ViViD124

SDI variable video delay

USER MANUAL

Contents

1   Introduction

ViViD124 is a Variable Video Delay which offers up to two seconds of delay (2.08 seconds in 625) and has been designed to match system delays elsewhere in an equipment chain.

ViViD124 Video Delay
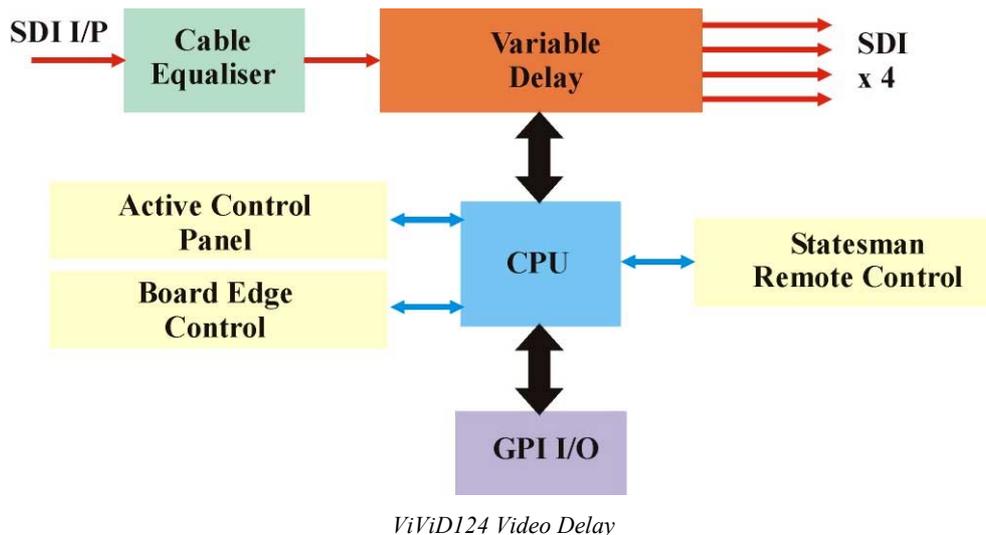
The main features are as follows:

- passes entire SDI stream, including HANC and VANC

- auto 525/625 selection

- one SDI loop-through input and four SDI outputs

- delay adjustable from 36 pixels to 60 frames in 525 and 52 frames in 625 in increments of fields, lines and groups of six pixels

- option to reconstruct or bypass syncs

- cut to black or blue upon signal loss immediately or after preset delay

- GPI control of signal loss behaviour and sync options

- GPI output indication of serial input fail and video standard

ViViD124 is a 100mm x 266mm module, which fits in the three standard frames and can be integrated with any boards from the company's full product range. It uses the RM01 rear connector.

Applications include virtual studios where ViViD124 can offset the virtual set delay so the camera feed and graphics both reach the chroma keyer at the same time and transmission where ViViD124 can compensate for the delay of MPEG encoders or decoders.

2 Using Statesman

The Crystal Vision Statesman PC control software is designed to control a range of Crystal Vision modules via serial control from a PC. Statesman provides a user friendly means of configuring and operating Crystal Vision modules with the benefit of see-at-a-glance status monitoring.

The main Statesman application communicates with each module in a frame through an active control panel. An active panel must be fitted to allow for Statesman control.

2.1 Installation

Minimum pre-requisites:

- A PC running Windows 98, NT4 with SP 5 or higher, Windows 2000 or Windows XP
- A parallel port dongle supplied with the Statesman software package
- An RS422 serial connection from the host PC to an FR2AV Crystal Vision frame and at least one ViViD124 module and/or other Statesman compatible module
- An active control panel MUST be fitted to the frame with version 1.5 or above firmware
- An optional RS422 to RS232 converter if the PC has no RS422 ports

Installing Statesman

- To view all application windows, set graphics resolution to at least 1024 x 768
- Remove any previous version of the Statesman software using the Add/Remove Programs application in the Windows Control Panel
- Ensure that the Statesman dongle is fitted to the parallel port of the host PC
- Insert the Statesman CD and the installation should start immediately – if it does not, run the setup.exe file on the CD
- Obey any installation program prompts and restart the PC when prompted

Running Statesman for the first time

The Statesman PC Control System may be run from the Crystal Vision programs folder via the Start menu or by double-clicking on the Crystal Vision.exe file in the installed program directory.

When the program runs it should automatically detect any Statesman compatible modules in the connected frame or frames and display them in the main application left hand explorer-style window.

Open any frame by clicking on the '+' sign or by double clicking on a frame. Installed modules should be shown with module icons. Frame and module icons can be named as desired by right-clicking or using the edit menu.

2.2 Statesman operation

The initial view will show an explorer style view of the connected frames and modules. Double-clicking on a module will enable the display of the main application menus.
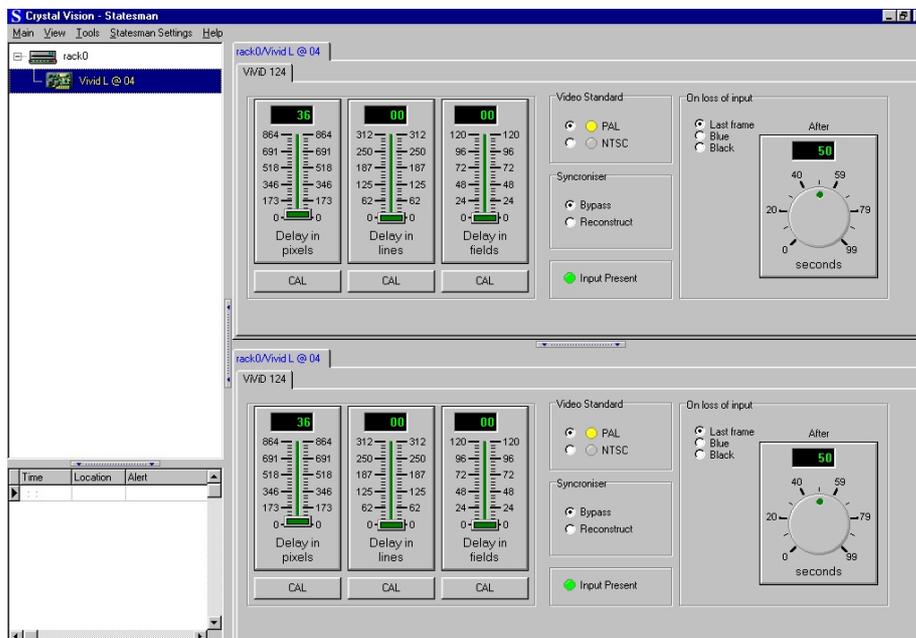
The Statesman main application window

The menu display is repeated for convenience to allow dual-control display of modules with duplicate signal paths or to allow two functions to be viewed at the same time.

ViViD has one Statesman menu that provides status information and allows configuration of delay, sync bypass/reconstruct options and loss of input behaviour.
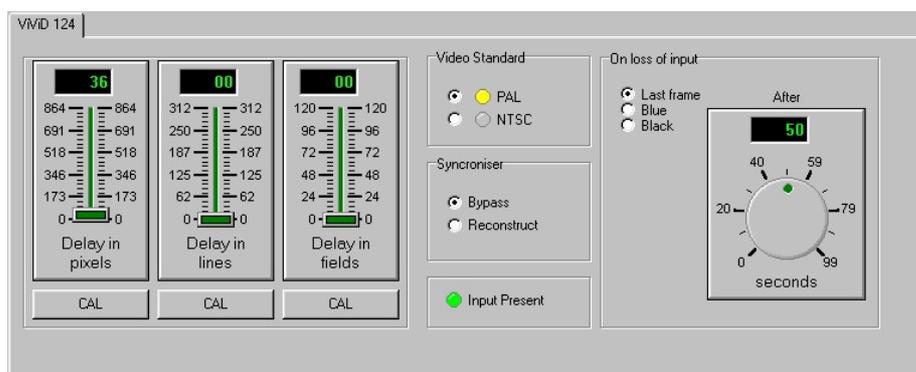
ViViD124 Status and Configuration menu

Input status

The Input present indicator will illuminate green when a valid input is present or red if the input is missing.

The video standard is automatically detected and is shown by a yellow indicator. If necessary, this automatic selection may be overridden by clicking in the space provided. In normal use, it is recommended to allow the standard choice to be automatically assigned.

Further status information is provided by the Statesman logging and alarms feature, which is described in more detail in the Statesman manual.

Configuring delay

The three sliders labelled delay in pixels, delay in lines and delay in fileds, may be adjusted to obtain a video delay between 36 pixels and 2 seconds for a 525 signal and 2.08 seconds for a 625 signal.

The maximum range of each slider is as follows:

Maximum delay values

	625 max values	525 max values
Pixel	858	852
Line	311(field 1) 312 (field 2)	261(field 1) 262 (field 2)
Field	104 (52 frames)	120 (60 frames)

The variable assigned is always shown in the top line of the slider display. It is not possible to reduce the total delay of the module below 36 pixels, even if a lower value can be shown.

Resetting delay

Press the CAL buttons to assign the minimum delay value for each associated delay variable.

Reconstruct or bypass sync

Reconstructed syncs may be helpful if there is any reason to suspect corrupted input syncs, and concealment is preferred. Examples include faulty upstream equipment or excessive cable losses.

Sync decoding tends to fail just before the input is totally lost. Reconstructed syncs help to reduce picture disturbances as the input signal strength approaches its minimum threshold. Active picture errors (dropped pixels or lines) may still occur, but they are usually less noticeable than lost syncs.

To ensure that ViViD124 reconstructs sync data check 'Reconstruct'. To use the incoming sync data, check 'Bypass'.

Loss of input behaviour

The behaviour of the module when an input signal is lost may be selected between, repeat last good frame, cut to black or cut to blue. The black or blue options are provided to provide operational flexibility. For example, a blue screen may provide a clearer warning that a live feed or transmission channel has lost its assigned video input than either a frozen image or black.

If either a black or blue screen is chosen, the last good frame will be shown for a preset delay before the output changes to the chosen colour. The delay may be selected from 0 to 99 seconds.

Note: If a delay of 0 (zero) seconds is chosen a frozen frame will not be seen and the cut to black or blue will be instantaneous.

Forcing the line standard

The 525/625 selection is provided to override the automatic standard detection process. The selection forces the standard when the input is removed or the output is black or blue. This may be an advantage when changing input to a video signal with a different standard, since manual selection is faster than autodetect and an on air disturbance can be prevented, albeit at the expense of a momentary black or blue screen during signal loss.

Note: The switch will be ignored with a valid input or when a frozen image is displayed. The switch does not affect the power-up default of 625.

3 Using the active control panel

The Crystal Vision active control panel is available as an integral part of the FP2-LF front door for the FR2AV 2U frame, the FR1AV frame, and the DTBAV desktop box or as a remote panel. Only one control panel can be connected to any frame, although one panel can control two frames.

The Crystal Vision control panel

At power up, the two line 20-character screen will display 'Crystal Vision' followed by the firmware version number for the control panel. Once the control panel is initialised, each module in a frame is polled. Modules that have completed their own initialisation will respond with a node address. A node address is a unique number that defines a module's position in a rack.

The control panel will display the name of the module that first responds to the polling request together with its node address.

Control panel showing available cards

To select a particular module in a frame, press the DEVICE key. The top line of the display will change to show 'Available Cards X', where X is the number of cards that have responded so far to the polling request. Rotating the shaft encoder will cause the bottom row of the display to cycle through the successfully polled cards by name and node number.

When the ViViD124 module is selected press the ENTER key to access that module's HOME menu.
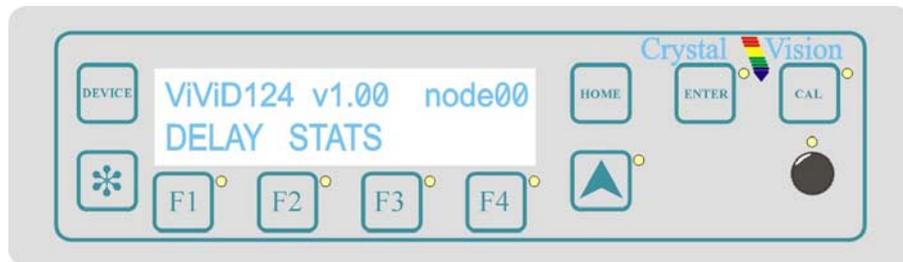
ViViD124 home menu

Ensure that ViViD124 card-edge switch lever 2 is in the DOWN position to enable remote control via the active control panel.

Note: In the 2U frame the node address is calculated in one of two ways:
*slot number minus 1 – giving a range of 0 – 11 in frame #1, OR
*slot number plus fifteen – giving a range of 16 – 27 in frame #2
The two ranges are provided to allow one control panel to control two frames.
In the 1 U frame the address range is 0-5 OR 16-21.
Please refer to the frame manual for further information on node addresses.

3.1 Navigating the display

The control panel keys are assigned the following functions when controlling ViViD124:

- DEVICE – selects a card or module to control

- Asterisk – no function assigned

- F1 to F2 – soft keys, function assigned within each menu

- HOME – moves the display to the home menu

- ENTER – accepts device selection

- CAL – assigns minimum delay value

- Upward arrow – used to move up the menu structure

- Rotary control – shaft encoder used to select options or variable data

# 3.2 Updating the display

The values displayed on an active front panel are only updated when an adjustment is made and when changing menu level. If changes occur through the use of card edge controls or other remote control, the text displayed on the active front panel will not be updated immediately. If necessary, use the upward arrow to leave and then re-enter a menu to update the display.

3.3 The ViViD124 active panel menu structure

The main top-level menus for the ViViD124 module are obtained by pressing the F1 and F2 keys from the HOME menu. Menu keys are illuminated when active and when further menus are available. The top-level menus are:

- Delay (Configure Pixel, Line Filed and Frame delay) – press F1

- Stats (Status) – press F2

- Sync bypass/reconstruct – press F3

- Frze - loss of input behaviour – press F4

The following chart shows the available menus.
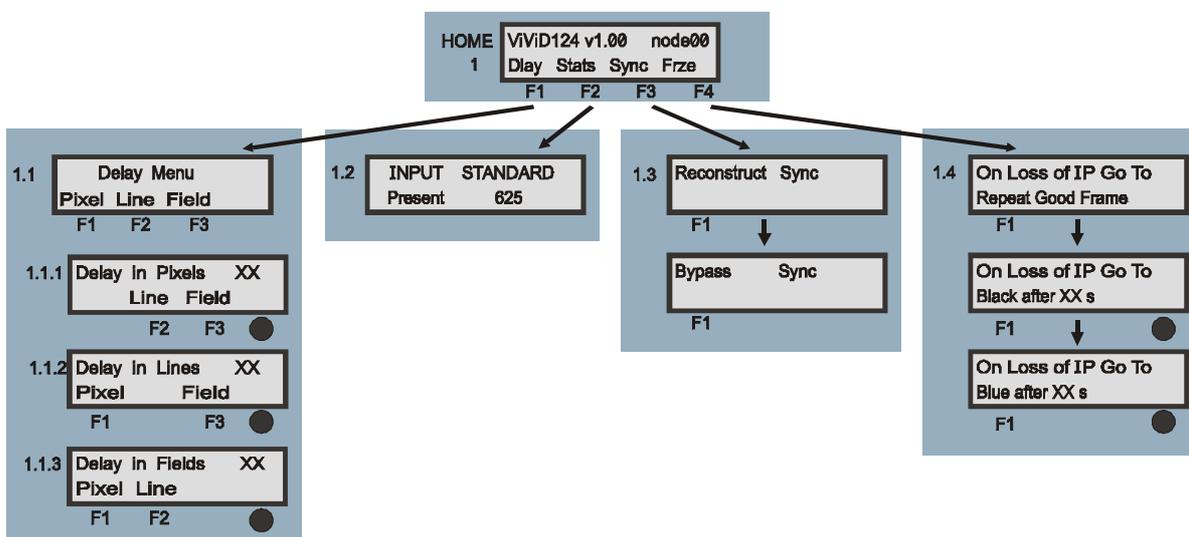
The ViViD124 menu tree

Note: Function keys and shaft encoder LEDs are illuminated when active.
Menus or function keys associated with the shaft encoder for changing assigned values are shown with a black circle.

Menu numbering scheme

This manual uses a simple menu numbering convention based on the sequence of keys required to reach each menu from the top level home menu. For example, menu 1.1.2 is reached from the home menu by pressing F1, then F2. Menu 1.2.3 is reached by pressing F2 and then F3.

3.4 Configuring delay

Pressing F1 from the home menu will bring up the delay menu. The delay menu provides access to the Pixel, Line, Field and Frame sub-menus:

ViViD124 delay menu	Description
1.1 Delay Menu — Pixel Line Field — F1 F2 F3	Provides access to the following sub-menus: PIXEL Menu – press F1 LINE Menu – press F2 FIELD Menu – press F3
1.1.1 Delay in Pixels XX — Line Field — F2 F3	Rotate shaft encoder to set delay in pixels. LINE Menu – press F2 FIELD Menu – press F3
1.1.2 Delay in Lines XX — Pixel Field — F1 F3	Rotate shaft encoder to set delay in lines. PIXEL Menu – press F1 FIELD Menu – press F3
1.1.3 Delay in Fields XX — Pixel Line — F1 F2	Rotate shaft encoder to set delay in fields. PIXEL Menu – press F1 LINE Menu – press F2

Maximum delay values

	625 max values	525 max values
Pixel	858	852
Line	311(field 1) 312 (field 2)	261(field 1) 262 (field 2)
Field	104 (52 frames)	120 (60 frames)

If the adjustment exceeds the maximum allowed, the value displayed will be reset to zero and one will be added to the higher value delay menu. This works for all menus, except Fields.

If an attempt is made to go below zero, one will be subtracted from the lower value delay menu. This works for all menus, except Pixels. It is not possible to reduce the total delay of the module below 36 pixels.

All delay variable controls – pixel, line, field and frame - can be accessed from any sub-menu. Use the F1, F2 and F3 controls to toggle through the available choices. The variable assigned to the shaft encoder is always shown in the top line of the display.

Resetting delay

Press CAL in any menu to assign the minimum delay value for the variable shown.

3.5 Input status

The input status menu will show if a valid input is present and the automatically detected standard.
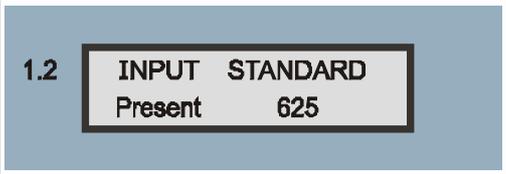
Status menu	Description
1.2 `INPUT  STANDARD` `Present    625`	Status menu: INPUT: Present or Absent STANDARD: 625 or 525

Note: The status menu will not change if the input status changes whilst the status display is shown. To refresh the status display, press the 'CAL' button.

3.6 Sync options

The output SDI sync information may be reconstructed or bypassed.
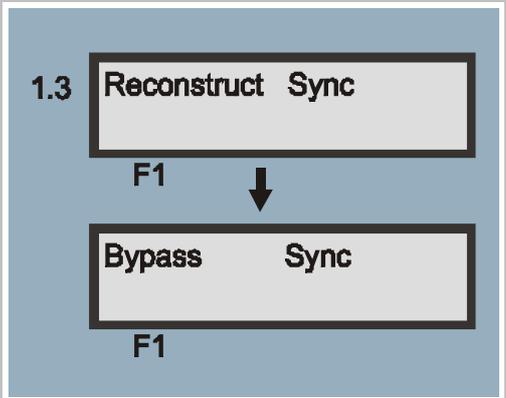
Sync menu	Description
1.3 `Reconstruct  Sync` F1 ↓ `Bypass      Sync` F1	Press F1 to toggle between: Reconstructed Sync OR Bypass Sync

Reconstructed syncs may be helpful if there is any reason to suspect corrupted input syncs, and concealment is preferred. Examples include faulty upstream equipment or excessive cable losses.

Sync decoding tends to fail just before the input is totally lost. Reconstructed syncs help to reduce picture disturbances as the input signal strength approaches its minimum threshold. Active picture errors (dropped pixels or lines) may still occur, but they are usually less noticeable than lost syncs.

To ensure that ViViD124 reconstructs sync data press F1 until Reconstruct Sync is shown. To use the incoming sync data, press F1 until Bypass syncs is shown.

3.7 Loss of input behaviour

The behaviour of the module when an input signal is lost may be selected between, repeat last good frame, cut to black or cut to blue. The black or blue options are provided to provide operational flexibility. For example, a blue screen may provide a clearer warning that a live feed or transmission channel has lost its assigned video input than either a frozen image or black.

Sync menu	Description
1.4 On Loss of IP Go To Repeat Good Frame — F1 ↓ — On Loss of IP Go To Black after XX s — F1 ↓ ● — On Loss of IP Go To Blue after XX s — F1 ●	Press F1 to toggle between: Repeat Good Frame OR Black after 0 to 99 seconds OR Blue after 0 to 99 seconds

If either a black or blue screen is chosen, the last good frame will be shown for a preset delay before the output changes to the chosen colour. The delay may be selected from 0 to 99 seconds.

Note: If a delay of 0 (zero) seconds is chosen a frozen frame will not be seen and the cut to black or blue will be instantaneous.

4   Card edge operation

Once the start-up initialisation procedure is complete, the ViViD124 card can be controlled or configured from the card edge, the active control panel or the Statesman PC interface (future option). This chapter will concentrate on the card edge controls.

The front edge of the card provides power rail monitoring, menu selection, delay assignment and a ten-digit visual status display.
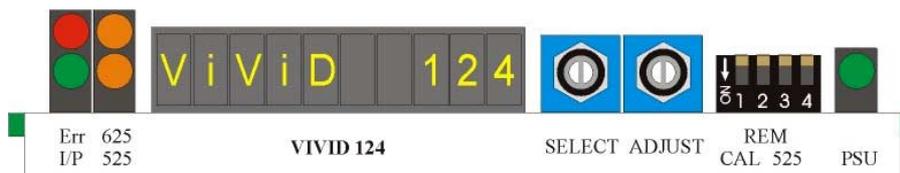
ViViD124 front edge view

4.1 Selecting the control mode

The 4-way piano switch allows control options to be selected.

Lever	Function	Action
All UP	Local mode	Card-edge control enabled
1 Down	CAL	Set lever 1 down (and rotate shaft-encoder) to reset delay
2 Down	Remote mode	Remote control enabled
3 Down	525	Down = 525, Up = 625
		Forces standard with input removed or output black/blue.
		Faster than autodetect (does not change power up default of 625).
4 Down	N/A	No function assigned

4-Way piano switch menu functions

4.2 Configuring delay, sync and freeze options

The SELECT control cycles through the available menus:
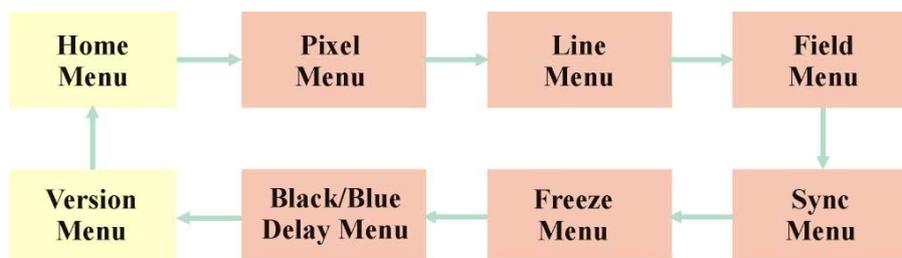
ViViD124 card-edge menus

The ADJUST shaft encoder changes the assigned parameter in each active menu.

Maximum delay values

	625 max values	525 max values
Pixel	858	852
Line	311(field 1) 312 (field 2)	261(field 1) 262 (field 2)
Field	104 (52 frames)	120 (60 frames)

If the adjustment exceeds the maximum allowed, the value displayed will be reset to zero and one will be added to the higher value delay menu. This works for all menus, except Fields.

If an attempt is made to go below zero, one will be subtracted from the lower value delay menu. This works for all menus, except Pixels. It is not possible to reduce the total delay of the module below 36 pixels.

SELECT menu	Function
Home	Shows module type: ViViD124
PIXEL: XXX	Use ADJUST to change delay in pixels
LINE: XXX	Use ADJUST to change delay in lines
FIELD: XXX	Use ADJUST to change delay in fields
Sync: Bypass/Reconstruct	Use ADJUST to select between Bypass or Reconstruct
Freeze: Frame/Black/Blue	Use ADJUST to select Frame, Black or Blue
Time XX	Use ADJUST to select cut to black/blue delay (0 to 99 seconds)
Version	Shows ViViD124 firmware version

Note: Loss of signal input will always cause a 'freeze' of the last good frame, unless the cut to black/blue option is set to occur immediately. If a delay of one second is selected, the frozen frame will be displayed for one second, after which either blue or black will be output until the input signal is restored.

Resetting delay

To reset the currently selected delay in any menu to its minimum value, press piano lever 1 DOWN (CAL) and rotate the ADJUST control. Return the CAL lever to the UP position to continue delay adjustment.

5   Installation

The ViViD124 video delay module is a single height module which fits into all Crystal Vision rack frames. All modules can be plugged in and removed while the frame is powered without damage.

5.1 Rear modules and signal I/O

FR2AV, FR1AV & DTBAV rear connectors

The FR2AV 2U frame takes up to 12 single height Crystal Vision modules, 6 single height modules fit in the FR1AV 1U frame and 2 single height modules fit in the DTB2AV 1U frame.

RM01 rear module connections:

RM01 fits in FR2AV, FR1AV & DTBAV frames	Description
	RM01 (ZLA00180 artwork) • 12 modules per FR2AV, 6 per FR1AV & 2 per DTBAV frame • All frame slots can be used
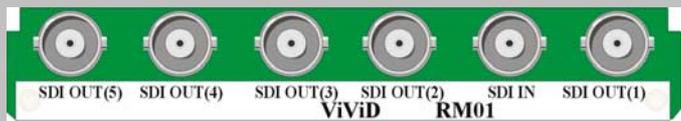
BNC	Signal
SDI IN	SDI In
SDI OUT(1)	SDI output 1
SDI OUT(2)	SDI input loop-through
SDI OUT(3)	SDI output 2
SDI OUT(4)	SDI output 3
SDI OUT(5)	SDI output 4

5.2 ViViD124 configuration

The jumper links on the board are set correctly when ViViD124 is tested before despatch and should be left as set at the factory. The following information is for jumper position confirmation only.
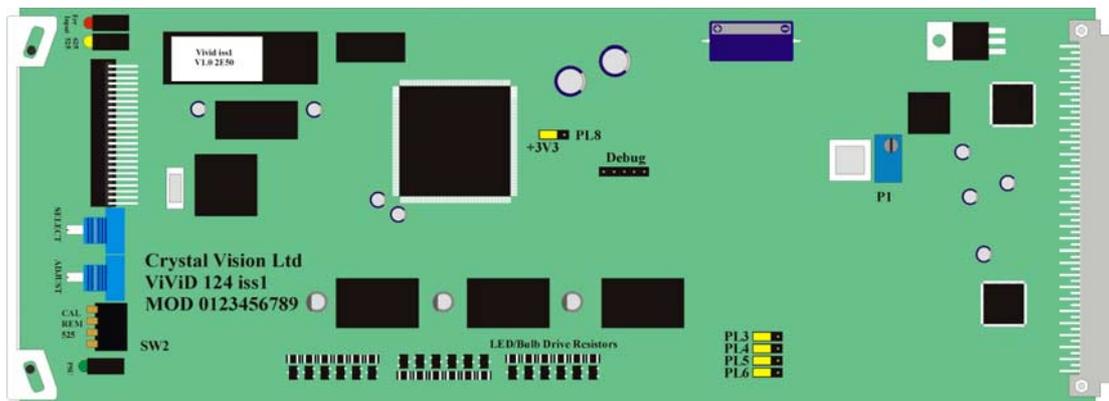
ViViD124 showing default factory jumpers

Link positions - board viewed as above

Link	Required position
PL3-6	Not used
PL8	Must be in the +3V3 position (link pins 1-2)

Adjustments - board viewed as above

Link	Function
PL1	Re-clocking centre frequency – factory set to 270 Mhz

5.3 Using GPIs

The following tables summarise the GPI assignments:

GPI inputs

GPI Ref	Function	OPEN	GND
'a'	Sync select	Bypass	Reconstruct
'b'	Input loss behaviour_1	No change	Black
'c'	Input loss behaviour_2	No change	Blue

Note: If both GPI inputs 'a' and 'b' are open, 'repeat last good frame' is selected.

GPI outputs

GPI Ref	Function	High	Low
'd'	Standard indication	625	525 or no input
'e'	Standard indication	525	625 or no input
'f'	Input present	OK	Missing

Note: Outputs are open-collector, active low.

LED/Bulb drive resistors

The factory default GPI output drive is for LEDs with 330ohm series resistors and pull-up resistors to 5V.

Replace resistor R85, R88, R91, R94, R98 and R101 (all 330 Ohm 0805) with zero Ohm 0805 resistors for bulbs up to 36V
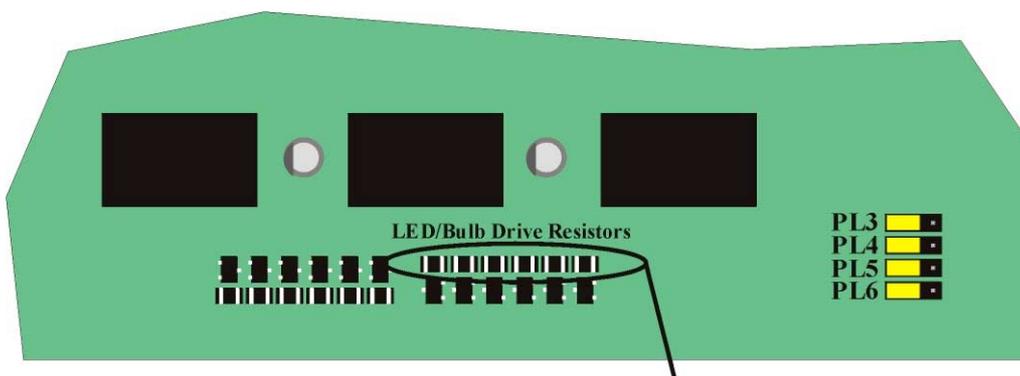
ViViD124 showing LED/Bulb drive resistors

GPI connections

Each slot has an associated set of connections on the frame rear-panel remote connectors. For convenience, GPI lines are associated with reference codes 'a' to 'f' in the connector pin-out tables for each frame.

FR2AV GPI connections

GPI lines 'a' to 'f' of each card are brought to one of the four remote connectors at the rear of the FR2AV frame as follows:

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Note: Remote 1 and Remote 3 are 26 way high density 'D' type female sockets and frame ground is pin 2 in each case. Remote 2 and Remote 4 are 26 way high density 'D' type male plugs and frame ground is pin 6 in each case.

Table shows Pin number (Remote number).

FR1-6 FRAME

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
4	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
5	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
6	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)

Note: Remote 1: 26 way high density D-type socket. Frame ground is pin 2.

Remote 2: 26 way high density D-type plug. Frame ground is pin 6.

Table shows Pin number (Remote number).

FR2-12 FRAME

Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	18 (1)	26 (1)	19 (2)	20 (2)
2	7 (1)	16 (1)	17 (1)	25 (1)	10 (2)	11 (2)
3	8 (3)	9 (3)	18 (3)	26 (3)	19 (4)	20 (4)
4	7 (3)	16 (3)	17 (3)	25 (3)	10 (4)	11 (4)
5	5 (1)	6 (1)	15 (1)	24 (1)	1 (2)	2 (2)
6	4 (1)	14 (1)	13 (1)	23 (1)	3 (2)	4 (2)
7	5 (3)	6 (3)	15 (3)	24 (3)	1 (4)	2 (4)
8	4 (3)	14 (3)	13 (3)	23 (3)	3 (4)	4 (4)
9	3 (1)	12 (1)	22 (1)	21 (1)	12 (2)	13 (2)
10	10 (1)	11 (1)	19 (1)	20 (1)	21 (2)	22 (2)
11	3 (3)	12 (3)	22 (3)	21 (3)	12 (4)	13 (4)
12	10 (3)	11 (3)	19 (3)	20 (3)	21 (4)	22 (4)

Note: Remote 1 and Remote 3: 26 way high density D-type sockets. Frame ground is pin 2.
Remote 2 and Remote 4: 26 way high density D-type plugs. Frame ground is pin 6.
Table shows Pin number (Remote number).

FR2-8 FRAME

| Slot no.	'a' pin	'b' pin	'c' pin	'd' pin	'e' pin	'f' pin
1	8 (1)	9 (1)	17 (1)	18 (1)	25 (1)	26 (1)
2	6 (1)	7 (1)	15 (1)	16 (1)	23 (1)	24 (1)
3	8 (2)	9 (2)	17 (2)	18 (2)	25 (2)	26 (2)
4	6 (2)	7 (2)	15 (2)	16 (2)	23 (2)	24 (2)
5	4 (1)	5 (1)	13 (1)	14 (1)	21 (1)	22 (1)
6	2 (1)	3 (1)	11 (1)	12 (1)	19 (1)	20 (1)
7	4 (2)	5 (2)	13 (2)	14 (2)	21 (2)	22 (2)
8	2 (2)	3 (2)	11 (2)	12 (2)	19 (2)	20 (2)

Note: Remote 1 and Remote 2: 26 way high density D-type sockets. Frame ground is pin 1.
PSU Relay connection on pin 10.
Table shows Pin number (Remote number).

6   Problem solving

Trouble shooting may be performed by using the card edge or remote status panel display.

6.1 Card edge status LEDs

Board edge LEDs provide status reporting and may be useful when fault finding.
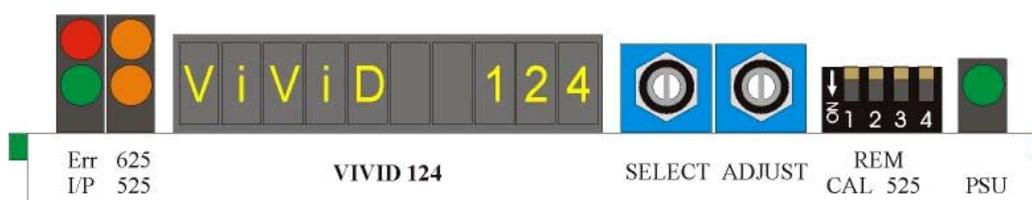
The following table summarises the card edge LED functions and colours:

Status	Led Colour	Description
PSU	Green	Power supply rail OK
I/P	Green	SDI input carrier detected
Err	Red	Invalid input
625/525	Amber	625 (upper) or 525 (lower) input

6.2 Control panel status

The input status is also shown in the STATS menu of the active control panel.

Status menu	Description
	Status menu: INPUT: Present or Absent STANDARD: 625 or 525

Note: The status menu will not change if the input status changes whilst the status display is shown.
To refresh the status display, press the 'CAL' button.

Basic fault finding guide

The Power OK LED is not illuminated

> Check that the frame PSU is functioning – refer to the appropriate frame manual for detailed information

There is no video output

> Check that a valid SDI is present and that any cabling is intact
>
> Note that SDI OUT(2) is an input loop-through

The video output exhibits jitter

> Check that the input SDI stability is within normal limits and that the maximum cable length has not been exceeded

The card no longer responds to card edge or front panel control

> Check that the card is seated correctly and that the Power OK LED is lit
>
> Check any active control panel cabling
>
> Check if the control panel can control another card in the same rack
>
> If necessary re-set the card by simply removing the rack power and re-applying power after a few seconds or by removing the card from the rack and then re-inserting the card
>
> It is safe to re-insert the card whilst the rack is powered

7   Specification

General

Dimensions	100mm x 266 mm module with DIN 41612 connector
Weight	180g
Power consumption	5 W

Inputs

Video	270Mb/s serial digital to EBU Tech 3267-E and SMPTE-259M
	Cable equalisation >250m Belden 8281 or equivalent
	Auto 525/625 selection

Outputs

Number and type:	4 reclocked SDI outputs to EBU Tech 3267-E and SMPTE-259M
	Will drive >250m Belden 8281 or equivalent

Processing

Vertical data	Passes entire SDI stream, including HANC and VANC
Delay	Adjustable in increments of 6 pixels, lines or fields to 2.0 secs/60 frames in 525 lines and 2.08 secs/52 frames in 625 line

Ordering information

ViViD124 Video Delay	For long video processing delays
FR2AV	2U frame for up to 12 modules
FR1AV	1U frame for up to 6 modules
DTBAV	1U Desk top box for up to 2 modules