



V1623 V1623K

Video Analogue to Digital Converter Module Key Channel Analogue to Digital Converter Module

INSTALLATION and OPERATION

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Filename: V1623om.doc
Issue : 2
Date: June 2002

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Video Analogue to Digital Converter Module

INSTALLATION AND OPERATION

1. DESCRIPTION

This manual covers both the V1623 video analogue to digital converter and the V1623K Key Channel analogue to digital converter. The Key Channel module has reduced functionality from the other version, as unnecessary controls and components have been removed. The V1623K uses the Y/G channel of the unit for the Key signal and the Pb/B and Pr/R channels are fixed at black in the processing.

The V1623 is a video analogue 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, V1603 or V1606 rack from which it gets its power and control. A passive rear module, 16VR1H or 16VR3H, is required for all signal interconnections.

The unit is fully dual standard for both 625/50 and 525/60 D1 signals. It can automatically detect the input standard and operate accordingly, or it can also be forced into a standard regardless of the input.

The unit can handle the analogue component signals in various formats to produce the standard D1 digital output. The formats are: -

Y, Pb, Pr (standard levels, Beta levels or US MII levels), with or without set-up
GBR with or without set-up

The sync reference may be a separate signal 300mV – 4V, or extracted from the Y or G signals.

Levels and timing parameters can be adjusted, along with blanking controls. An internal test pattern generator is also included for alignment purposes.

Video Gain	+ 6dB
Chroma Gain	+ 6dB
Black Level	+ 100mV
Green Gain	+ 6dB (GBR Mode only)
Blue Gain	+ 6dB (GBR Mode only)
Red Gain	+ 6dB (GBR Mode only)
Input Format	Y/Pb/Pr, GBR, MII, Beta
Output Standard	525, 625
Reference select	Y/G, External
Reference Fail Mode	Free Run, Black, Mute
Test Pattern	Bars, Black, Picture Edge, Ramp, Split screen
Monochrome mode	Colour, Monochrome
Picture position	+ 2.3 us
Y/C Timing	+ 0.55 us
Output Delay	0 – ½ line
Vertical Blanking	
Wide Screen Blanking	4:3, 14:9, 16:9, Key Level
Error Detection & Handling	On, Off
Limiting	Set-up ear removal (525 modes only)
Engineering Mode	Enables extra test Patterns & Mono Modes
Alignment mode	Module alignment set-up modes

In common with all Vistek V1600 modular units there is a local control panel, which lets the user adjust most of the controls. In addition the module may be controlled remotely using the DART system. DART is the general purpose control architecture supplied by Vistek and other manufacturers, and enables full control and monitoring of this and all other V1600 units.

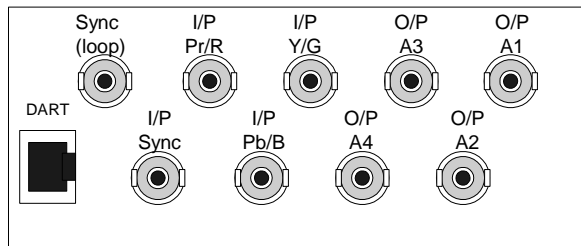
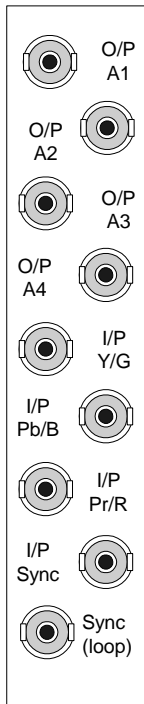
2. INSTALLATION

2.1 REAR PANEL CONNECTIONS

The V1623 rear module connections are shown below.

3U Rear Module (**16VR3H**)

1U Rear Module (**16VR1H**)



* The V1623K Module has the Y/G input labeled as Key and the Pb/B and Pr/R inputs are not connected.

2.2 INTERFACING

SIGNAL		COMMENTS
Power	7.5W	Supplied from rack
Analogue Inputs	BNC	Video (700mV nominal, but will handle 1.4V signals) Sync Reference (300mV – 4V) (looping un-terminated)
SDI O/P 1,2,3,4	BNC	Video to SMPTE 259M. Drive cable length up to 200m

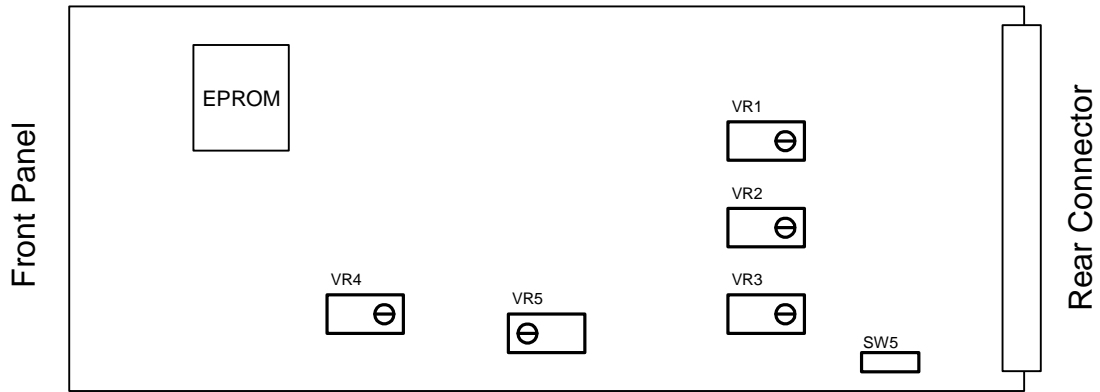
2.3 INSERTION DELAY

Sync Reference to SDI Output	6.3µs	
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2.4 HARDWARE

The figure below shows diagrammatically the printed circuit board along with certain other components of interest. In particular it shows the position and orientation of the controls and switches, which set up the calibrated levels and External Reference level range.

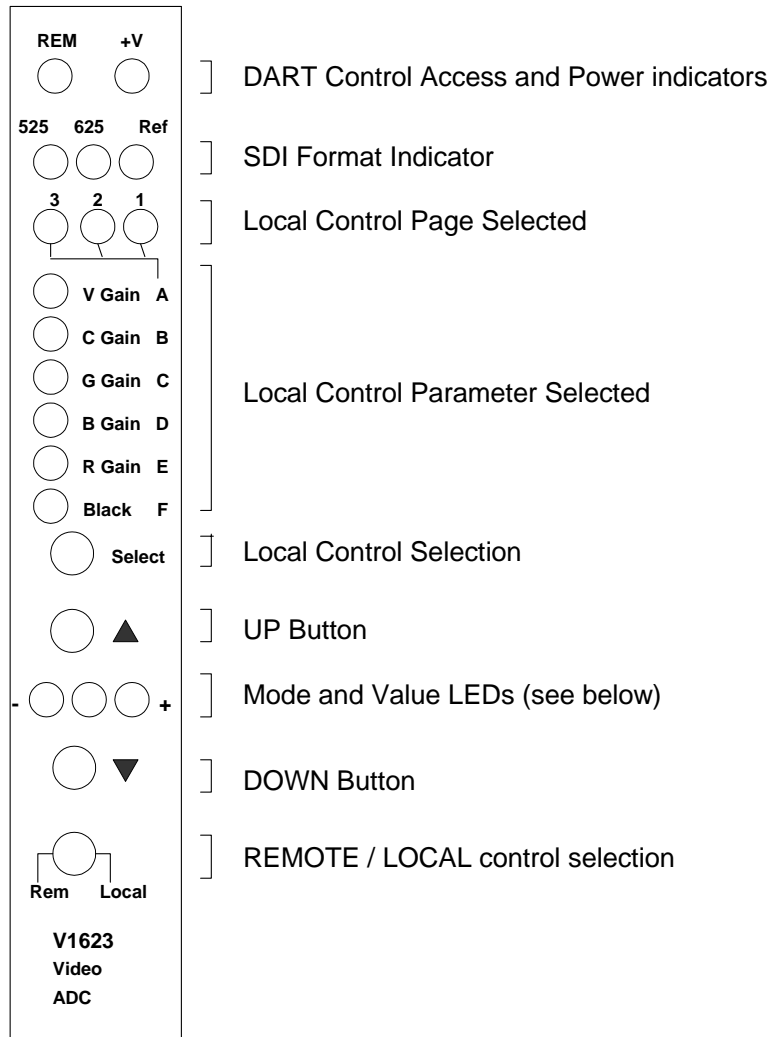
The EPROM location is shown, as it is the component that would need to be changed as a result of any software upgrade in the field.



The purposes of the controls and switches are shown in the following table. Details of their operation are described in later sections.

ITEM	Title	Section	Comments
SW5	External Reference input range		Sets the reference input voltage range between 300mV - 1V and 1V - 4V
VR1	Y/G amplitude		Calibrates the input analogue circuit
VR2	Pb/B amplitude		Calibrates the input analogue circuit
VR3	Pr/R amplitude		Calibrates the input analogue circuit
VR4	27MHz frequency		Sets the freerun frequency of the oscillator
VR5	Fine phase		Sets the clock edge to reference timing

2.5 FRONT PANEL



The front panel shown above has three purposes:

Provide the user with the operating conditions
Offer Local control and indication of the primary controls
Select the control source

2.5.1 Operating Conditions

The LEDs at the top of the panel have these meanings

REM	Short blinks to indicate access by the DART controller, if fitted. It does not indicate that the unit is in one of its remote control modes.
+V	Indicates that 5V is present on the board. This is derived from the +15V distributed through the rack.
525	Indicates that a 525/60 format signal is being Output. Green = Input. Amber = Test Pattern
625	Indicates that a 625/50 format signal is being Output. Green = Input. Amber = Test Pattern
Ref	Indicates that a valid Reference signal is being received. Green = Locked Amber = Standard conflict Red = Failed

2.5.2 Adjustments

The central section is used in Local control to select which of the four available pages and which of upto 6 available menus is to be adjusted and to make the adjustment. In remote mode or Page 0, menu 0, the menu LEDs indicate by flashing if any of the gains are off their calibrated settings.

Selecting a page is done by holding down the select button and pressing the τ button. The pages will rotate around 0 – 1 – 2 – 3 – 4 – 0 etc.

Selecting a menu is done by pressing and releasing the select button. The menus will rotate A – B – C – D – E – F – null – A etc. (Not all menus are available on each page, so non-available menus will be skipped. Availability can also depend on operating modes.)

Once a control has been selected then it is changed by pressing the σ and τ buttons.

Level and timing adjustments have rate laws on the σ and τ buttons, so holding them down will increase the speed of adjustment. Parameter adjustments are done in single steps, requiring button press and release to step between them.

Any adjustment can be returned to its calibrated value by pressing the σ and τ buttons simultaneously for at least five seconds.

The three central LEDs give an indication of the parameter status. The exact meaning of each LED is described in the following table. These LEDs will flash Amber on Page 0, menu 0 if the unit is left in Engineering mode or Red if it is in Alignment mode.

V 1623 Menu's.

Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
0	A	Video Gain	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	B	Chroma Gain	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	C	*Green Gain (RGB Mode only)	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	D	*Blue Gain (RGB Mode only)	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	E	*Red Gain (RGB Mode only)	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	F	Black Level	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow

			-ve gain	Yellow	Off	Off
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Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
1	A	I/P Standard	YUV	Off	Off	Off
			RGB	Off	Off	Green
			RGB + Set-up	Yellow	Off	Green
			MII + Set-up	Yellow	Green	Off
			Beta + Set-up	Yellow	Green	Green
			Beta	Off	Green	Green
1	B	O/P Standard	Last Used	Off	Off	Off
			Default 525	Green	Off	Off
			Default 625	Off	Green	Off
			Forced 525	Yellow	Off	Off
			Forced 625	Off	Yellow	Off
1	C	Reference I/P	External	Off	Off	Off
			Y/G	Off	Off	Green
1	D	Ref Fail Mode	Free run	Off	Green	Off
			O/P Black	Off	Yellow	Off
			O/P Mute	Off	Red	Off
1	E	Test Patterns	Off	Off	Off	Off
			Colour Bars	Off	Off	Yellow
			Split Bars	Yellow	Off	Yellow
			Black	Off	Yellow	Off
1	F	Mono Mode	Colour	Green	Green	Green
			Mono	Green	Off	Off
2	A	Picture Position (wrt picture)	Calibrated	Off	Green	Off
			Sync's late	Off	Off	Yellow
			Sync's early	Yellow	Off	Off
2	B	*Y/C Timing (YUV Mode Only)	Calibrated	Off	Green	Off
			Chroma late	Off	Off	Yellow
			Chroma early	Yellow	Off	Off
2	C	O/P Delay	Minimum	Off	Green	Off
			Delay	Off	Off	Off
2	D	Vertical Blanking	Normal	Off	Green	Off
			Narrow	Yellow	Off	Off
2	E	Widescreen Blanking	Off	Off	Off	Off
			14:9	Off	Off	Green
			16:9	Off	Green	Off
			14:9 + Key	Yellow	Off	Green
			16:9 + Key	Yellow	Green	Off

Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
2	F	EDH	On	Off	Green	Off
			Off	Off	Off	Off
3	A	Limiting	Off	Off	Off	Off
			Set-up ear limit	Off	Yellow	Off
3	B	Operating Mode	Normal	Off	Off	Off
			Engineering	Yellow	Yellow	Yellow
			Alignment	Red	Red	Red
3	C	Test Patterns	Off	Off	Off	Off
			Colour Bars	Off	Off	Yellow
			Split Bars	Yellow	Off	Yellow
			Black	Off	Yellow	Off
		(* Eng. Mode Only)	Edge of picture	Off	Off	Red
			Split Edge	Yellow	Off	Red
			SDI Ramp	Off	Red	Off
			Split Ramp	Yellow	Red	Off
3	D	Mono Modes	Colour	Green	Green	Green
			Y Only	Green	Off	Off
		(* Eng. Mode Only)	U Only	Off	Green	Off
			V Only	Off	Off	Green
**1	**A	**Alignment	Y to Y O/P only	Off	Off	Off
			B to Y O/P only	Off	Off	Green
			R to Y O/P only	Yellow	Off	Green
			Y/Pb to Y/Pb O/P	Yellow	Green	Off
			Y/Pr to Y/Pr O/P	Off	Green	Off
			Normal	Off	Green	Green

V1623K Menu's.

Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
0	A	Video Gain	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off
0	F	Black Level	Calibrated	Off	Green	Off
			+ve gain	Off	Off	Yellow
			-ve gain	Yellow	Off	Off

Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
1	B	O/P Standard	Last Used	Off	Off	Off
			Default 525	Green	Off	Off
			Default 625	Off	Green	Off
			Forced 525	Yellow	Off	Off
			Forced 625	Off	Yellow	Off
1	C	Reference I/P	External	Off	Off	Off
			Y	Off	Off	Green
1	D	Ref Fail Mode	Free run	Off	Green	Off
			O/P Black	Off	Yellow	Off
			O/P Mute	Off	Red	Off
1	E	Test Patterns	Off	Off	Off	Off
			Staircase	Off	Off	Yellow
			Split Staircase	Yellow	Off	Yellow
			Black	Off	Yellow	Off
2	A	Picture Position (wrt picture)	Calibrated	Off	Green	Off
			Sync's late	Off	Off	Yellow
			Sync's early	Yellow	Off	Off
2	C	O/P Delay	Minimum	Off	Green	Off
			Delay	Off	Off	Off
2	D	Vertical Blanking	Normal	Off	Green	Off
			Narrow	Yellow	Off	Off
2	E	Widescreen Blanking	Off	Off	Off	Off
			14:9	Off	Off	Green
			16:9	Off	Green	Off
			14:9 + Key	Yellow	Off	Green
			16:9 + Key	Yellow	Green	Off
2	F	EDH	On	Off	Green	Off
			Off	Off	Off	Off

Page	Menu	Item	Parameter / Value	'-' led	' ' led	'+' led
3	A	Limiting	Off	Off	Off	Off
			Set-up ear limit	Off	Yellow	Off
3	B	Operating Mode	Normal	Off	Off	Off
			Engineering	Yellow	Yellow	Yellow
			Alignment	Red	Red	Red
3	C	Test	Off	Off	Off	Off
		Patterns	Staircase	Off	Off	Yellow
			Split Staircase	Yellow	Off	Yellow
			Black	Off	Yellow	Off
		(* Eng. Mode Only)	Edge of picture	Off	Off	Red
			Split Edge	Yellow	Off	Red
			SDI Ramp	Off	Red	Off
			Split Ramp	Yellow	Red	Off

2.5.3 Control Source

The lowest switch has three positions and selects the control source:

Rem	Control is from the DART system. This requires the use of an external controller running a suitable programme, which communicates with multiple racks using the Dartnet protocol.
Local	Control is from the front panel itself.

2.6 INITIALISATION

When the unit powers up it will be reset to the same conditions as when power was removed until it is changed. In the Remote control mode any changes will be made by the control system, but in Local they will be made on the front panel.

In Local mode the control panel will start up at page 0, menu 0. This is also the case when it is switched into remote mode.

There are separate stores for adjustments and parameters on the module for Local and Remote modes, so the unit may change its settings when switched between the control modes.

3. OPERATION

3.1 ADJUSTMENT RANGES

The adjustment ranges on the main parameters are:

PARAMETER	RANGE
Video Gain	$\pm 6\text{dB}$ (aggregate)
Chroma Gain	$\pm 6\text{dB}$ (aggregate)
Green Gain	$\pm 6\text{dB}$ (aggregate)
Blue Gain	$\pm 6\text{dB}$ (aggregate)
Red Gain	$\pm 6\text{dB}$ (aggregate)
Black Level	± 100 levels ($\sim 100\text{mV}$)

Since the gain components are subject to both the video, chroma and individual colour gains the applied gains are compounded. However the overall gain limit is still $\pm 6\text{dB}$.

Since the control system does the gain compounding, there is no loss of signal integrity. For example a video gain of $+3\text{dB}$ and a chroma gain of -3dB will have no effect on the chrominance components at all, so there will be no limiting or loss of resolution.

3.2 FUNCTION ORDER

The Black Level offset is applied before the gain stages. This is considered the best arrangement when the offset is used to correct for an incorrect input, such as may occur with poor quality input signals.

3.3 INPUT FORMAT

The input format may be selected to be either Y,Pb,Pr or GBR. In addition to these formats variations can be selected to handle set-up on luminance and GBR signals, or amplitude variations encountered from certain video tape formats.

3.4 OUTPUT STANDARD

The output standard of the unit can be controlled in several ways. The module can be left to decide automatically what standard to use according to the input reference signal, or forced to always produce a certain standard.

When the reference fails the unit can be set to default to the last used standard or default to a given standard. The output can also be selected to freerun, output Black or mute if the reference fails.

3.5 Y/C DELAY AND PICTURE POSITION

The Y/C delay control will allow adjustments to be made for timing errors between the component signal. It is only operational in the Y,Pb,Pr modes.

The Picture position allows timing adjustments to be made to align the Reference input with the video inputs.

3.6 VERTICAL AND WIDE SCREEN BLANKING

Vertical Blanking is nominally set to blank all the lines during the vertical interval. It can however be adjusted to allow extra lines through, removing a line of blanking per field with each adjustment, upto the standards maximum.

Standard	Field 1	Field 2
625	Line 6 - 22	Line 318 - 335
525	Line 10 - 19	Line 273 - 282

Wide screen blanking can be added to reduce the picture height to a 14:9 or 16:9 aspect ratio. The value of the blanking level can also be set to Key mode, which will put the luminance channel to a digital value of 63 during the active picture blanking section and change any other occurrence of 63 in the active picture luminance channel to 64.

3.7 TEST PATTERN GENERATOR

The internal test pattern generator produces Colour Bars and Black, which are legal signals for transmission plus, when in Engineering mode, Edge + centre of picture markers and SDI Ramp. All the test patterns, except Black can also be put into Split screen mode, so half the picture is test pattern and the other half Input video.

3.8 EDH

The V1623 contains an EDH generator. This means a correct EDH data packet is always created on the output, when it is switched on.

3.9 SETUP EAR REMOVAL

When a 525 video input is used with set-up, it is not possible to accurately know where the pedestal starts and stops, due to the specification differences between analogue and digital horizontal blanking. Therefore sometimes small positive or negative pulses are present on the SDI output following set-up removal. The set-up ear removal option will detect and remove any negative going pulses within the uncertainty period at the start and end of the lines.

3.10 ENGINEERING AND ALIGNMENT MODE

The Engineering mode allows additional Test patterns to be selected, which are not legal signals for transmission, Edge + Centre Picture Markers and SDI Ramp. It also allows selection of individual output channels to provide Y only, Pb only, Pr only or colour output. (These signals and modes are inhibited when not in Engineering mode).

The Alignment mode is only available from the front control panel when the module is in Local mode. It allows an Engineer to align the video paths through the unit a single channel at a time onto the Y output.