

Contents

1	Introduction	2
2	Installation	4
2.1	Signal I/O	5
3	Configuration	6
3.1	Setting the television standard	7
3.2	Setting blanking options	8
3.3	Setting the local/remote control mode	8
3.4	Setting monitoring output gain	9
3.5	LED indicators	10
4	Trouble shooting	11
5	COSMOS status monitoring	14
6	Specification	16
7	Ordering information	18

1 Introduction

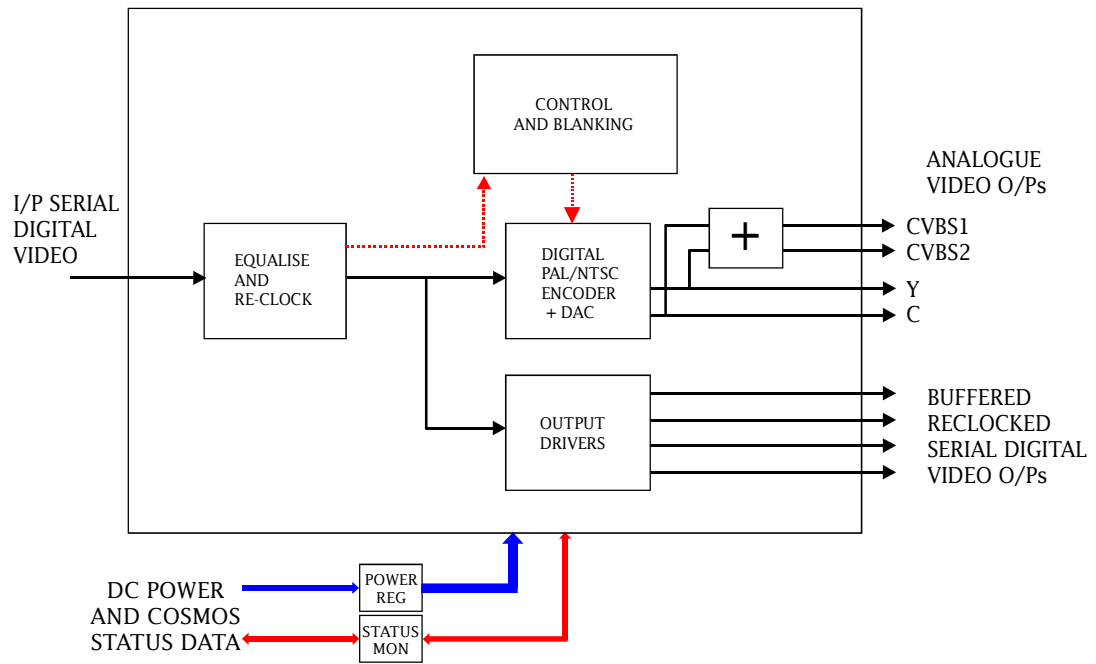
The 3416 is a serial digital video distribution amplifier with analogue monitoring facilities. It is designed to fit in the 1050 3U and 1051 1U ICON modular product rackframes and comes with a choice of 20mm and 30mm rear connectors.

It accepts serial digital video at 270Mbit/s and provides input equalisation, four re-clocked serial outputs, one set of Y/C outputs and two analogue composite outputs. Only two re-clocked outputs, one set of Y/C outputs and one composite output are available with the 20mm rear connector, but rack packing density is higher.

Output coding can be manually or automatically set to PAL or NTSC to correspond with the input line standard.

Characteristics of the 3416 module are:

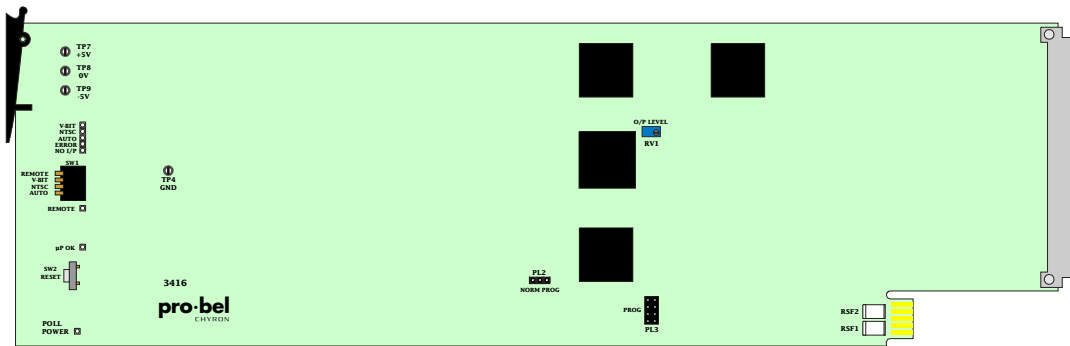
- 4 output serial digital video distribution amplifier
- equalisation and re-clocking
- up to 2 analogue composite monitoring outputs (PAL/NTSC as appropriate)
- analogue Y/C outputs
- automatic or manual PAL/NTSC coded monitoring
- May be set to pass vertical interval auxiliary data to analogue outputs
- 30mm and 20mm rear connector panels
- card edge monitoring and setup controls
- remote configuration and monitoring with Pro-Bel COSMOS status monitoring



The 3416 digital video DA and monitoring DAC

2 Installation

The monitoring DA consists of a 3416 ICON module which fits in either a 1U 1051 or a 3U 1050 ICON Pro-Bel modular rackframe. It is available with two rear connectors, the 20mm K3416.2 for increased packing density or the 30mm K3416.3 with fully connected outputs.



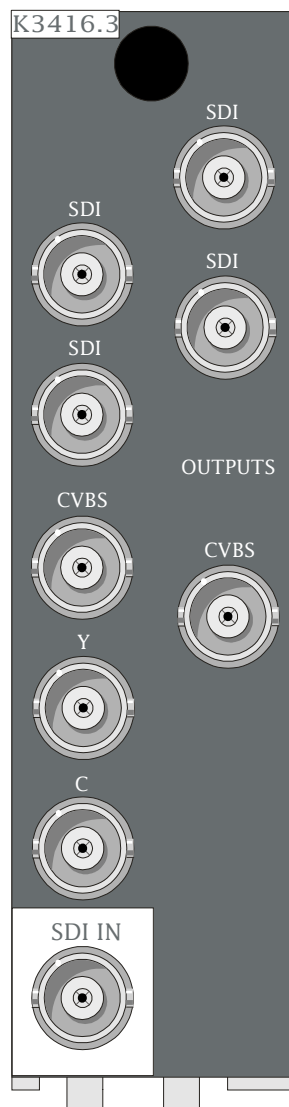
The 3416 digital video monitoring DA

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

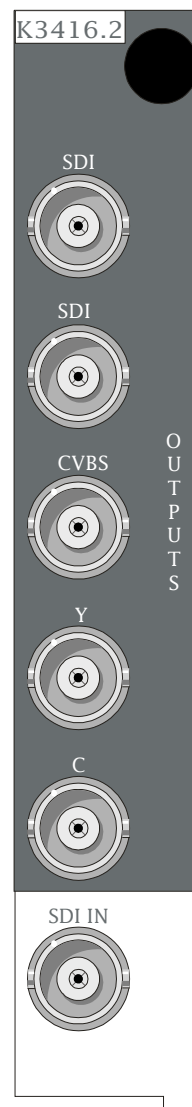
2.1 Signal I/O

The K3416.3 rear panel is fully connected and allows the full complement of module outputs to be used. The complete I/O provided consists of single SDI input, four re-clocked serial digital outputs, two analogue composite outputs and one set of Y/C outputs.

The 20mm K3416.2 panel allows only two re-clocked outputs and one composite outputs plus the Y/C pair. However, 20mm rear panels do allow for higher packing densities over 30mm panels.



The 30mm K3416.3 panel



The 20mm K3416.2 panel

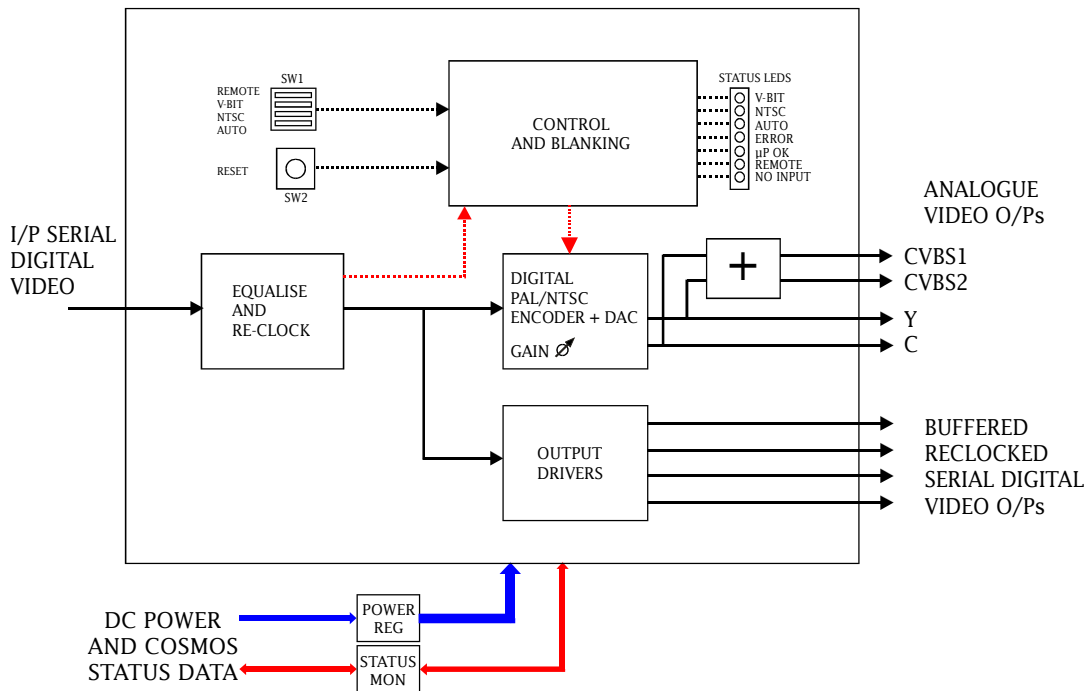
3 Configuration

The 3416 monitoring DA accepts 8 or 10 bit component digital video which is equalised and re-clocked and fed to four output drivers. The output digital video is also fed to PAL/NTSC encoder, converted to analogue in an 8 bit DAC and output as both composite and Y/C signals for monitoring purposes.

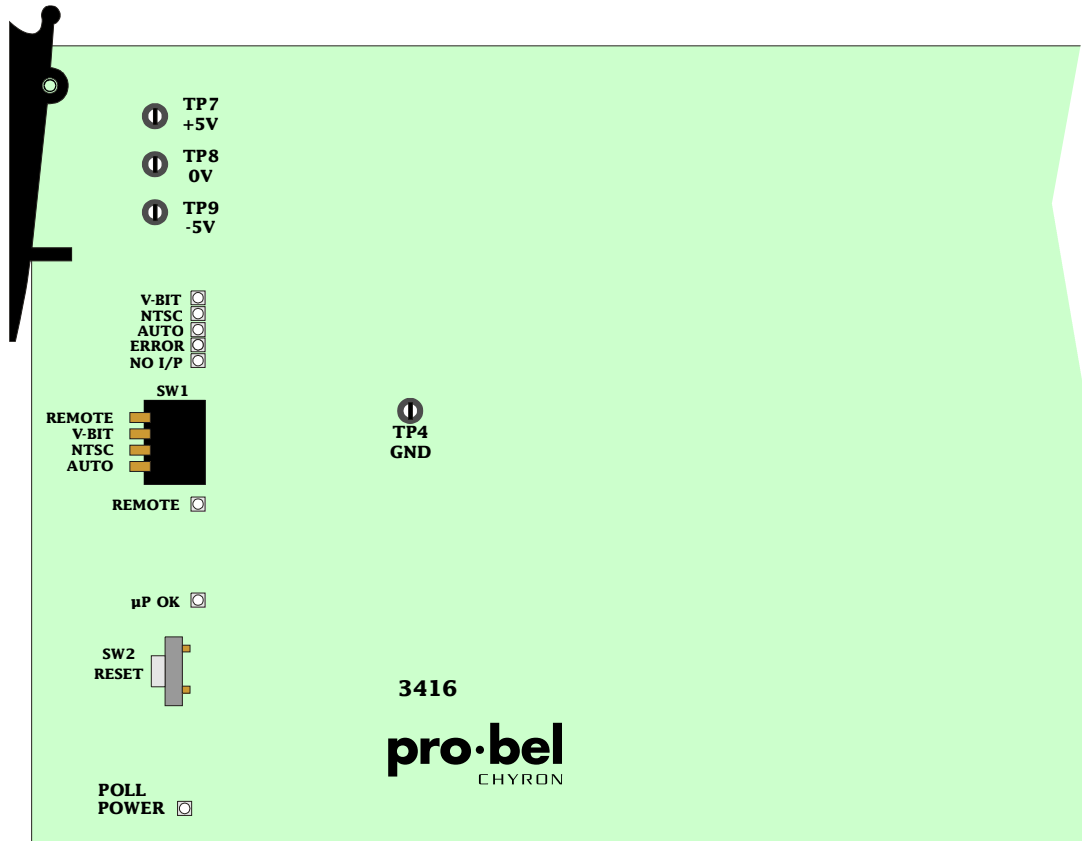
An on-board microprocessor provides detection of the incoming frame rate to set the encoder in PAL or NTSC mode automatically if desired. The analogue outputs may be configured to either pass or re-blank vertical interval ancillary data.

Any errors in either the equaliser or the DAC, such as missing or invalid input or initialisation problems will light an ERROR LED. If the microprocessor operates correctly, the μ P LED will flash continually.

A configuration switch, SW1, allows an operator to select automatic or manual television standard modes, to set vertical blanking duration and to assign both standard selection and blanking control to the COSMOS status monitoring system.



The 3416 serial digital distribution and analogue monitoring amplifier



Sectional view showing configuration control and status indicators

3.1 Setting the television standard

The analogue encoded monitoring output may be set to PAL or NTSC manually or left to the on-board microprocessor to set automatically. Change the setting with SW1.

Analogue output standard selection			
Mode	SW1 DOWN=ON	Indication Yellow LEDs	Description
AUTO	SW1-4 ON	AUTO LED ON	Automatic standard selection
	SW1-4 OFF	AUTO LED OFF	Manual selection
NTSC	SW1-3 ON	NTSC LED ON	NTSC selected
	SW1-3 OFF	NTSC LED OFF	PAL selected

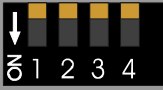


3.2 Setting blanking options

Vertical interval ancillary data may be re-blanked or allowed to pass to the analogue outputs. With SW1-2 set to OFF, the end of vertical blanking is controlled by the V bit of the SDI bitstream. This causes vertical ancillary data earlier than the first line of active picture to be re-blanked (except in the case of some early 525 line systems).

With SW1-2 set to ON, only the first eight lines of vertical blanking are re-blanked allowing ancillary data to pass through to the analogue outputs. This control has no effect on the SDI outputs which are exact copies of the inputs.


Blanking VITC			
Mode	SW1 Down = ON	Indication Yellow LED	Description
V-BIT	SW1-2 ON SW1-2 OFF	V-BIT LED ON V-BIT LED OFF	8 lines blanked from start of vertical blanking Normal blanking



3.3 Setting the local/remote control mode

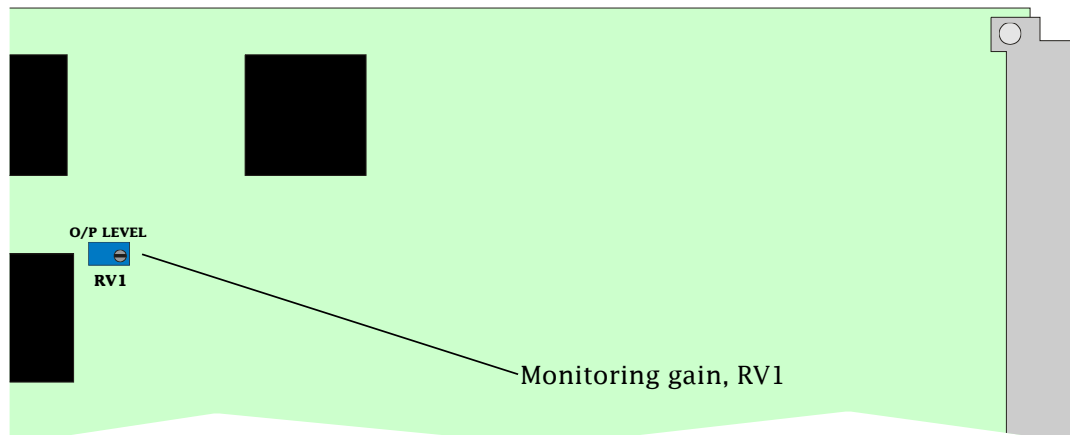
The control of vertical blanking and PAL/NTSC/Auto operation may be transferred to the COSMOS status monitoring system with SW1-1.

Local/remote control			
Mode	SW1 Down = ON	Indication Yellow LED	Description
Remote	SW1-1 ON SW1-1 OFF	Remote LED ON Remote LED OFF	Vertical blanking, NTSC/PAL/Auto assigned to COSMOS Local control



3.4 Setting monitoring output gain

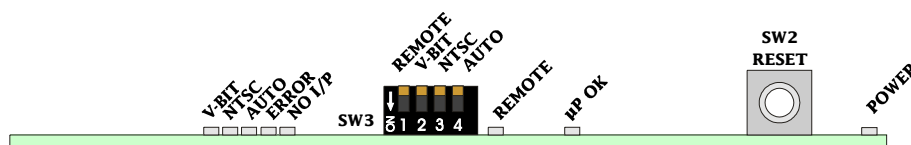
The analogue monitoring output gain is set at the factory and should not require re-adjustment.



Monitoring gain	
Adjustment	Description
RV1	Analogue monitoring output level

3.5 LED indicators

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 COSMOS status monitoring system and may be monitored remotely and logged.



3416 front view with handle removed for clarity

Basic indicators			
LED	Indication	Meaning	COSMOS ACCESS
Power	Green	Both +5 volt and -5 volt on-board regulators working	Yes
Error	Red	Control circuit fault, bad input, DAC initialisation error	Yes
Lock	Red	Lights to show an INVALID serial digital output	No
No I/P	Red	Lights when an input signal is NOT present	Yes
V-BIT	Yellow	Modified vertical blanking ON	Yes
NTSC	Yellow	NTSC = ON, PAL = OFF	Yes
Auto	Yellow	TV standard automatic , OFF=Local control	Yes
µP OK	Yellow - flashing	Local microprocessor OK	No
Remote	Yellow	ON = COSMOS control, OFF=LOCAL	Yes

4 Troubleshooting

The green card edge POWER LED is not lit

- check the PSU indicator to confirm that there is power to the frame
- if necessary examine the fusible resistors RSF1, RSF2 protecting the card to see if they have operated - turn the power off and wait for 30 seconds before 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 card edge POWER LED is lit
- check that the inputs are connected to the rear panel and a valid signal is present
- check the output connection from the rear panel to the monitoring device and the output cable

The analogue output standard is incorrect

- for local control ensure that SW1-1 (REMOTE) is OFF
- set SW1 for Auto/PAL/NTSC as desired

There is no vertical interval ancillary signal present in the monitoring output

- for local control ensure that SW1-1 (REMOTE) is OFF
- set SW1-2 to ON (V-BIT) to pass vertical ancillary data

The red error LED is lit

- check that the input is valid
- check that the OK LED is flashing
- if necessary reset the on-board microprocessor by pressing the RESET button

The yellow P LED does not flash

- check that the green POWER LED is lit
- if necessary, reset the on-board microprocessor by pressing the RESET button

The output signal is corrupted

- check that the red error LED is not lit

5 COSMOS status monitoring

If the frame is equipped with a COSMOS controller card the following parameters will be reported back by the 3416 module to the COSMOS status monitoring system:

- module present
- power OK
- SDI carrier detected (I/P present)
- V-BIT status
- NTSC/PAL status
- auto status
- error status
- local/remote status

The following module parameters may be controlled through the status monitoring system, when remote operation is enabled:

- NTSC/PAL mode
- auto mode
- V-BIT status

Remote operation is indicated by illumination of the yellow remote LED.

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.

6 Specification

Inputs

Number and type:	One serial digital video to EBU Tech 3267E, SMPTE 259M-C
Impedance:	75 Ω
Data rate:	270Mbit/s
Regenerator:	Clock regeneration on input
Return loss:	> 15dB 10MHz to 300MHz > 13dB 300MHz to 400MHz
Equaliser:	Adaptive automatic for up to 290m of cable (Belden 8281, PSF 1/2M or equivalent)

Outputs SDI

Number and type:	Four unbalanced NRZI coded serial data, SMPTE 259M-C (Two with 20mm rear panel)
Impedance:	75 Ω
Data rate:	270Mbit/s
Return loss:	> 15dB 10MHz to 300MHz > 13dB 300MHz to 400MHz
Amplitude:	800mV pp nominal

Outputs (analogue video)

Number and type:	Two composite NTSC or PAL (One with 20mm rear panel) One Luminance only and one Chrominance only (Y/C)
Impedance:	75 Ω
Return loss:	> 40dB to 4.43MHz
Amplitude:	1V pp nominal
Frequency response:	0.25dB to 5.5MHz
Diff phase:	< 1 $^{\circ}$
Diff gain:	< 1.5%

On-card controls	Auto/standard select switch Blanking select switch Local/remote select switch
LED indicators	V-BIT, vertical blanking - yellow Auto - yellow NTSC - yellow μ P OK (flashing) - yellow No -I/P - red Error - red Remote control mode - yellow Power OK - green
Rear panels	K3416.2, 20mm wide rear connector K3416.3, 30mm wide rear connector

7 **Ordering information**

ICO-3416-2000 2 output SDI Distribution Amplifier with analogue composite and Y/C monitoring outputs

ICO-3416-3000 4 output SDI Distribution Amplifier with analogue composite and Y/C monitoring outputs