

# VISTEK V6334E/D & V6334Q/D HD/SD SDI DIGITAL AUDIO DE-MULTIPLEXER USER GUIDE



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# **VISTEK V6334E/D & V6334Q/D**

## **hd/sd sdi digital audio de-multiplexer**

### **1. DESCRIPTION**

The V6334/D Digital Audio De-Multiplexer is a full broadcast specification de-multiplexer of audio data from HD (High Definition) and SD (Standard Definition) SDI data streams. Two versions of the V6334 are available, one with 4 AES outputs (V6334Q/D), and another with 8 AES outputs (V6334E/D). Although the V6334 processes High Definition (HD) video signals, it is fully compatible with all other products in the range in terms of form factor, power supply requirements and control interface. The V6334 is a 3U high card that can be fitted into a V1606 rack or a V6011 '1-Box', from which it obtains its power and control.

There is also an audio multiplexer module, the V6333, which is fully compatible with the V6334.

A passive rear module is required for all signal interconnections. There are 3 types of rear module; a 4 unbalanced output (Single module width), an 8 unbalanced output (Double module width), and one offering 8 balanced outputs (Single module width).

The unit automatically detects the standard and format of the SD or HD input video and operates accordingly.

The unit de-multiplexes audio from SDI video data stream according to SMPTE 272M (SD) and SMPTE 299M (HD). Audio channels from all of the available audio groups may be de-multiplexed and output from the module. Unlike de-multiplexers from some other manufacturers the audio does not need to be synchronous with the video into which it is to be embedded.

There are up to two SDI outputs, and one re-clocked versions of the SDI input. All ancillary data may be optionally stripped off the SDI input signal before being outputted. The EDH is optionally regenerated on the card for SD.

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

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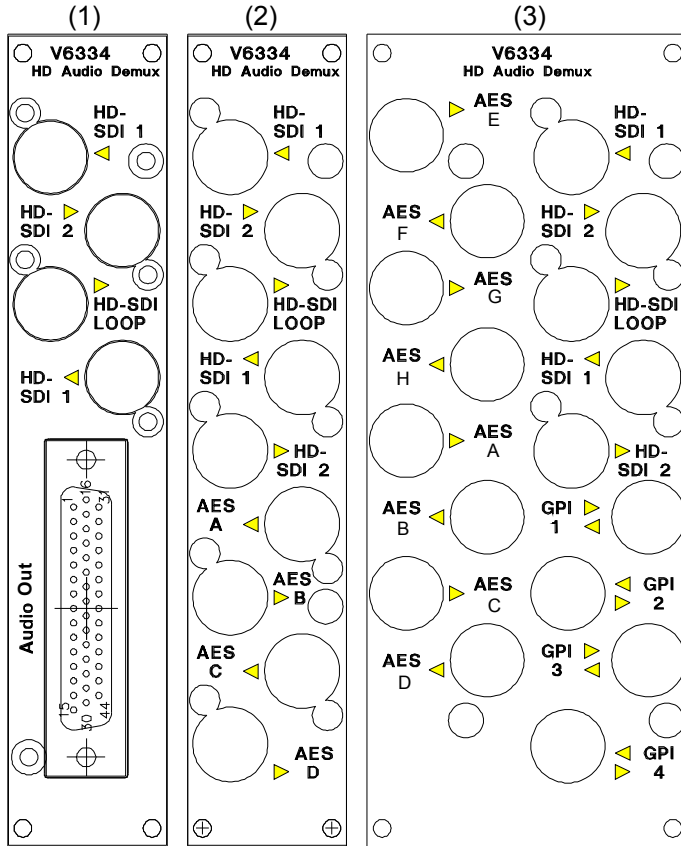
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## 2. INSTALLATION

### 2.1 Rear Panel - 3U

Three rear panel options are available, depending on the number and format of the outputs. They are shown below:



(1) 8 balanced AES outputs are provided by an interface cable from the high density 44 way D-Type connector.

(2) 4 unbalanced AES outputs are provided by BNC interface directly onto the rear panel.

(3) 8 unbalanced AES outputs are provided by BNC interface directly onto the double width rear panel.

### 2.2 Rear Panel Connections

SIGNAL	CONN	DESCRIPTION
▶ HD/SDI 1	BNC	HD/SD SDI Video Input 1
▶ HD/SDI 2	BNC	HD/SD SDI Video Input 2
◀ HD/SDI LOOP	BNC	HD/SD SDI Re-clocked and Buffered Loop-through Output
◀ HD/SDI 1	BNC	HD/SD SDI Main Output 1
◀ HD/SDI 2	BNC	HD/SD SDI Main Output 2
◀ AES n	BNC	Unbalanced AES output A to D or A to H
▶ GPI n	BNC	General purpose interface 1 to 3, GPI 4 is not available on the V6334.
◀		
Audio I/O	D-Type	Balanced AES outputs A to H, and GPI 1 to 4



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### 2.3 D-Type Connector Pin-Out

The D type connector on the unit is male.

Sig. Group Label	Pin	Signal Name	Signal Function	Sig. Group Label	Pin	Signal Name	Signal Function
	14	AES_P1	Out AES E1 Pos		4	NC	
AES E	44	AES_N1	Out AES E1 Neg		34	NC	
	15	GND	Out AES E1 Gnd		19	NC	
	13	AES_P2	Out AES F2 Pos		3	NC	
AES F	43	AES_N2	Out AES F2 Neg		33	NC	
	28	GND	Out AES F2 Gnd		19	NC	
	12	AES_P3	Out AES G1 Pos		2	NC	
AES G	42	AES_N3	Out AES G1 Neg		32	NC	
	26	GND	Out AES G1 Gnd		16	NC	
	11	AES_P4	Out AES H2 Pos		1	NC	
AES H	41	AES_N4	Out AES H2 Neg		31	NC	
	40	GND	Out AES H2 Gnd		16	NC	
	9	AES_P5	Out AES A1 Pos		23	NC	
AES A	39	AES_N5	Out AES A1 Neg		22	NC	
	10	GND	Out AES A1 Gnd		35	NC	
	8	AES_P6	Out AES B2 Pos		18	NC	
AES B	38	AES_N6	Out AES B2 Neg		17	NC	
	24	GND	Out AES B2 Gnd		35	NC	
	7	AES_P7	Out AES C1 Pos		20	GPI_1	
AES C	37	AES_N7	Out AES C1 Neg		25	GPI_2	
	21	GND	Out AES C1 Gnd		29	GND	
	6	AES_P8	Out AES D2 Pos		30	GPI_3	
AES D	36	AES_N8	Out AES D2 Neg		29	GND	
	5	GND	Out AES D2 Gnd		27	NC	

### 2.4 Power Consumption

~12W

### 2.5 Video Insertion Delay

The video insertion delay, from SDI input to SDI output is:

- 2.32  $\mu$ s for SD signals
- 711 ns for HD signals

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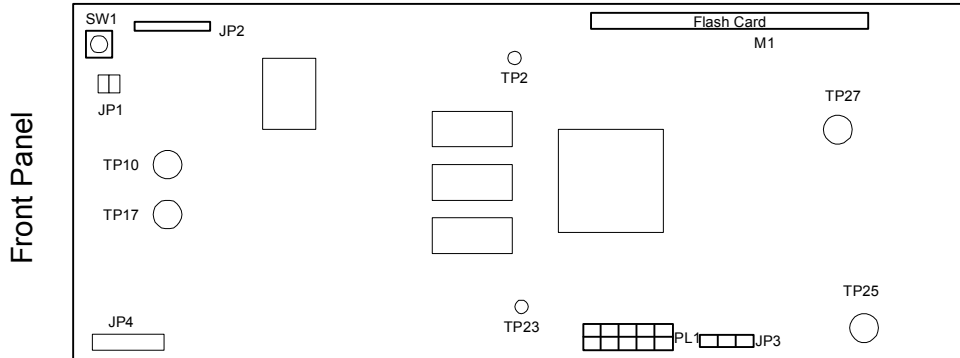
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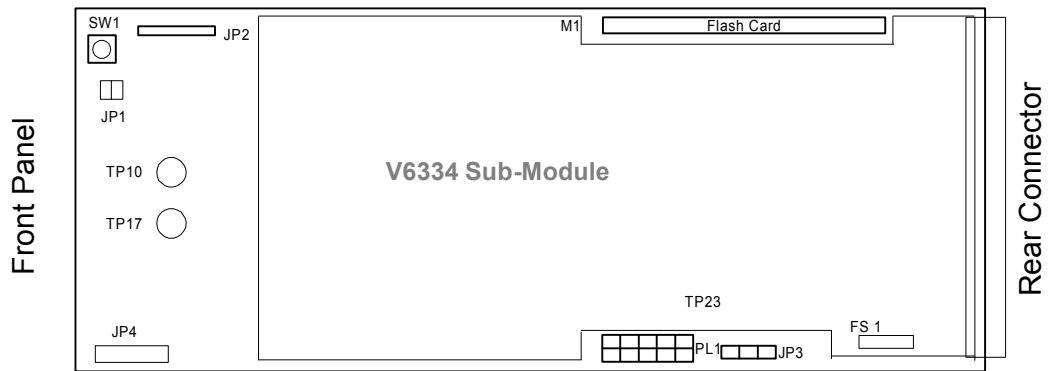
### 2.6 Internal Hardware

#### 2.6.1 Main Board

**Main board with no sub-module**



**Main board with V6334 sub-module**





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The purposes of the links and switches is shown in the following table.

ITEM	Title	Comments
SW1	RESET	Used to reset the internal microcontroller.
JP1	Debug/Normal Link	Should be left with no link, for development only.
TP10	+1.5V	1V5 Test Point
TP17	+3.3V	3V3 Test Point
JP4	+15V Plug	+15V Alternative supply plug.
JP2	H8 Debug and Programming Port	For downloading the H8's Bootloader program, and also used as a serial port for development.
TP2	+1.8V 1	1V8 Test Point from Reg U301
TP23	+1.8V 2	1V8 Test Point from Reg U309
M1	Flash Card	Stores H8 Application code and Firmware for the FPGA. Also used to store application specific data.
PL1	JTAG Connector	For development and test use only
JP3	JTAG enable	Link 2-3 for operational use.
FS1	Fuse	The main 2Amp fuse on the frame supply.

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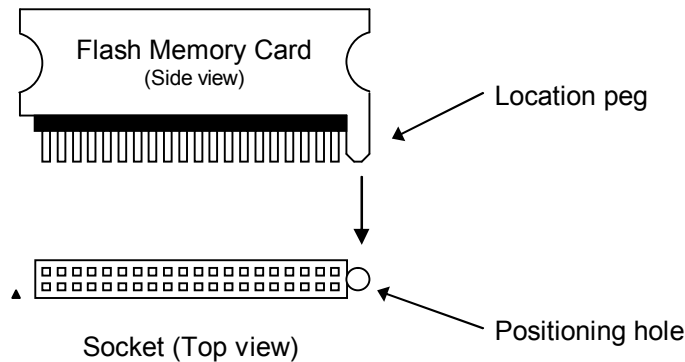
### 2.6.2 Fuse

There is only one fuse on these modules, which is in series with the main DC input.

FS1	Fuse 2 Amp Wire ended	In series with the +15V input to the module on the I/O daughter board.
-----	-----------------------	--

### 2.6.3 Flash Memory Card

The Flash Memory Card stores the firmware for the Microcontroller and the FPGA and is essential for the operation of the module. If this card is missing, the front panel display will come up with an error message (ERROR 10). The Flash Memory Card sits in a socket with a location peg to the right. In case of a firmware upgrade, one has to make sure that the replaced card sits firmly and straight in the socket with the location peg mating with the positioning hole on the baseboard.



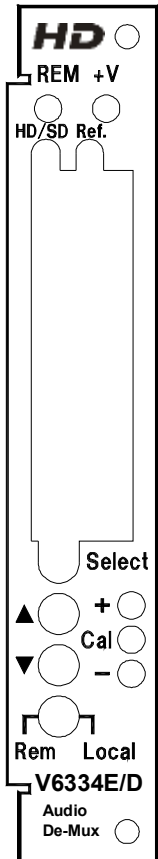
The Flash Memory Card is re-programmable. Customers are kindly asked not to throw it away after having upgraded a module with a newer firmware version. A Vistek service technician will collect it on his/her next visit or it can be put in an envelope and sent back to the postal address shown on the cover of this manual.

### 3. OPERATION

#### 3.1 Front Panel

##### 3.1.1 Direct Indications

The four LEDs at the top of the panel provide these direct indications of the unit:



REM	Short blinks to indicate access by the DART controller, if fitted. It does <b>not</b> directly indicate that the unit is in remote control mode. If the rack frame does not have a Rack Controller fitted then this LED will not blink.
+V	Indicates that the main +3.3V is present on the board. This is derived from the +15V distributed through the rack. The modules do have many power rails, but only the main +3.3V is indicated here. It will, of course, be off if the fuse, FS1, were to have been blown.
HD/SD	Indicates that a valid SDI signal (either HD or SD) is being received.
Ref.	This LED has no function on the V6334, but will follow the state of the HD/SD LED.

##### 3.1.2 Display and Switches

The main display is an eight character LED matrix display. It has been set so that when fitted into a 3U rack (V1606) it can be read from the left, and when fitted to a 1U rack (V1601) it is horizontal and the 'proper' way up. (At time of writing it is not possible to fit the HD products into the V1602 1U rack.)

The three action buttons are labelled **Select**, ▲ and ▼. The **Select** button is used to move down and up the menus. A short press will move down one level, while pressing and holding for about half a second will move up one level. If you continue to hold it will progressively move up a level every half second until it reaches the top level (**SLEEP**), or you let go, in which case it will stay where it is. When at any level the ▲ and ▼ buttons will move through the list of options, or if in an actual variable (such as Video Gain) they will change the values.



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If the unit is in Local control then the display and switches are used to set up and show the operation the module. If in remote mode then they are still active for showing the status but cannot be used to actually change anything.

Beside the ▲ and ▼ buttons are three LEDs marked +, **CAL** and -. In general the **CAL** LED is used to show that a variable is set to its normalised value and if not then the others show in which direction it has been changed or that it is no longer on its CAL value.

The toggle switch Rem/Local selects the source of control for the module. Remote control is discussed next.

### 3.2 Remote Control

The V6334 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 V6334 can be used. Vistek can provide either the V1605 1U control panel, V1602 2U control panel, or ViewNet, which is a PC based universal control system. Any DART controller can be used, provided it has 'knowledge' on the V6334.

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.

### 3.3 Menu System

The menus used for local control and status of the module is a hierarchical menu system with five levels as follows:

Sleep	Display is blank (except for Banner warnings).
Top Level	e.g. <b>V6334Q/D</b>
Main Menu	The Main menu items, such as <b>MAIN</b> , <b>ENG' ING</b> etc. These items are all in Upper Case.
Sub Menu	Menu items under each main heading, such as <b>Video</b> or <b>Output A</b> under the <b>MAIN</b> menu. These items are all in Sentence Case (generally lower case but with upper case first letters).
Parameter	The lowest level under the Sub Menu, and used to actually adjust a parameter. The display will depend on the actual parameter and may be a value such as <b>ON</b> or <b>OFF</b> for a switch variable. There is usually a title to describe the variable and a small icon in the left hand character position, but 8 characters cannot provide for a detailed description.

To move down a level just press the **Select** button briefly; then press either the **Select** button again to go down another level or the ▲ and ▼ buttons to move around the options within a level.

To move up a level press and hold the **Select** button for about half a second which will move up one level. If you continue to hold the **Select** button then it will move up a level every half a second until it reaches the Sleep level (one above the Top Level).

The menus are described in the next section.



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### 3.4 Banner Warnings

When certain invalid operating conditions occur one or more messages scroll across the front panel in sleep mode. Here are the details of the warnings that can be displayed.

#### Wrong FPGA File

The configuration file located in the flash memory card is incorrect for this type of module. Probably due to the incorrect flash memory module being fitted.

#### No sub-module

There is no sub-module fitted on the base board, therefore the module cannot operate.

#### Wrong sub-module

The incorrect sub-module has been fitted, therefore the module cannot operate.

#### Unknown rear module

The rear into which the module has been inserted is not a compatible rear for this module.

#### Only 4 AES O/Ps

The module is a V6334E/D and has been inserted into a rear that only has 4 output. So outputs E to H can not be used.

### 3.5 Main Menu

Here as a guide and a description of the operation of the module are the details of all the available controls and statuses available on the front panel menu. Please refer to appendix A for an overview of the menu structure, as the menus are described here in the order they appear in Appendix A from top to bottom, left to right.

#### 3.5.1 Video Input Selection

The SDI inputs must conform to either the SD or HD standards listed in Appendix B.

Two selectable SDI input connections are available on all rear versions. If only one input is required then it should be connected to SDI 1.

The input selection is done on the **MAIN** : **Video** menu.

#### 3.5.2 Group to Output Selection

There can be up to four groups of embedded audio, each group carrying two AES streams. The V6334 can de-embed any and all of these channels onto any output by selecting a group's channel for every output using the front panel.

In menu **MAIN** there is a control for each output; **Output A**, **Output B**, **Output C** etc. In each of these controls it is possible to select any group half, i.e. '**A Grp1.1**' will de-embed the first channel of group 1 to output A.

Note:

If no audio is present on the selected channel no AES carrier will be present on the output.

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### 3.6 Status Menu

#### 3.6.1 Variant

Displays the module type. This will be the same as the module type displayed on the front panel display on power up.

V6334Q/D  
V6334E/D.

#### 3.6.2 Options

Indicates the password protected options.

4 Output  
8 Output

#### 3.6.3 Sub-Module

All Vistek sub-modules have a unique identifier which is communicated to the main board so that the module can operate accordingly.

4 OP DMX  
8 OP DMX

#### 3.6.4 Rear ID

The V6334 can operate in any of the three rears available. Even if an 8 output de-mux is plugged into a 4 output rear. The number of available outputs is reduced but the module operates as normal. To help the operator correctly configure the module without having to go around the back of the installation to find out what rear the module is plugged into the type of rear is displayed here.

4AES BNC  
8EAS BNC  
8AES DTp

#### 3.6.5 Video Source

Indicates the value that has been set in the **MAIN** : **Video** menu.

I/P 1  
I/P 2

#### 3.6.6 Input Standard

Displays the detected standard of the input video.



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### 3.6.7 Video Input 1 & 2 Presence

Indicates the presence of the video inputs.

```
I/P 1
  I/P 1 Ü   Input 1 present
  I/P 1 x   Input 1 not present
I/P 2
  I/P 2 Ü   Input 1 present
  I/P 2 x   Input 1 not present
```

### 3.6.8 Input Audio Groups Presence

Indicates the presence of groups on the input video.

Display format:

```
1 2 3 4
```

The group number is displayed for all present groups.

### 3.6.9 GPI Status

Connecting a GPI input to 0v activates the GPI, leaving it open de-activates it. The status of each GPI is shown in the STATUS menu as ↑ or ↓, the former being active and the latter inactive (despite the fact that connecting it to 0v makes it active).

### 3.6.10 Module Code & hardware Versions

Displays the various versions of the code and hardware that make up the module.

```
Soft Ver : Software Version
FPGA Ver : FPGA Firmware Version
MCPLDVer : Main Board CPLD Firmware Version
PCB Ver  : PCB Version
Boot Ver : Software Boot Version
```

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### 3.7 Engineering Menu

#### 3.7.1 Audio Output Enables

Each audio output can individually be turn off, on and muted.

<b>OP A</b>	Control for output A
<b>OPA On</b>	Turn output A
<b>OPA Off</b>	Turn output A
<b>OPA Mute</b>	Mute output A
<b>OP B</b>	Control for output B
<b>Etc ...</b>	

#### 3.7.2 Ancillary Data Blanking

Any data already in the ancillary data space can be removed by using this control. Set **ENG' ING: Anc Data** to **Anc Blnk** to remove all horizontal ancillary space data.

Note: If the Ancillary data is set to be blanked then ALL data in the horizontal ancillary (HANC) space will be removed, not just the audio data.

#### 3.7.3 Output EDH

EDH is a method of embedding data within the ancillary data space which carries a measurement of the video and other data. By regenerating the equivalent measurement at the receiving end it is possible to check that the data has been received correctly.

HD signals always have the EDH data embedded, but for SD signals it is optional. On the V6334 Audio de-multiplexer, the EDH on the output can be disabled on the **ENG' ING : O/P EDH** menu.

#### 3.7.4 Display Sleep

Since, for the vast majority of its life, the modules will operate behind the front panel of a rack frame the display on the local front panel will not be visible so it will go to sleep after a certain time. This timeout delay can be changed on the **ENG' ING : Sleep** menu to be anything between 0 and 30 minutes; 0 minutes means that it will stay on indefinitely. The sleep timeout always counts from the last front panel button push. The default time is 5 minutes.

The panel can also be forced into its sleep mode by moving up a level from the Top Level menu which displays the module type, **V6334Q/D** etc.

To get the display to come on again simply press one of the buttons and the menus will start again at the Top Level.

#### 3.7.5 Display Brightness

The brightness of the front panel display can be adjusted on the **ENG' ING : LEDLevel1** menu.



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### **3.8 Configuration Menu**

The GPI functionality can be enabled in the configuration menu. Apart from the GPIs it does not any operator functions. It is mainly used for factory initialisation of the module.

#### **3.8.1 GPI Configuration**

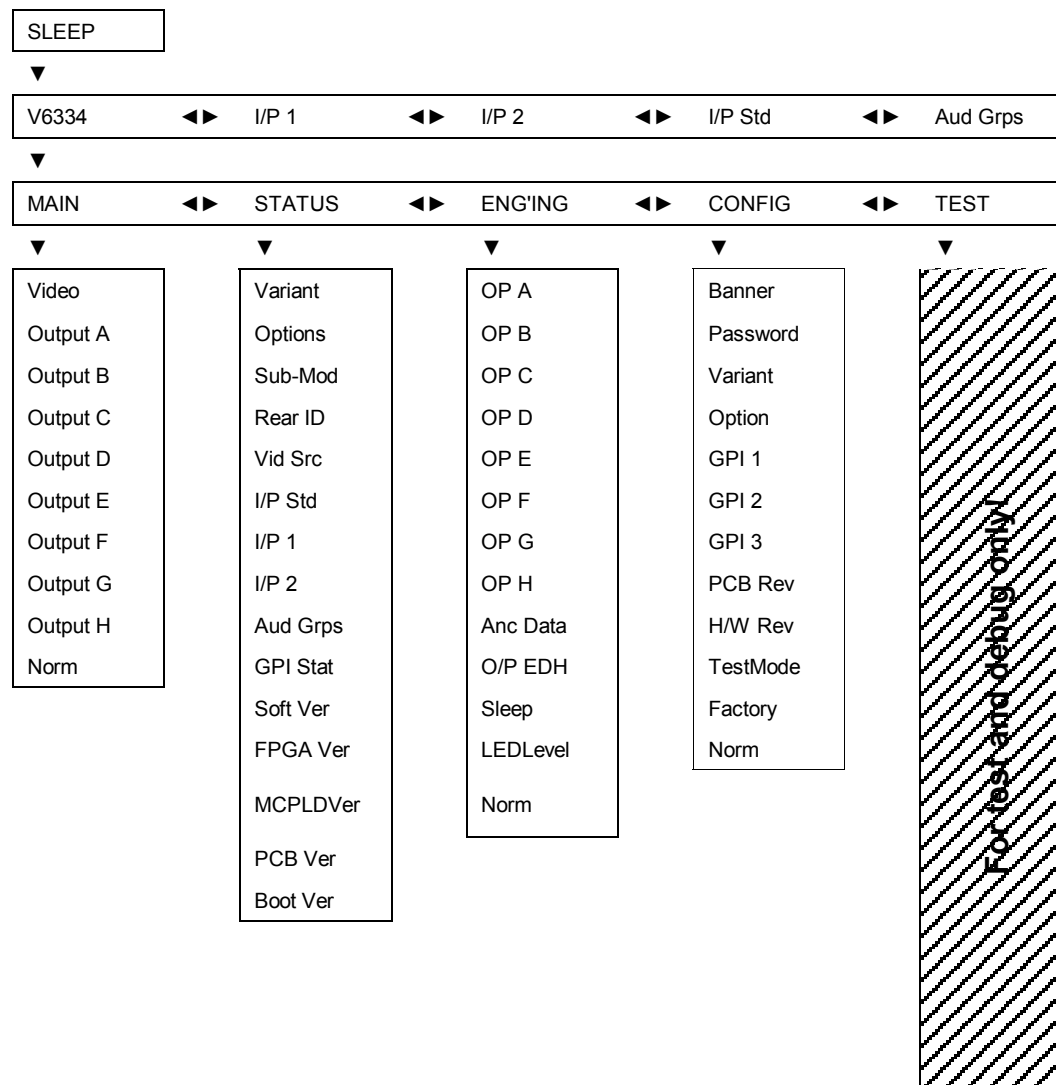
There are three GPIs. They are all active low with on-board pull-ups and voltage protection. Each of the three GPIs can be configured to switch the SDI input selection to the second input when active, or the GPI can be disabled.

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### APPENDIX A. V6334E/D DIGITAL AUDIO DE-MULTIPLEXER MENU STRUCTURE



Note: All references to inputs E to H are not present in the V6334Q/D menu structure due to the reduced number of outputs.



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## APPENDIX B. CONTROLS

These tables show a complete list of all the parameters that can be controlled locally. The tables also show the full range of the controls and their ranges and normalised value, if appropriate. The normalised value or setting is shown by the 'n'.

MAIN	Video	I/P 1	n	SDI Input selection	
		I/P 2			
	Output A	A None			Assign group halves to audio
		A Grp1.1	n		outputs.
		A Grp1.2			
		A Grp2.1			
		A Grp2.2			
		A Grp3.1			
		A Grp3.2			
		A Grp4.1			
	A Grp4.2				
	Output B	B Grp1.2	n		Selection available
	Output C	C Grp2.1	n		is the same as above.
	Output D	D Grp2.2	n		
Output E	E Grp3.1	n			
Output F	F Grp3.2	n			
Output G	G Grp4.1	n			
Output H	H Grp4.2	n			

STATUS	Variant	V6334E/D	Eight AES Output Dmx
		V6334Q/D	Four AES Output Dmx
	Options	8 x AES	
		4 x AES	
	Sub-Mod	8 OP Dmx	
		4 OP Dmx	
	Rear ID	8AES DTp	DType provides 8 balanced O/Ps
		8AES BNC	8 Unbalanced AES outputs
		4AES BNC	4 Unbalanced AES outputs
	Vid Src	I/P 1	
		I/P 2	
	I/P Std	625i50	
	I/P 1	I/P 1 ũ	SDI input presence
	I/P 2	I/P 2 ũ	ũ = Present x = No input
	Aud Grps	1 2 3 4	SDI input embedded group presence
	GPI Stat	1↓ 2↓ 3↑	GPI States ↑ - Active ↓ - Inactive
	Soft Ver	00.00.00	Version numbers
	FPGA Ver	00.00	
	MCPLDVer	00.00	
	DCPLDVer	00.00	
PBC Ver	00.00		
Boot Ver	00.00.00		



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ENG'ING	Op A	G1.1 On	n	Audio output On/Off/Muting
		G1.1 Off		
		G1.1Mute		
	Op B	G1.2 On	n	Selection available
	Op C	G2.1 On	n	is the same as above.
	Op D	G2.2 On	n	
	Op E	G3.1 On	n	
	Op F	G3.2 On	n	
	Op G	G4.1 On	n	
	Op H	G4.2 On	n	
	Anc Data	Anc Blnk	n	Blank data already in I/Ps HANC
		Anc Pass		Pass data already in I/Ps HANC
	OPA Sync	A ASync	n	
		A Sync		
	OPB Sync	B ASync	n	
	OPC Sync	C ASync	n	
	OPD Sync	D ASync	n	
	OPE Sync	E ASync	n	
	OPF Sync	F ASync	n	
	OPG Sync	G ASync	n	
	OPH Sync	H ASync	n	
	O/P EDH	EDH On	n	EDH handling
		EDH Off		
	Sleep	0 – 30 min		Normalised Value = 5 min
	LEDLevel			

CONFIG	Banner	On	n	Enable banner messages
		Off		
	Password	0		Test purposes only
	Variant	V6334E/D		
	Option	8 x AES		
	GPI 1	GPI Off	n	Activating GPI has no function
		GPI SDI2		Activating GPI switches the V6334 to SDI input 2
	GPI 2	GPI Off	n	Selection available
	GPI 3	GPI Off	n	is the same as above.
	PCB Rev	0		Test purposes only
	H/W Rev	0		Test purposes only
	TestMode	Off	n	Test purposes only
		On		
	Factory	Off	n	Test purposes only
		On		



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### APPENDIX C. SUPPORTED VIDEO STANDARDS

These units have been designed to operate using all the current Standard Definition and High Definition Standards based on field and frame rates of 23.98Hz, 24Hz, 25Hz, 29.97Hz, 30Hz, 50Hz, 59.94Hz and 60Hz. The Bit Serial Interface for all listed HD modes is in accordance with SMPTE specification 292M. For all SD modes, the Serial Digital Interface is in accordance with ANSI/SMPTE 259M.

#### V6334 HD/SD Digital Audio Multiplexer

##### Supported Video I/O Standards at the time of printing

Tektronix Definition	SMPTE	Colloquial
1920x1080/60/2:1	274M - 4	1080i60
1920x1080/59.94/2:1	274M - 5	1080i59
1920x1080/50/2:1	274M - 6	1080i50
1920x1080/30/1:1	274M - 7	1080p30
1920x1080/29.97/1:1	274M - 8	1080p29
1920x1080/25/1:1	274M - 9	1080p25
1920x1080/24/1:1	274M - 10	1080p24
1920x1080/23.98/1:1	274M - 11	1080p23
1920x1080/24/1:1SF	RP211 - 15	1080sf24
1920x1080/23.98/1:1SF	RP211 - 16	1080sf23
1280x720/60/1:1	296M	720p60
1280x720/59.94/1:1	296M	720p59
1280x720/50/1:1	296M	720p50
1280x720/30/1:1	296M	720p30
1280x720/29.97/1:1	296M	720p29
1280x720/25/1:1	296M	720p25
1280x720/24/1:1	296M	720p24
1280x720/23.98/1:1	296M	720p23
1920x1035/60/2:1	260M	1035i60
1920x1035/59.94/2:1	260M	1035i59
625/50/2:1	125/259M	625i50
525/59.94/2:1	125/259M	525i59

**Note:** The 'colloquial' label is how they are referred to in this manual.