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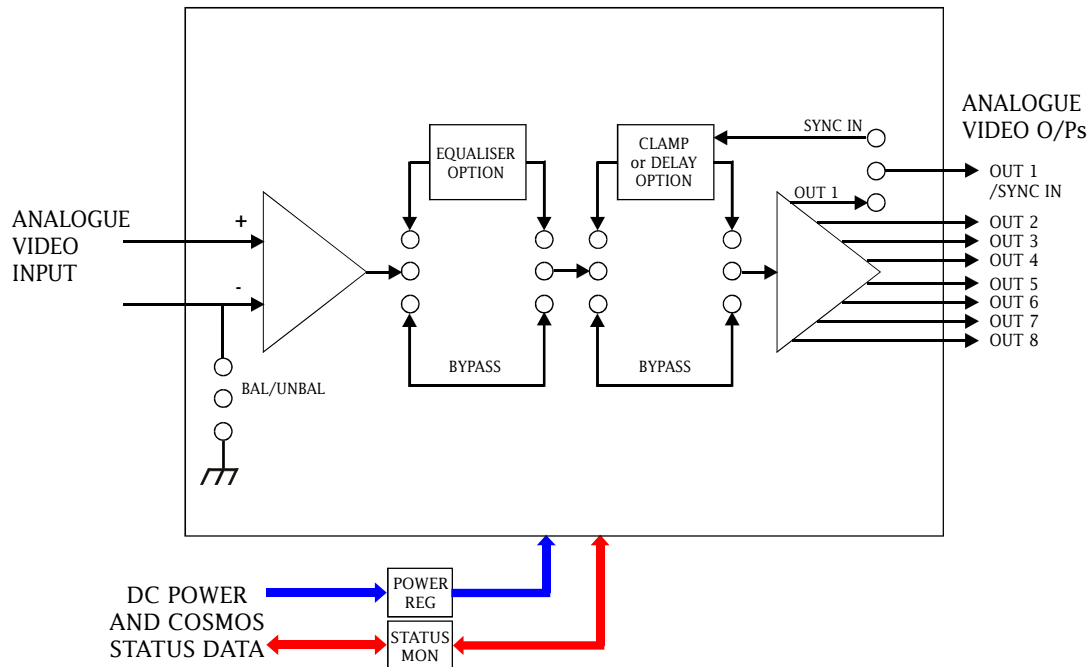
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1 Introduction

The 3430 is an eight output video and pulse amplifier with a differential input. It may be used with a range of plug in modules to perform cable equalisation, variable delay or back porch clamp functions. It is designed to fit in the 1050 3U and 1051 1U ICON modular product rackframes. It may be used with the fully connected 30mm rear panel or a 20mm panel which provides four outputs and enables higher packing densities.

Characteristics of the 3430 are:

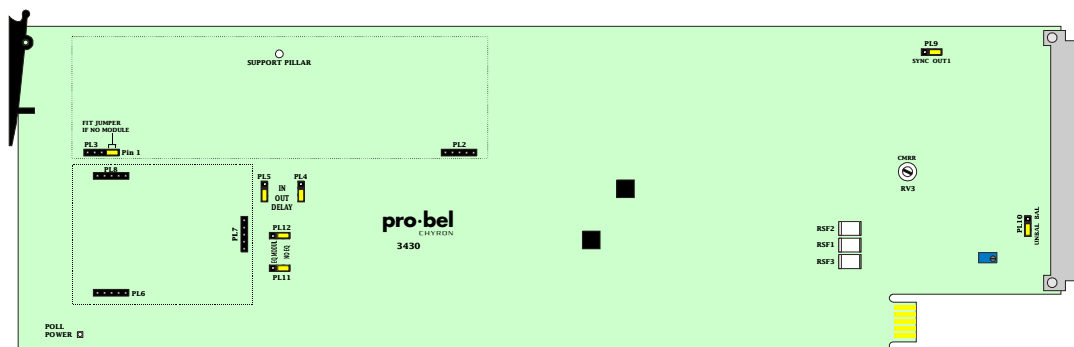
- distributes analogue video or pulses
- differential input mode
- 8 or 4 outputs
- compatible with HDTV
- plug in equaliser options
- black level clamp option
- programmable delay option
- compatible with Pro-Bel COSMOS status monitoring



The 3430 8 output analogue video and pulse DA

2 Installation

The 8 output analogue video and pulse distribution amplifier consists of a 3430 ICON module which fits in either a 1U 1051 or a 3U 1050 ICON modular rackframe and accepts a range of plug in modules. It is available with the fully connected 30mm K3430.3 rear panel or the four output 20mm K3430.2 panel.

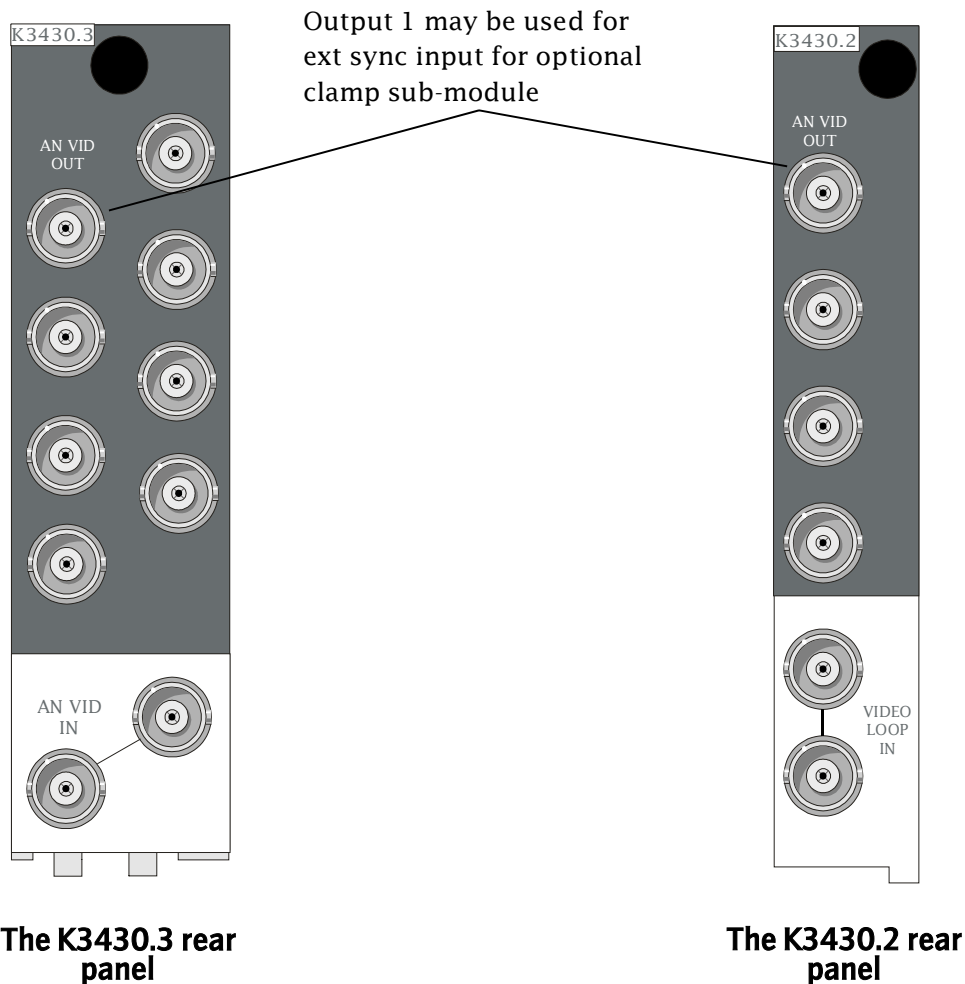


The 3430 8 output analogue video and pulse DA

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

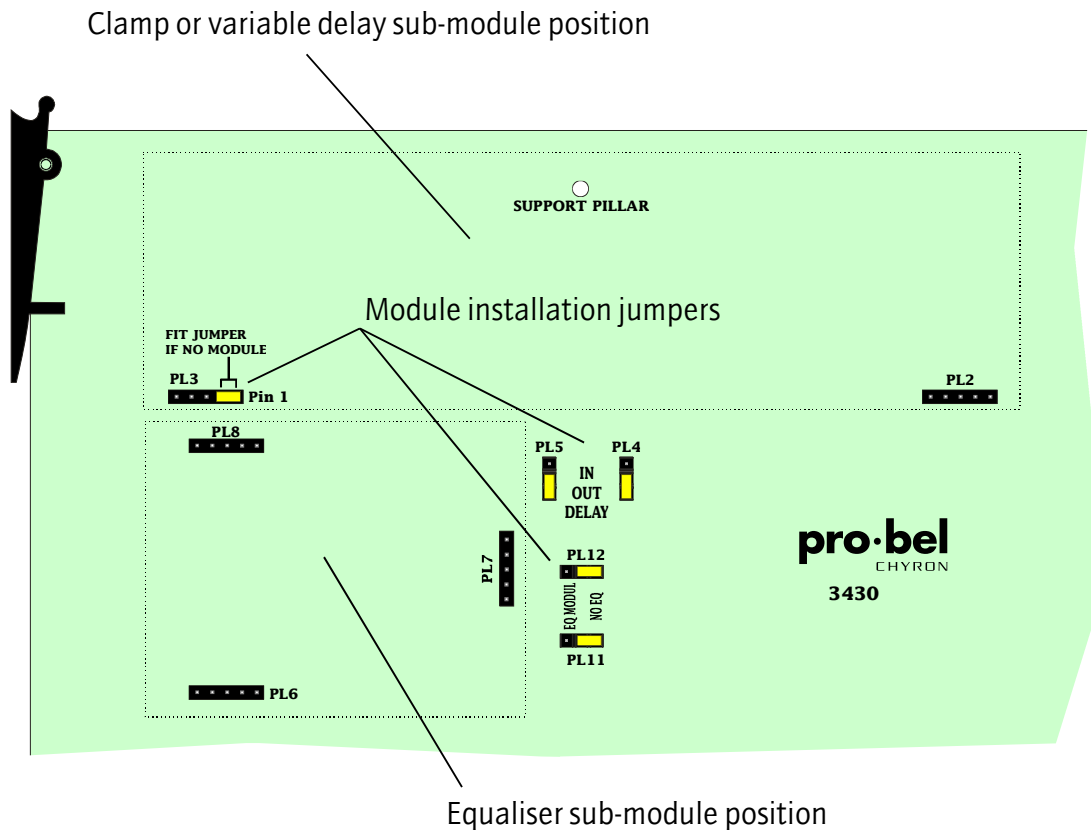
2.1 Signal I/O

The 30mm K3430.3 rear panel allows all eight outputs to be used, whilst the 20mm K3430.2 panel only allow four outputs but permits higher packing densities to be achieved. Note that if an external sync input to the clamp sub-module is used, output 1 is not available.



2.2 Installing optional sub-modules

The equaliser sub-modules occupy the the push-fit headers PL6, 7 and 8 at the bottom of the 3430 module whilst the clamp or variable delay sub-modules are fitted to headers PL2 and 3 as well as the plastic support pillar at the top of the module. The sub-modules fit only one way round, and care should be exercised during removal and replacement not to bend the header pins.



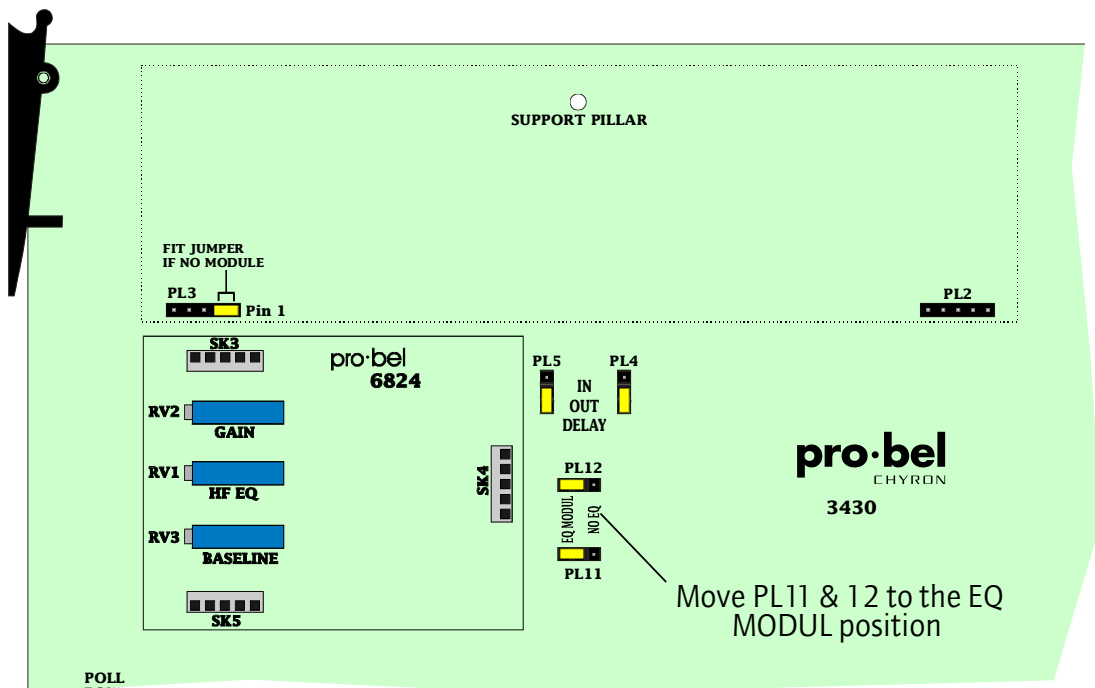
3430 sub-module positions

The next sections detail the use of the module installation jumpers.

Note that it is not possible to fit both a clamp and a variable delay sub-module on the same 3430 module.

2.3 Installing an equaliser sub-module

3430 installation jumpers for equaliser sub-modules	
3430 jumper	Description
PL11 & PL12	Place these jumpers in the 'EQ MODUL' position when an equaliser sub-module is fitted. Return the jumpers to the NO EQ position if no equaliser sub-module is fitted.

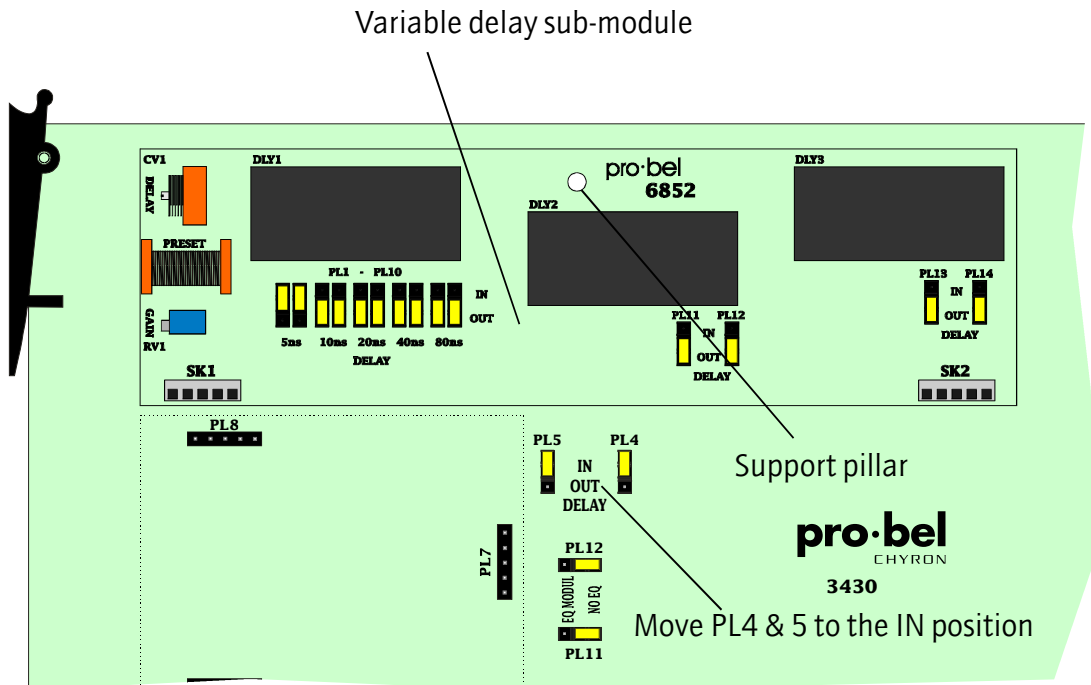


3430 with an equaliser sub-module installed

2.4 Installing the 6852 delay sub-module

A jumper is fitted on pins 1 and 2 of PL3 when no sub-module is present in the clamp or variable delay position. Remove this jumper when fitting these sub-modules.

3430 installation jumpers for the variable delay sub-module	
3430 jumper	Description
PL3, pins 1&2	Remove this jumper when fitting the clamp or variable delay sub-modules
PL4 & PL5	Place these jumpers in the IN position when a clamp or delay sub-module is fitted. Return the jumpers to the OUT position if a clamp or delay sub-module is not fitted.

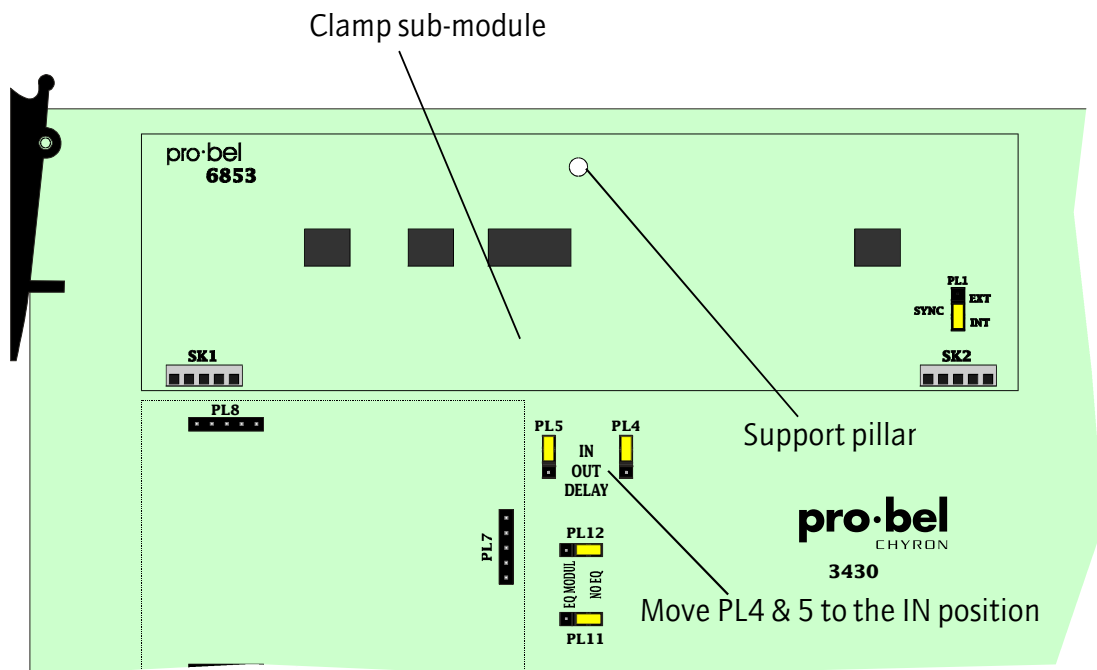


3430 with variable delay sub-module installed

2.5 Installing the 6853 clamp sub-module

A jumper is fitted on pins 1 and 2 of PL3 when no sub-module is present in the clamp or variable delay position. Remove this jumper when fitting the sub-module.

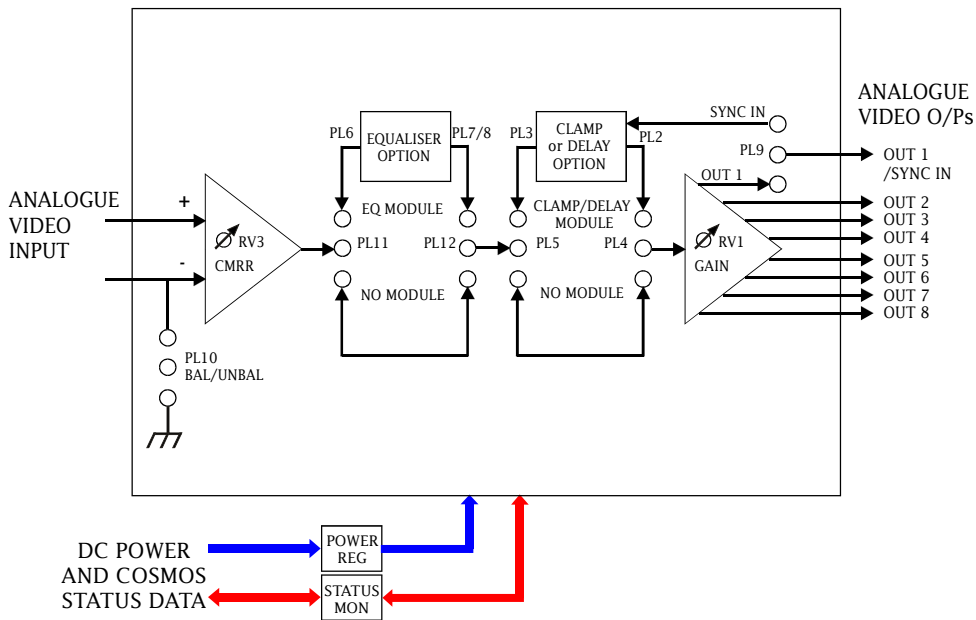
3430 installation jumpers for the clamp delay sub-module	
3430 jumper	Description
PL3, pins 1&2	Remove this jumper when fitting the clamp or variable delay sub-modules
PL4 & PL5	Place these jumpers in the IN position when a clamp or delay sub-module is fitted. Return the jumpers to the OUT position if a clamp or delay module is not fitted.



3430 with clamp sub-module installed

3 Configuration

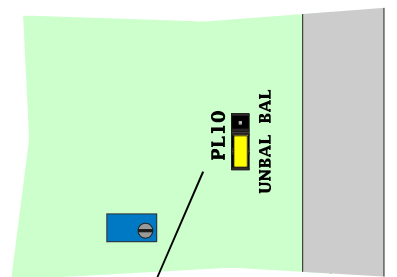
The 3430 has configuration jumpers to set input configuration, install or bypass sub-modules, and to allow the OUT 1 connector to be used to feed external sync to the clamp module. Refer to the Installation chapter for help with module installation jumper settings. There are also factory set-up adjustments on the 3430 module, which should not normally require re-adjustment.



3.1 Setting the input mode

Use PL10 to set the unit for balanced(differential) or unbalanced inputs.

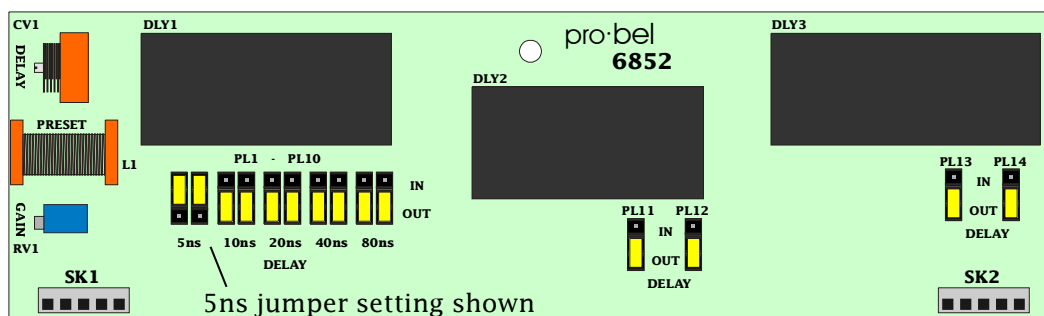
Input mode	
Jumper	Description
PL10	Set to BAL for differential operation Set to UNBAL to take the input screen to earth



PL10 input mode jumper

3.2 Using the 6852 delay sub-module

The 6852 is a variable delay sub-module and is fitted with a programmable 155ns delay line as standard. Printed circuit board solder-pads are available for a further two Faraday or Matthey fixed delay lines which can be selected for 5.5MHz or 11MHz operation. The maximum delay is 760ns at 11MHz and 900ns at 5.5MHz operation. The unit is shipped with its minimum delay setting, which is typically 42ns.



The 6852 programmable delay sub-module

Adjusting the variable and programmable delays

The input stage has a continuously variable 5.5ns trim delay, adjusted by CV1. In series with this is a 155ns delay block which has jumper selectable delay values of 5ns, 10ns, 20ns, 40ns and 80ns. Gain variations may be offset by using RV1 as delay components are adjusted. L1 is factory preset and should not be tampered with.

Adjusting variable and programmable delays

Setting	Description
RV1	Used to maintain overall gain as delay components are varied
CV1	5.5ns continuous trim delay
PL1 to 10	Programmable delay, DLY1 adjustments. Note: jumpers must be moved in pairs.

Adding further fixed delays

Further fixed delays may be added to positions DLY2 and DLY3 to increase the overall delay. Examples of delay blocks available for 5.5MHz and 11MHz operation are listed in the Delay Tables.

Note: Position DLY2 accepts 16 and 28 pin delay lines up to 200ns, whilst DLY3 accepts 16, 28 and 36 pin delay lines up to 500ns.

Use PL11 to PL14 to install the added delay blocks as follows:

Installing further fixed delay blocks	
Jumper	Description
PL11&PL12	Place both to the IN position when installing DLY2
PL13&PL14	Place both to the IN position when installing DLY3

Delay tables

Maximum delay with Faraday delay lines			
Full range ns	DLY2	DLY3	Max delay
40 to 200	Not fitted	Not fitted	200
40 to 400	200	Not fitted	400
40 to 500	Not fitted	300	500
40 to 600	Not fitted	400	600
40 to 700	200	300	700
40 to 700	Not fitted	500*	700*
40 to 800	200	400	800
40 to 900	200	500*	900*

*Not available in 11MHz

Faraday delay line types available			
Delay	Frequency	Max delay	Pins
100ns	5.5MHz	AF16B0100	16
	11MHz	BF16B0100	16
200ns	5.5MHz	AF28B0200	28
	11MHz	BF28B0200	28
300ns	5.5MHz	AF36B0300	36
	11MHz	BF36B0300	36
400ns	5.5MHz	AF36B0400	36
	11MHz	BF36B0400	36
500ns	5.5MHz	AF36B0500	36
	11Mhz	Not available	

Maximum delay with Matthey delay lines

(not all ranges shown)

Full range ns	DLY2	DLY3	Max delay
40 to 200	Not fitted	Not fitted	200
40 to 360	160	Not fitted	360
40 to 400	200	Not fitted	400
40 to 600	Not fitted	400	600
40 to 660	160	300	660
40 to 700	Not fitted	500*	700*
40 to 760	160	400	760
40 to 860	160	500*	860*

*Not available in 11MHz

Matthey delay line types available

Delay	Frequency	Max delay	Pins
160ns	5.5MHz	MF160D200	28
	11MHz	BF160X210	28
200ns	5.5MHz	MF200D200	28
	11MHz	BF200X210	28
300ns	5.5MHz	MF300D300	36
	11MHz	BF300X310	36
400ns	5.5MHz	MF400D300	36
	11MHz	BF400X310	36
500ns	5.5MHz	MF500D300	36
	11MHz	Not available	

Programmable delay lines available (DLY1)

Manufacturer	5.5MHz	11MHz
Faraday	AP28B0155	BP28B0155
Matthey	BP155D205	BP155X215

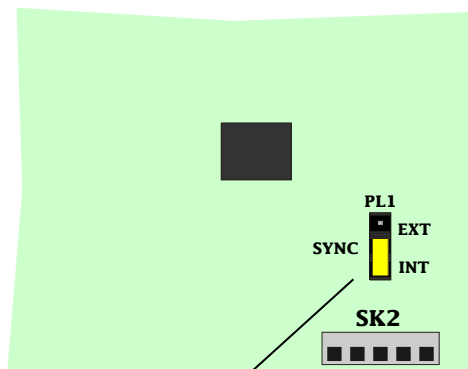
3.3 Using the 6853 clamp sub-module

The 6853 clamp sub-module features a backporch clamp to enable 525 or 625 video to be clamped to zero volts. It may be used with sound in syncs and provides a clamp accuracy to better than 10mv at the output of the 3430 module.

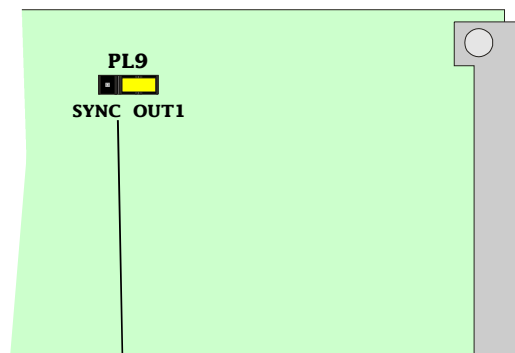
An on-board sync separator is fitted which may be used fed from the signal video or a feed or external syncs. Use PL1 on the 6853 module to select internal or external syncs. The first output of the 3430 module, OUT1, is used as the ext sync input, with PL9 on the 3430 module in the SYNC IN position. The number of outputs will then be reduced by one.

External syncs will maintain the clamping action during input signal disturbances but require that the input signal is synchronous with the external sync feed.

Clamp sync mode jumpers		
Jumper	Internal sync	External sync
PL1, 6853	INT	EXT
PL9, 3430	OUT 1	SYNC



PL1 on the 6853 clamp sub-module



PL9 sync/out jumper on the 3430 module

3.4 Using cable equalisers

A wide range of equaliser options are available and are summarised below. See chapter 7 for ordering information.

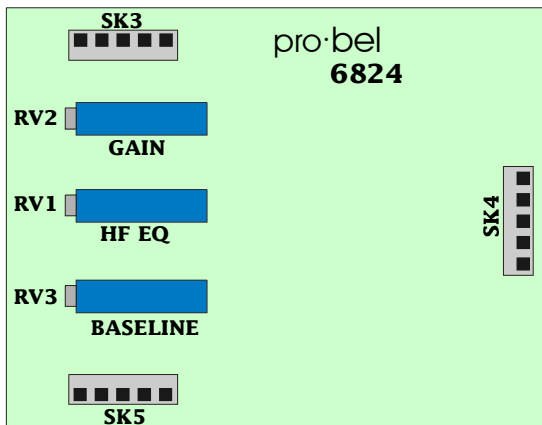
Equaliser options	
Equaliser option code	Application
0	No equaliser fitted
1 (type 6824)	0 to 300m cable type A to 8MHz 0 to 100m cable type A to 30MHz 0 to 250m cable type B to 8MHz 0 to 100m cable type C to 8MHz
2 (type 6821)	0 to 100m PKI 0.6/2.8 to 8MHz
3 (type 6825)	50 to 500m PMS 184 to 30MHz
4 (type 6807)	0 to 250m cable type B to 13MHz
5 (type 6814)	290 to 400m cable type A to 8MHz
6 (type 6818)	0 to 200m SPA-RX75 to 8MHz

Standard cable types are as follows:

Standard cable types	
Name	Cable types
Type A	PSF1/2M, T3205, F&G 1.0/6.6, Belden 8281, 9321, 88281
Type B	PSF1/3M, T3304, F&G 0.6/3.7
Type C	RG59 B/U, NEK Multicoax

Option 1 (6824) cable equaliser

Option 1, the standard equaliser available for the 3430 is the 6824. It incorporates adjustments for gain, h.f response and baseline (mid-frequency) distortion compensation. Baseline distortion is a type of signal error found on long transmission networks. It causes large black to white transitions to be followed by a long trailing portion, producing a visible streak. It is particularly noticeable when using the traditional composite pulse and bar waveform in the form of bar-corner distortion.



The 6824 equaliser sub-module will equalise the following cable lengths:

Cable equalisation chart		
Cable type	EQ compensation @ 8MHz	EQ compensation @ 30MHz
PSF1/2	to 300m	to 100m
T3205	to 300m	to 100m
F&G 1.0/6.6	to 300m	to 100m
Belden 8281	to 300m	N/A
Belden 9231	to 300m	N/A
Belden 88281	to 300m	N/A
PSF1/3	to 250m	N/A
F&G 0.6/3.7	to 250m	N/A
T3304	to 250m	N/A
NEK Multicoax	to 100m	N/A
RG59	to 100m	N/A

Equaliser setup

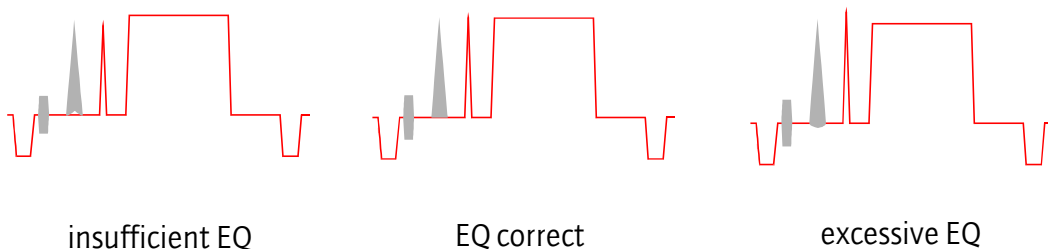
Equipment required:

- source of PAL/NTSC composite 2T pulse and 10T chroma pulse and bar
- waveform monitor, line rate triggered
- equaliser and 3430 connected to cable within the cable equalisation chart range

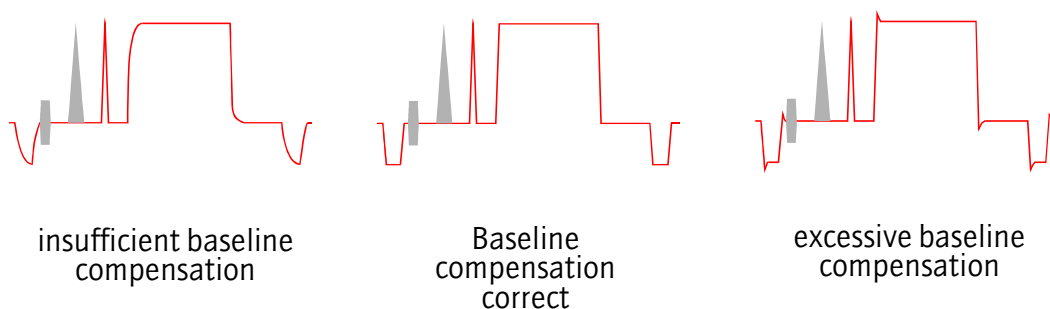
Method

With the pulse and bar source connected as a test source at the remote end of the desired cable length:

- 1) Set equaliser for 0dB gain using RV2 (video pk-pk amplitude 1V)
- 2) Adjust EQ control for the correct response:



- 3) Adjust the baseline control for the correct response:



Note: These diagrams are idealised representations and are for guidance only.

The preceding alignment procedure assumes the use of the 6824, other equalisers are generally similar but may not possess the baseline distortion compensation control.

4 **Trouble shooting**

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 and RFS3 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 are no output signals

- 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 equaliser does not fully correct for cable distortion

- ensure that the jumpers PL11 and PL12 are both placed in the EQ MODUL position
- check that the cable type and length are within the equaliser capability
- if necessary check the equaliser with a known test signal such as pulse and bar with any clamp or delay module bypassed by setting PL4 and PL5 to OUT

The delay module produces signal distortion

- ensure that the jumpers PL4 and PL5 are both placed in the IN position
- check that jumpers have been moved in pairs according to the configuration chapter instructions
- if necessary check the delay unit with a known test signal with any equaliser bypassed by setting PL11 and PL12 to NO EQ

The clamp module produces signal distortion

- ensure that the jumpers PL4 and PL5 are both placed in the IN position
- check that any hum or other superimposed disturbance present on the input is within the clamp sub-module specification
- if necessary check the clamp with a known test signal with any equaliser bypassed by setting PL11 and PL12 to NO EQ

5 **COSMOS status monitoring**

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

- module present
- module power LED status

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 Specifications

3430 specification

Inputs

Number and type:	One bridging with selectable differential mode
Amplitude:	Video 1V pp, pulse 2Vpp
Impedance:	75Ω balanced or unbalanced
Return loss:	>46dB to 4.43MHz
Superimposed DC:	± 30V

Outputs

Number and type:	Eight with 30mm rear panel, 4 with 20mm rear panel
Impedance:	75Ω unbalanced
Return loss:	> 46dB 50Hz to 8MHz
Isolation:	> 46dB 50Hz to 5.5MHz
DC on output:	< ± 50mV
Headroom:	> 3dB for 1V video, > 1dB for 2V pulse

Performance (basic unit with EQ set to minimum)

Coupling:	AC
Nominal gain:	0db ± 0.1 dB
Gain range:	± 1.5dB
Gain stability:	± 0.1dB
Differential gain:	<0.1% at 4.43MHz (12.5% to 87.5% APL)
Differential phase:	<0.1% at 4.43MHz (12.5% to 87.5%)
Signal to noise ratio:	> 80dB weighted ITU-R 567-2
Frequency response:	±0.1dB 50Hz to 15MHz +0.25dB -1dB to 30MHz +0.25dB -3dB to 60MHz

On-card controls	Differential input jumper Gain, HF and baseline with 6824 Gain, coarse delay and fine delay with 6852
LED indicators	Power OK - green
Rear panels	K3430.2, four output 20mm wide rear connector K3430.3, eight output 30mm wide rear connector

Sub-module specifications

6852 delay module

Intrinsic delay:	42ns
Trim delay:	5.5ns
Gain range:	-2dB to +8dB
Standard delay (5.5MHz):	typically 42ns to 195ns with 5, 10, 20, 40 and 80ns taps
Optional block delay:	DLY2 28 pin 200ns max , DLY3 36 pin 500ns max
Maximum delay:	900ns at 5.5MHz, 760ns at 11MHz

6853 clamp module

Hum reduction 50/60Hz:	>30dB
Blanking level stability:	< \pm 3mV
Clamp pulse breakthrough:	< \pm 3mV

Equalisers

(See section 3.4)

7 **Ordering information**

Ordering code format for 3430 DA options

Base code: ICO-3430-wxy0

w = 2	4 output DA (20mm)
w = 3	8 output DA (30mm)
x = 0	No clamp or delay option
x = C	Clamp option (type 6853)
x = T	155ns delay option (type 6852-155)
x = Z	Unpopulated delay card option (type 6852-000)
y = 0	No equaliser option
y = 1	Equaliser option 1, type 6824
y = 2	Equaliser option 2, type 6821
y = 3	Equaliser option 3, type 6825
y = 4	Equaliser option 4, type 6807
y = 5	Equaliser option 5, type 6814
y = 6	Equaliser option 6, type 6818

Refer to section 3.4 for cable details for equaliser options.

Ordering codes for frequently ordered modules are as follows:

Common module codes

ICO-3430-2010	4 output analogue video DA (20mm), standard equaliser (6824)
ICO-3430-3010	8 output analogue video DA (30mm), standard equaliser (6824)
ICO-3430-2000	4 output analogue video DA (20mm), no equaliser option
ICO-3430-3000	8 output analogue video DA (30mm), no equaliser option