V, 3 watts. Requires power supply.
Reference Loop	75 Ohm (unterminated). HD/SD Sync, AES-11, or Wordclock (48/96 KHz)


pin 1
pin 3
pin 2
pin 1
pin 2
pin 3
Input A
Input B
Input C
Input D
Output A
Output B
Output C
Output D
Side View:
End View:
pin 1
pin 13
pin 14
pin 25
AJA Channel Index ADA4
Input A = Analog Ch. 1 or AES Ch. 1/2
Input B = Analog Ch. 2
Input C = Analog Ch. 3 or AES Ch. 3/4
Input D = Analog Ch. 4
Output A = Analog Ch. 1 or AES Ch. 1/2
Output B = Analog Ch. 2
Output C = Analog Ch. 3 or AES Ch. 3/4
Output D = Analog Ch. 4

ADA4 Cable