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# 1 Introduction

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The 3422/3423 Component Digital Video Keyer/Mixer is a stand alone, dual function, linear keyer or mixer for use with 270Mbit/s component serial digital video signals. It provides high quality 10 bit 4:2:2 processing and may be used as either a keyer or a mixer. It is particularly suited to multi-channel playout applications and may be controlled through GPI triggers, a serial interface or from the Pro-Bel COSMOS status monitoring and configuration system.

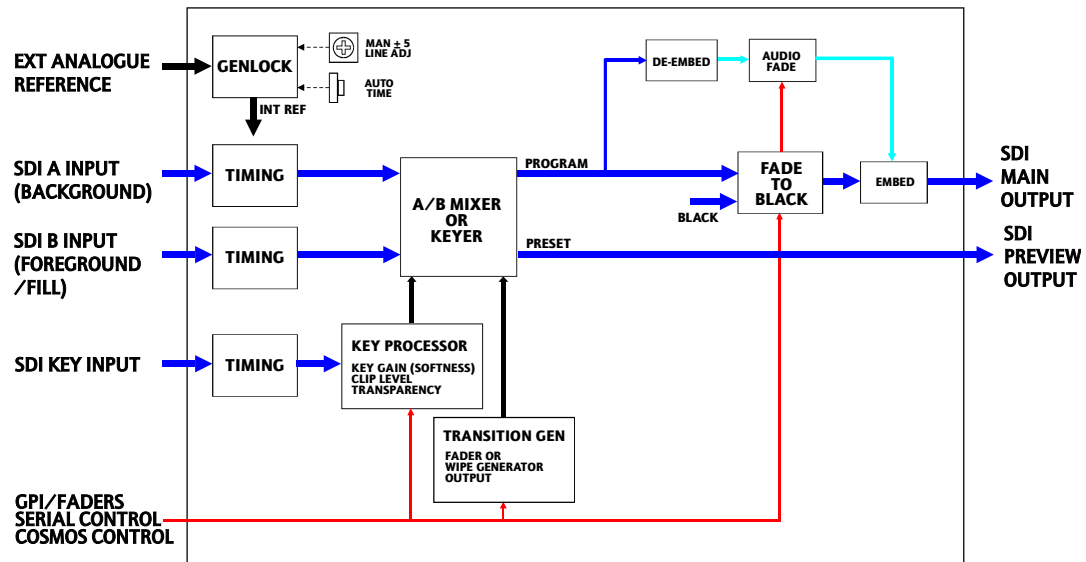
The full feature set is as follows:

- 10 bit 4:2:2 linear keyer or mixer modes
- all inputs cut to black when an input signal is not present
- integrated wipe pattern generator
- preview output
- one line manual or automatic phasing on A, B and key inputs
- external analogue reference input with  $\pm 5$  line genlock range
- adjustable key clip, gain and transparency
- selectable FX/Caption key modes
- selectable external/self key modes
- master fade to black
- embedded audio fade - available on the 3422 only and not the 3423
- key mix or wipe transitions
- variable transition rates (1 to 250 frames)
- 525 and 625 standards supported
- RS485 remote control and assignable GPI triggers
- user configuration saved to on-board EEPROM memory
- mixer/keyer set of GVG 100 protocol supported
- special TX modes supported
- compatible with COSMOS status reporting and control

The 3422 is designed to fit in the 1050 3U and 1051 1U ICON modular product rackframes.

The 3423 module is the same as the 3422 except it does not do embedded audio fades. Throughout this manual the 3422 is used to refer to either card.

The 3423 processes embedded audio in the same way as other ancillary data, by cutting at mid-transition or always passing data embedded on the A/Bgnd input. See section 3.2.



Whilst the 3422 Keyer/Mixer is particularly suited to use in an automated environment, it can easily be interfaced to simple control interfaces via the GPI port.

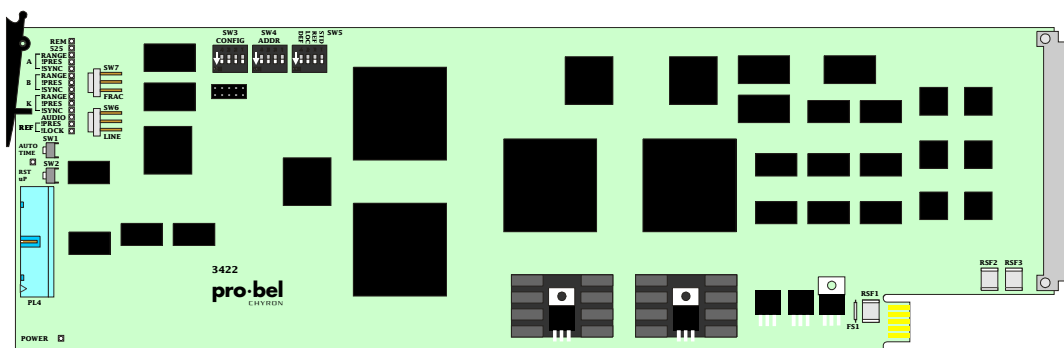
The default GPI assignments are designed to cover the majority of the simple mixing and keying functions that the unit is most likely to be used for as a stand-alone device. A user set-up mode is provided to allow alternative functions to be assigned from the COSMOS control and status monitoring system.

Serial control protocol compatible with Pro-Bel TX410 or TX420 master control switchers.

## 2 Installation

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The 3422 Component Digital Video Keyer/Mixer is used with the 30mm K3422.3 rear connector and fits in the 1050 3U and 1051 1U ICON modular product rackframes.



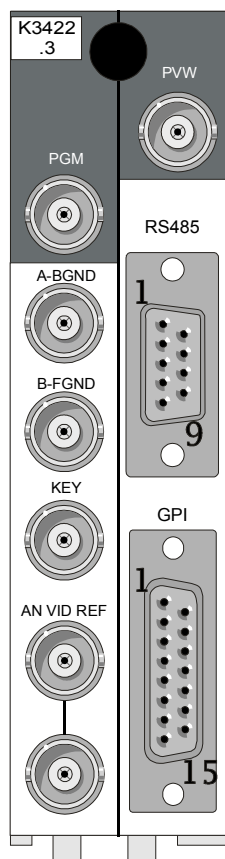
The 3422 Component Video Keyer/Mixer

For module and rear connector installation please refer to the appropriate ICON rackframe section of the manual.

## 2.1 Signal I/O

The 30mm K3422-3 rear panel provides BNC connectors for Program and Preview outputs and the background, foreground, key and analogue reference inputs. A fifteen way 'D' female connector provides access to GPIs and RS485 serial control is provided by a 9 way female 'D' connector.

COSMOS control and status monitoring requires optional 1250 COSMOS controllers that communicate directly with ICON cards in each frame.



RS485 - serial data port		
Pin	Function (Tributary mode)	Function (Master mode)
1	Chassis	Chassis
2	TX-	RX-
3	RX+	TX+
4	GND	GND
5	GND	GND
6	GND	GND
7	TX+	RX+
8	RX-	TX-
9	Chassis	Chassis

**Note:** The default pin-out is for Tributary mode. In Master mode, the TX and RX assignments are reversed.

## Default GPI port assignments

All eight GPIs are open collector interfaces each with an integral ‘pull-up’ resistor to the +5 volt supply. Each circuit may be configured as either an input or an output.

There are two GPI input modes, Pulse and DC. Pulse operated inputs require a negative going pulse to change state, whilst DC operated inputs need to be pulled low continually to change state.

GPI outputs may be used to drive external LEDs or other devices with suitable interface circuitry.

The GPI inputs and outputs are available on the GPI 15 pin ‘D’ connector as follows:

<b>GPI functions - default assignments</b>				
<b>Note: 0 = pulled or pulsed low, 1 = high or open circuit</b>				
<b>GPI</b>	<b>Pin</b>	<b>Function</b>	<b>Mode</b>	<b>Notes</b>
<b>1</b>	1	Mixer/Keyer mode select	DC 1 = keyer mode 0 = mixer mode	
<b>2</b>	9	Mix/Wipe mode select	DC 1 = wipe mode 0 = mix mode	Valid for mixer and keyer modes
<b>3</b>	2	Wipe 1 / Wipe 2 select	DC 1 = wipe 2 0 = wipe 1	Only valid in wipe mode
<b>4</b>	10	Cut A/B (or key)	Pulse - low	Toggles cut transition A/B (mixer mode) or key on/off (keyer mode)
<b>5</b>	3	Mix A/B (or key)	Pulse - low	Toggles mix/wipe transition A/B (mixer mode) or key on/off (keyer mode)
<b>6</b>	11	Fade to / from black & silence	Pulse - low	Toggle action, valid in all modes for video, only applicable to audio if audio fade is enabled
<b>7</b>	4	A on air tally	N/A	Active low when video input A is contributing to the output signal
<b>8</b>	12	B on air tally	N/A	Active low when video input B is contributing to the output signal
<b>5V</b>	8	+5 volts	N/A	GPI 5 volt supply
<b>0V</b>	15	GND	N/A	Ground - control zero volts



If enabled, there are three analogue control inputs for external potentiometers to adjust key clip, key gain and key transparency. The default analogue inputs are available on the GPI 15 pin 'D' connector as follows:

<b>Analogue control - default pin-out</b>				
<b>Control</b>	<b>Pin</b>	<b>Function</b>	<b>Polarity</b>	<b>Notes</b>
<b>Analogue input 1</b>	5	Key clip	0V = white +5V = black	0 to +5 volt input from external potentiometer
<b>Analogue input 2</b>	13	Key gain	0V = min +5V = max	As analogue 1
<b>Analogue input 3</b>	6	Key transparency	0V = min +5V = max	As analogue 1
<b>Supply</b>	7	+5V	N/A	Potentiometer 5 volt supply
<b>GND</b>	14	0V	N/A	Ground -analogue potentiometer zero volts common

**Notes:**

Recommended value for external potentiometer; 10K Ohms linear.

Please refer to the section 3.5 for the GPI pin-out for the special TX modes.

An external supply (up to +12v max) can be connected for GPI control supply - useful to power incandescent bulbs on a GPI control panel.

## Optional user selectable GPI functions

The following functions may be allocated to the GPI port using COSMOS, in place of any of the default assignments, if user set-up mode is selected.

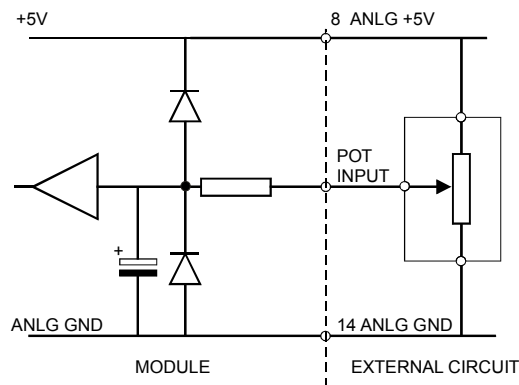
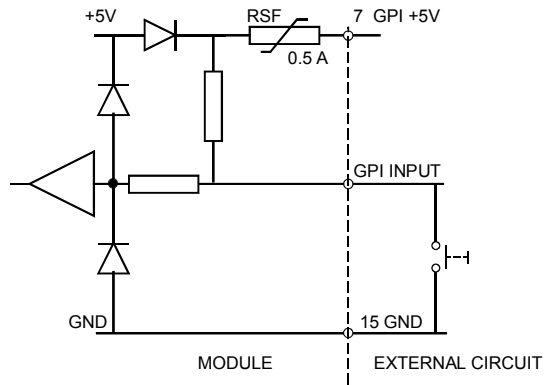
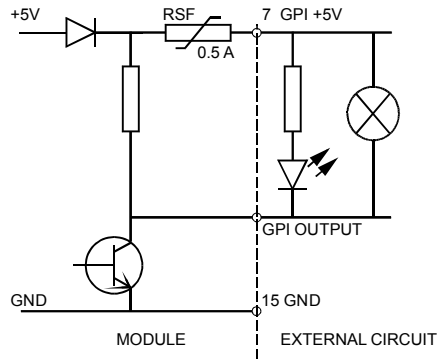
GPI port optional assignments			
Function	Mode	Mixer	Keyer
Cut to A	Pulse	Cut to A	Cut key off
Cut to B (key)	Pulse	Cut to B	Cut key on
Mix to A	Pulse	Mix to A	Mix key off
Mix to B (key)	Pulse	Mix to B	Mix key on
Fade to black & silence	Pulse	Master fade to black and silence	
Fade from black & silence	Pulse	Master fade from black and silence	
Fade to silence	Pulse	Fade embedded audio to silence	
Fade from silence	Pulse	Fade embedded audio from silence	
Select transition rate 1/2	DC 1 = rate 2 0 = rate 1	Selects transition rate	
Enable audio fade	DC 1 = AF ON 0 = AF OFF	Enables audio fade - audio follows video on mix, performs fast V fade on cut (Audio performs fast V fade on mix if audio fade not enabled)	
Enable potentiometers	DC 1 = Pots ON 0 = Pots OFF	Enables faders or potentiometers connected to analogue inputs on the GPI port (Note: functions assigned via COSMOS)	
Output at black tally	Output	Active low when video output signal is faded to black	
Key invert	DC 1 = Invert 0 = Normal	Selects inverted key	
Key on air tally	Output	Active low when key is on air	
Force output to 1	N/A	Always high	
Force output to 0	N/A	Always low	
Unassigned	N/A	Always high	

**Note:** If potentiometers have been enabled serial and COSMOS control of fader values will be disabled.

## 2.2 Electrical interfaces

GPI outputs are of the open collector type whilst GPI inputs and analogue inputs are buffered prior to being fed to receiver interfaces.

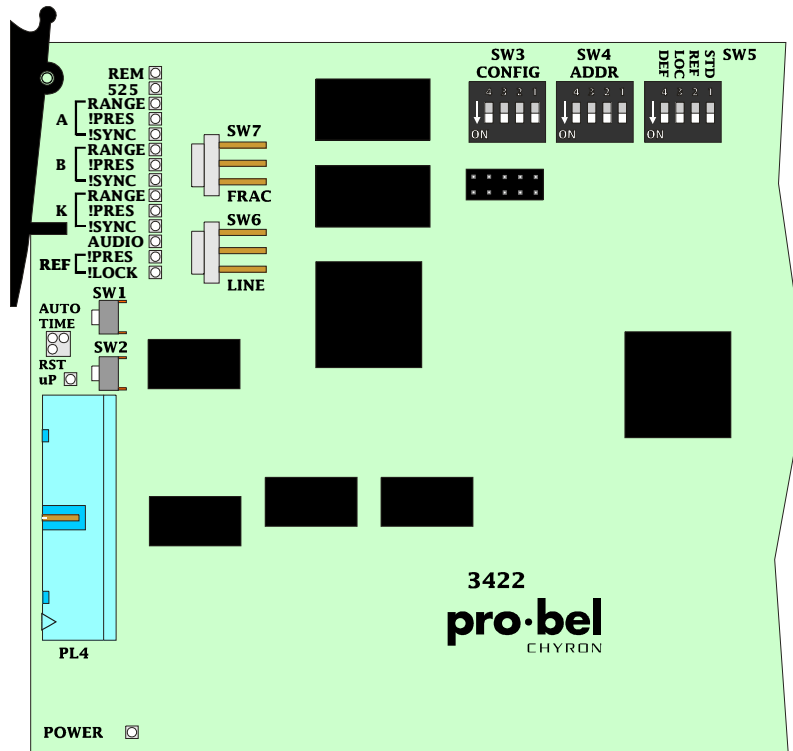
The following diagrams depict these interfaces and show typical external applications.



# 3 Configuration

The 3422 Component Digital Video Keyer/Mixer is provided with hardware configuration controls for the following functions:

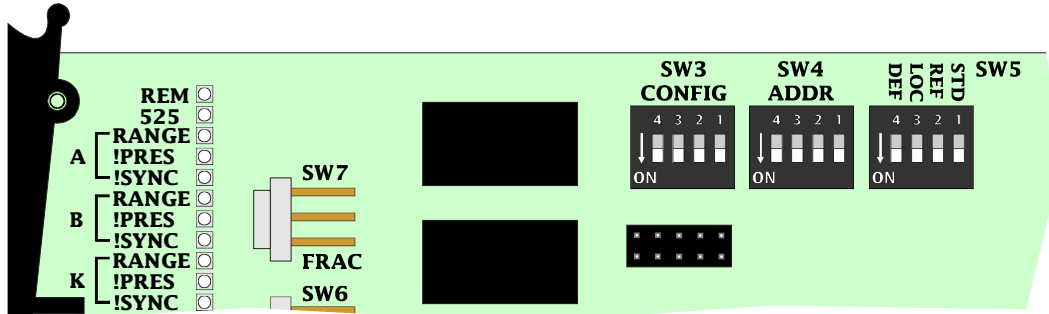
- 525/625 select
- reference select
- local/remote
- user/default configuration select
- multi-drop port address assignment
- blanking mode select
- auto/manual phasing
- master/tributary mode select (Rx/Tx pin swap)
- Special TX mode select (master control or opt out )
- reset



Hardware configuration controls and indicators

### 3.1 System configuration

SW 5 and SW 3 provide access to system configurations as follows:



**Note:** ON or logic condition 0 (zero) is obtained with switch levers in the ON position, away from the card edge as shown by the arrow.

SW5	
Switch lever	Function
1 (STD)	Standard: ON = 525 (yellow 525 LED on) , OFF = 625 (LED off)
2 (REF)	Reference select: ON = SDI A Input, OFF = EXT Reference
3 (LOC)	Local/Remote: ON = COSMOS remote (yellow REM LED on), OFF = Local (LED off)
4 (DEF)	Default GPI assignment: OFF = Factory, ON = USER (Configured by COSMOS only)

**Notes:**

Default GPI assignments will be the same as Factory default without re-assignment via COSMOS.

GPI assignment loaded on power-up or reset.

SW 3	
Switch lever	Function
1	RS485 serial port: ON = Normal, OFF = Factory test only
2	RS485 Tx/Rx swap: ON = Bus controller or Master, OFF = Tributary or Slave
3	Special TX mode: ON = normal or stand alone, OFF = TX modes
4 (see note)	Ancillary data mode: ON = Follow, OFF = A

**Note:** See section 3.5 for alternative operation of SW3/4 in special TX mode (SW3/3).

## 3.2 Selecting the ancillary data mode

There are essentially two modes. In normal mode ancillary data such as embedded audio or VITC follow the program outputs changing at the mid point of a mix or wipe transition. Alternatively, ancillary data can be set to always follow the A input. The latter choice may be useful, if for example, important data is only embedded in the vertical interval of the A input.

The available choices depend on whether Mixer or Keyer mode is selected as explained in the following table:

SW 3-4 Ancillary data mode	
Switch lever	Function
<b>Mixer mode</b>	SW3-4 ON: Ancillary data follows program output and switches at mid-point SW3-4 OFF: Ancillary data always follows the A input
<b>Keyer mode</b>	Ancillary data always follows the A input irrespective of switch position

## 3.3 Setting the multidrop address

The serial address of the 3422 card may range from hex address 30 to 3F and is controlled by SW4 as explained in the following table:

SW 4 - Multidrop address			
SW 4		SW 4	
1 2 3 4		1 2 3 4	
0 0 0 0	30	0 0 0 1	38
1 0 0 0	31	1 0 0 1	39
0 1 0 0	32	0 1 0 1	3A
1 1 0 0	33	1 1 0 1	3B
0 0 1 0	34	0 0 1 1	3C
1 0 1 0	35	1 0 1 1	3D
0 1 1 0	36	0 1 1 1	3E
1 1 1 0	37	1 1 1 1	3F

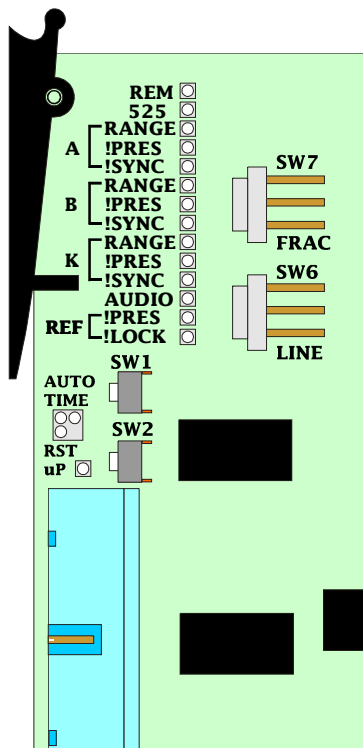
**Note:** In the above table 0 (zero) signifies ON and 1 signifies OFF.

This address is not read in any special TX mode.

## 3.4 Timing adjustments

The 3422 Keyer/Mixer is provided with an on board timing generator to enable the unit to be easily integrated into a variety of system designs as flexibly as possible. Timing adjustment may be performed from the card edge in local mode using the following controls:

- auto time
- manual line and fraction delay



Each input has a variable one line delay, and normal keying and mixing can occur providing all three inputs are within a total timing spread of one TV line.

The card generates its own internal reference which is locked either to the A input or an external analogue reference.

The internal reference may be advanced or retarded by  $-5$  to  $+4 \frac{7}{8}$  lines to allow the inputs to fall within the timing window.

This allows the unit to be used with a reference that is between  $4 \frac{7}{8}$  lines earlier and 5 lines later than the required output timing.

The internal reference may be timed manually by using the line and fraction controls or automatically by pressing the Auto Time button.

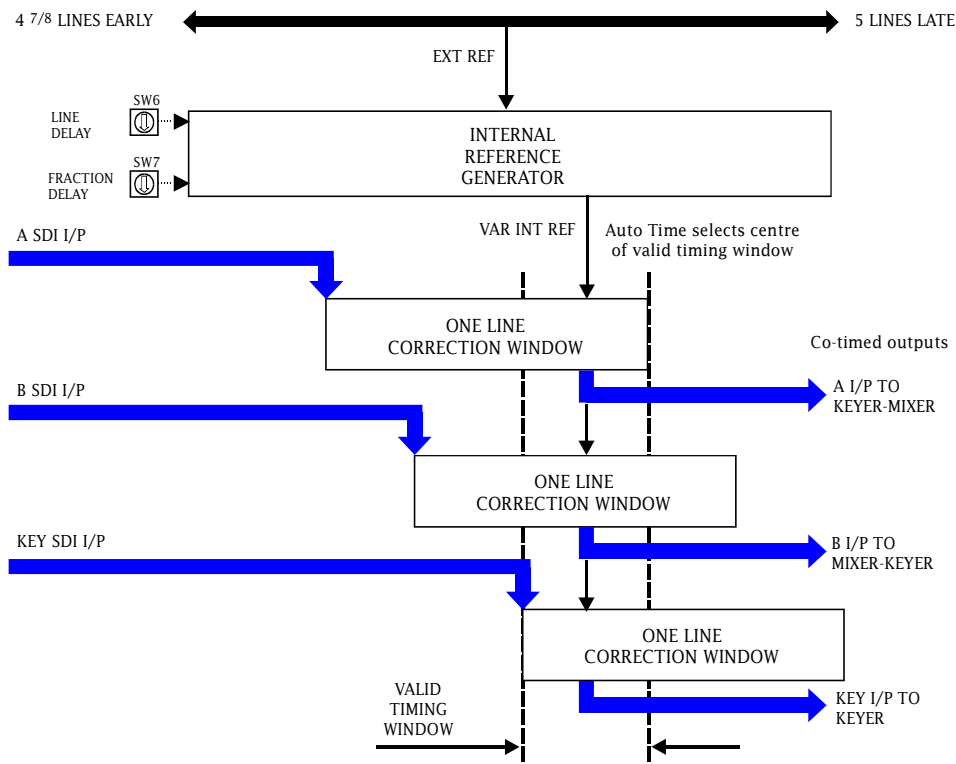
When all three inputs are within their timing windows, each Range LED will illuminate green. The Range LED will illuminate red for any input that is out of range. Orange illumination indicates that the auto-timing function is seeking the best timing.

Auto-timing generally takes a second or less to succeed.

**Note:** Corresponding controls are provided by COSMOS when in remote mode.

## Line and Fraction adjustment

For the three video inputs to be synchronised for keying and mixing, they must each lie inside their one line timing window.



Auto-phasing principle for A, B and KEY SDI inputs

The auto-phasing timing window may be thought of as a variable one line delay through which each SDI input passes. Once all the inputs are centred within their window the amount of delay is automatically adjusted for each input to give constant output timing. This will hold true despite changes in input timing, providing those changes remain within the correction window range. Larger changes in input timing can only be accommodated by re-adjusting the internal reference timing to bring all the inputs back inside the timing windows. This is achieved by pressing auto-time or by adjusting SW 7 and SW 6 until all the Range LEDs illuminate green.

**Note:** The early settings accommodate an input earlier than the reference and should not be taken to imply that the unit can advance the input



**Manual adjustment:**

Adjust the internal reference to centre the inputs within their correction windows using SW 6 for whole line delay and SW 7 for adding delay in steps of 1/8th of a line.

Whole line delay	
Output timing	SW 6 postn
-5 lines early	5
-4 lines early	6
-3 lines early	7
-2 lines early	8
-1 line early	9
In sync	0
+1 line late	1
+2 lines late	2
+3 lines late	3
+4 lines late	4

Fractional delay	
Output timing	SW 7 postn
Exact line delay value	0
Line delay + 1/8	1
Line delay + 1/4	2
Line delay + 3/8	3
Line delay + 1/2	4
Line delay + 5/8	5
Line delay + 3/4	6
Line delay + 7/8	7
Line delay + 7/8	8
Line delay + 7/8	9

Differently timed inputs can be accommodated providing timing variations are less than one line. Proceed as follows to work with a number of differently timed inputs:

- start at the earliest reference delay setting with SW 6 at 5 and SW 7 at zero - all range LEDs should be off
- increase SW 6 until all range LEDs are green
- go back one position on SW 6
- increase SW 7 until all range LEDs again go green - if necessary increase SW 6 by one position and set SW 7 to zero
- note this setting in lines and fractions - it represents the earliest valid setting
- increase SW 7 until one range LED turns off, then go back one position on SW 7 - if a range LED does not turn off, increase the setting of SW 6 by one position, set SW 7 to zero and continue as before
- note this setting in lines and fractions - it represents the latest valid setting
- choose a reference delay as required between the earliest and latest reference delay settings noted above

## 3.5 Special TX modes

Two special transmission modes are available to support the use of the 3422 Keyer/Mixer in typical master control or opt-out applications. These modes require a special 1428 ICON rear connector.

### Mode 1 - Master TX payout

This mode is intended to allow the unit to be used as part of a transmission master playback system under mainly serial control. Only GPI 1 to 5 have assigned functions as follows:

GPI port pin-out for Master TX mode				
GPI	Pin	Function	Configuration	Description
1	1	Keyer/Mixer mode select	GPI I/P DC level	On (0V) = mixer mode, OFF = keyer mode
2	9	Multi-Drop address	GPI I/P DC level	Bit 0
3	2	Multi-Drop address	GPI I/P DC level	Bit 1
4	10	Multi-Drop address	GPI I/P DC level	Bit 2
5	3	Multi-Drop address	GPI I/P DC level	Bit 3

Since GPI 2 to 5 are used for the multidrop address, SW 4 is ignored. However the address starts at 30 hex as before.

### Mode 2: Opt-out

In this mode the unit is only ever used as a mixer, never a keyer. Special GPI assignments are provided as follows:

GPI port pin-out for Opt-out mode				
GPI	Pin	Function	Configuration	Description
1	1	A/B select	GPI I/P DC level	On (0V) = A, OFF = B
2	9	Mix or V fade select	GPI I/P DC level	On (0V) = V fade, OFF = mix
3	2	AB transition rate	GPI I/P DC level	Bit 0
4	10	AB transition rate	GPI I/P DC level	Bit 1
5	3	BA transition rate	GPI I/P DC level	Bit 0
6	11	BA transition rate	GPI I/P DC level	Bit 1

Full audio fade capabilities will be provided in this mode. Transition rates options are set using two GPIs giving four possible values.

<b>Transition rates in mode 2</b>		
<b>Rate in frames</b>	<b>GPI 3/ 5</b>	<b>GPI 4/ 6</b>
<b>0</b>	0	0
<b>4</b>	0	1
<b>8</b>	1	0
<b>12</b>	1	1

To enter these special modes set SW3-3 OFF and use SW3-4 to select mode as follows:

<b>Accessing the special TX modes</b>		
<b>Mode</b>	<b>SW 3-3</b>	<b>SW 3-4</b>
<b>Mode 1 (TX)</b>	OFF	OFF
<b>Mode 2 (Opt)</b>	OFF	ON

**Notes:**

GPIs are only read on power -up

In mode 2, the A/B select line is a live signal and is polled for any changes.

## 4 Operation

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The 3422 Keyer/Mixer is designed to be operated in the following ways:

- as a standalone unit under GPI control (for example a local control panel)
- under serial and/or GPI control (for example from an automation system)
- from the COSMOS configuration and status monitoring system

The features available will vary depending on the control method chosen. For example, in standalone control, the GPIs can be used to select between Mixer and Keyer modes and to initiate transitions. However, only COSMOS currently provides full access to all features.

### 4.1 Keyer mode

In keyer mode a Foreground input (B) can be inserted over or cut into the Background input (A) using the Key input.

The following features are provided:

- selectable external/self key mode
- selectable FX/Caption key modes
- ability to fade or wipe the key in or out
- software control of fade or wipe transition rates - from 1 to 250 frames
- adjustable key, clip, gain and transparency

**Notes:**

In keyer mode, mixer functions are not available.

The preview output allows clip, gain and transparency to be setup when the key is not present in the main output - key transitions cannot be previewed.

#### Setting up a self key

In the absence of an external key signal the luminance of the fill signal (foreground) may be used as a 'self key'. This requires that the keyed objects should have reasonably high luminance values.

## FX and Caption modes

The linear keyer can operate in two different modes under COSMOS control:

- an FX mode for keying simple objects whose edges have fast rise and fall times
- a Caption mode for keying antialiased objects such as text

In the Caption mode the key input is only used to produce a black space in the background video with edges shaped to complement the foreground objects.

Foreground objects should be generated against a black background and are simply added to the processed background signal without further processing.

### Notes:

The keyer mode selection and key source selection can be accomplished via COSMOS and serial control.

These functions may also be assigned to GPIs using COSMOS.

True linear keyer action is achieved with clip at 8% and gain at 30%.

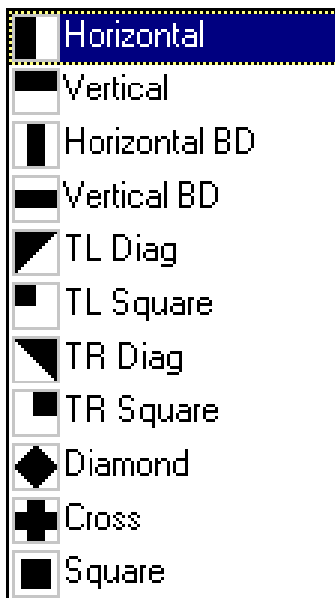
## 4.2 Mixer Mode

In mixer mode the following transitions between the SDI A (Program) and SDI B (Preset) inputs are available:

- Cut
- Mix, with software control of transition rate from 1 to 250 frames
- Wipe - 11 patterns with normal or reverse directions, variable softness and variable transitions rates
- V-Fade - fade to black and silence, fade up to next source
- Fade and Take - fade to black and silence, cut to next source
- Take and Fade - cut to black and silence, fade to next source

Macros which combine primitive functions to make complex operations such as V-Fades or Fade and Take operations are best performed by automation systems. Macros are not available with COSMOS, but complex operations can be performed manually, one step at a time.

The available wipe patterns are:



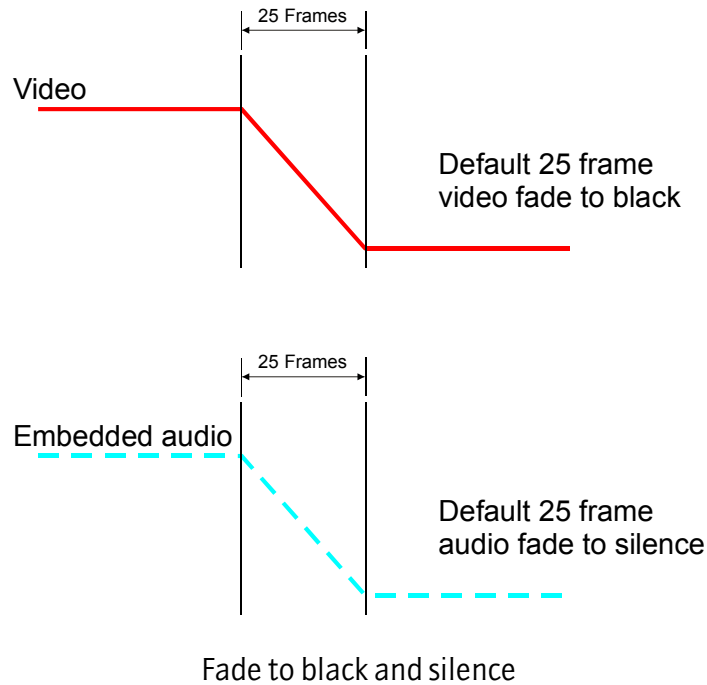
**Notes:**

In mixer mode, keyer functions are not available.

The preview output shows the next source - transitions cannot be previewed.

## 4.3 Fade to black and fade to silence

A dedicated video mixer is provided downstream of the Keyer/Mixer stage to allow video to be faded to and from black. An audio fade facility is also provided to allow the embedded audio to be faded to and from silence. During a cut, the video and embedded audio are always cut together.



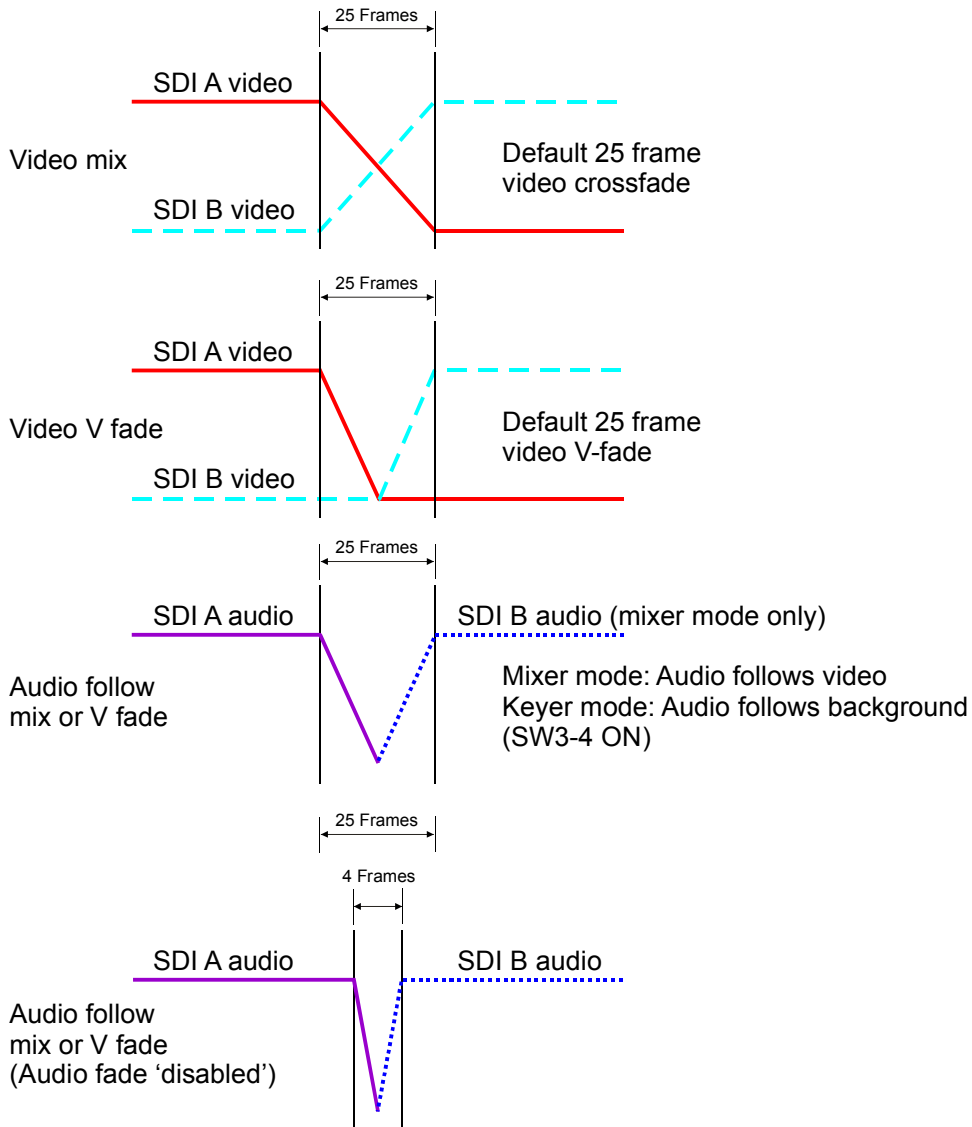
**Note:** The audio fade follows a logarithmic law to achieve the perceived linear fade progression shown.

The audio fades are only available on the 3422 card and not on the 3423.

## 4.4 Video and audio cross-fades

By default, embedded audio will always fade to silence at the middle of a video cross fade or video V-fade. The total time the old audio takes to fade out and the new audio fades in will then be equal to the video transition rate.

If audio fade is disabled via COSMOS or a COSMOS assigned GPI, the audio fade time will be set to a very short value of around 4 frames. A cut would be undesirable since clicks may result from instantaneous audio transitions.



**Note:** Audio and video are cut together during a simple video cut.



## 4.5 Handling ancillary data

In mixer mode the default setup ensures that ancillary data including blanking and embedded audio are always derived from the A input until the output is mixed or wiped beyond the mid transition point. Ancillary data will then come from the B input until mixed or wiped beyond the mid transition point back to A.

This default behaviour may be modified to force ancillary data to always follow the A input by configuration switch SW3-4 as explained in section 3.1 of the Configuration chapter.

In keyer mode, ancillary data is always derived from the A (background) input.

## 4.6 Serial control

The serial port provides access to the following functions:

- mix
- cut
- fade to black
- ext/self key select
- wipe pattern select
- transition rate
- mix/wipe rate
- fade to black rate
- reverse wipe
- wipe softness
- key invert
- key clip
- key gain
- key transparency
- FX/Caption mode select

**Note:** the serial port cannot be used to control any audio functions, GPI assignments or timing adjustments.

## 5 COSMOS status monitoring

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The 3422 module will provide the following information to the COSMOS status monitoring controller (if fitted):

- module present
- power OK
- A, B and KEY inputs present
- no reference
- reference unlock
- timing reference ext/Input A
- A, B, KEY I/P in range
- A, B, KEY I/P early or late
- line and fraction delay setting
- 525/625 standard
- remote/local mode
- output faded to black
- factory default/user set-up
- multidrop address
- ancillary data mode

In addition a wide range of parameters may be controlled through the status monitoring system, when remote operation is enabled. Remote operation is indicated by illumination of the yellow remote LED.

Please refer to section 4.5 for details of the features COSMOS can control.

In addition, the module is programmed with the following information, which can be read by the status monitoring controller:

- Module type
- Module bar code
- Module issue no

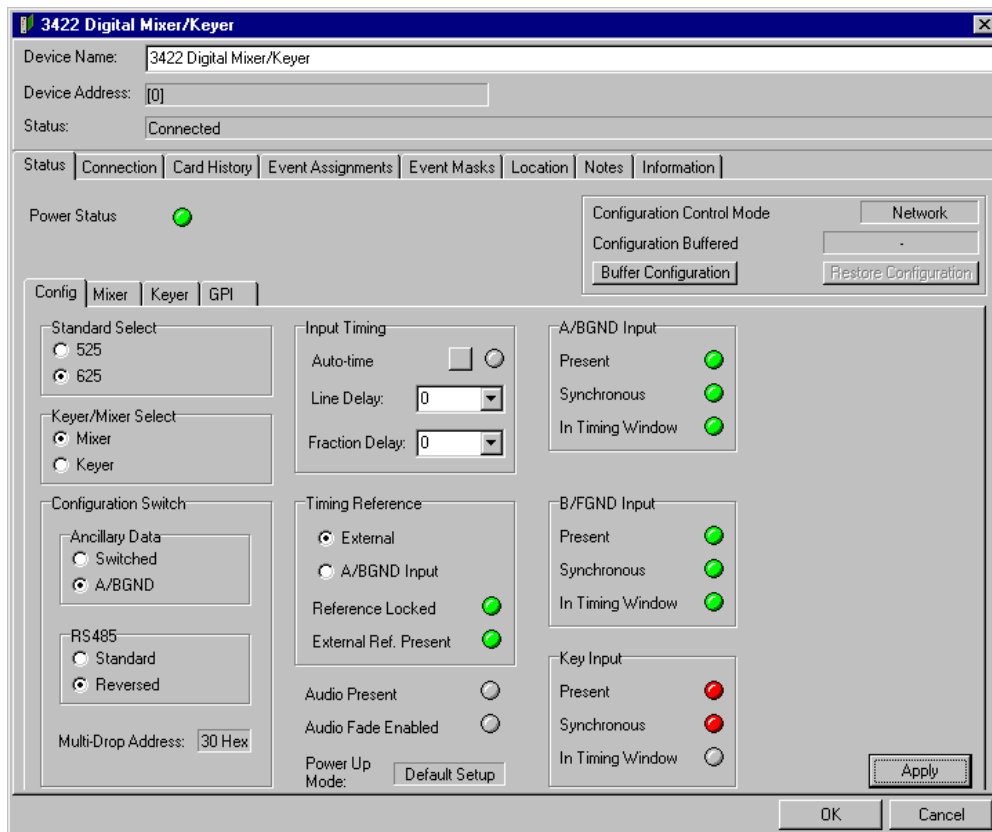
For further details of the Pro-Bel status monitoring system please refer to the COSMOS status monitoring manual.

## 5.1 COSMOS control

The COSMOS configuration and status monitoring system enables the monitoring of both set-up and error status of all ICON modules within a facility as well as providing remote configuration and logging of selected parameters.

COSMOS also allows features of the 3422 Keyer/Mixer to be controlled that may not be accessible from any other interface.

The card's parameters can be controlled from the configuration tab of the Status screen within the COSMOS application. Please refer to the COSMOS manual for further details of the valuable features offered by COSMOS.



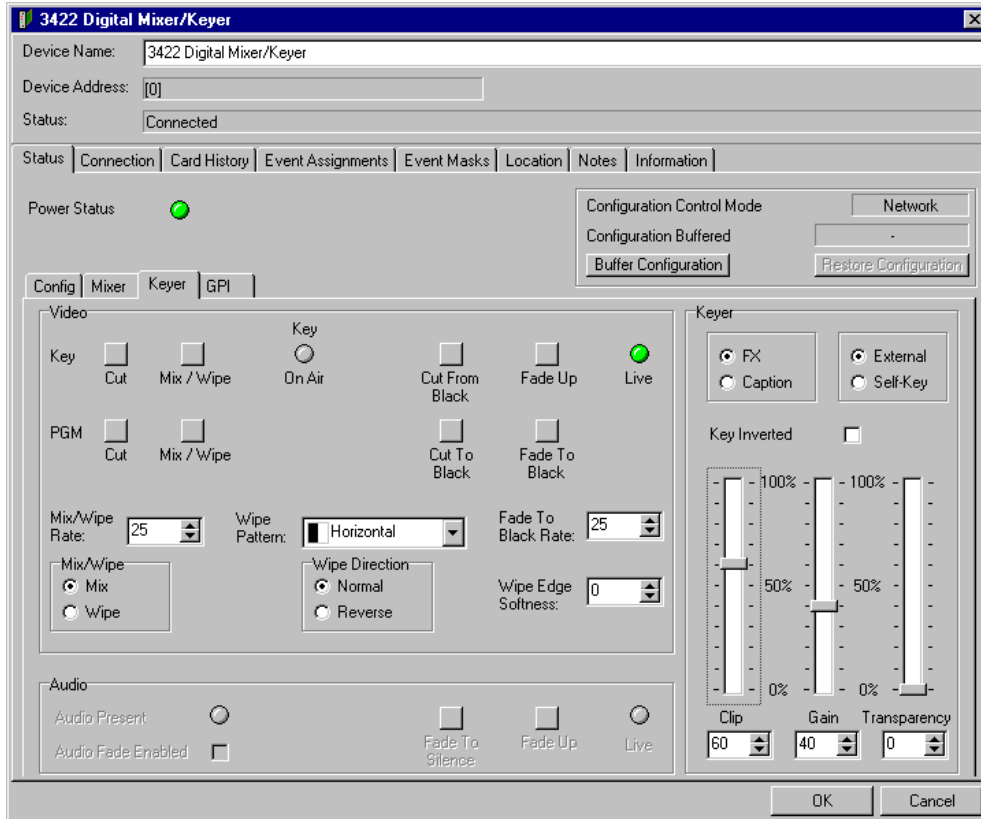
### Notes:

COSMOS control is only available if the local/remote switch SW 5-3 in the remote position (ON).

The Power Up mode is selected by configuration switch SW 5-4. User setting will not be applied unless SW 5-4 is ON.

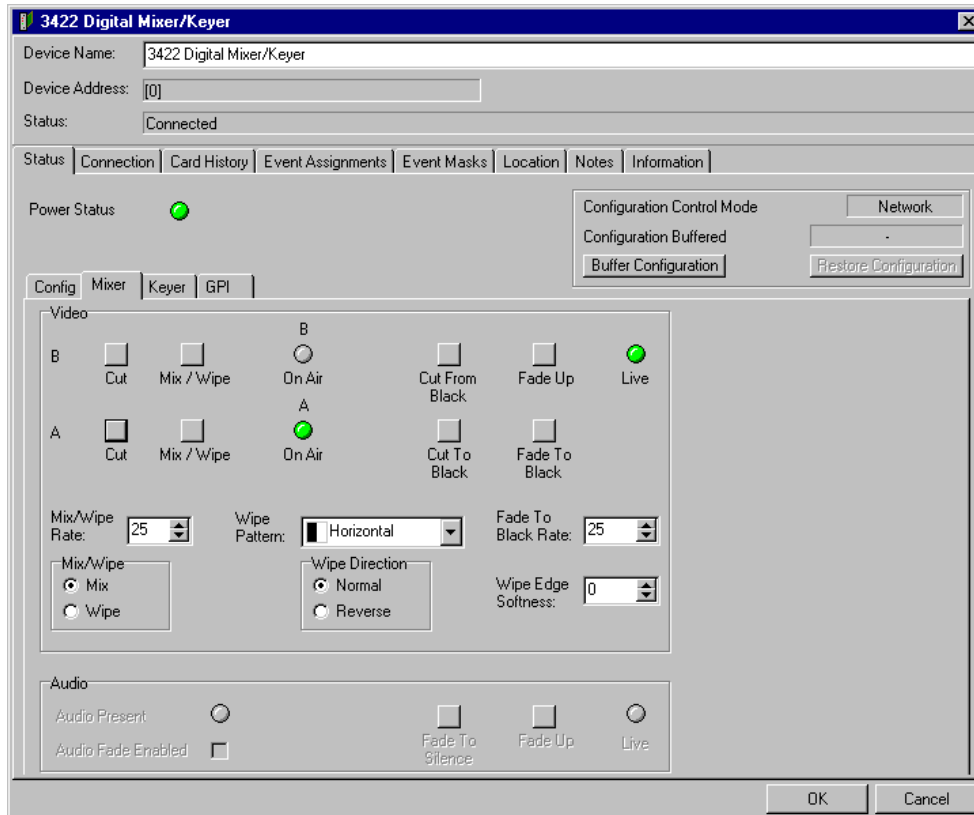
## 5.2 Keyer set-up

Keyer set-up also includes Wipe pattern controls, since keys may be wiped on or off.



## 5.3 Mixer set-up

The mixer set-up tab provides full access to all mixer features including wipe edge softness.



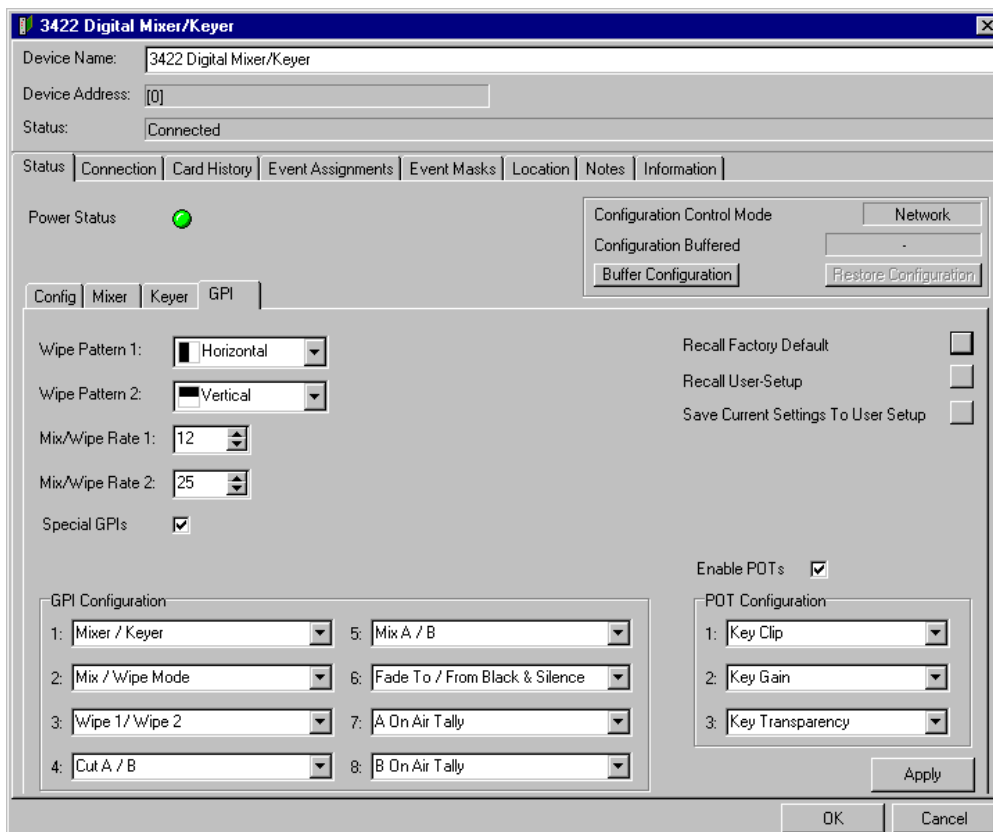
### Notes:

Wipe pattern assignment to the Wipe 1/Wipe 2 GPI control line is made via the GPI tab. The available wipe patterns are shown in section 4.2.

If present, embedded audio may be faded to silence independently of video. If enabled, audio will perform a V fade to match a video mix.

## 5.4 GPI assignment

There are eight general purpose interface lines for connection to switches and lamps or for the remote control of mix and key functions. In addition, there are three input lines for connection to analogue potentiometers for remote control of key mode functions, clip, gain and transparency or control of mix and wipe transitions.



The GPI tab also allows the GPI triggered wipe patterns to be selected and for user set-up assignments to be saved and for factory or user set-ups to be restored. The GPI lines and analogue input lines may be freely assigned to available functions or disabled.

## Available function assignments:

Any of the available 8 GPIs may be assigned to any of the GPI functions shown in the default and optional assignment tables in section 2.1.

The analogue control or potentiometer assignments may be made for each of the three analogue control lines as follows:

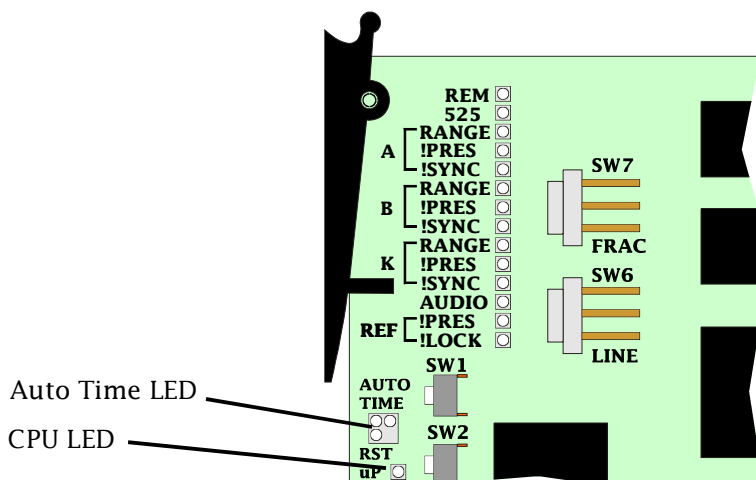
<b>Analogue controls</b>	
<b>Name</b>	<b>Default</b>
<b>Don't assign</b>	
<b>Key clip</b>	Yes
<b>Key gain</b>	Yes
<b>Key transparency</b>	Yes
<b>Manual transition fader</b>	
<b>Manual fade to black fader</b>	
<b>Audio fader</b>	
<b>Wipe softness</b>	

Please refer to section 2.1 for details of default GPI pinout, electrical characteristics and the optional GPI assignments available.

# 6 Troubleshooting

## Status LEDs

The LED indicators on the board use a simple colour coding to assist with easy status monitoring. Green is used for LEDs that usually remain on and indicate correct operation, yellow is used to provide information such as mode or selected line/frame rate standard, and red indicates an error condition. Many of these status indicators are also made available to the Pro-Bel status monitoring system and may be monitored remotely and logged.



Basic indicators		Note: ! = 'Not'	
LED	Indication	COSMOS aware	Meaning
<b>Power</b>	Green	Yes	Both +5 V and +12 V on-board regulators OK
<b>CPU</b>	Flash Yellow	No	Processor OK & reference present
<b>REF !LOCK</b>	Red	Yes	Lights to show Genlock is not locked
<b>RANGE x 3</b>	Green	Yes	Lights when I/P within timing window
<b>!SYNC x3</b>	Red	Yes	Lights when INPUT is NOT synchronous to reference
<b>!PRES x4</b>	Red	Yes	Lights when REF or INPUT is NOT present.
<b>AUDIO</b>	Yellow	Yes	Lights when embedded audio is present in PGM O/P
<b>525</b>	Yellow	Yes	TV standard, OFF=625, ON=525
<b>REM</b>	Yellow	Yes	OFF = LOCAL, ON = REMOTE (COSMOS)



## Ensuring correct timing

When each Range LED is illuminated green then each input signal is within the correction range of its one line autophase window. If any of the Range LEDs illuminate red, then the associated input signal is outside its correction window.

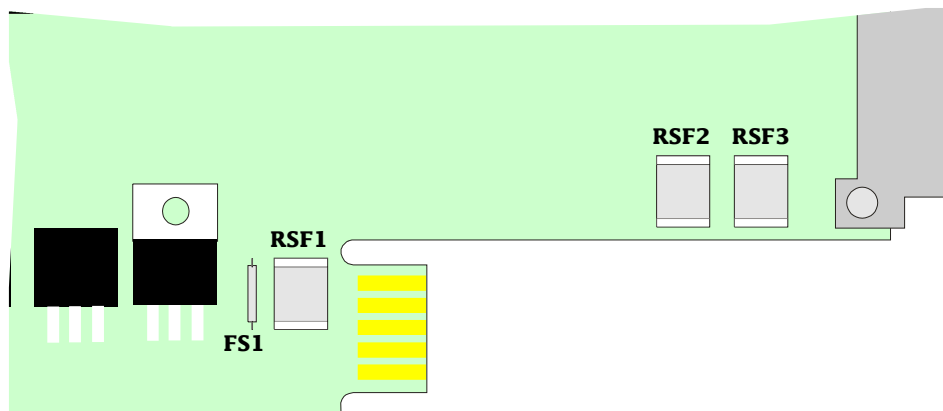
Auto time LED indicators			
LED	Indication	Status Monitored	Meaning
Auto Time	Red	Yes	unable to find common timing for all inputs
	Green		I/P in range for all inputs
	Yellow		Seeking best timing during Auto Time
	Off		Auto timer has not run

Refer to section 3.4 for timing set-up procedure.

## Trouble shooting checks

### The green card edge POWER LED is not lit

- check the PSU indicator to confirm that there is power to the frame
- check the wired in fuse, FS1, (see diagram below) which protects the +5V supply. If necessary remove and replace with a wire ended quick blow 10A fuse (Pro-Bel part UQ1101)
- check the resettable fuses protecting the card - do this by removing the power to the card for about 30 seconds then restoring the power
- if necessary, refer to the power supply trouble shooting guide in the appropriate ICON rackframe manual section



**There is no output signal**

- ensure that the green power LED on the front of the card is lit
- check that the inputs are connected to the rear panel and a valid signal is present
- check that the standard selection is correct
- check the output connection from the rear panel to the monitoring device and the output cable
- check that the CPU LED is flashing and that the reference unlocked REF !LOCK LED is out
- if the REF!LOCK is red check that the reference selection is correct

**A selected key, wipe, mix or cut does not function**

- check that the CPU LED is flashing and that the reference unlocked REF!LOCK LED is out
- if the REF!LOCK is red check that the reference selection is correct
- check that the Range LED illuminated green for all inputs
- perform a manual or automatic reference re-time if necessary
- check that a valid control path has been established to the chosen Keyer/Mixer card
- check that there are valid clip/gain/transparency values (for example, 100% transparency would be off)



# 7 Specification

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## Inputs

A (Bgnd):	One serial digital video input to EBU Tech 3267E, SMPTE 259M-C
B (Fgnd/Fill):	One serial digital video input as A
Key:	One serial digital video input as A Luminance only used
Reference:	One analogue video, looping
Impedance:	75Ω unbalanced

## Outputs

Program:	One serial digital video input to EBU Tech 3267E, SMPTE 259M-C
Preview:	One serial digital video input to EBU Tech 3267E, SMPTE 259M-C
Impedance:	75Ω unbalanced

## Performance

Signal path:	10 bit, 4:2:2 processing Transparent to all embedded data (except when audio fade is operating) Inputs automatically switched to black if input signal fails
Autophasing range:	One television line on each signal input
Genlock range wrt ext analogue video reference:	Five lines early to 4 <sup>7/8</sup> lines late
Television standard:	525/625 user selectable
Return loss SDI output/input:	> 15dB 5MHz to 360MHz
DC offset:	< 0.5 V
Amplitude:	800 mV p-p nominal
SDI data rate:	270Mbit/s

**GPI port**

8 assignable General Purpose Interface lines for connection to switches/lamps and remote control of Mix and Key functions

3 assignable input lines for analogue potentiometers for remote control of adjustable Key mode functions or control of Mix and Wipe transitions

+5 volt (current limited ~ 500mA) and 0 volt supply lines for analogue potentiometers

Note: GPI outputs are capable of sinking 50mA whilst remaining CMOS compatible any may be used with an external supply of not more than +12V

**RS485 port**

Serial port supports Mixer/Keyer part of the GVG100 protocol.

Master and tributary modes both supported

**Rear panels**

K3422-3 30mm wide rear connector

1428 240mm rear connector for special TX modes

## 8 **Ordering information**

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**Part number**

ICO-3422-3000

**Description**

SDI Digital Video Keyer/Mixer, 30mm