



**VISTEK V1669 & V1669/SY
12-BIT PAL/NTSC TO SDI ADAPTIVE
DECODER WITH OPTIONAL FRAME
SYNCHRONISER USER GUIDE**

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VISTEK V1669 & V1669/SY 12 bit pal/ntsc to sdi adaptive decoder

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1. GENERAL DESCRIPTION

The V1669 is a broadcast quality multi-standard adaptive decoder, and forms part of the Vistek V1600 modular range of interface products. The 3U x 250mm card may be fitted into either the V1601 (1U) or V1603 (3U) 19" rack mountable enclosures, from which it derives its power. All signal inputs and outputs are made via a passive rear module.

In its basic form, without a Frame Synchroniser fitted, the unit converts an analogue colour encoded composite video input to a 270Mbit component Serial Digital Video (SDV) output standard.

A Frame Synchroniser module may be optionally fitted to the decoder. The Frame Synchroniser permits the output of the unit to be timed up to an external reference, with a user programmable offset of up to ± 75 lines relative to the reference.

The V1669 has a high impedance looping input, into which the analogue colour encoded input is presented. The card will detect, and consequently automatically decode, any of the standards listed below:-

PAL B, G, I, M, N
NTSC M, NTSC JAPAN
NTSC 443

The decoder may also be forced into any one of the specified standards, although it is generally recommended that the user leave the card set in automatic (**AUTO**) mode.

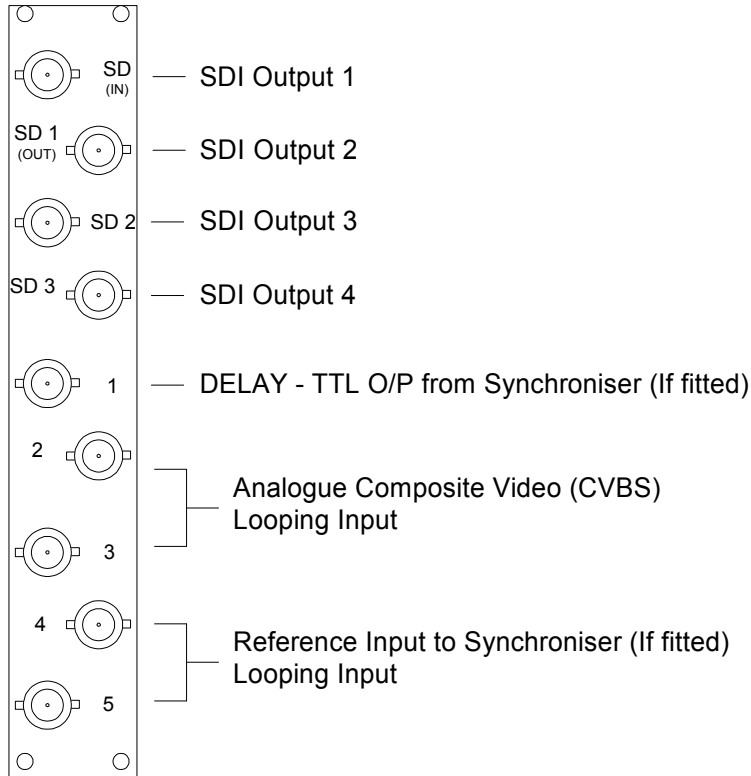
The V1669 has four 270Mbit component Serial Digital Video (SDV) outputs.

Front panel controls enable the user to set up/adjust various operating parameters, and if a Frame Synchroniser option is fitted they may be used to time the unit into an installation.

All parameter settings, for each standard, are stored in non-volatile memory. Thus a unit may be powered down without the settings being lost.

2. INSTALLATION

2.1 Rear Panel Layout and Signal Connections



BNC Connector	Input / Output Description	Comments
SD (IN)	SDI Output 1	Cable drive length:- up to 200 metres.
SD 1 (OUT)	SDI Output 2	Cable drive length:- up to 200 metres.
SD 2	SDI Output 3	Cable drive length:- up to 200 metres.
SD 3	SDI Output 4	Cable drive length:- up to 200 metres.
BNC 1	Delay O/P (TTL)	Only valid when a synchroniser sub-module is fitted.
BNC 2	CVBS	High impedance looping input.
BNC 3	Looping Input	
BNC 4	Reference	High impedance looping reference input.
BNC 5	Looping Input	Only valid when a synchroniser sub-module is fitted.

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2.2 Frame Synchroniser Module (Optional)

A Frame Synchroniser module may be optionally fitted to the V1669. It is located into sockets P1, P2, P3 and P4. Its presence is automatically detected by the on board micro-processor and is consequently integrated into the signal processing path.

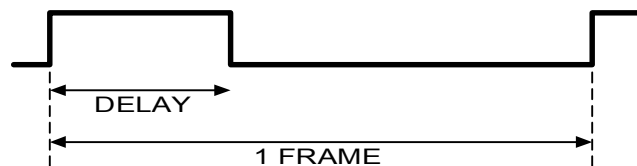
With a Frame Synchroniser fitted, the user may adjust the V1669 output timing relative to the reference input by up to a maximum offset of ± 127 lines. This operation is described in section 5.2 **Timing Parameter Selection and Adjustment**.

If a Frame Synchroniser module is fitted, but there is no reference input, then the output will be locked to the input video signal, with a user programmable offset. This mode is particularly useful in removing the inherent one line delay introduced by the adaptive 3 line comb within the decoding section of the unit.

2.3 Frame Synchroniser Delay

When the Frame Synchroniser delay option is fitted there is a TTL signal to indicate the amount of extra delay inserted above the minimum as specified for the unit. The signal has a constant period of one frame and a variable mark space ratio which depends on the amount of delay inserted. The HIGH portion of the signal indicates the delay.

A typical waveform is as shown below:



Note: If the input and reference signals are asynchronous then the width of the delay pulse will vary, and will be dependent on the relative timing of the two signals.

2.4 Insertion Delay

The insertion delay through the V1669 is dependent on whether a Frame Synchroniser option is fitted. Without a Frame Synchroniser it is deterministic and fixed. With the Frame Synchroniser fitted there is a delay range, and the absolute delay will be dependent on the relative timing between the input video signal and the reference input.

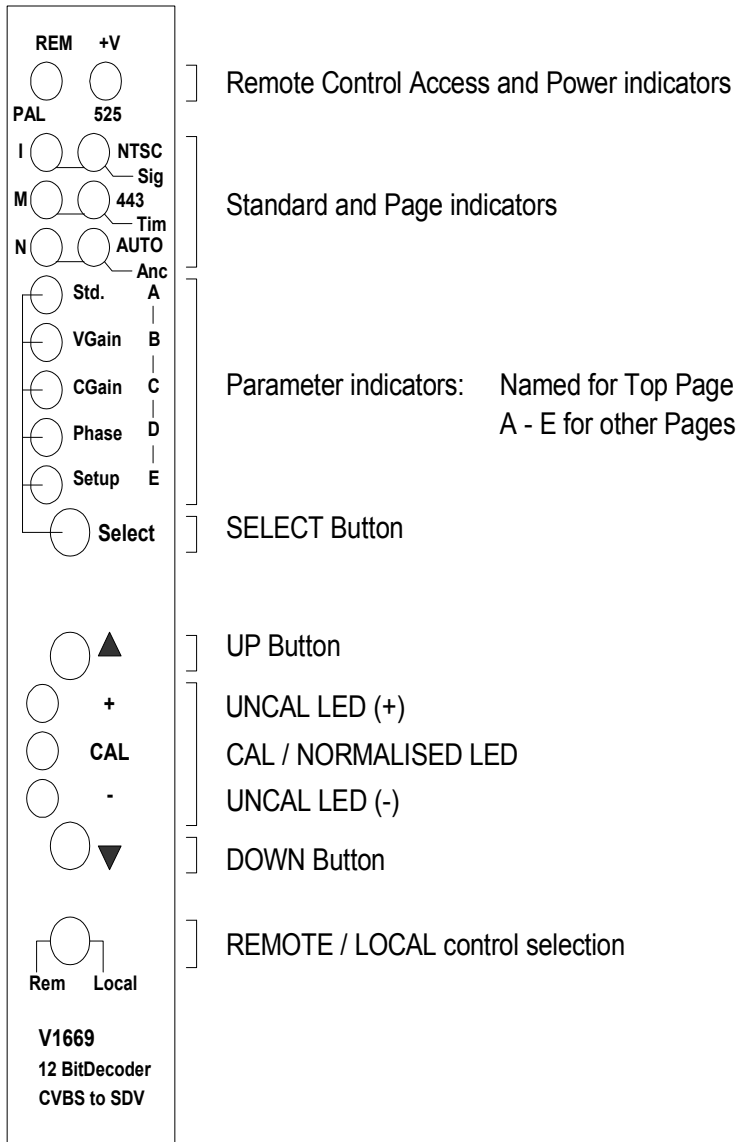
In each case the delay is measured between the composite video input and the input to the SDI serialiser.

Condition	Unit Delay
V1669 + No Frame Synchroniser Module	1 Line + 7 μ s
V1669 + Frame Synchroniser Module	1 Line + 7 μ s (Minimum) 1 Frame + 1 Line + 7 μ s (Maximum)



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3. FRONT PANEL LAYOUT



The V1669 has a versatile front panel, shown above. Commonly used controls are directly available, whilst the less used ones are protected from inadvertent use. The panel uses the concept of **Pages** and **Parameters**. Within each **Page** there are a possible 5 adjustable **Parameters**.

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There is provision for 5 pages in total, although only 3 are currently used. These are:

- Top page (normal operation)** This is the normal operating page. The unit will always enter this page at power up. **See 4. FRONT PANEL DESCRIPTION (NORMAL OPERATION).**
- Timing Page** This page is used to adjust the Frame Synchroniser timing parameters and input failure modes, and is accessible only when a Frame Synchroniser module is fitted to the card. **See 5. TIMING PAGE (FRAME SYNCHRONISER).**
- Engineering Page** This page is used to make changes to the decoder processing that it is considered the user will only need to access infrequently (VITS pass/blank, etc). **See 6. ENGINEERING PAGE.**

3.1 Page/Parameter Map

This table shows all the adjustable **Parameters** in each **Page**. It may be convenient to keep a copy close to the equipment.

	Top Page	Page 1 (SIG)	Page 2 (TIM)	Page 3 (ANC)	ENG.
A	Standard		V Timing		NTSC type
B	Video Gain		H Timing		VITS
C	Chroma Gain		Synch Fail Mode		
D	Phase		Minimum delay		Delay line PAL
E	Setup/Black		Timing Reset		Chroma B/W



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4. FRONT PANEL DESCRIPTION (NORMAL OPERATION)

4.1 +V Indicator

This is a green LED that is illuminated when the module is powered.

4.2 REM Indicator

This yellow LED is illuminated when remote operation has been selected and the module is accessed by the DART remote control system.

4.3 Video Standard Indicators / Selection of Video Standard

This is a bank of six yellow LEDs which indicate the operating standard and the status of the input signal. Please note that selection of the video standard via the front panel may only be achieved if the Local / Remote switch is set to **Loc**. When it is set to **Rem** there is a front panel lockout condition.

Selection of the operating standard is made by first pressing the Select button until the green Standard parameter LED is illuminated, then secondly by pressing the Up or Down buttons (▲ or ▼ respectively) to select the desired standard of operation.

The software allows the user to force any one standard, depicted by the relevant LED being illuminated, or to enter an automatic detect and decode mode, whereby the AUTO LED will be illuminated together with the relevant detected standard LED.

If there is no input signal present, or if the input signal is of poor quality, then the decoder will indicate this by flashing the selected standard LED when in force mode. When in automatic mode the AUTO LED will flash and none of the standard LEDs will be illuminated.

4.4 Parameter Indicators and Adjustment

There are five parameters that may be adjusted by the decoder in the Top Page. These are the video standard, video gain, chrominance gain, demodulation phase and setup/black level. The row of five green parameter LEDs indicate which parameter has been selected, and the status of the non-selected parameters.

Please note that selection and adjustment of any video parameter via the front panel may only be achieved if the Local / Remote switch is set to **Loc**. When this switch is set to **Rem** there is a front panel lockout condition.

Selection of the parameter to be adjusted is made by repeatedly pressing the **Select** button until the relevant green parameter LED is illuminated. The software cycles through each parameter in turn plus a sixth 'dummy' position, within which no parameter is selected (no LED illuminated). This helps to prevent accidental mis-alignment of a parameter.

After selecting the desired parameter, adjustment is made by using the Up and Down buttons (▲ or ▼ respectively). If the selected parameter is adjusted away from the calibrated position the green Cal LED will be extinguished, and one of the red LEDs (+ or -) will be illuminated, dependent on whether the chosen parameter has increased or decreased (Note: any non-selected parameter that has been adjusted away from its calibrated position will flash at low duty cycle). To reset the selected parameter to its calibration position depress the Up and Down buttons (▲ and ▼) simultaneously.

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Adjustment of the video standard (**Standard**) is described in the Section **4.3 Video Standard Indicators / Selection of Video Standard**.

Video gain (**VGain**) may be increased by pressing the Up button (**▲**) or reduced by pressing the Down button (**▼**). Video gain amplifies or attenuates all three of the component signals (Y, Cb, Cr) after the demodulation process and each by the same ratio.

Video gain	Max	200%	Resolution	0.2 % steps
	Cal.	100%		
	Min	0%		

Chrominance gain (**CGain**) may be increased by pressing the Up button (**▲**) or reduced by pressing the Down button (**▼**). Chroma gain amplifies or attenuates both of the colour difference signals (Cb, Cr) after the demodulation process and by the same ratio.

Chroma gain	Max	200%	Resolution	0.2 % steps
	Cal.	100%		
	Min	0%		

Demodulation phase (**Phase**) may be adjusted either side of the calibration position by using the Up and Down buttons (**▲** and **▼**).

Phase adj.	Max	+45°	Resolution	0.3° steps (approx.)
	Cal.	0°		
	Min	-45°		

The luminance output black level (**Setup**) of the signal may be adjusted either side of the calibration position (0mV black level in all standards) by using the Up and Down buttons (**▲** and **▼**).

Setup	Max	+150mV	Resolution	0.75mV steps (approx.)
	Cal.	0mV		
	Min	-50mV		

Please note: this adjustment is made **after** a nominal 54mV pedestal has been removed from 525 line standard inputs (excluding NTSC Japan).

4.5 Remote / Local Switch

The V1669 may be controlled locally via the front panel, hence this switch will be set to Local. Alternatively, the card may be controlled via the DART remote control system, in which case the switch will be set to Rem.

When in the Rem position the front panel is locked out ie. it is not possible to modify the video standard or to make signal parameter adjustments.



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5. TIMING PAGE (FRAME SYNCHRONISER)

5.1 Timing Page Entry

Press the Select button and hold in, followed by the Down (▼) button. Entry to the Timing Page will occur immediately, and will be indicated by the **Tim** pair of LEDs (PAL M and 443) flashing simultaneously.

Note: The Timing Page may only be accessed if there is a Frame Synchroniser Module fitted to the card.

5.2 Timing Parameter Selection and Adjustment

There are 4 adjustable parameters defined in the Timing Page. These are defined in the table below:

	Parameter
A	V Timing Offset
B	H Timing Offset
C	Sync Fail Mode
D	Minimum delay
E	Timing Reset

Selection of the parameter to be adjusted is made by repeatedly pressing the **Select** button until the relevant green parameter LED is illuminated. Then use the Up (▲) and Down (▼) buttons to adjust the chosen parameter as defined below.

To reset the chosen parameter to its calibration position depress the Up (▲) and Down (▼) buttons simultaneously.

The output of the decoder is vertically co-timed to the reference input when **V Timing Offset** is in the Cal. position (Green Cal. LED illuminated). If required the output may be advanced or delayed with respect to the reference by a maximum of 127 lines.

V Timing Offset	Max	+127 lines	Resolution	1 line
	Cal.	0 lines		
	Min	- 127 lines		

The output of the decoder is horizontally co-timed to the reference input when **H Timing Offset** is in the Cal. position (Green Cal. LED illuminated). If required the output may be advanced or delayed with respect to the reference by a maximum of $\pm 1/2$ line.

H Timing Offset	Max	+ 1/2 line	Resolution	37 ns
	Cal.	0 line		
	Min	- 1/2 line		

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The Frame Synchroniser offers three modes of operation when the input signal fails/disappears (**Sync Fail Mode**). These are:

Sync Fail Mode	(▲)	Freeze picture.
	Cal.	Freeze picture for 3 seconds, then cut to black
	(▼)	Cut to black.

All of the timing parameters may be reset to their respective normalised positions by following the procedure described below:

- 1 Select the **Timing Reset** parameter.
- 2 Depress the Up (▲) and Down (▼) buttons simultaneously, and keep both depressed for 5 seconds.

Successful timing reset will be indicated by the **Timing Reset LED (D)** being extinguished and the **V Timing Offset LED (A)** illuminating.

5.3 Timing Page Exit

Press the Select button, followed by the Down (▼) button. The decoder will exit the Timing Page immediately, and resume normal front panel operation.

If the unit is left in the Timing Page for more than five minutes, during which no button has been pressed, then the decoder will timeout from this mode and revert to normal front panel operation.



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6. ENGINEERING PAGE

6.1 Engineering Page Entry

Press the Select button and hold in, followed by the Down (▼) button.
Keep both buttons depressed for 5 seconds until all six yellow standard LEDs become illuminated simultaneously. This indicates that the decoder has entered the Engineering Page.

6.2 Engineering Parameter Selection and Adjustment

Scroll around the five parameters using the Select button. The engineering parameter functions may be switched ON and OFF by using the Up and Down (▲ and ▼) buttons respectively.

Engineering parameters are defined as:-

Parameter (Panel Legend)	Cal. LED	Engineering Page Parameter Function	Comments
A	ON OFF	NTSC NTSC Japan	Default (1)
B	ON OFF	Pass vertical interval data Blank vertical interval data	Default 625 Default 525
C	ON OFF	Not used	
D	ON OFF	Adaptive delay line PAL Simple PAL	Default all PAL standards Default all other standards
E	ON OFF	Chrominance band pass filter	
All 5 LEDs	Depress the + and - buttons for 5 seconds for Factory Initialisation of all parameters in all standards (except timing parameters, which may be normalised within the timing page). After successful Factory Initialisation the decoder will automatically resume normal front panel operation.		

(1) NTSC or NTSC Japan selection is only available when in the NTSC standard setting.

6.3 Engineering Page Exit

Press the Select button, followed by the Down (▼) button. The decoder will exit the Engineering Page immediately, and resume normal front panel operation.

If the unit is left in the engineering page for more than five minutes, during which no button has been pressed, then the decoder will timeout from this page and revert to normal front panel operation.

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7. TECHNICAL SPECIFICATION

Analogue Input (Looping)

Format	PAL B, G, I, M, N, NTSC M, NTSC Japan, NTSC 443
Level	1V p-p composite (terminated)
Connector	BNC
Impedance	75Ω (external)
Return loss	> 35dB to 5.5MHz

Reference Input (Frame Synchroniser fitted)

Format	PAL B, G, I, M, N, NTSC M, NTSC Japan, NTSC 443
Level	Standard level Black and Burst (or 1V p-p composite)
Connector	BNC
Impedance	75Ω (external)
Return loss	> 35dB to 5.5MHz

Serial (SDV) Outputs (4)

Format	EBU Tech.3267 ANSI / SMPTE T14.22/082
Data rate	270 Mb/s
Connector	BNC
Impedance	75Ω
Return Loss	> 15dB 5-270MHz
Amplitude	800mV p-p (terminated)
DC offset	0V +/- 0.5V
Rise and fall times	0.75-1.5 ns
Jitter	< 0.2 UI p-p
Drive length	up to 250m (Belden 8281)

Video Performance

Y frequency response	< 0.2dB to 5.5MHz
Y non-linearity	< 1.5 %
Chrominance non-linearity	< 1.5 %
2T pulse	< 1 % K
2T pulse / bar	< 0.5 % K
Chroma/luma timing error	< 10 ns
Subcarrier rejection	> 40 dB
Signal to noise ratio	> 65 dB (weighted)

Miscellaneous

Power consumption	8W approx. 10W approx.	Frame Synchroniser NOT fitted. Frame Synchroniser fitted.
Insertion delay	1 line + 7μs	Frame Synchroniser NOT fitted.



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8. APPENDIX

8.1 On Board Adjustable Components

Circuit Reference	Description
VR1	Syncs to picture timing alignment.
VR2	625/525 line standard discrimination.
VR3	Luminance gain alignment:- 525 input
VR4	Luminance gain alignment:- 625 input

Note: The table above is included for information only. Users are strongly advised not to adjust these components, as to do so may mis-align the related function.