

# Contents

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# 1 Introduction

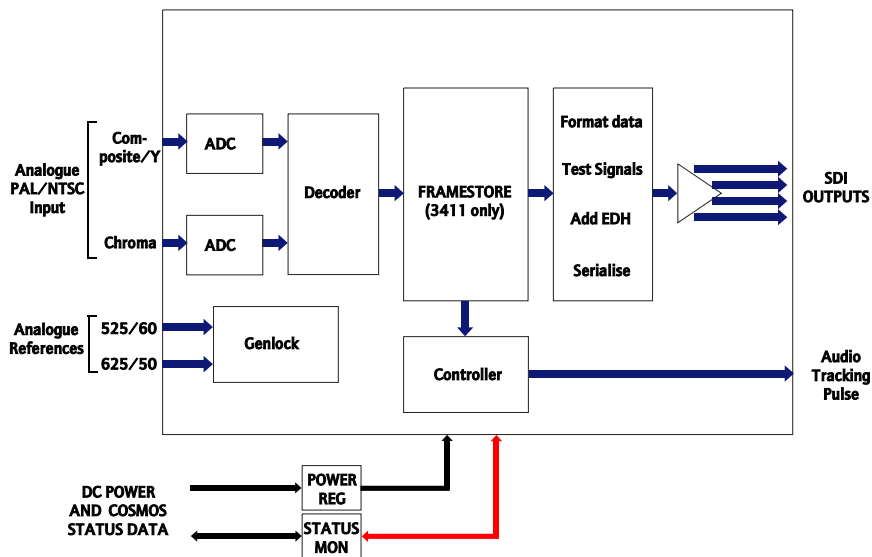
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The 3411/3412 is a high quality 10 bit PAL/NTSC to SDI decoder/ADC with the option of a frame synchroniser (3411). A high degree of separation is achieved between luminance and chrominance and 'non-mathematical' composite inputs from 'colour under' VTRs are easily handled. A TTL tracking pulse is available with the frame synchroniser option to pass phasing information to an accompanying audio delay unit such as the Pro-Bel 4423. Type 3411 includes the frame synchroniser whilst the 3412 does not.

Configuration settings can be remotely controlled or monitored via the COSMOS interface.

The main features available are:

- high quality 3/5 line adaptive comb decoding
- composite and Y/C inputs
- four SDI outputs
- dual analogue 525/625 references
- auto standard sensing
- horizontal and vertical adaption - modifies comb filter across colour transitions
- chroma enhancement
- input chroma AGC
- EDH equipped
- eight internal test signals
- frame synchroniser version (3411)
  - full horizontal and vertical phasing
  - audio tracking pulse output
  - freeze mode
  - panic freeze when input fails
- local controls with alphanumeric display
- full COSMOS remote control

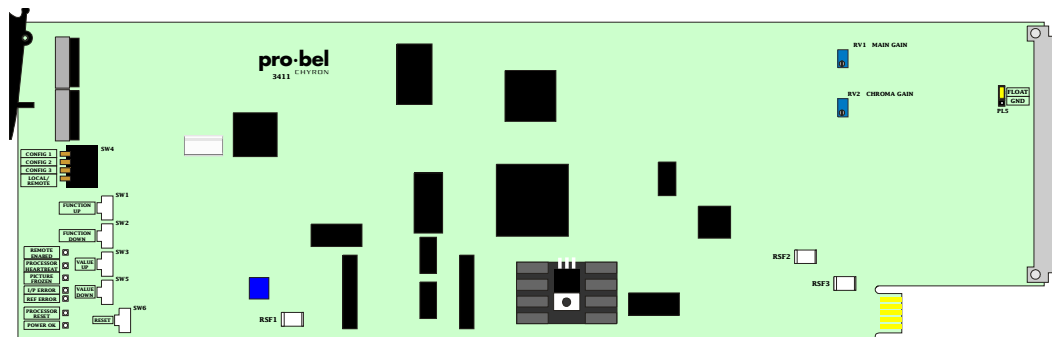
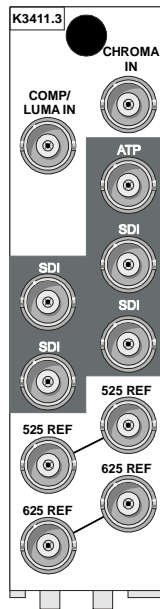


The 3411/3412 PAL/NTSC to SDI decoder/ADC

## 2 Configuration and operation

### 2.1 The K3411-3 rear connector

The 3411 and 3412 are used with the 30mm K3411-3 rear connector.

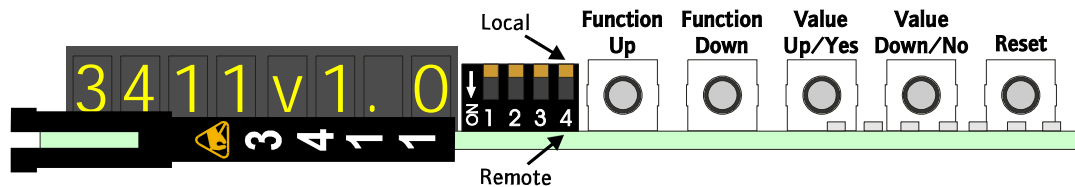


The 3411 /3412 PAL/NTSC to SDI decoder/ADC

Please refer to the installation chapter for help with installing modules and rear connectors into the ICON frame.

## 2.2 Card edge controls

The 3411/3412 can be controlled from the card edge or from the COSMOS interface. An eight character display on the card edge shows functions and their assigned values. On power-up the display will show the current firmware version.



Card edge controls

Card edge controls consist of four push button switches. The UP and DOWN Function buttons cycle through the available functions whilst the UP and DOWN Value buttons assign different values to the functions displayed.

Ensure that the Local/Remote switch is in the UP position to enable local control.

When the card is inserted into a powered frame, the reset button should be pressed to ensure correct power-up initialisation of the card.

### **Frame synchroniser controls (3411 only)**

The control functions specific to the frame synchroniser, horizontal and vertical phase, picture phase and freeze, are hidden when the 3411 is being used with the input as reference.

The frame synchroniser controls are not available on the 3412

## 2.3 Setting input/output signal options

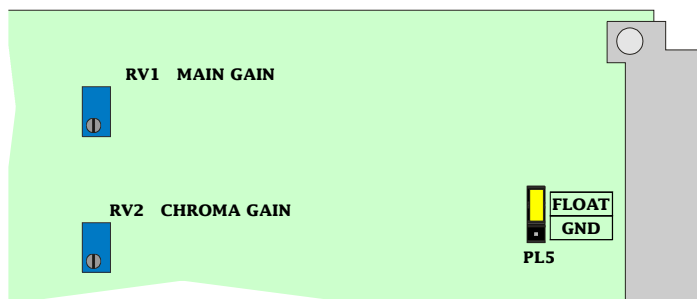
The available options are shown in the following table:

Signal options			
Function	Display	Default	Order
Input gain	<b>IpVid±n</b> (n = -10% to +10%)	<b>IpVid 0%</b>	5
Y/C input chroma gain	<b>IpChr±n</b> (n = -10% to +10%)	<b>IpChr 0%</b>	6
Input black level	<b>Black±n</b> (n = -10% to +10%)	<b>Black 0%</b>	7
525 Setup	<b>Setup_PASS</b> or <b>Setup_DEL</b>	<b>Setup PASS</b>	8
525 Hue	<b>Hue±n</b> (n = -45° to +45°)	<b>Hue 0°</b>	9
Input select	<b>I/P_Comp</b> or <b>I/P_Y/C</b>	<b>I/P_Comp</b>	13
Chroma AGC	<b>ChAgc Off</b> or <b>ChAgc On</b>	<b>ChAgc Off</b>	15

Note: The order column shows the order in which the function appears in the display when cycling with the Function UP button from the power up default display.

Chroma AGC corrects the chroma level of the input by measuring the incoming colour burst amplitude.

The composite input may be fully floating or referenced to local ground. Make the selection with PL5 as shown:



Note:

RV1 and RV2 are factory adjusted and should not require re-adjustment.

## 2.4 Selecting the reference (3411 only)

In Auto mode the input standard is detected and the external reference is then selected accordingly. In 'Ref Input' mode the reference is taken from the SDI video

input. No external reference is required and the frame synchroniser features are not available in this mode.

Reference select			
Function	Display	Default	Order
Reference	Ref Auto or Ref Input or Ref 525 or Ref 625	Ref Auto	1

## 2.5 Setting Decoder options

The available options are shown in the following table:

Decoder options			
Function	Display	Default	Order
Vertical adaption	DcdrV On or DcdrVOff	DcdrV On	2
Horizontal adaption	DcdrH On or DcdrHOff	DcdrH On	3
Chroma Enhancement	ChEnh On or ChEnhOff	ChEnh On	4

Note: Vertical adaption turns off comb filtering during vertical colour changes. Horizontal adaption changes the comb filter bandwidth so that the inherent vertical degradation is confined to a narrower band of horizontal frequencies in broad areas of colour. Chroma Enhancement provides a crispening function on colour transistions

## 2.6 Test signals

The available test signals are shown in the following table:

Note: The window signal is a strip of 100% colour bars across the middle 12.5% of the screen.

Test signals			
Function	Display	Default	Order
Test off	TSig OFF	TSig OFF	14
100% colour bars	TSig 1		
75% colour bars	TSig 2		
Component ramps	TSig 3		
Pulse and bar	TSig 4		
Grey field	TSig 5		
Multiburst	TSig 6		
Ramp	TSig 7		
Black	TSig 8		
Matrix of all signals	TSigMrtx		
Window (for test)	TSig Win		

## 2.7 Setting output picture phase (3411 only)

Output picture phase may be adjusted from +962ns to -962ns in 26 74ns steps.

Picture phase			
Function	Display	Default	Order
Picture Phase	PPhs±n, n = -962ns to +962ns in 74ns steps	PPhs 0	16



## 2.8 Setting Frame Synchroniser options (3411 only)

The available options are shown in the following table:

Framestore options			
Function	Display	Default	Order
Horizontal phase	<b>Hph ±n</b> n = -3198 to +3200 in 18.5 ns steps (1 line)	<b>Hph 000</b>	10
Vertical phase	<b>Vph +n</b> n = 000 to 624 (524) in lines (1 frame)	<b>Vph 000</b>	11
Freeze mode	<b>Live</b> or <b>Frame</b> or <b>Field1</b> or <b>Field2</b>	<b>Live</b>	12

## 2.9 User settings

To save or recall a user setting, first select one of eight register memory numbers. The ninth register 'Defs' recalls factory settings and cannot be written to.

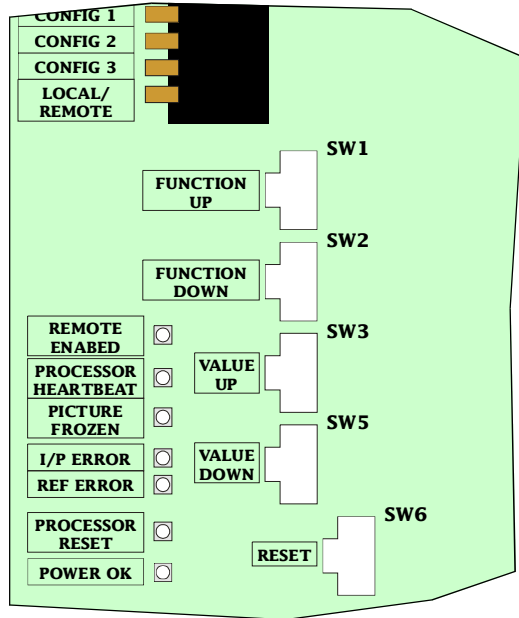
Cycle through the available functions until 'Reg Num' is displayed. Use the Value UP/DOWN buttons to change the register number or select 'Defs'. Then use the Function UP button to select either 'Save' or 'Load'. Respond appropriately to 'Are You Sure' with the Value UP/Yes button.

The available register memories are shown in the following table:

User settings			
Function	Display	Default	Order
Select register memory	<b>Reg Num 1-8</b> or <b>'Defs'</b>	<b>Reg Num 1</b>	17
Save	<b>Save</b>		18
Load	<b>Load</b>		19

## 2.10 Switches and status LEDs

The module is equipped with the following indicators to provide a means of monitoring operation:



Indicators		
LED	Colour	Function
Remote enabled	Red	Illuminates yellow in remote (COSMOS) control
Processor heartbeat	Yellow	CPU OK
Picture frozen	Yellow	Picture frozen in framestore
I/P error	Red	Internal PLL not locked
Ref error	Red	Illuminates when reference not locked or absent
Processor reset	Red	Illuminates when processor reset applied
Power OK	Green	Power OK

Notes:

Press the LOCAL/REMOTE switch DOWN to enter remote mode.

Switches Config 1 to Config 3 are not used.

In normal local operation with a 'live' input and 625/50 mode the processor heartbeat should flash and the green POWER LED should be lit. Other LEDs will be off unless the Picture has been frozen with the Frame Synchroniser (3411).



## 3 **Trouble shooting**

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### **The Input Error LED is lit**

- check that a valid composite or Y/C video signal is connected to the rear connector input BNC and that syncs are present

### **Video black level is raised in 525 mode**

- check that the 525 setup (pedestal) is removed if 7.5 IRE set-up is not required (not standard in digital domain)

### **Output levels are incorrect**

- for calibrated levels check that the IpVid gain is set to 0 - re-adjust IpVid if necessary

### **The Power LED is not lit**

- check mains power to the frame is turned on
- if necessary check the PSU as explained in the power supply section
- check the card is plugged in securely
- check to see if one of the re-settable fuses has operated. To do this turn the power off, wait for thirty seconds and then restore the power.

### **Front panel display is blank - buttons non-functional**

- Press the reset button. Occasionally, due to frame loading and voltage variations, the processor power up reset circuitry may fail to initialise correctly. Manual reset will clear this problem.



## 4 COSMOS status monitoring

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The 3411/3412 module will provide the following read only status information to the COSMOS status monitoring controller (if fitted):

- Reference in use (3411)
- input error or PLL lock status
- panic freeze triggered (input lost - 3411 only)
- reference fail (3411 only)
- Power OK
- local/remote configuration select switch status

The following status information is sent to COSMOS when the data changes and may also be controlled in remote mode:

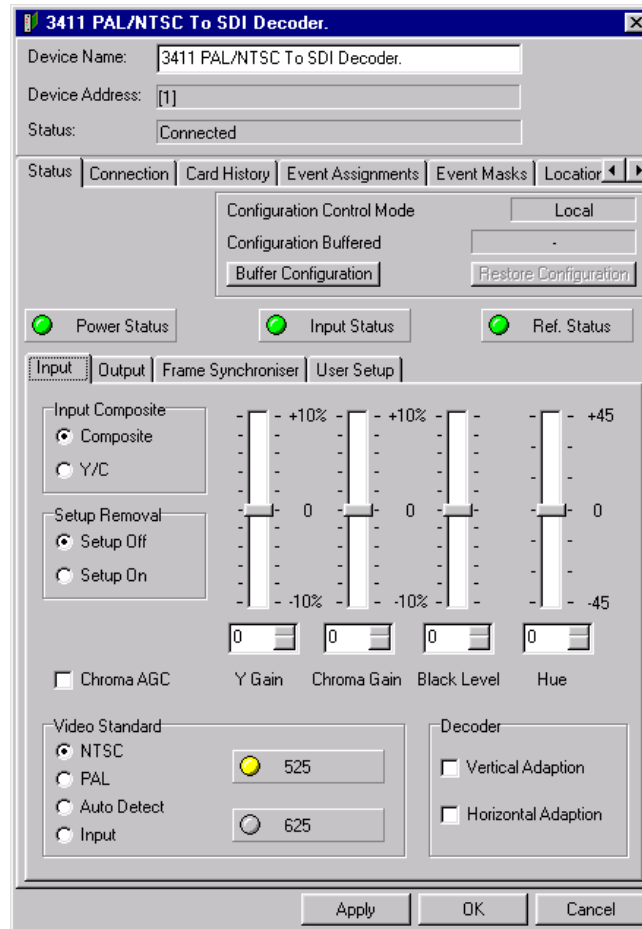
- reference selection (3411)
- select input (composite / Y/C)
- setup remove/pass (525)
- input luminance gain
- input chroma gain (Y/C)
- black level
- hue (525)
- picture phase (3411)
- horizontal phase (3411)
- vertical phase (3411)
- freeze mode (3411)
- decoder vertical adaption
- decoder horizontal adaption
- chroma enhancement
- chroma AGC
- test pattern

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

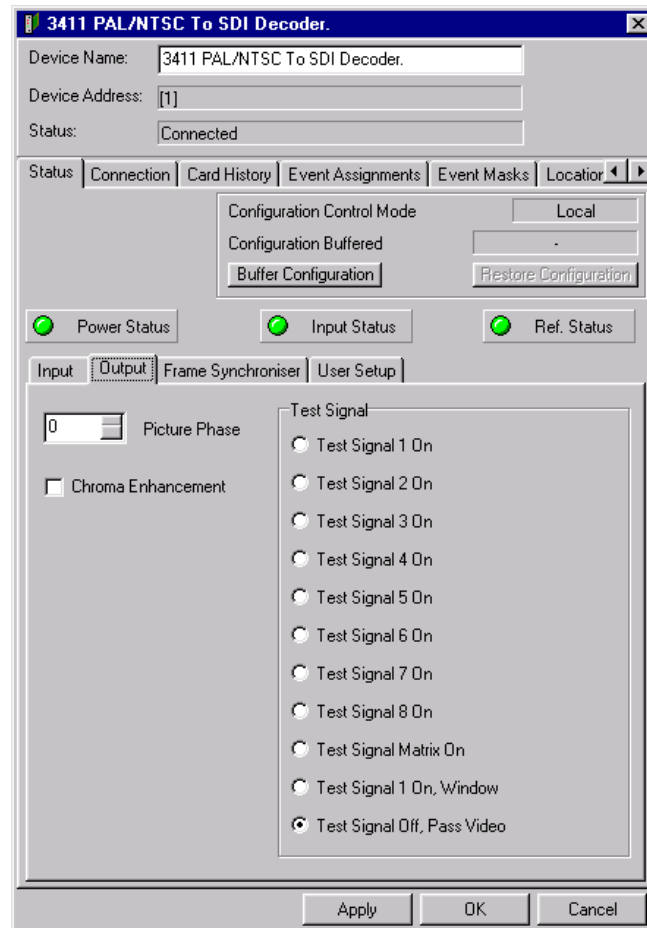
- module present
- module type
- module bar code
- module issue no

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

## Typical 3411/3412 COSMOS configuration menus

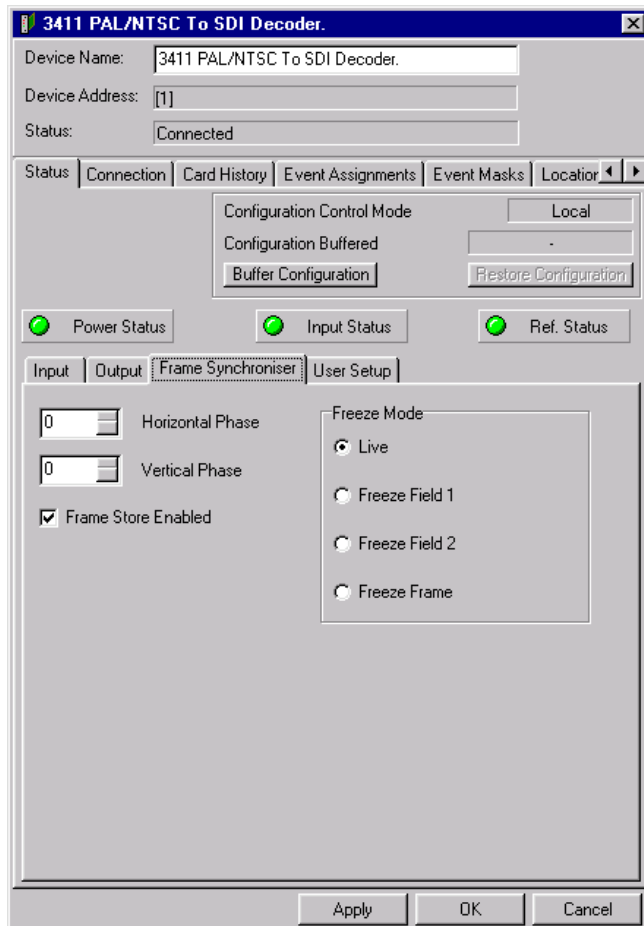


3411/3412 PAL/NTSC to SDI Decoder/ADC - Input Menu

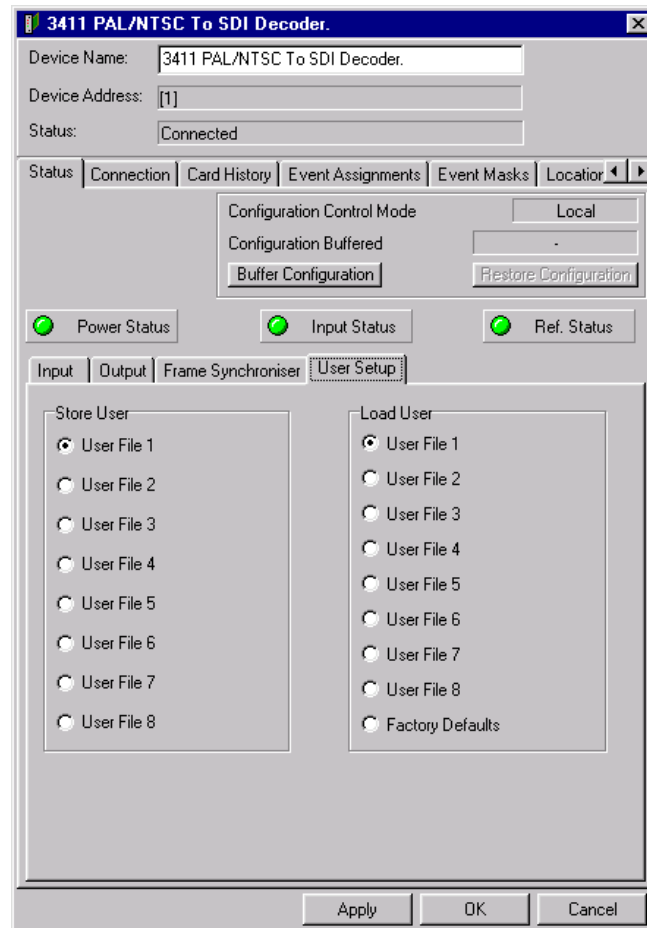


3411/2 PAL/NTSC to SDI Decoder/ADC - Output Menu





3411 PAL/NTSC to SDI Decoder/ADC - Frame Synchroniser Menu



3411/3412 PAL/NTSC to SDI Decoder/ADC - User Setup Menu



# 5 Specification

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## Inputs

Composite:	Analogue PAL, 625/50/4.43 or NTSC 525/60/3.58 (auto detecting)
Connector/Impedance:	BNC/75Ω differential mode
Y/C:	Colour systems as Composite, separate luminance and chrominance inputs
Connector/Impedance:	2 x BNC/75Ω unbalanced

## Reference (3411 only)

Type:	2 sets looping analogue black & burst for 525 and 625, auto sensing
Connector/Impedance:	4 x BNC/75Ω unbalanced

## Outputs

Main SDI:	4 x SDI to SMPTE 259-C 270Mb/s
Connector/Impedance:	4 x BNC/75Ω unbalanced
Audio Tracking Pulse:	Frame rate positive pulse, width equal to current video delay (3411 only).
Connector:	BNC

## Performance - analogue

Luminance response:	± 0.25dB to 5.5MHz
Input return loss:	> 40dB to 5MHz
2T pulse shape:	<0.5%K
2T bar slope:	<0.5%
Pulse to bar ratio	<0.5%
50Hz square wave tilt:	<0.5%
Differential gain:	<1%
Differential phase:	<1°

Y/C delay inequality: <10ns

Subcarrier rejection: >45dB

### Performance - SDI

Output amplitude: 800mV pp  $\pm$ 10% into 75 $\Omega$

Jitter: <0.2 UI pp

Rise/fall time: <1.5ns

### Local control

Eight character LED menu display with 4 x miniature push button switches controlling the following functions:

Basic (3411 or 3412):

- Composite or Y/C input
- Set-up (525) pass/delete
- Input gain
- Input black level
- Hue (525)
- Test signals (8 full frame patterns + matrix)
- Save user settings (1 to 8)
- Restore user setting
- Restore default settings
- V adapt on/off
- H adapt on/off
- Chroma AGC on/off

With Frame  
Synchroniser (3411)

- Horizontal phase ( $\pm$  1/2 line)
- Vertical phase (0 to 1 frame in 1 line increments)
- Freeze mode
- Picture phase (position  $\pm$ 900ns)

### LED indicators

- Input fail
- Reference fail
- Processor heartbeat
- Processor in reset
- Picture frozen
- Power status
- Remote control (COSMOS) enabled

## 6 **Ordering information**

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**Part number**

ICO-3411-3F00

ICO-3412-3000

**Description**

PAL/NTSC to SDI Decoder/ADC with Frame Synchroniser, 30mm

PAL/NTSC to SDI Decoder/ADC, 30mm