

V1636

24-bit Audio Digital To Analog Converter

User Guide

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Vistek V1636 24-bit Audio Digital To Analog Converter

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1 Description

The V1636 is a broadcast quality 24-bit audio digital to analog converter which forms part of the Vistek V1600 range of interface products. It is a 3U high card which is fitted into either a V1601 or V1603 rack, from which it receives its power. A passive rear module with screw terminal connections, is required for all signal interconnections.

The unit accepts two AES-3 digital stereo audio inputs and converts these signals to 4 differential mono analog outputs in two pairs. The V1636 is fully compatible with the Vistek DART remote system, allowing status information to be read and control settings invoked by a DART compatible rack controller.

INPUTS:

- 2 x AES3-1992 balanced 110 Ω digital audio channels, $Z_{in} = 110\Omega$ (or 75 Ω unbalanced with special rear module).
- Sampling frequencies of 32-96kHz are supported.
- AES inputs A and B can be different sample frequencies - asynchronous sample rate conversion to an internal sample rate of 48kHz is performed on the inputs.

OUTPUTS:

- 4 x Analog differential quasi-balanced outputs with $Z_{out} < 50\Omega$ (V1636) or $Z_{out} < 18\Omega$ (V1636ARD)
- Max Output level: 0dBFS = +28dBu. Output level adjustable by on-card switches from 0dBFS = +14dBu to 0dBFS=+28dBu in 1dB steps.

FUNCTIONS:

- Panel Selectable/DART controlled **Delay** from 0ms to 1250ms may be applied to the outputs. All outputs are subject to the same delay value.
- Panel Selectable/DART controlled **A/B Swap** transposes the AES input streams.
- Panel Selectable/DART controlled **Test Tone** of 997Hz at -18dBu may be applied to either or both A or B channelpair analog outputs
- Control source may be Panel switches (LOCAL mode) or DART (REMOTE mode)
- The V1636 responds to de-emphasis (50 μ s or CCITT) code embedded in the AES Channel Status.



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2 Installation

2.1 Rear Panel Connections

The standard 3U Screw terminal rear panel is shown below. Other 3U and 1U panel variants with screw terminal and/or BNC connectors are similarly marked. Table 2.1.1 describes the connections to the unit when these panels are used.

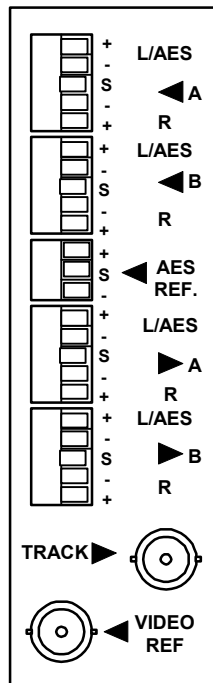
Notes on Table 2.1.1:

1. Certain connections are **reserved**. Do not connect anything to these connections.
2. Grounds/screens (S) are connected to chassis on all outputs and inputs and should be connected to all cable screens to minimize hum and noise.
3. Neither (+ or -) analog output should be grounded.

Table 2.1.2 describes connections to the unit when D-type panels are used.

Notes on Table 2.1.2:

No connect means do not connect this pin to anything.



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Table 2.1.1

Description of V1635 rear panel connections for standard rear panel assemblies

SIGNAL name	SOURCE	COMMENTS
POWER DART bus	Rack PWR Header Rack DART header	+15V nominal (9-35V) at 10W max Vistek DART Rack controller
A 3 (IN) L/AES (+/-)	External AES source	AES3/AES3id digital input for channelpair A
R (+/-)	Do Not Connect	Reserved
B 3 (IN) L/AES (+/-)	External AES source	AES3/AES3id digital input for channelpair B
R (+/-)	Do Not Connect	Reserved
A 4 (OUT) L/AES (+/-)	V1636	L Analog output for channelpair A
R (+/-)	V1636	R Analog output for channelpair A
B 4 (OUT) L/AES (+/-)	V1636	L Analog output for channelpair B
R (+/-)	V1636	R Analog output for channelpair B
AES 3 (IN) REF	Do not connect	Reserved
VIDEO 3 (IN) REF	Do not connect	Reserved
TRACK 3 (IN)	Do not connect	Reserved



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Table 2.1.2

Description of V1635 rear panel connections for D-type rear panel assemblies

D15F Input connector					
Pin	Signal		Pin	Signal	
1	AES A in -		9	AES A in +	
2	No connect		10	No connect	
3	GND		11	GND	
4	AES Ref in -		12	AES Ref in +	
5	AES B in -		13	AES B in +	
6	No connect		14	No connect	
7	GND		15	GND	
8	GND				

D15F Output connector					
Pin	Signal		Pin	Signal	
1	A left out -		9	A left out +	
2	A right out -		10	A right out +	
3	GND		11	GND	
4	GND		12	GND	
5	B left out -		13	B left out +	
6	B right out -		14	B right out +	
7	GND		15	GND	
8	GND				

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2.2 Maximum Output Level Adjustment

The V1636 has two rotary Hex Switches for adjusting the MOL (**M**aximum **O**utput **L**evel) of each of the channelpairs A and B. Looking at the V1636 with the Euro connector on the right hand side, the right switch is for channelpair A (L and R) and the left switch is for channelpair B (L and R). The location of the MOL switches is shown on the figure below. These switches adjust the analog MOL corresponding to 0dBFS digital input in 1dB steps from +14dBu to +28dBu. The table below shows the correspondence between the 16 switch positions and the max output level setting for the V1636.

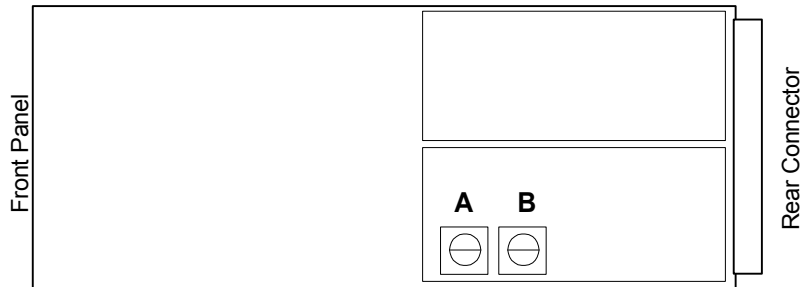
Switch setting	MOL (dBu)
0	+14
1	+15
2	+16
3	+17
4	+18
5	+19
6	+20
7	+21
8	+22
9	+23
A	+24
B	+25
C	+26
D	+27
E	+28
F	reserved



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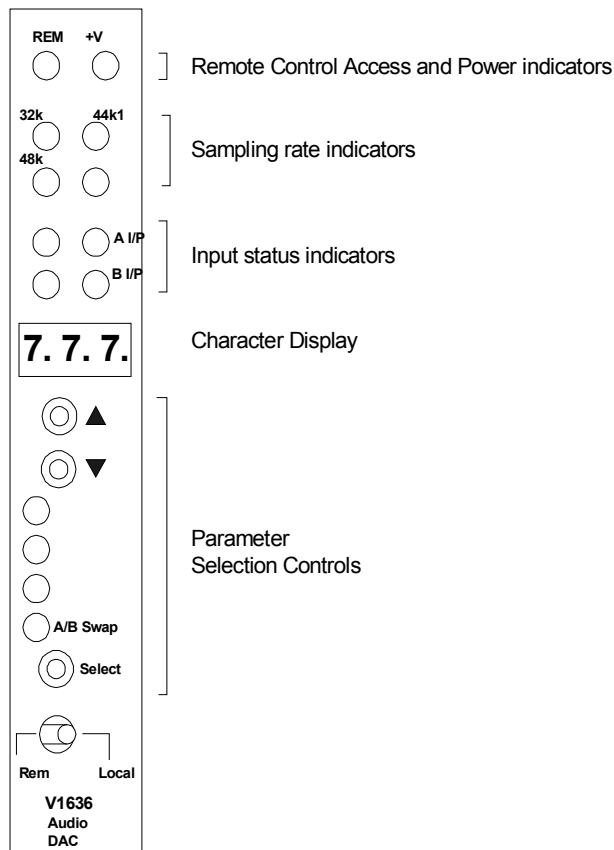
3 Operation

3.1 Front Panel Controls and Indicators



3.1.1 Remote Control Access and Power Indicators

The green V+ LED is lit when the unit's on-board power supply is delivering voltage. The yellow REM LED is lit whenever the unit is accessed by the Rack Controller for the DART remote system



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3.1.2 Sampling Rate Indicators

Because the sampling rates of input AES A and B to the V1636 DAC may be different, the inputs are asynchronously converted to an internal sample rate of 48kHz which is not user adjustable. The 48kHz LED will therefore always be lit when the card is operating.

3.1.3 Input Status Indicators

The A I/P and B I/P LEDs respectively indicate the status of the AES inputs A and B. If the AES input is valid, the corresponding LED is lit, otherwise the LED is off.

3.1.4 Character Display

Used for displaying parameters which have numeric or alphanumeric values

3.1.5 Parameter Selection Controls

These are used for selection of, and adjustment of, operating parameters when the REM/LOCAL switch is set to LOCAL.

3.2 Adjustment of Operating Parameters

3.2.1 General

The V1636 has two *pages* (**Page 0** and **Page 1**) of panel adjustment modes, each page allows adjustment of one or more *parameters*. Conceptually the procedure is not unlike setting a digital alarm clock or watch.

- Panel adjustment pages can only be invoked if the **REM/LOCAL** switch on the panel is set to **LOCAL**.
- Pressing the **SELECT** button on its own invokes the panel adjustment modes of **Page 0**
- Pressing the **SELECT** button while holding in the **p** button invokes the panel adjustment modes of Page 1. In other words, the **p** button behaves like a 'SHIFT' key on a typewriter when selecting pages of adjustment modes. By this analogy, Page 0 corresponds to lower case and **Page 1** corresponds to upper case letters on a typewriter.
- Once any panel adjustment page has been selected, repeated pressing of the **SELECT** button allows the user to scroll through the various parameters available on the page. A row of LEDs above the **SELECT** button indicates which *parameter* is presently selected for adjustment.
- For any given parameter selected for adjustment, the value of the parameter may be increased or decreased by pressing the **p** or **q** keys respectively. The *value* of the parameter is indicated either on the character display or the respective sets of LEDs above the character display.



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- Holding the or p or q buttons down will cause the value of the parameter to auto increment and autodecrement respectively. The longer the button is held down, the faster the rate of autoincrement or autodecrement.
- Once a parameter has been adjusted to the desired value, the Panel Adjustment mode is exited by pressing the **SELECT** button until all four of the LEDs above the **SELECT** button are off. **NOTE: Only when Panel Adjustment mode is exited will the parameter adjustments take effect.**
- The V1636 has non volatile memory storage that automatically saves the values of all the operating parameters so that on power-up, the last used settings will be invoked.

The following table indicates the available Panel Adjustment modes on the two pages.

LED indicator	Page 0		Page 1	
	Parameter	Adjust range	Parameter	Adjust range
Delay	Delay	0ms to 1250s	Test Tone	A,B Off/A,B on
-	-		-	
-	-		-	
A/B Swap	A/B Swap	Normal/Swapped	-	

3.2.2 Delay Adjustment

- A fixed delay may be applied to all four analog channels as a group and the present setting may be seen on the character display as a number when **Page 0** Panel Adjustment mode has been entered and **Delay** selected as a parameter.
- By Panel Selection the delay value may be adjusted from 0ms to 1.25 seconds. Adjustment from 0 to 99ms is in 1ms steps, and adjustment from 100ms upwards is in 10ms steps. From 0 to 999ms, the delay value is displayed in ms and from 1.0s upwards it is displayed in seconds.
- The DART interface can control the delay in 1ms steps across the range.
- The minimum throughput delay of the V1636 is less than 1ms.

Note: changing the fixed delay will cause a temporary disruption of audio for not less than the value of the new delay setting.

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3.2.3 A/B Swap

- A transposition of AES A and AES B inputs may be invoked and the present setting may be seen on the character display as a letter combination when **Page 0** Panel Adjustment mode has been entered and **A/B Swap** selected as a parameter.
- When AES input channelpairs A and B are normally converted to AL/AR and BL/BR analog output pairs respectively, the A/B Swap parameter is indicated on the character display as **A-A**.
- When AES input channelpairs are transposed so that AES A converts to BL/BR and AES B converts to AL/AR analog output pairs respectively, the A/B Swap parameter is indicated on the character display as **A-b**.

3.2.4 Test Tone

- A test tone of 997Hz 0dBu may be invoked on the L/R channels of either or both A and B channelpair outputs and the present setting may be seen on the character display as a number combination when **Page 1** Panel Adjustment mode has been entered and **Test Tone** selected as a parameter.
- The table below explains the available Test Tone selections

Display	Test Tones
0 0	No test tones selected
1 0	Test tone on channelpair A only
0 1	Test tone on channelpair B only
1 1	Test tone on both channelpairs



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4 Dart Interface

4.1 General

The V1636 is a Class 4 DART module which has a serial EEPROM for reading and writing card details through the DARTbus in the same manner as other V1600 range cards. In addition the unit has several read and write registers, details of which may be found in document *scsm1636.doc*