



VISTEK V165X SERIAL DIGITAL VIDEO ROUTER MODULE USER GUIDE

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VISTEK V165X serial digital video router module

Contents

1.	INTRODUCTION	3
1.1	Description	3
2.	INSTALLATION	4
2.1	Rear Panel Connections	4
2.2	Hardware	5
2.2.1	Switch and Link Settings	5
3.	OPERATION	9
3.1	Front Panel Indication	9
3.2	Indicators	11
3.3	Controls	12

VISTEK V165X serial digital video router module



1. INTRODUCTION

1.1 Description

The V165X Serial Digital Video Router Module provides a platform on which several different types of router may be built. All the variants can handle the four main video standard frequencies of 143, 177, 270 and 360 Mbits/s. The outputs are fully re-generated.

The range consists of :-

The V1651 2x1 SDI router with automatic signal error detection and changeover.

The V1652 8x1 SDI router.

The V1653 8x1 SDI router with synchronous switching.

The V1654 8x8 SDI router with Output monitoring.

All the routers can be fed with an analogue external reference signal, but this reduces the 8x1 routers to 7x1's due to the limited rear panel space. If the external reference is not fitted the switching reference will be taken from the currently selected output, so vertical interval switching will be maintained between sources of the same relative timings. The switching line used is user selectable and may be field or frame based.

The routers are all provided with front panel controls and indicators. All the modules are provided with the required interface logic for the Dart remote control system and also a simple remote panel interface. (See V1650 Remote Control Manual).

The V1651, 2 & 3 modules are 3U high cards and are designed to fit in the V1601 or the V1603 racking systems. The V1654 is also 3U high modules, but is double width, so will only fit in the V1603 rack.

The V1651 and V1653 are designed to have clean switching between the sources. The routers achieve this by timing the new source as close to the reference as possible, before switching. The reference is obtained from either the External Reference input (I/P 8), or if not present the currently selected source. (The V1651 may have its clean switching turned off if a reference is not available.)

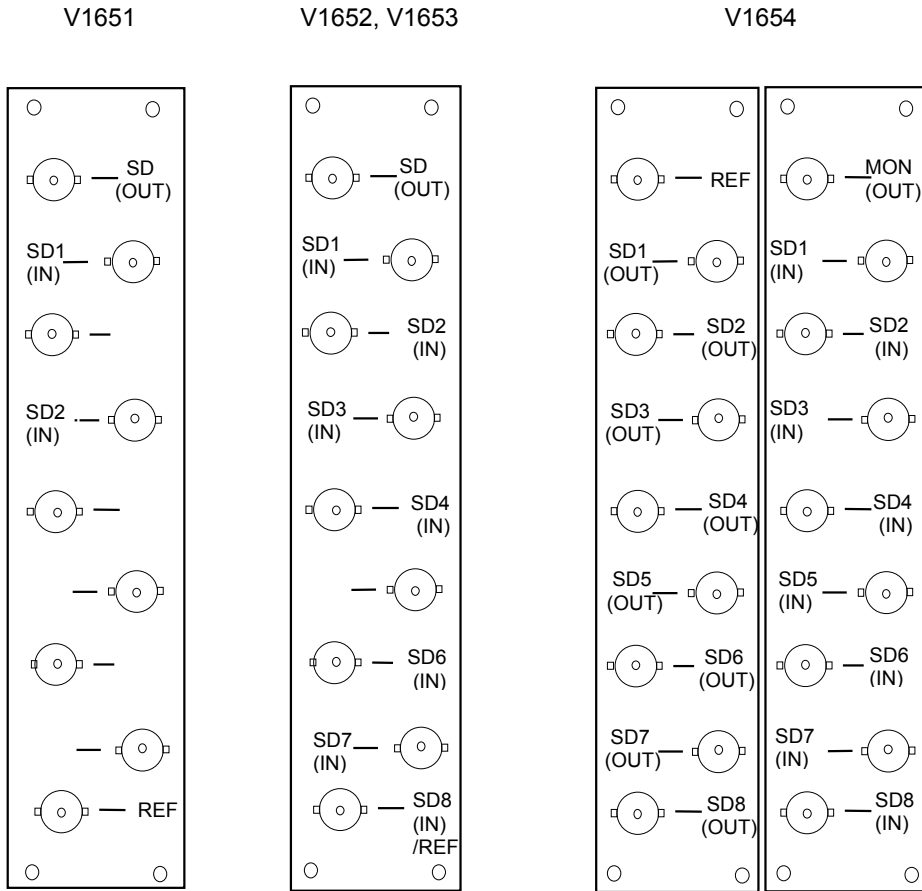
Due to the sources having differing clock phases it is only possible to synchronise the sources within one clock cycle, so if the reference is taken from the sources rather than an external reference the delay through the router can progressively change as sources are selected.



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2. INSTALLATION

2.1 Rear Panel Connections



Power

The power is picked up by the input connector panel from the frame to feed the router. The nominal power consumption of each router is:-

V1651	8.5W
V1652	6W
V1653	10W
V1654	13.5W

If the V1650 Remote Control Panel Interface is connected the power consumption of the router module is increased by 0.5W.

SD1-8 (IN)

The Serial Digital Inputs are passed straight through the rear module and terminated in 75 Ohms on the main module. Input 8 on the V1652 and V1653 is shared with the reference input and a zero ohm resistor is fitted on the module to set the operational mode. (R102 - I/P 8, or R103 - Ref). Inputs 2, 4, 5, 6 & 7 are not used on the V1651 and input 8 is set on the main module to the reference mode.

VISTEK V165X serial digital video router module



REF

The reference input is an analogue video signal of either 1Vp-p video or upto 4Vp-p mixed sync pulses. The signal is passed through the rear module and terminated in 75 Ohms on the input router module.

SD (OUT) & SD1-8 (OUT)

The outputs are driven directly through the rear module from the input or output router module at 75 Ohm impedance.

MON (OUT)

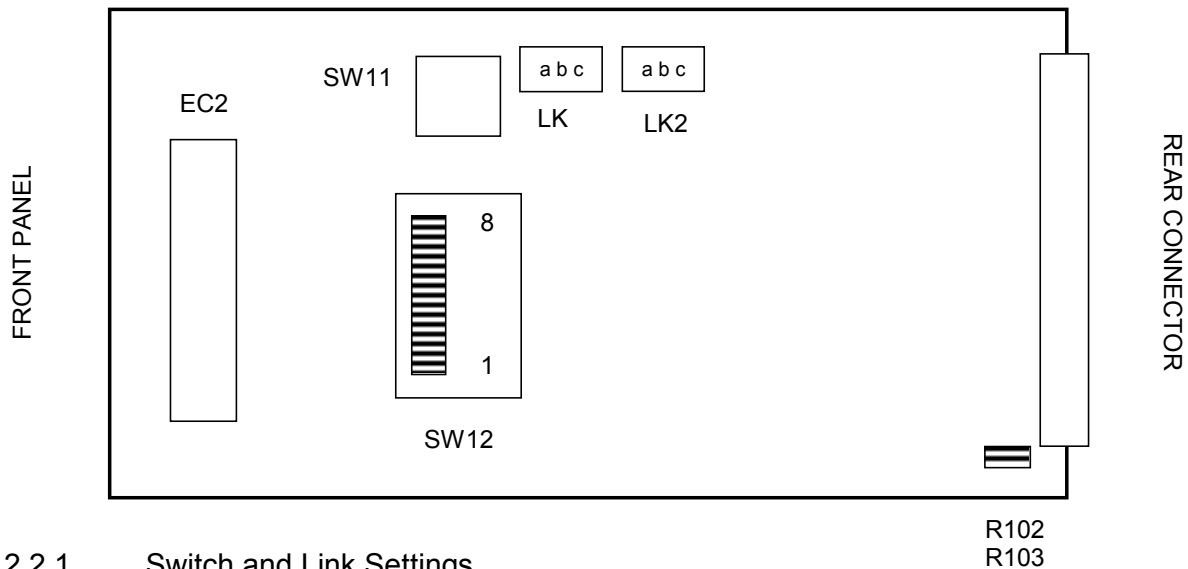
The monitoring output is driven directly through the rear module from the input router module at 75 Ohm impedance. This output monitors the output busses of the crosspoint ic and not the inputs to the crosspoint.

DART Remote Control

The DART control interface is picked up by the input rear module from the rack and routed into the input router module.

2.2 Hardware

The figure below shows diagrammatically the input module, which contains all the control hardware and link selectable variations. Not all components are fitted in every variant, (see text for details). The 8 Output module has no links and is therefore not shown.



2.2.1 Switch and Link Settings

R102 & R103

These two resistors are used to control the routing of the signal on input eight to determine if the reference is used or SDI input eight. The modules are shipped in the following configurations:-

V1651	R103	Reference Input.
V1652	R102	SDI Input eight.
V1653	R103	Reference Input.
V1654	R102	SDI Input eight.



VISTEK V165X serial digital video router module

The V1652 and V1653 may be changed to allow a reference to be used for switching timings or input 8. To change the mode move R102 or R103 to the other position. (A surface mount resistor is used rather than a link to reduce the signal degradation of the SDI signal).

The V1651 and V1654 do not require changes to be made as the signal paths are not required for dual purpose use.

LK1

Link 1 controls the switching frequency of the router between Frame rate and field rate.

LK2

Link 2 is used to tell the control system which signals are used to obtain the switching reference timing. If the link is set to INT. (Internal) the switching reference timing will be taken off the currently selected video output, or in the absents of a signal the free running clock. When the link is selected to EXT (External) the switching reference timing is taken from the REF. input, but in its absents the router reverts to using the currently selected output or the free running clock.

The link is also used on the V1652 and V1653 to instruct the control system as to the number of available SDI inputs. With the link set to INT there are 8 selectable inputs, but with the link set to EXT there are only 7 and the source button eight is ignored by the control system.

Note: If the V1654 is running off internal reference the signal used for switching timing is the currently selected monitoring output, selected by the local destination panel.

SW11

Switch 11 is used to assign the line on which the router will switch. (See table below)

SW11	625 Lines		525 Lines	
	LK1 FRM	LK1 FLD	LK1 FRM	LK1 FLD
0	621	621 & 309	525	525 & 263
1	622	622 & 310	1	1 & 264
2	623	623 & 311	2	2 & 265
3	624	624 & 312	3	3 & 266
4	625	625 & 313	4	4 & 267
5	1	1 & 314	5	5 & 268
6	2	2 & 315	6	6 & 269
7	3	3 & 316	7	7 & 270
8	4	4 & 317	8	8 & 271
9	5	5 & 318	9	9 & 272
A	6	6 & 319	10	10 & 273
B	7	7 & 320	11	11 & 274
C	8	8 & 321	12	12 & 275
D	9	9 & 322	13	13 & 276
E	10	10 & 323	14	14 & 277
F	11	11 & 324	15	15 & 278

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SW12

Switch 12 is only fitted on the V1651 and the V1653 and can be divided into two halves. The switches 1-4 control the synchroniser delay for both routers and the switches 5-8 are used by the V6151 to determine the conditions for an automatic change over of sources.

Switch 1 (V1651 only)

This switch turns off the synchronising function and reduces the delay of each channel to a minimum. This is the recommended mode of operation if an external reference is never provided.

Switches 2-4

These switches control the amount of delay added to the signal path with respect to the reference signal being used. This will allow the synchronising mechanism to time signals early on the reference upto 4000 clock cycles minus the selected delay, or late on the reference upto the selected delay. (See table).

Approximate selected delays. (wrt selected reference).

SW12			143Mbits/s	Approx. Delay (us)			
2	3	4		177Mbits/s	270Mbits/s	360Mbits/s	
On	On	On	-179, +0.7	-225, +0.5	-147, +0.5	-109, +0.3	
On	On	Off	-177, +3	-224, +2	-146, +1.5	-109, +1	
On	Off	On	-173, +7	-220, +6	-144, +3.5	-107, +3	
On	Off	Off	-264, +16	-213, +13	-139, +9	-104, +6	
Off	On	On	-245, +35	-197, +28	-130, +18	-97, +13	
Off	On	Off	-210, +70	-169, +56	-111, +37	-83, +27	
Off	Off	On	-175, +105	-142, +84	-93, +55	-69, +41	
Off	Off	Off	+140	+113	+74	+55	

* WARNING * Care should be taken when setting the delay, as picture disturbances will occur if the FIFO minimum or maximum lengths are reached.

Switch 5 (V1651 only)

This switch allows the unit to select between synchronous and Non-synchronous switching modes according to whether an external reference is present and being used. If the units link 2 is in EXT and a reference is provided the router will operate with synchronous switching. If link 2 is set to INT or the reference is not present the unit will change to non-synchronous mode automatically.



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Switches 6-8

These switches are only used on the V1651 to set up the operation of the automatic mode.

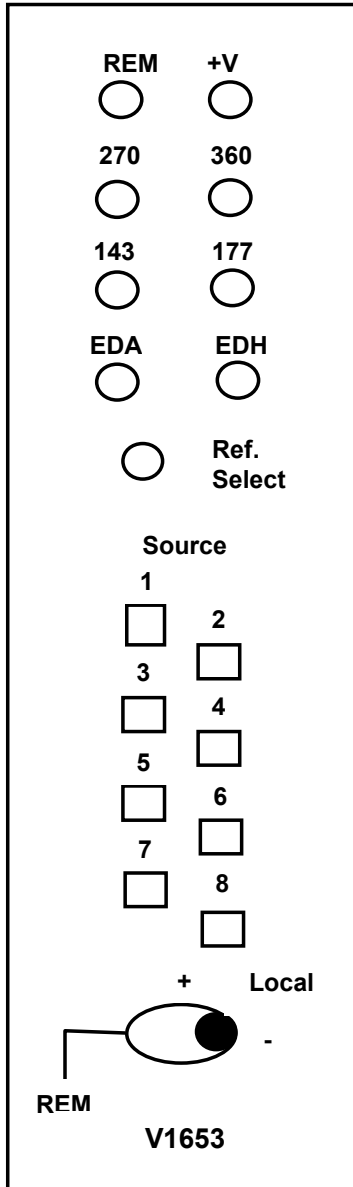
- | | |
|-------------|--|
| Switch 6 on | Lock Fail
Sets the fail condition to occur when the currently selected source does not lock up the re-clocker ic. |
| Switch 7 on | EDH Fail
Sets the fail condition to occur when multiple EDH errors are detected. An error condition will be set if 3 fields containing EDH errors are detected within 32 fields and cleared once 32 consecutive error free fields are present. |
| Switch 8 on | HOLD
Sets the router to change sources when the current source fails, providing the other source is good, when in AUTO mode. |
| off | FLIP/FLOP
Sets the router to always select input 1 if source 1 is good, when in AUTO mode. |

VISTEK V165X serial digital video router module



3. OPERATION

3.1 Front Panel Indication



The **REM** lamp indicates that the DART control system communications link is active.

The **+V** lamp indicates that power is applied to the module.

The **270** lamp indicates that a 270Mbit/s ITU-R Rec.601 serial component video source is selected.

The **360** lamp indicates that a 360Mbit/s ITU-R Rec.601 serial component video source is selected.

The **143** lamp indicates that a 143Mbit/s ITU-R Rec.601 serial composite video source is selected.

The **177** lamp indicates that a 177Mbit/s ITU-R Rec.601 serial composite video source is selected.

The **EDA** lamp indicates an error in the Serial Video Signal which was detected prior to this unit. (Error detected already).

The **EDH** lamp indicates an error in the Serial Video Signal which was detected by this unit. (Error detected here).

The **Ref. Select** button is recessed behind the front panel and is used to re-time the output on the V1651 and V1653 only.

Source 1-8 Local selection of input source.

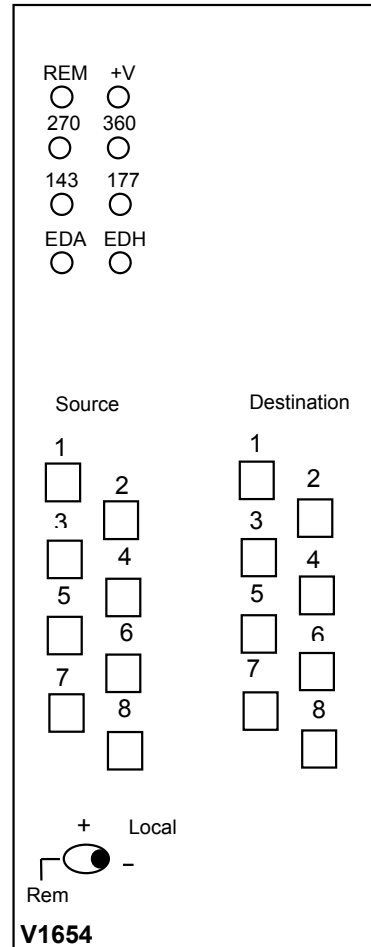
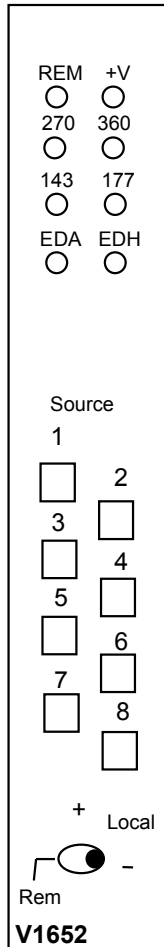
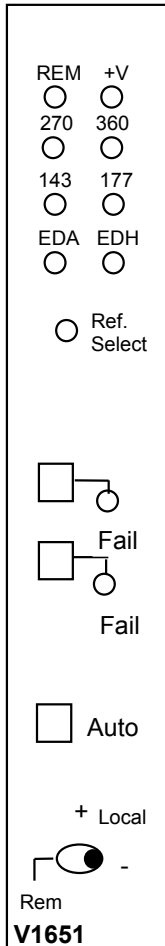
Rem Remote control via the Dart control Interface.

+ All router source selection controls are inhibited.

Loc. Local control from the front panel and the V1650 Remote Control Panel Interface.



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3.2 Indicators

REM

The REM (Remote) indicator illuminates whenever the module is accessed by the DART control system. This will occur even if the module is under local control.

+V

This indicates that the module is powered and producing its internal voltage rail.

270, 360, 143, 177

When a source is routed through the unit the indicators will show the video frequency standard of the locally selected output, provided the signal is locked in the reclocking ic. If no indicators are on then the signal has not locked up in the reclocker.

EDA, EDH

These indicators are used to display Errors that are detected within certain checksums embedded in the Video data stream. They show Full Field errors including ancillary data. The EDA (Error Detected Already) indicator shows that a unit prior to the router has found an error and set the appropriate flag in the video data stream. The EDH (Error Detected Here) indicator shows that the data has got errors between its contents and the inserted checksums. If the video has no checksums inserted the indicators will not illuminate even if there are errors in the path.



VISTEK V165X serial digital video router module

3.3 Controls

Ref. Select

This control is a push button recessed behind the front panel on the V1651 and V1653 and is used to reset the video timing delay through these synchronous routers. If the external reference is being used the button, upon release will re-synchronise the video selected to the output. (When a new source is selected this re-timing is done automatically). If the reference is taken from the internal signals, the release of the button will set the output timing to the selected delay from the currently selected output signal. (When a new source is being selected it will automatically time to the current source).

Source 1-8

These are illuminated push buttons and allow selection of the source to the currently selected destination when the unit is being used in local mode. The buttons illuminate when they are pressed and display the correct source selection when all are released. In Remote (Rem) or + mode the buttons have no effect on the selection. When the router is internally selected to External Reference or it detects an external reference on input eight the selection of this source to the output is prohibited automatically.

Destination 1-8

These are illuminated push buttons and allow selection of the destination bus for the local control panel on the V1654 only. These buttons remain active in all modes of remote and local control. The destination selection controls the output monitoring bus of the router and thus the source for the front panel indications. It monitors the output busses of the crosspoint ic rather than selecting the source routed to that destination.

Fail

These indicators only appear on the V1651 2x1 router and are used to indicate that the input signal has failed either because of EDH errors or loss of a locked input, according to the settings of the failure mode switches on the board.

Auto

The button only appears on the V1651 2x1 router and has a toggle action. When illuminated the router will self switch under source failure conditions, as set by the SW12 switches.

Rem, +, Local

This toggle switch is used to assign which control system is being used to control the router.

- Rem** (Remote) mode inhibits the V1650 Remote Control and the local source control panel from operation and only accepts changes made by the DART Remote Control system.
- + Mode** The Local Control system and the DART Control are disabled.
- Local** Allows the V1650 Router Remote Control system and the local panel to control source selection, but inhibits the DART Remote systems.