



VISTEK V1637 24-BIT AUDIO ANALOGUE TO DIGITAL CONVERTER USER GUIDE

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VISTEK V1637 24-bit audio analogue to digital converter

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1. DESCRIPTION

The V1637 is a broadcast quality 24-bit audio analog to digital 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 stereo pairs of analog audio inputs and converts these signals to two AES digital audio streams. The V1637 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:

- 4 x Analog differential quasi-balanced outputs with $Z_{in} > 20k\Omega$.
- Max input level: +28dBu = 0dBFS. Input sensitivity adjustable by on-card switches from +14dBu = 0dBFS to +28dBu = 0dBFS in 1dB steps.

OUTPUTS:

- 2 x AES3-1992 balanced 110 Ω digital audio channels, $Z_{out} = 110\Omega$ (or AES3id 75 Ω unbalanced with special rear module).
- Sampling frequencies of 32kHz, 44.1kHz, 48kHz are provided on the standard V1637. The V1637/96 provides 96kHz as well.
- AES outputs A and B can reference-locked to an NTSC/PAL video source, a separate AES reference source, or can be free-running to the internal crystal oscillator.
- AES channel status output to AES3-1992.

FUNCTIONS:

- Panel Selectable/DART controlled **Delay** from 0ms to 1250ms may be applied to the outputs when sampling at 32kHz, 44.1kHz or 48kHz. Maximum delay is 600ms when the V1637/96 is used at 96kHz. 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 -18dBFS may be applied to either or both A or B channelpair analog outputs.
- Panel Selectable **Reference Source** can be external Video at 48kHz, external AES reference at 32kHz or 48kHz, or internal free-running crystal oscillator at any sample rate.
- Panel Selectable **Sample rate** can be 32kHz, 44.1kHz, 48kHz. The V1637/96 offers 96kHz as well.
- Control source may be Panel switches (LOCAL mode) or DART (REMOTE mode).



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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 describes the connections to the unit when these panels are used.

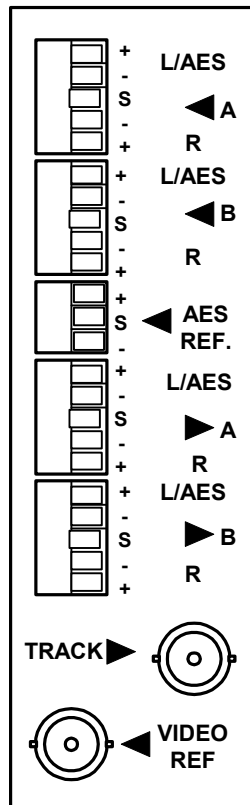
Notes on Table 2.1:

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.

Table 2.2 describes connections to the unit when D-type panels are used.

Notes on Table 2.2:

1. No connect means do not connect this pin to anything.
2. Both pairs of AES outputs are available on D-type rear panels. These are denoted as AESA1, AESA2, AESB1 and AESB2.



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Table 2.1

Description of V1635 rear panel connections for standard rear panel assemblies

SIGNAL NAME	SOURCE	COMMENTS
POWER DART bus	Rack PWR Header Rack DART Header	+16V nominal (9-35V) at 10W max Vistek DART Rack Controller
A ◀ (IN) L/AES (+/-)	<i>Ext. Analog Source</i>	<i>L Analog input for channel pair A</i>
R (+/-)	<i>Ext. Analog Source</i>	<i>R Analog input for channel pair A</i>
B ◀ (IN) L/AES	<i>Ext. Analog Source</i>	<i>L Analog input for Channel pair B</i>
R (+/-)	<i>Ext. Analog Source</i>	<i>R Analog input for channel pair B</i>
A ▶ (OUT) L/AES (+/-)	V1637	AES3/AES3id digital output for channel pair A
R (+/-)	Do not connect	Reserved
B ▶ (OUT) L/AES (+/-)	V1637	AES3/AES3id digital output for channel pair B
R (+/-)	Do not connect	Reserved
AES ◀ (IN) REF	External AES Reference Source	AES3/AES3id digital input for reference
VIDEO ◀ (IN) REF	External Video Reference Source	525/625 line analog studio grade reference 75Ω/Hi-Z
TRACK ◀ (IN)	Do not connect	Reserved

Table 2.2

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

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

D15F Output connector					
Pin	Signal		Pin	Signal	
1	AES A1 out -		9	AES A1 out +	
2	No connect		10	No connect	
3	AES A2 out -		11	AES A2 out +	
4	No connect		12	GND	
5	AES B1 out -		13	AES B1 out +	
6	No connect		14	No connect	
7	AES B2 out -		15	AES B2 out +	
8	GND				

2.3 Output Wordlength Setting

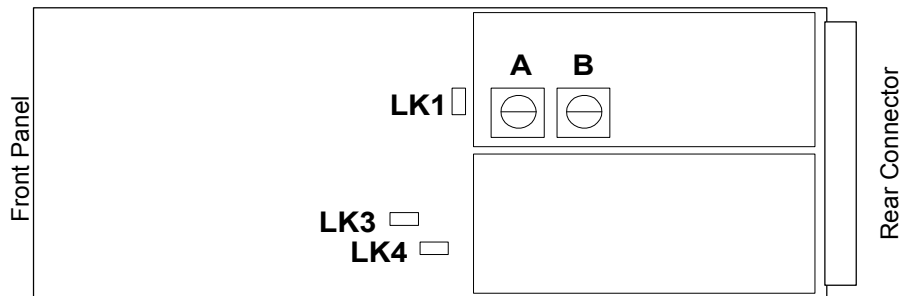
The digital audio output wordlength is normally 24 bits. It may be set to **20 bits** by **closing** jumper LK1.

2.4 Video Reference Input Impedance

The video reference input impedance is 75Ω when jumper LK3 is **closed**. It is high impedance when jumper LK3 is open to facilitate video reference daisy chaining.

2.5 AES Reference Input Impedance

The AES reference input impedance is **110/75Ω** when jumper LK4 is **closed**. It is high impedance when LK4 is open, facilitating reference daisy chaining. Daisy chains may include up to 4 modules.

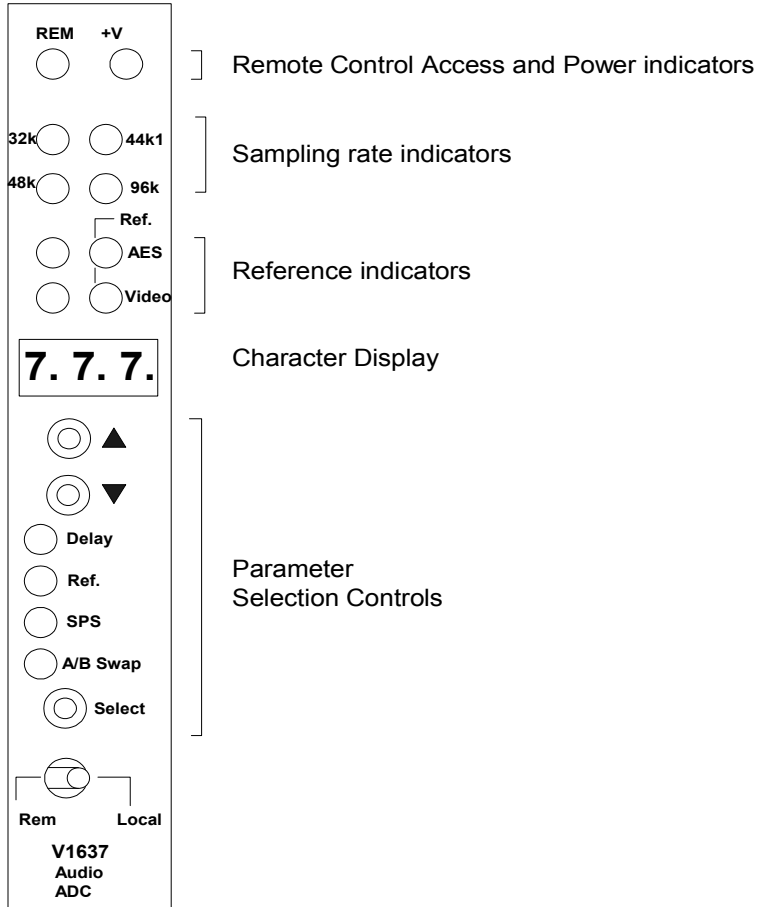


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3. OPERATION

3.1 Front Panel Controls and Power 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.

3.1.2 Sampling Rate Indicators

These LEDs indicate the sampling rate of the AES digital outputs, as selected by the Parameter Selection Controls.



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3.1.3 Reference Indicators

These LEDs indicate the present reference source, as selected by the Parameter Selection Controls. When Free-Running (internal crystal oscillator) is selected, none of the LEDs are lit, and when an external AES or Video reference is selected and is present, the appropriate LED will be lit continuously. If the selected external AES or Video reference fails, the LED will flash and the V1637 will default to free-running mode until the reference recovers.

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.

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3.2 Adjustment of Operating Parameters

3.2.1 General

The V1637 has a 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 **▲** button invokes the panel adjustment modes of Page 1. In other words, the **▲** 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 **▲** or **▼** keys respectively. The *value* of the parameter is indicated either on the character display or the respective sets of LEDs above the character display.
- Holding the or **▲** or **▼** 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.
- The V1637 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.

Note: The parameter adjustments take effect immediately but will not be saved to non-volatile memory until adjustment mode is exited.

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
Ref.	Reference	Free, AES, Video	-	
SPS	Sample rate	32, 44.1, 48, 96kHz*	-	
A/B Swap	A/B Swap	Normal/Swapped	-	

* 96kHz only available on the V1637/96



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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 at all sample rates up to 48kHz. When the V1637/96 is used in 96kHz mode, the maximum delay is 600ms. Delay 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 V1637 is approximately 1ms.

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

3.2.3 Reference Setting

- The reference source may be selected and the present setting may be seen on the Ref LEDs when **Page 0** Panel Adjustment mode has been entered and **Ref.** selected as a parameter.
- The reference may be set to **Free Run**, **AES** or **Video** which correspond to Ref LEDs none, AES and Video being lit respectively.
- If an external reference fails, the appropriate LED will flash and the V1637 will default to Free run mode with reference from the internal crystal oscillator.
- **Free Run** reference is available at all sample rates.
- **AES Ref.** reference is available at 32kHz and 48kHz.
- **Video Ref.** reference is available at 48kHz only.

3.2.4 Sample Rate Select

- The sample rate of the output AES STREAMS may be selected and the present setting may be seen on the SPS LEDs when **Page 0** Panel Adjustment mode has been entered and **SPS** selected as a parameter.
- The sample rate may be set to **32kHz**, **44.1kHz** or **48kHz** which corresponds to SPS LEDs 32k, 44k1, 48k being lit respectively. The **96kHz** option is only available on the V1637/96.

3.2.5 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 channel pairs 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 channel pairs 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**.

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3.2.6 Test Tone

- A test tone of 997Hz -18dBu 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

4 DART INTERFACE

4.1 General

The V1637 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 **scsm1637.doc**.