



VISTEK V1647 & V1647F ASPECT RATIO CONVERTER USER GUIDE

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VISTEK V1647 & V1647F aspect ratio converter

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1. GENERAL DESCRIPTION

The V1647 / V1647F is a broadcast quality 10 bit Aspect Ratio Converter, 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.

The V1647 / V1647F has a single 270Mbit component Serial Digital Interface (SDI) input, into which either a 525 or 625 line input source may be presented. The card will automatically detect the input line standard and will process the input signal accordingly.

The primary function of the V1647/ V1647F Aspect Ratio Converter is to convert a serial SDI input source picture, in one display aspect, into a serial SDI output source picture, in another display aspect. The V1647F offers six fixed conversion ratio settings for conversion between 4:3 inputs and 16:9 outputs and vice-versa, whilst the V1647 offers these same features together with the more sophisticated facilities of picture resizing and repositioning.

The card may be controlled locally via the **front panel**, remotely via an **RS485** interface port, the **DARTnet** control system, or a **GPI** input port.

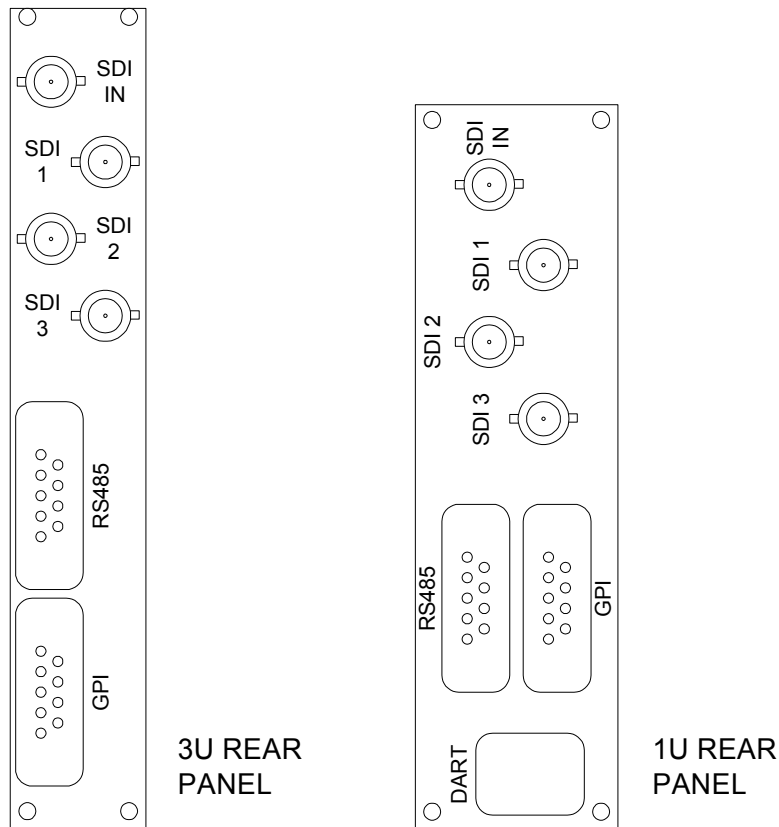
The V1647/ V1647F Aspect Ratio Converter comprises two cards; a lower base card which provides the serial SDI input and output interfaces and all interfaces to the rear panel connector, and the upper card which is the main processing engine.

The V1647 has three 270Mbit component Serial Digital Interface(SDI) outputs.

1.1 Table of Product Features

Feature	V1647	V1647F
Standard ratio selection (6)	✓	✓
User presets (10)	✓	x
Bypass selection	✓	✓
DART control	✓	✓
RS485 control	✓	✓
GPI control	✓	✓
Auto/force standard (525/625)	✓	✓
Variable picture zooms (H + V) and picture positioning (alignments and variable position)	✓	x
Picture cropping (H + V)	✓	x
Background colour / key	✓	x
Variable insertion delay	✓	✓
Internal test patterns	✓	x
Film mode (NOT currently available)	✓	x

2. REAR PANEL LAYOUT AND SIGNAL CONNECTIONS

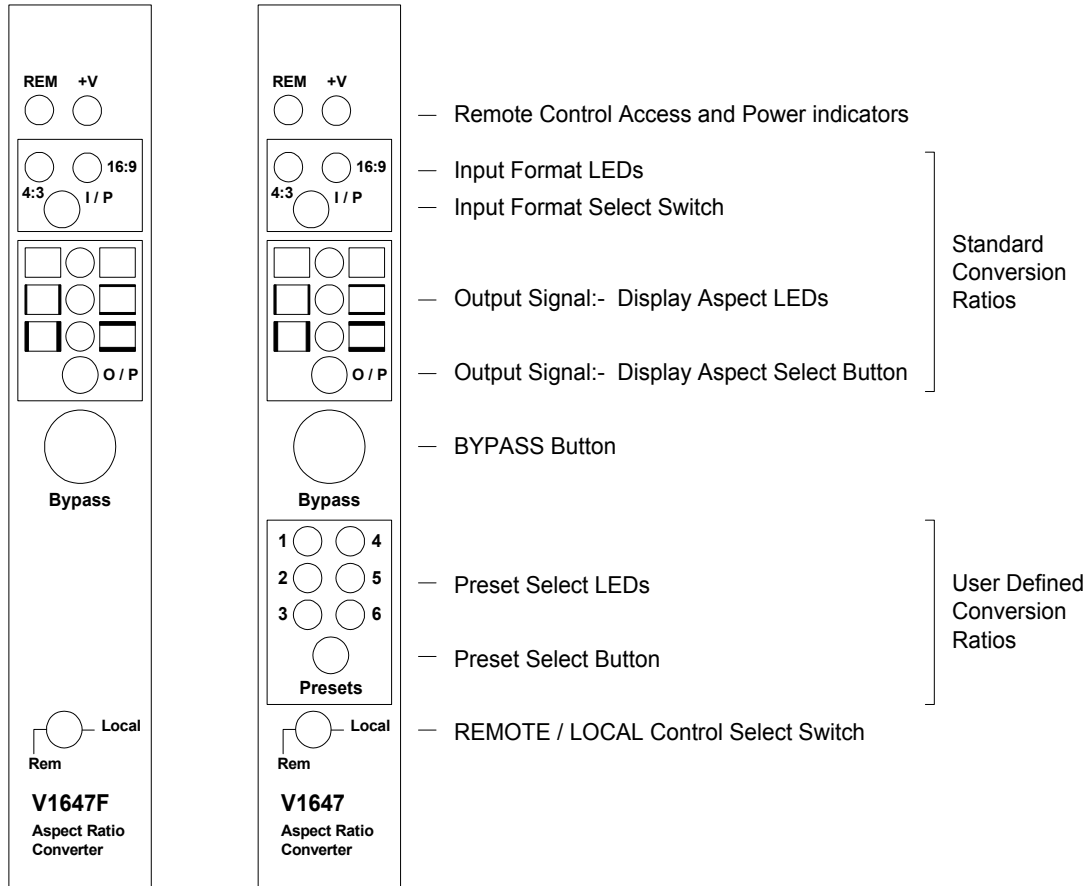


Connector	Input / Output Description	Comments
SDI IN	SDI Input	Input cable receive length:- up to 150 metres.
SDI 1	SDI Output 1	Output cable drive length:- up to 200 metres.
SDI 2	SDI Output 2	Output cable drive length:- up to 200 metres.
SDI 3	SDI Output 3	Output cable drive length:- up to 200 metres.
RS485	RS485 Remote Control Input	9 way D-type connector.
GPI	GPI Remote Control Input	9 way D-type connector.
DART	DARTnet Connector	Optional connector on the 1U rear panel assembly.

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3. FRONT PANEL LAYOUT





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4. FRONT PANEL DESCRIPTION

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 Selection and Indication of Standard Conversion Ratios

There are six **Standard Conversion Ratios** available to the user via the front panel; three associated with a 4:3 input signal, and three associated with a 16:9 input signal. All six define conversions between 4:3 inputs and 16:9 outputs, or vice-versa.

The toggle switch **I/P** may be momentarily forced towards either **4:3** or **16:9** to select the input format. The associated LED will be illuminated. The momentary push button **O/P** may then be depressed and released by an appropriate number of times until the correct output display aspect LED is illuminated. The six available **Standard Conversion Ratios** are:-

Input Format LED	Output Display Aspect LED	Definition Of Conversion Ratio
4:3	Top	4:3 input > 16:9 output; full width aspect
4:3	Middle	4:3 input > 16:9 output; 14:9 pillarbox aspect
4:3	Bottom	4:3 input > 16:9 output; full pillarbox aspect
16:9	Top	16:9 input > 4:3 output; full height aspect
16:9	Middle	16:9 input > 4:3 output; 14:9 letterbox aspect
16:9	Bottom	16:9 input > 4:3 output; full letterbox aspect

4.4 Bypass Button

The unit may be forced into bypass mode by depressing the **Bypass** button, and will be indicated by the internal LED being illuminated. The unit will toggle between bypass and process each time the button is depressed.

All vertical and horizontal processing (zooms and filtering) will be switched off when in bypass. The output signal will match the input signal precisely, but will be retain the same insertion delay through the unit as in the non-Bypass mode.

4.5 Selection and Indication of User Defined Presets

User defined presets are not available on the V1647F.

There are ten user definable presets on the V1647. Selection of the desired preset may be achieved by depressing then releasing the **Preset** select button until the appropriate LED(s) is illuminated. The software will step through presets 1 to 6, 7 (6 + 1) , 8 (6 + 2) , 9 (6 + 3) , 10 (6 + 4) then return to 1.

The user may define and store the setup of each preset via the DART interface (Viewfind or the V1605 control panel) or the remote RS485 input (Vistek's Vnetbrow software package).

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4.6 Remote / Local Switch

The V1647 / V1647F Aspect Ratio Converter may be controlled locally via the front panel or remotely via the RS485 input, the DART remote control system or the GPI input port. The position of the **Local / Rem** toggle switch defines the mode of control. The position of internal switch SW3-2 defines whether remote control is via RS485 or DART. See figs. 7.1 and 7.3 in the appendix for details. When in the **Rem** position all front panel switches and buttons are de-activated.

4.7 Adjustment / Indication of Unit Insertion Delay

The nominal insertion delay through the V1647 / V1647F aspect ratio converter is one video frame. This is adjustable by up to +/- 7 lines, in 1 line steps, to suit the specific application / installation.

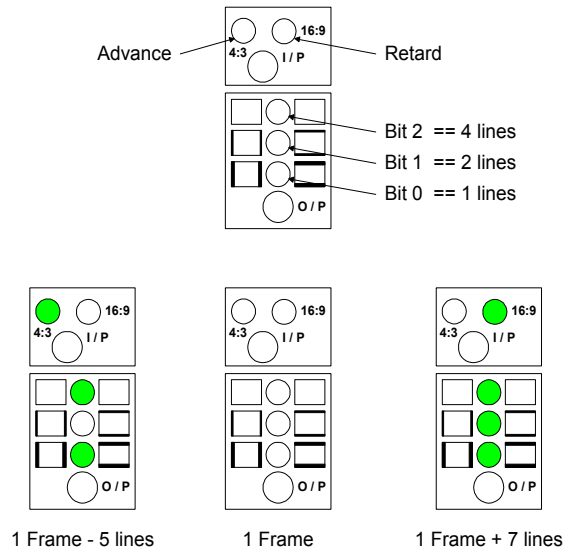
Modification of the unit insertion delay may be made via a Secondary Engineering Timing Panel. The following procedure describes how to enter this panel mode, make adjustment of the unit delay and finally exit to normal panel operation.

- (i) Depress and hold the Bypass button for approximately 5 seconds.
- (ii) Entry to the Secondary Engineering Timing Panel will be indicated by the Bypass button flashing.
- (iii) Adjustment of the insertion delay is made by pushing the centre biased toggle switch (I/P) to the left to reduce delay, or to the right to increase delay. Each individual push and release of the toggle switch will modify the insertion delay by one line in the chosen direction. The absolute insertion delay is indicated by a combination of the I/P and O/P select LEDs.

The input select LEDs indicate if the insertion delay is less than one frame (4:3 illuminated) or greater than one frame (16:9 illuminated). The amount of advance or retard is indicated by the O/P select LEDs, which are binary coded, thus indicating a range of +/- 7 lines of adjustment with respect to 1 frame.

- (iv) To exit the Secondary Engineering Timing Panel depress the Bypass button. The Bypass button will stop flashing, and the panel will revert to normal operation.

If there are no panel adjustments for a period of 5 minutes, then the panel will time out of Secondary Engineering Timing, and revert to normal operation.

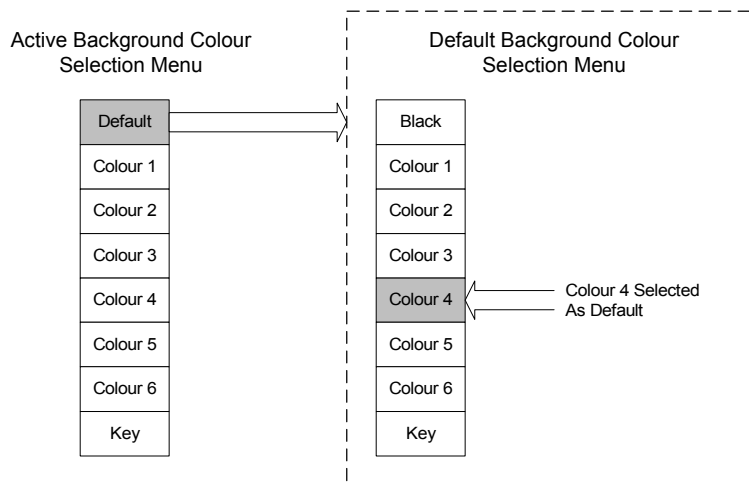


4.8 Adjustment / Indication of Default Background Colour

This facility is not available on the V1647F as the background colour is always set to black.

There are eight optional background colours available on the V1647, of which two are fixed (Black and Key) and six are user definable.

The six standard conversion ratios (for conversion between 16:9 and 4:3 formats) always utilise the **Default** background colour, whereas each of the user defined presets may be displayed (and stored) with any of the alternative background colours. See menus below:-



Active background colour may only be modified remotely (Vnetbrow, Viewfind or the V1605 control panel), whereas the **Default** background colour may be changed via a secondary engineering page on the front panel (see below).

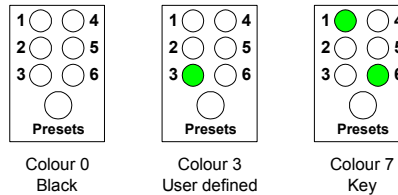
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- (i) Depress and hold the Bypass button for approximately 5 seconds.
- (ii) Entry to the Secondary Engineering Panel will be indicated by the Bypass button flashing.
- (iii) Adjustment of the **Default** background colour is made by pushing, then releasing, the **preset** select button until the appropriate preset LED(s) is illuminated. The software will step through presets 0 (no LEDs = Black), 1 to 6 (Colours 1 to 6), 7 (6 + 1 = Key) then return to 0.

Default Background Colour Selection



- (iv) To exit the Secondary Engineering Panel depress the Bypass button. The Bypass button will stop flashing, and the panel will revert to normal operation.

If there are no panel adjustments for a period of 5 minutes, then the panel will time out of the Secondary Engineering Panel, and revert to normal operation.

4.9 Factory Reset

This facility is not available on the V1647F.

Applying the **Factory Reset** will re-initialise the 10 user defined presets, the 6 user defined colours and the insertion delay to standard factory settings. The default background colour will also be reset to black (colour 0).

To apply **Factory Reset**, simultaneously depress and hold down the **O/P** and **Preset** push buttons for approximately 5 seconds. Factory Reset has been applied when all six Preset LEDs illuminate together for a period of approximately one second.



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5. REMOTE CONTROL

5.1 Remote Control Mode Selection

There are three optional remote control modes available on the V1647 / V1647F Aspect Ratio Converter; **RS485**, **DART** or **GPI**.

The position of internal switch SW3-2 defines whether the primary remote control mode is RS485 or DART. See figs. 7.1 and 7.3 in the appendix for details.

The GPI input port becomes active, hence overriding all other remote control modes, when pin 9 of the rear panel GPI input connector (GPI Enable pin) is connected to ground (pin 6). See Section 5.4 for details of GPI operation.

5.2 Dart Control

The V1647 / V1647F Aspect Ratio Converter may be remotely controlled via the DARTnet control system using the **V1605** 1U control panel or Vistek's PC based software application package, **Viewfind**.

All features available to the relevant product (V1647 / V1647F) may be selected and adjusted via the DART interface (see Product Feature table, 1.1). This includes full control of all V1647 picture processing features, including variable picture resizing, repositioning of the output picture, variation of the unit insertion delay and the ability to store or recall all ten user defined presets.

Operating status of the V1647 / V1647F remains displayed via DARTnet whilst the front panel Local / Remote switch is set to local.

5.3 RS485 Control

The V1647 Aspect Ratio Converter may be remotely controlled via the rear panel RS485 input (9 way D-type connector). This remote control means allows multi-drop simultaneous control of up to 64 modules. Two on board slide switches and a single hex switch define the unique card address; see figs 7.1, 7.2 and 7.3 in the appendix for details.

All features available to the relevant product (V1647 / V1647F) may be selected and adjusted via the RS485 interface (see Product Feature table, 1.1). This includes full control of all V1647 picture processing features, including variable picture resizing, repositioning of the output picture, variation of the unit insertion delay and the ability to store or recall all ten user defined presets. These features may be simply controlled using Vistek's PC based windows application package, **Vnetbrow**, or alternatively the RS485 protocol can be made available for integration to a third party control system.

See Fig. 7.7 in the appendix for an illustration of the Vnetbrow control panels for the V1647 / V1647F Aspect Ratio Converter.

5.4 GPI Control

The GPI input port is available via a 9 way D-type connector on the rear panel of the V1647 / V1647F. There are 6 input control lines, of which two are dedicated as the GPI enable (pin 9) and Bypass enable (pin 8). The other 4 lines are binary coded to offer the user 16 optional conversion settings.

Each of the inputs is activated by closing a contact between the relevant input pin and ground (pin 6).

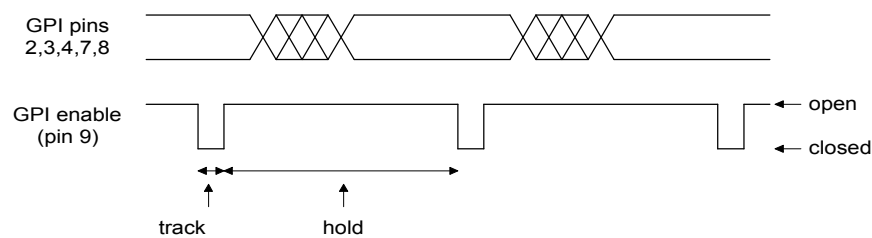
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The card also offers a +15V output on pin 5. This may be used to drive simple electronics on a remote GPI control panel. A maximum of 500mA may be drawn from this supply.

The GPI input port may become operational **ONLY** when the front panel LOCAL/REMOTE switch is set to the REM position. If the GPI enable pin is then connected to ground, the GPI port takes control of the V1647 / V1647F, overriding any other remote control means (RS485 or DART). The conversion mode may then be set by pulling the appropriate GPI input pins to ground. If the GPI enable pin is released (OPEN connection) then the GPI conversion mode is latched until another remote message (RS485 or DART) is received by the card.

The GPI enable pin may be used as a strobe. This feature allows the other 5 GPI input pins to be set up (and settled) in advance of a momentary contact closure between the GPI enable pin and ground.



See figures 7.4, 7.5 and 7.6 in the appendix for details of the rear panel GPI connector pinouts and the GPI control maps for each of the two products.



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6. TECHNICAL SPECIFICATION

Serial Input

Format	EBU Tech.3267 ANSI / SMPTE T14.22/082
Connector	BNC
Impedance	75 Ohm
Return loss	< -15 dB, 5-270 MHz
Cable	0-150m (Belden 8281)
Data rate	270 Mb/s

Serial (SDI) Outputs (3)

Connector	BNC
Impedance	75 Ohm
Return loss	< -15 dB, 5-270 MHz
Amplitude	800mV p-p (terminated)
DC offset	0V +/- 0.5V
Rise and fall times	0.75-1.5 ns
Drive length	up to 200m (Belden 8281)

Conversion

Insertion delay	1 Video Frame (Adjustable by +/- 7 lines, 1 line resolution)
SDI Ancillary data	Transparent (Delay matches conversion delay)
Vertical Interval data	Transparent (Delay matches conversion delay)
Bypass delay	Matches conversion delay

Picture Processing (V1647 only)

Horizontal zoom	0.5 to 8192
Horizontal position	Left, centre, right alignment and manual (0..359)
H crop (left)	0..7 (150ns per increment)
H crop (right)	0..7 (150ns per increment)
Vertical zoom	0.5 to 8192
Vertical position	Top, centre, bottom alignment and manual (0..287 lines)
V crop (top)	0..31 (lines)
V crop (bottom)	0..31 (lines)
½ line blanking	On / Off
Background colours	Black, key and 6 user defined.
Black	64, 512, 512 (10 bit Y, Cb, Cr)
Key	63, 512, 512 (10 bit Y, Cb, Cr)
User defined	24 bit RGB colour entry (8 bit Red; 8 bit Green; 8 bit Blue)

Where:	Black = 0	Peak White = 255
	0	255
	0	255

Miscellaneous

Power consumption	15W (approx.)
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7. APPENDIX

Figure 7.1

Location Of Switches, Links And Miscellaneous Components On Upper Card

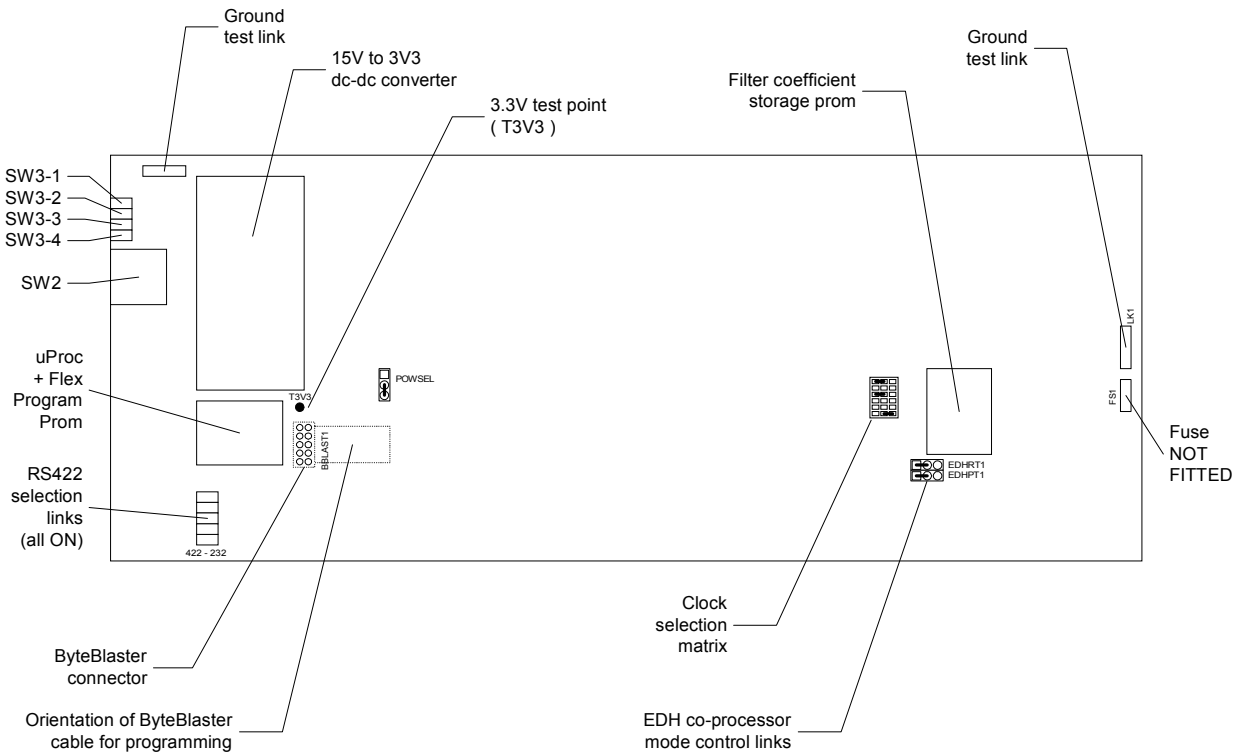


Figure 7.2

RS485 Card Address:- Switch Settings

RS485 Card Address	SW3-3 A[5]	SW3-4 A[4]	SW2 A[3]
0	OFF	OFF	0
1	OFF	OFF	1
2	OFF	OFF	2
3	OFF	OFF	3
15	OFF	OFF	F
16	OFF	ON	0
32	ON	OFF	0
63	ON	ON	F

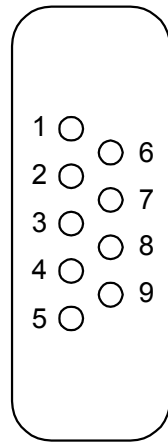
Figure 7.3

Remote Control:- RS485 / DART Mode Selection

SW3-2	Remote Control Mode
OFF	RS485
ON	DART

Figure 7.4

GPI:- Rear Panel D-type Connector Pinout



- 1 RESERVED
- 2 INPUT
- 3 INPUT
- 4 INPUT
- 5 +15V OUTPUT
- 6 GND
- 7 INPUT
- 8 BYPASS INPUT
- 9 GPI ENABLE INPUT

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Figure 7.5

GPI Control Map:- V1647

STANDARD MODES	PIN 9	PIN 8	PIN 7	PIN 4	PIN 3	PIN 2
4:3 > Full Width 16:9	CLOSED	OPEN	OPEN	OPEN	OPEN	CLOSED
4:3 > 14:9 Pillarbox	CLOSED	OPEN	OPEN	OPEN	CLOSED	OPEN
4:3 > Full Pillarbox	CLOSED	OPEN	OPEN	CLOSED	OPEN	OPEN
16:9 > Full Height 4:3	CLOSED	OPEN	CLOSED	OPEN	OPEN	CLOSED
16:9 > 14:9 Letterbox	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN
16:9 > Full Letterbox	CLOSED	OPEN	CLOSED	CLOSED	OPEN	OPEN
BYPASS	CLOSED	CLOSED	X	X	X	X
GPI NOT ACTIVE	OPEN	X	X	X	X	X

USER PRESETS	PIN 9	PIN 8	PIN 7	PIN 4	PIN 3	PIN 2
1	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN
2	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED
3	CLOSED	OPEN	OPEN	CLOSED	OPEN	CLOSED
4	CLOSED	OPEN	OPEN	CLOSED	CLOSED	OPEN
5	CLOSED	OPEN	OPEN	CLOSED	CLOSED	CLOSED
6	CLOSED	OPEN	CLOSED	OPEN	OPEN	OPEN
7	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
8	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED
9	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN
10	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED
BYPASS	CLOSED	CLOSED	X	X	X	X
GPI NOT ACTIVE	OPEN	X	X	X	X	X



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Figure 7.6

GPI Control Map:- V1647F (Fixed Ratio ARC)

STANDARD MODES	PIN 9	PIN 8	PIN 7	PIN 4	PIN 3	PIN 2
4:3 > Full Width 16:9	CLOSED	OPEN	OPEN	OPEN	OPEN	CLOSED
4:3 > 14:9 Pillarbox	CLOSED	OPEN	OPEN	OPEN	CLOSED	OPEN
4:3 > Full Pillarbox	CLOSED	OPEN	OPEN	CLOSED	OPEN	OPEN
16:9 > Full Height 4:3	CLOSED	OPEN	CLOSED	OPEN	OPEN	CLOSED
16:9 > 14:9 Letterbox	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN
16:9 > Full Letterbox	CLOSED	OPEN	CLOSED	CLOSED	OPEN	OPEN
BYPASS	CLOSED	CLOSED	X	X	X	X
GPI NOT ACTIVE	OPEN	X	X	X	X	X

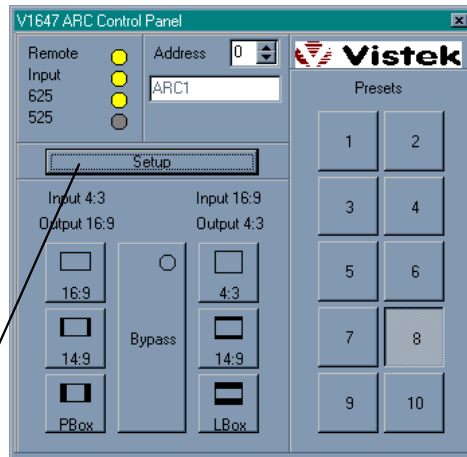
MODE	PIN 9	PIN 8	PIN 7	PIN 4	PIN 3	PIN 2
BYPASS	CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN
BYPASS	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED
BYPASS	CLOSED	OPEN	OPEN	CLOSED	OPEN	CLOSED
BYPASS	CLOSED	OPEN	OPEN	CLOSED	CLOSED	OPEN
BYPASS	CLOSED	OPEN	OPEN	CLOSED	CLOSED	CLOSED
BYPASS	CLOSED	OPEN	CLOSED	OPEN	OPEN	OPEN
BYPASS	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED
BYPASS	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED
BYPASS	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	OPEN
BYPASS	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED
BYPASS	CLOSED	CLOSED	X	X	X	X
GPI NOT ACTIVE	OPEN	X	X	X	X	X

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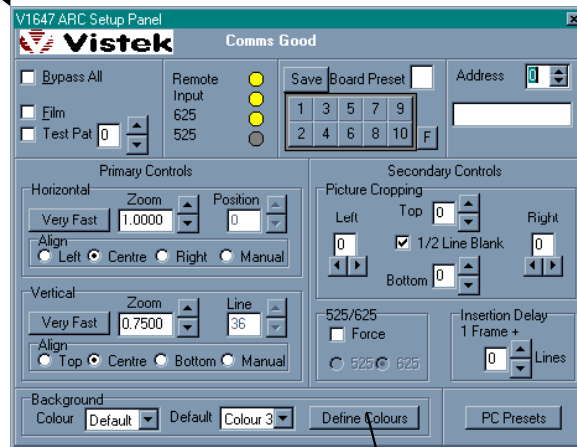


Figure 7.7

Vnetbrow Control Panels



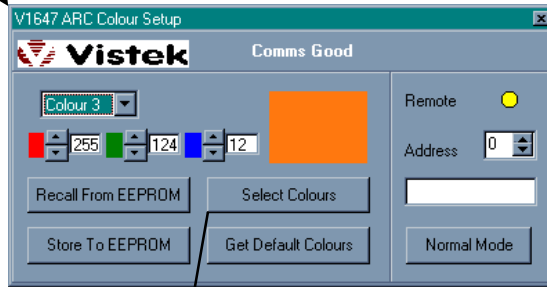
Depress the **Setup** button within the Control Panel in order to display the Setup Panel



Depress the **Define Colours** button within the Setup Panel in order to display the Colour Setup Panel

See next page

From previous page



Depress the **Select Colours** button within the Colour Setup Panel in order to display the Colour Palette Panel

