

# **V1634/A V1634/D**

## **SDI AUDIO DEMULTIPLEXER**

### **INSTALLATION and OPERATION**

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**VISTEK Electronics Ltd  
Wessex Rd  
Bourne End  
Buckinghamshire, SL8 5DT  
ENGLAND**

**Tel. +44 1628 531221  
Fax. +44 1628 530980**

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# SDI AUDIO DEMULTIPLEXER

## INSTALLATION AND OPERATION

### 1. DESCRIPTION

The V1634A Audio Demultiplexer is a full broadcast specification extractor of audio data from an SDI data stream. It forms part of the Vistek V1600 range of modular interface products. It is a 3U high card which is fitted into either the 1U V1601 or 3U V1603 chassis from which it receives its power. It is an improved and upgraded replacement for the V1634. The main improvements are a single board construction, and the fitting of audio sub-boards. This means that either digital AES or analogue outputs can be provided. The choice is made by fitting one of two available sub-modules. There is an audio multiplexer module, the V1633A, which replaces the V1633 and is fully compatible with the V1634A.

In both the V1601 and V1603 racks passive rear modules are required to interface to the outside world. For each rack two rear modules are available depending on whether the audio is required to be analogue, digital AES balanced or digital AES unbalanced. The rear modules are common for the V1634A and V1633A.

The SDI video may be either D1 or D2 and either 625/50 or 525/60. The unit automatically detects the standard and format of the input signal and operates accordingly.

If the analogue output module has been fitted then all four audio outputs are available as balanced signals. If the digital AES output option is fitted then the AES signals are available either balanced or unbalanced, depending on the type of rear module that is fitted to the rack.

The unit extracts audio that has been embedded into a SDI video data stream according to SMPTE 272M. Any one of the available audio groups may be extracted; the number depend on whether the signal is D1 or D2. Unlike de-multiplexers from some other manufacturers the audio does not need to be synchronous with the video into which it has been embedded. This makes the use of embedded audio within a studio area much simpler to implement. This means that within SMPTE 272M it operates at Levels A, B, C and D. The overall design is particularly rugged in respect of use with a wide range of audio multiplexers, which has proved particularly important since there have been many 'interpretations' of SMPTE 272M.

Another facility to assist the installation in a real environment is the ability to lock an AES output to an external reference. (With an analogue output the reference serves no purpose.) The external reference may be either a Black and Burst video, another AES signal, or the SDI video itself can be used.

There are three SDI outputs which are re-clocked versions of the SDI input. If the signals are D1 then the ancillary data may be stripped off the SDI output signal. This facility is not available for D2 signals.

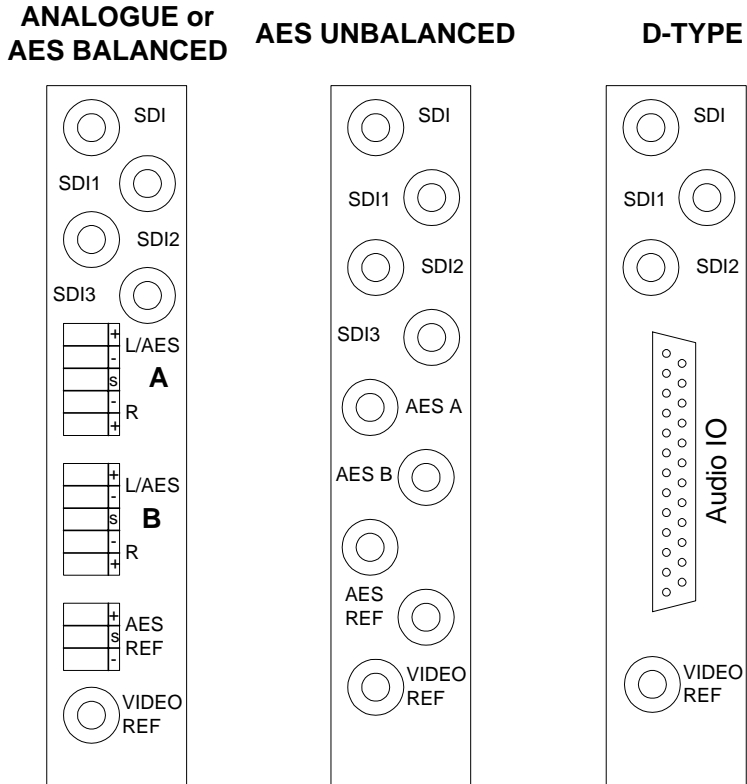
The unit is fully controllable over the DART remote control system.

The output of the unit has full EDH signals applied, but there is no EDH detection on the input.

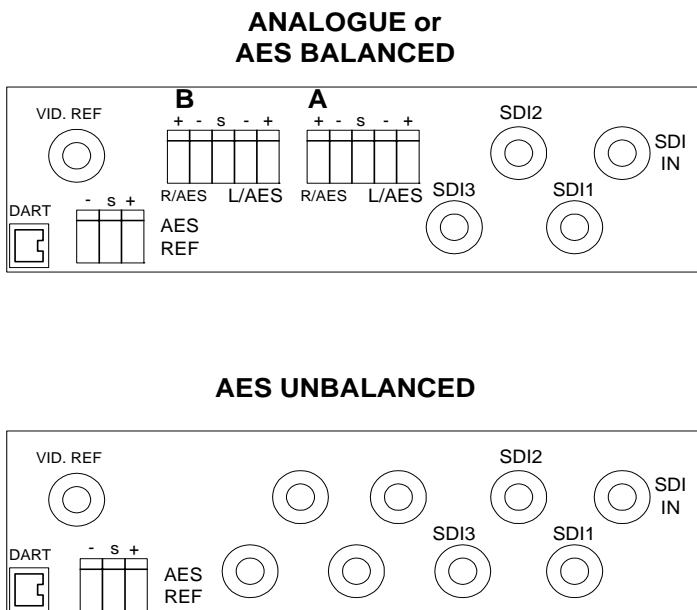
## 2. INSTALLATION

### 2.1 REAR PANEL - 3U

Two 3U rear panel options are available, depending on the output format. They are shown below:



### 2.2 REAR PANEL - 1U



## 2.3 REAR PANEL CONNECTIONS

SIGNAL	CONN	DESCRIPTION
SDI IN	BNC	SDI Video Input
SDI 1, 2, 3	BNC	3 off SDI Video Outputs
A, B		Audio Outputs or Channels A and B
+,-		Indicate the Positive and Negative of AES signal
L/AES		The Left channel (analogue) or AES O/P 1 (digital)
R/AES		The Right channel (analogue) or AES O/P 2 (digital)
AES REF		AES Reference Input
VID. REF	BNC	Video Reference Input
DART	RJ45	DARTNET connection. Only used in on position in 1U rack.

## 2.4 D-TYPE CONNECTOR PIN-OUT

The D type connector on the unit is female.

### Analogue Output

Pin	Function	Pin	Function
1	A Left Out -	14	A Left Out +
2	GND	15	GND
3	A Right Out -	16	A Right Out +
4	GND	17	GND
5	B Left Out -	18	B Left Out +
6	GND	19	GND
7	B Right Out -	20	B Right Out +
8	GND	21	GND
9	GND	22	GND
10	N/C	23	N/C
11	GND	24	GND
12	GND	25	GND
13	GND		

### AES Input

Pin	Function	Pin	Function
1	AES A1 Out -	14	AES A1 Out +
2	GND	15	GND
3	AES A2 Out -	16	AES A2 Out +
4	GND	17	GND
5	AES B1 Out -	18	AES B1 Out +
6	GND	19	GND
7	AES B2 Out -	20	AES B2 Out +
8	GND	21	GND
9	GND	22	GND
10	AES Ref In -	23	AES Ref In +
11	GND	24	GND
12	GND	25	GND
13	GND		

## 2.4 POWER CONSUMPTION

The power consumption of the V1634A depends on which output module is fitted and is shown in the following table:

Base Unit :	7W
Base Unit + Analogue I/O	12W
Base Unit + Digital I/O	9W

## 2.5 INSERTION DELAY

The video insertion delay, from D1 I/P to D1 O/P is **495µs**.

## 2.6 MODULE INSTALLATION

One of the two available output modules must be fitted. The options are:

Analogue Output	PCB 130-2192
Digital Output	PCB 130-2202

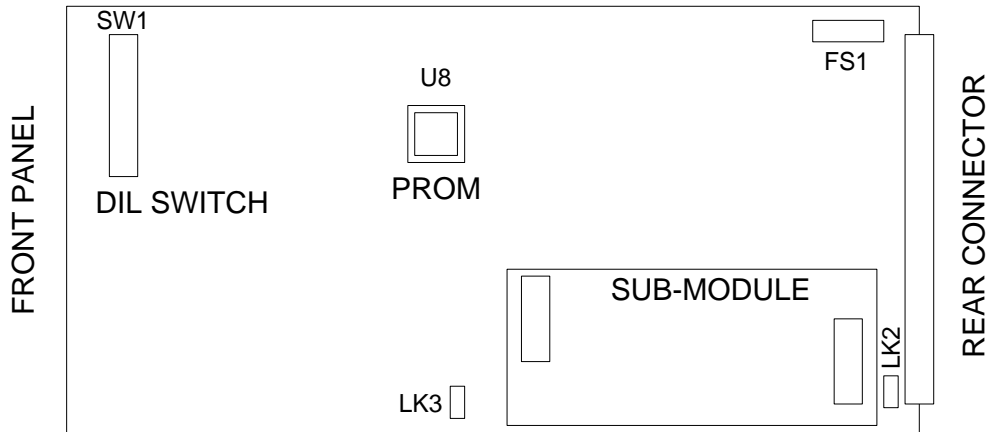
The module fits in the lower right hand area of the PCB labelled '**OUTPUT MODULE**'. Ensure the module is inserted the right way round, so the component ident writing is the same orientation as that on the main board. It is not possible to fit one on the sub-boards meant for the companion V1633, but it is possible to fit one of these boards the wrong way round.

**NOTE DO NOT FIT OR REMOVE A SUB-MODULE WITH THE UNIT POWERED.  
ENSURE THE MODULE IS CORRECTLY FITTED BEFORE APPLYING POWER**

When the unit is powered front panel LEDs indicate which type of output module is fitted - DAC or AES.

## 2.7 INTERNAL HARDWARE

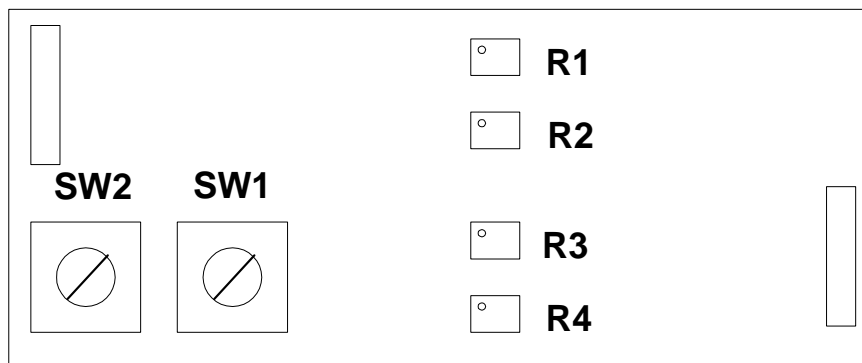
### 2.7.1 MAIN BOARD



The significant items on the main board are described here:

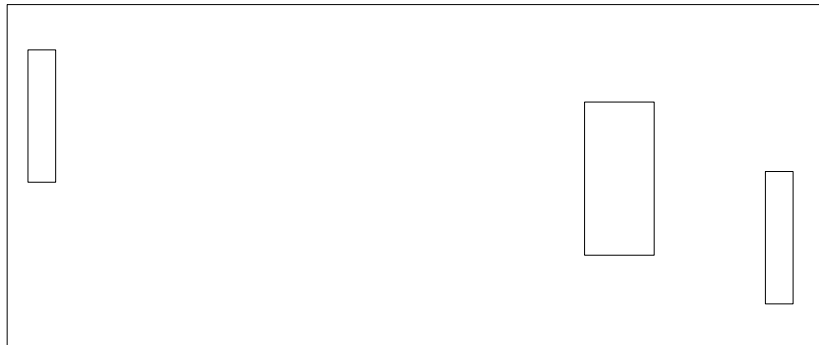
FS 1	Input power fuse, 3A.
SW 1	Internal configuration switches, S1 at the top. See section 0 for details. Note that
U8	The PROM that contains the firmware for the programmable device. In the event of upgrades in the field it is most likely that this is the device that will need to be changed.
LK 2	Enables termination of the video reference: UP = Open DOWN = Terminated
LK 3	Enables termination of the AES reference: UP = 600R Balanced DOWN = 75R Unbalanced
Sub-Module	Fitted with either the Analogue O/P Module (130-2190) or the digital O/P module (130-2202). Check for correct orientation before powering the unit.

### 2.7.2 ANALOGUE O/P MODULE



SW 1	Set Maximum Output Level (MOL) for channelpair A
SW 2	Set Maximum Output Level (MOL) for channelpair B
R 1	Calibration trim channel AL
R 2	Calibration trim channel AR
R 3	Calibration trim channel BL
R 4	Calibration trim channel BR

### 2.7.3 DIGITAL O/P MODULE

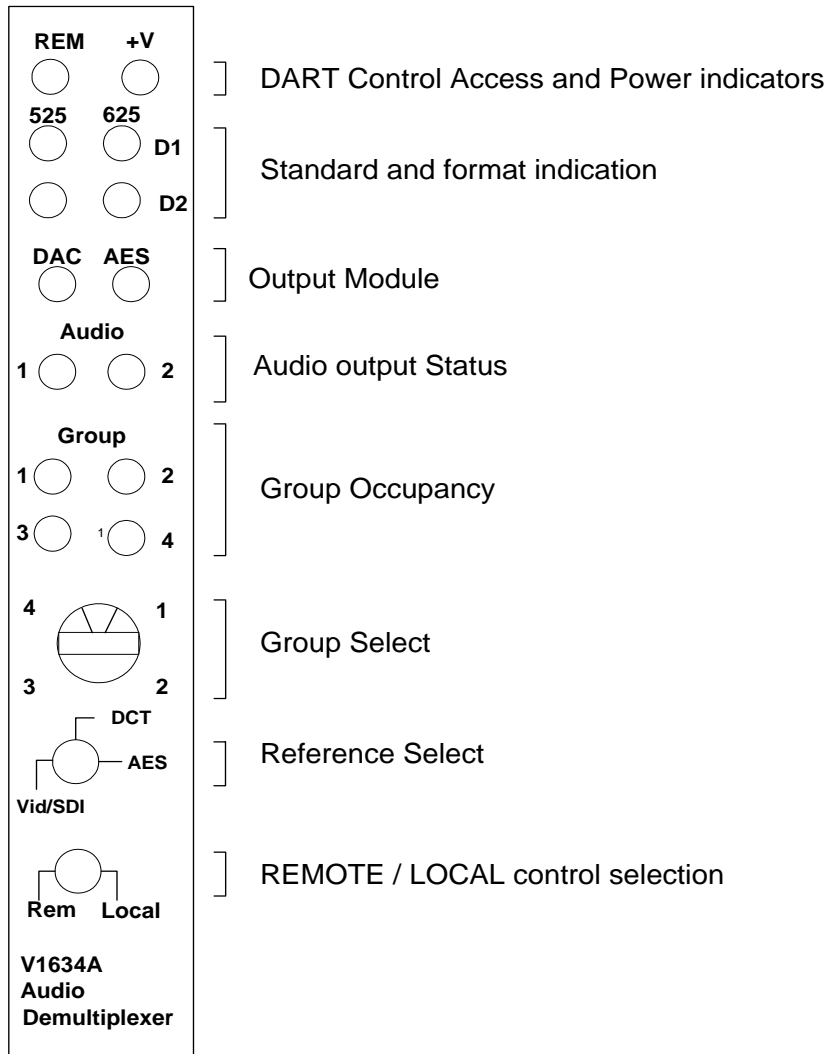


There are no adjustments on the digital O/P module



### **3. OPERATION**

#### **3.1 FRONT PANEL**



#### **3.2 POWER**

The power LED, marked +V, indicates that the 5V VCC power rail is present on the board. This shows not only that power has been applied to the rear, but also that the on board regulator is functioning.

There is a fuse on the unit in series with the power input, and if this has 'blown' then the +V LED will be OFF.

#### **3.3 REMOTE CONTROL**

The V1634A can be controlled from either the front panel, shown above or through the DART remote control Network. If DART is used then any DART controller, with knowledge of the V1634A can be used. Vistek can provide either the V1605 1U control panel or VIEWFIND which is a PC based universal control system. Any DART controller can be used, provided it has 'knowledge' on the V1634A.

The control source, Local or Remote, is selected by the toggle switch on the front panel. The REM LED does not indicate the selection of remote control, but 'blips' to show access by the Rack

Controller, if fitted. Only the position of the toggle switch indicates that remote control has been selected.

The status LEDs on the front panel are active for Local or Remote control so always show the operating condition.

### 3.4 STANDARD INDICATIONS

Four LEDs on the front panel show the standard and format of the input signal. The unit can operate in either 525/60 or 625/50 formats, each of which can be component (D1) or composite (D2). Only one LED can be on at any one time.

If there is no SDI video input then all four of these LEDs will OFF.

### 3.5 MODULE INDICATION

Two LEDs are used to indicate which of the two available sub-modules is fitted. Normally just one of these LEDs will be ON. It is possible that a future module will provide one AES output and one analogue output, a so-called hybrid module; in this case both LEDs will be ON.

### 3.6 GROUP SELECTIONS - D1

With a D1 input signal there can be up to four groups of embedded audio, each group carrying two AES streams. The V1634A can only extract one of these groups and which one is selected using a front panel rotary switch with markings **1** to **4**. The switch should be used to indicate which of the groups has been selected and not the GROUP LEDs above.

The LEDs indicate which groups are occupied on the input signal, and not which groups has been selected. Thus any number of the LEDs may be ON. If a group has been selected which does not have any audio embedded on it then the relevant LED will flash. This is a warning that there will be no audio output.

### 3.7 REFERENCE SELECTION

Many installations have difficulty with embedded audio, which can often be traced to the frequency and phase relationship between the video and AES audio. Unlike many SDI De-multiplexers the V1634A does not require the signals to be synchronous. In fact it is quite possible for the SDI video and the two de-multiplexed audio data streams to have no defined relationship. (The companion V1633A Multiplexer can operate in several modes to enable reliable operation with a variety of de-multiplexers.)

To assist in operational installation the V1634A can be used to synchronise the audio to various references. This may help if the audio is to be re-inserted at a later stage by another manufacturer's multiplexer. The reference source may be either an AES signal or a video signal. The video reference may be either the SDI input signal itself or an external analogue black and burst reference.

The front panel has a three position selection switch used as follows:

POSn	Definition	Description
VID/SDI	Video Ref and SDI I/P	Use one of the video references. The choice between Ref and SDI is made by S0 on the internal DIL switch. If Ref is selected but not present, then SDI will be used.
DCT	Direct	Pass AES without synchronisation.
AES	AES Ref	Use the external AES as a reference. If this is absent then the SDI input will be used. An AES reference of 48kHz must be used.

### 3.8 INTERNAL SETTINGS

S	Title	Description	Left	Right (= ON)
0	REF SDI	Select video reference between Ext Ref and SDI	SDI	EXT
1	ANC Blank	Blank all ancillary data from the output	Blank	Pass
2	EDH Gen	Set the EDH on the output into Generate mode, (as opposed to Process mode)	Generate	Process
3		reserved		
4		reserved		
5	Op. Mode	Select 1 of 8 operating modes (Use 000)	1	0
6			1	0
7			1	0

For normal operation all switches should be set to the right (ON).

### 3.9 EDH

The unit contains an EDH (Error Detection and Handling) chip on its output stages. This is normally set to Process mode, but can be set to Generate, by setting S2 on the DIL switch. This can also be set over the remote control.

### 3.10 ANCILLARY BLANKING

If the SDI signal from the V1634A is to be used for further processing it may be necessary to remove any data already in the ancillary data space. This can be done by wetting S3 of the internal DIL switch accordingly. This can also be set over the remote control.

If the Ancillary data is set to be blanked then ALL data in the ancillary space will be removed, not just the audio data.

### 3.11 TROUBLE SHOOTING

There are a number of pitfalls in using embedded audio data in a digital video bit stream, and experience has shown where some of the difficulties may lie. In many cases these problems are caused by some manufacturers have a slightly different interpretation of the Standard. Some equipment already in service was designed before the final issue of the standard was released and therefore may have deficiencies. In other cases the standard has simply not been followed.

This section lists some possible problems and what their causes could be:

SYMPTOM	CAUSE AND CURE
No Audio from either channel.	Wrong Group selection. Check that audio is actually embedded on the right group, and the demux is set up properly. The front panel of the V1634A indicates which groups are active. Some multiplexers require an input on both AES channels, and blank all audio if this is not the case. The V1633A allows the user to route a single AES input to both embedding channels.
One O/P channel silent.	Check the rear panel wiring.
No AES output	Check the V1634 is fitted with an AES output module.
No analogue audio output	Check the V1634 is fitted with a DAC output module.

## **4. DAC OUTPUT MODULE**

### **4.1 DESCRIPTION**

The 130-2192 dual DAC output module features 24-bit DACs to accommodate future upgrade to 24 bit embedding in the SDI. Each channel pair - consisting of L and R channels - has digitally controlled MOL which may be adjusted from +12dBu to +24dBu by the on-board hex switches SW1 and SW2. Each of the four analog outputs is quasi balanced 50Ω differential.

### **4.2 MAX OUTPUT LEVEL SETTING**

The MOL of each of the two channel pairs A and B may be set from +12dBu to +24dBu in 1dB steps by means of the on-board hex switches if the V1634 is operated in local mode. Hex switch SW1 and SW2 control MOL of channel pair A and B respectively and Table 4.2.1 below shows the MOL settings for each hex switch position. The factory supplied shipping setting is +18dBu.

If the V1634 is connected to a DART compatible remote host and operated in remote mode, the MOL may be set remotely and the on-board hex switches are disabled.

**Table 4.2.1**

<b>Switch Setting</b>	<b>MOL</b>
0	+12dBu
1	+13dBu
2	+14dBu
3	+15dBu
4	+16dBu
5	+17dBu
6	+18dBu
7	+19dBu
8	+20dBu
9	+21dBu
A	+22dBu
B	+23dBu
C	+24dBu
others	+24dBu

### **4.3 CALIBRATION**

The 130-2192 DAC output module has four trimming potentiometers R1, R2, R3 and R4, which respectively trim the gain of the module's digitally controlled gain block for analogue outputs AL, AR, BL and BR. These potentiometers should not require adjustment by the user as they are accurately set at the factory.

## **5. AES OUTPUT MODULE**

### **5.1 DESCRIPTION**

The 130-2202 AES output module has dual AES outputs which, depending on the reference mode selected, are either asynchronous or locked to SDI, external Black and Burst video or AES reference source.

If the external Black and Burst video reference is selected, the unit will automatically synchronise to 525 /60 or 625/50 Black and Burst video input to the VID REF connector on the rear panel.

If the external 48kHz AES reference is selected, the unit will frequency lock both AES output streams to the external AES applied to the AES REF connector on the rear panel, and will time-align AES output frames and channel status blocks to those of the external AES reference.

If the selected reference source is disconnected or fails, the unit will automatically default to the internal SDI reference.