A03911 CONV-SFP-4

Quad Channel SFP Converter supporting Video and GbE SFPs

User manual

Rev. C

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Revision history

Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
C	B	2019-02-20	OEH	Reducing HD cable length for SFP-3G-TR-DIN/ HDBNC
B	A	2016-05-10	BA	Re-written chapter 3.1 and added picture. Added chapter 6 (SFPs/SFP specification plus CONV-HW products).
A	-	2016-01-25	GAJ	Initial document

Contents

1 Product overview

The CONV-SFP-4 is a quad channel SFP converter that utilizes Nevion's range of video and GbE SFPs for flexible and cost efficient conversions.

The product can be configured with different hardware options enabling a large range of electrical/optical conversions as well as signal conversion. All active components are placed on the module that can be hot-swap replaced from the front. SFPs are hot-swap replaced from the back. This ensures minimum service down time for upgrades or unit replacement.

The SFPs, module health and signal status is monitored and presented thru web or SNMP interface with the Multicon control system when installed in the modular Flashlink frames.

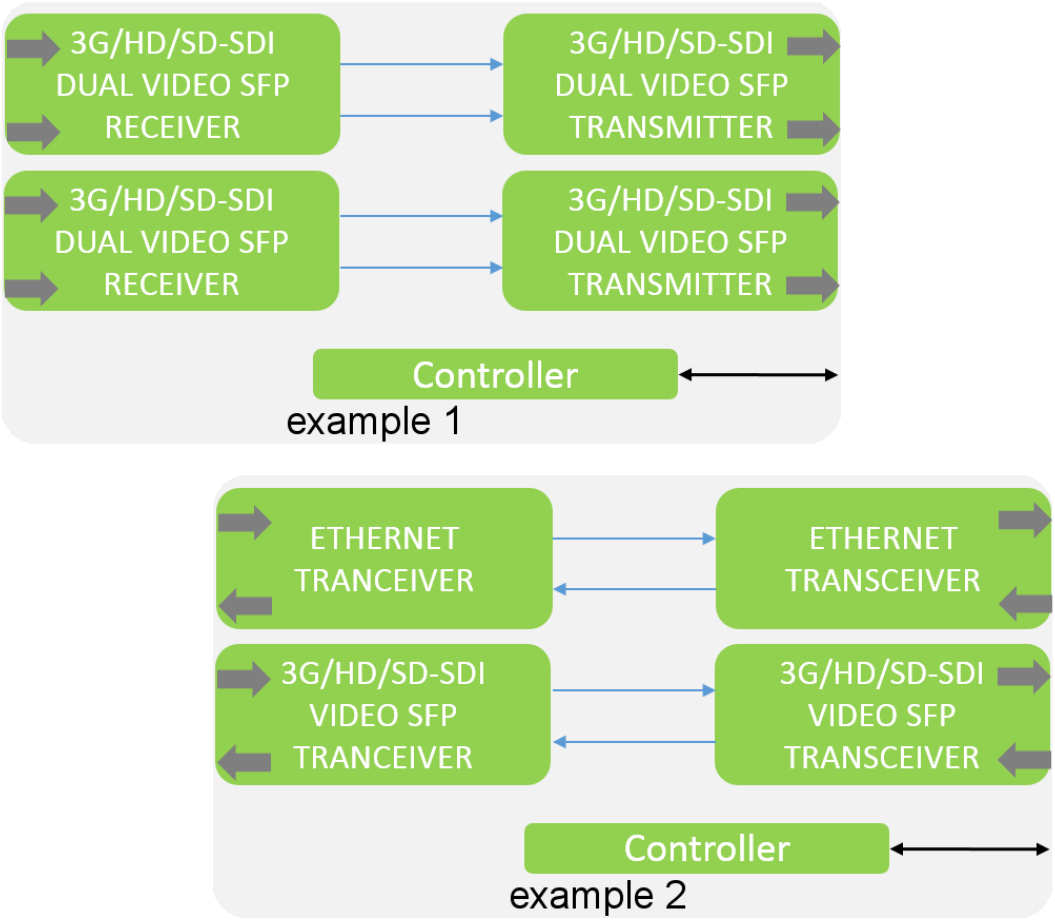


Figure 1: Block diagrams of the CONV-SFP-4 Quad Channel SFP Converter, including, but not limited to, example 1 and example 2 displaying two hardware SFP configurations.

2 Specifications

2.1 General

Power (DC)	+5 V / +15 V (Configurable DIP switch setting)
	1 W maximum without SFPs
	7 W typical with 4 SFPs
User interface	Status LED, Status GPI, configuration DIP switches
	Web interface and SNMP thru Multicon controller
Operating temperature	0 to +45 °C

2.2 SFP slots

No of SFP slots	4
Standard	non-MSA and MSA
Signal type	See chapter 6 (or manual for installed SFP)
Signal rate	See chapter 6 (or manual for installed SFP)

2.3 SFPs

Applicable SFPs	Nevion’s video and GbE SFP range (seen in chapter 6)
Other specifications	See manual for installed SFP (chapter 6)

2.4 GPI ports

No of ports	5
Connector	RJ45

2.5 Open collector GPIOs

No of ports	1
Applied voltage (DC)	30 V max.
Permitted current drain in output “low” state	100 mA max.

2.6 Bidirectional GPIOs

No of ports	4	
Applied voltage (DC)	15 V max.	
Permitted current drain in output “low” state	150 mA max.	
Saturation voltage at max. permitted current drain	100 mV max.	
Acceptable input levels	“Low”	0 V to 0.5 V
	“High”	3 V to 15 V

3 Connections

The CONV-SFP-4 has a dedicated connector module; CONV-SFP-C1 and –C2. This module is mounted at the rear of the sub-rack. The layout of the module is shown in the figure below.

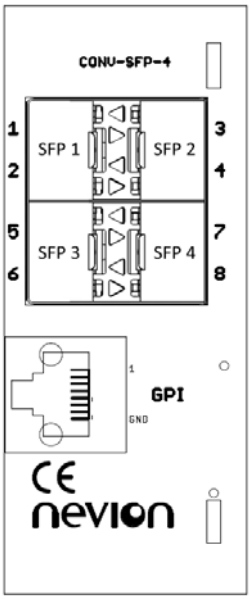


Figure 2: Backplane connector module for CONV-SFP-4.

Signal channels are fixed between SFPs: • SFP 1 and SFP 2 is connected together • SFP 3 and SFP 4 is connected together

3.1 Mounting the connector module

Product consists of three main parts (plus 0-4 SFP's depending on product) as seen in **Figure 3**.

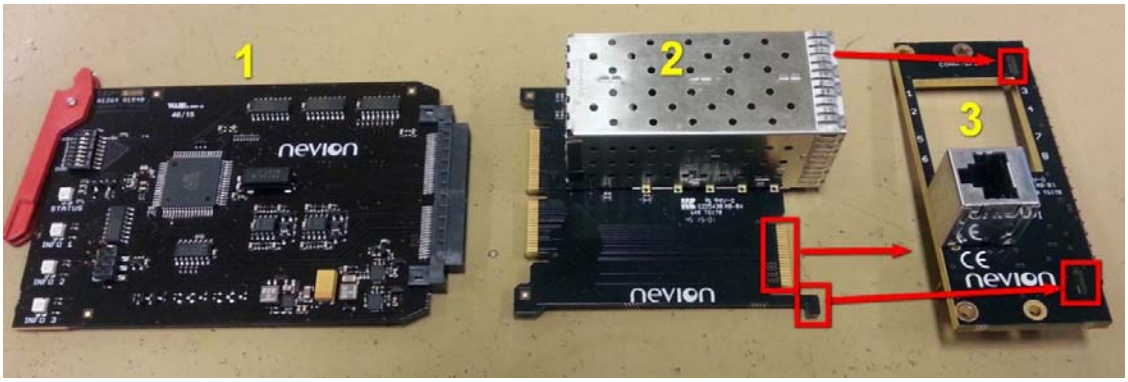


Figure 3: the three main parts of the product.

Some assembly is needed before this can be installed into a frame:

1. Connect backplane (3, Figure 3) to SFP housing module (2, Figure 3) and make sure the connectors are firmly in place together with the two guide pins located on top/bottom as seen in Figure 3.

2. Slide the component assembled in last step into the back of a frame while making sure it slides correct in the frames guide rail. Make sure the pins aligns and correctly connects to the connector as seen in Figure 4.
3. Fasten the backplane with the supplied screws.

More details of how the connector module is mounted, is found in the user manual for the sub-rack frame FR-2RU-10-2.

This manual is also available from our web site: http://www.nevion.com

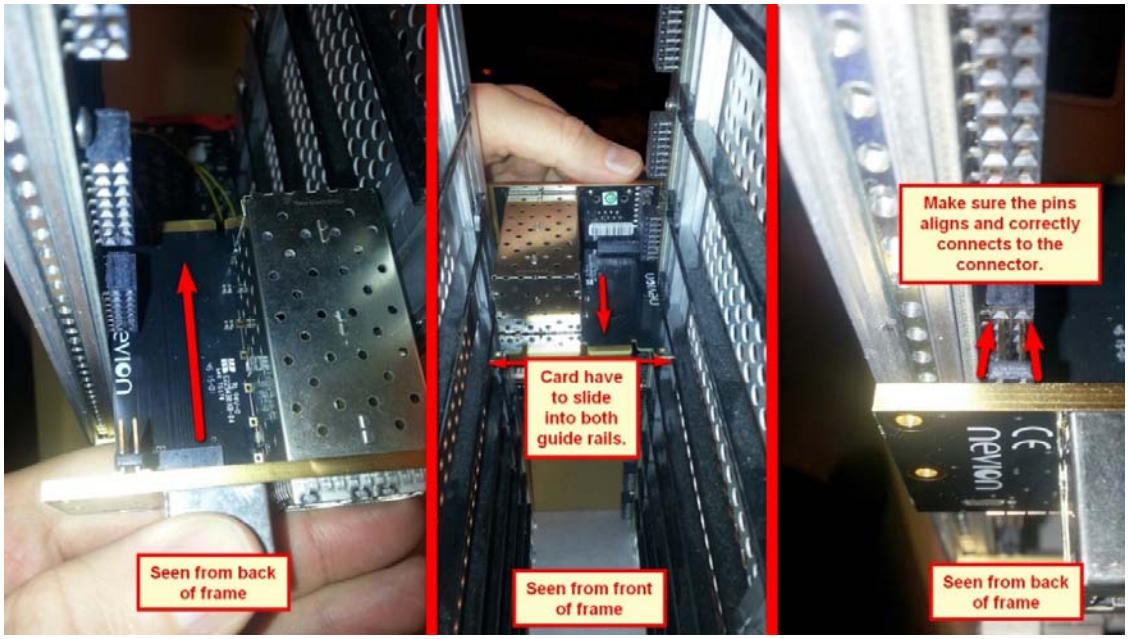


Figure 4: Instalment from the back of the frame.

3.2 Terminal format support

The connector module can be fitted with four SFPs supporting both non-MSA and MSA standard. All SFP ports can be used as input or output ports. Also, the connector module has a RJ45 female connector for use of GPIO´s. The table below show which signal formats are supported on the selected terminals.

Table 1: Signal support

Terminal	Function	Supported Format	Mode
SFP slot 1-4	Any approved SFP	non-MSA / MSA	Input / Output
SFP port 1-8	Optical / Electrical	Any format supported by the connected SFP	Input / Output
GPIO-1	Alarm, status		OC Output
GPIO-(4-7)	Alarm, status or control		Bidirectional

3.3 GPI ALARM – Module Status Outputs

These outputs can be used for wiring up alarms for third party control systems. One GPI output is open collector and the rest is bidirectional. The GPI connector is shown in figures below.

3.3.1 GPI connections

CONV-SFP-4 module GPI pinning:

Signal	Name	Pin #	Mode
GPIO-1 / Status	General error status for the module	Pin 1	Open Collector This is normally closed
N/A		Pin 2	
N/A		Pin 3	
GPIO-4	See section 4.1.1 for configuration	Pin 4	Bidirectional
GPIO-5	See section 4.1.1 for configuration	Pin 5	Bidirectional
GPIO-6	See section 4.1.1 for configuration	Pin 6	Bidirectional
GPIO-7	See section 4.1.1 for configuration	Pin 7	Bidirectional
Ground	0V / gnd pin	Pin 8	0V

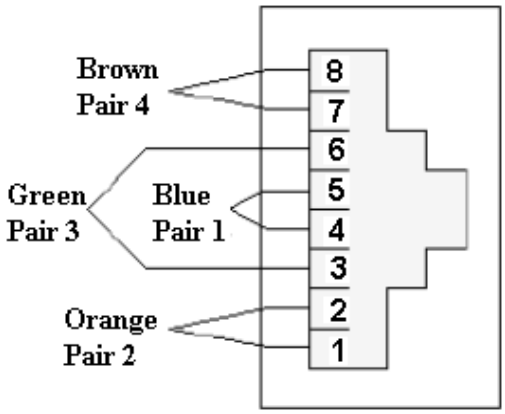


Figure 5: GPI connector.

3.4 Status monitoring

3.4.1 Front Panel

The status of the module can be easily monitored visually by the LEDs at the front of the module. The LEDs are visible through the front panel as shown in the figure below.

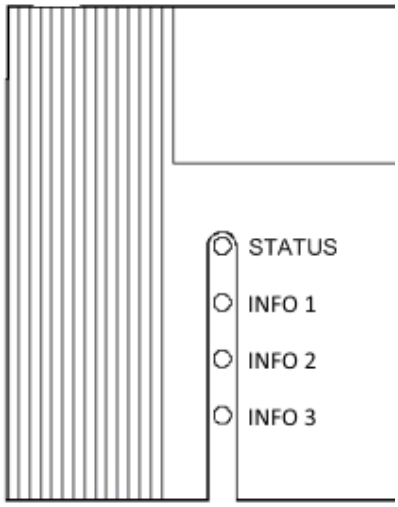


Figure 6: Front panel LEDs.

Table 2: Front panel LEDs

LED \ State	Red	Yellow	Green	No light	Comment
Status	Module is faulty, or module is initializing	N/A	Module is OK Module power is OK	Module has no power	
INFO 1	See Table 3. (See Table 5: DIP settings for configuration)				Copy backplane SFP port LED status
INFO 2	See Table 3. (See Table 5: DIP settings for configuration)				Copy backplane SFP port LED status
INFO 3					To be defined

3.4.2 Backplane

There are eight LED port indicators at the SFP cage on the backplane. Each LED represents signal status of each port pointed to.

Table 3: Backplane SFP port LEDs

LED \ State	Red	Yellow	Green	No light	Comment
Port 1 to 8: Input	No signal	N/A	Signal	No valid Nevion SFP present	
Port 1 to 8: Output	Off	N/A	On	No valid Nevion SFP present	

4 Configuration

Configuration of this card can either be done from Multicon GYDA element manager or locally on the card by DIP switches.

4.1 Multicon GYDA configuration

Below is a snapshot from the Multicon GYDA interface.

Quad channel SFP converter

Card label		Locate card	sec		
Firmware upgrade	Upload file: None	Upload			
Electrical output 3	On Auto Off				
Electrical output 4	On Auto Off				
Optical output 5	On Off				
Optical output 6	On Off				
GPIO setup selector	Setup 1				

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Electrical input 7			Normal	Ignore	Send	Ignore
Electrical input 8			Normal	Ignore	Send	Ignore
Optical output 5			Normal	Ignore	Send	Ignore
Optical output 6			Normal	Ignore	Send	Ignore
Optical input 1			Normal	Ignore	Send	Ignore
Optical input 2			Normal	Ignore	Send	Ignore
Voltage (5V)	4500 mV	5500 mV	Normal	Ignore	Send	Ignore
Voltage (15V)	13500 mV	16500 mV	Normal	Ignore	Send	Ignore
Voltage (3.3V)	3000 mV	3600 mV	Normal	Ignore	Send	Ignore

Card version	
Serial	0314709470201243
hw	1.0
lib	1.3.1
sfp 1	18793
sfp 2	EB30CS2T-AN
sfp 3	19233
sfp 4	EB30HD2R-LN
sw	0.0.28

Figure 7: Configuration tab example (varies with different SFP types).

Changing SFP type by hot-swap will trigger “Card lost” in Multicon GYDA so that graphics and text blocks in both Status tab and Configuration tab is updated. The module is not rebooted and will not interrupt other functions.

4.1.1 Bidirectional GPIOs

The GPIO functions are configurable by pre-defined schemes which can be chosen between by the “GPIO setup selector” drop down menu as shown in Figure 7.

The different setups are described in the table below.

Table 4: Pre-defined GPIO schemes

Setup	GPIO-	Input / Output	Function
1	4	To be defined	To be defined
	5	To be defined	To be defined
	6	To be defined	To be defined
	7	To be defined	To be defined
# (Possible future use)	4		
	5		
	6		
	7		

4.2 Configuration through DIP settings

The correct configuration can either be set with the DIP switch on the card or through the GYDA Control System. The layout is shown in the drawing below with the DIP switch to the upper left position.

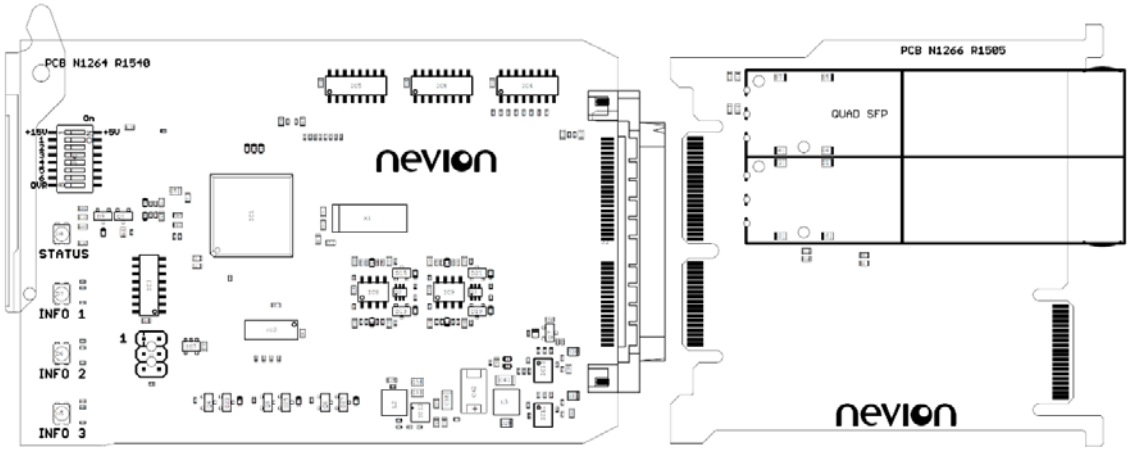


Figure 8: CONV-SFP-4 board layout.

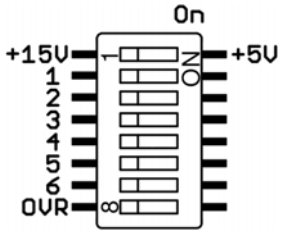


Figure 9: DIP switch..

Table 5: DIP settings.

<table>
<tr><th>Switch #</th><th>Label</th><th>Function, DIP=OFF</th><th>Function, DIP=ON</th><th>Comment</th></tr>
<tr><td>1</td><td>+15V</td><td>Board supplied by +15 V DC</td><td>Board supplied by +5 V DC</td><td>Selection of power
<u>Attention:</u>
Must only be operated when the board is unpowered.</td></tr>
<tr><td>2</td><td>1</td><td></td><td></td><td>To be defined</td></tr>
<tr><td>3</td><td>2</td><td></td><td></td><td>To be defined</td></tr>
<tr><td>4</td><td>3</td><td></td><td></td><td>To be defined</td></tr>
<tr><td>5</td><td>4</td><td></td><td></td><td>To be defined</td></tr>
<tr><td>6</td><td>5</td><td colspan="2" rowspan="2"><table><tr><th>SW-7</th><th>SW-6</th><th>SFP</th></tr><tr><td>OFF</td><td>OFF</td><td>1</td></tr><tr><td>OFF</td><td>ON</td><td>2</td></tr><tr><td>ON</td><td>OFF</td><td>3</td></tr><tr><td>ON</td><td>ON</td><td>4</td></tr></table></td><td rowspan="2">Copy backplane SFP port LEDs to Front panel LEDs “INFO 1” and “INFO 2”</td></tr>
<tr><td>7</td><td>6</td></tr>
<tr><td>8</td><td>OVR</td><td>GYDA control. Config. with GYDA</td><td>Override GYDA control Config. with DIP switch</td><td>Select config. from GYDA</td></tr>
</table>

All DIP switches are off when pointing towards the release handle.

4.2.1 Selection of power supply

(Only DIP configurable)

The module can be configured to be powered from either +5 V or +15 V DC power rails with DIP switch labeled “+15V”. This feature is useful to improve utilization of, or balancing the available power in a system. The DIP switch must only be operated when the board is unpowered to prevent instability. The configuration is set to +5 V default.

4.2.2 Copy backplane SFP port LEDs to Front panel LEDs

(Only DIP configurable)

At the backplane, the SFP cage has built-in LED indicators for each SFP port. To ease inspection of these LEDs, it is possible to copy each SFP LED indicators to the Front panel LEDs labeled “INFO 1” and “INFO 2” by configuration of DIP switch labeled “5” and “6”.

5 Operation

5.1 Module status

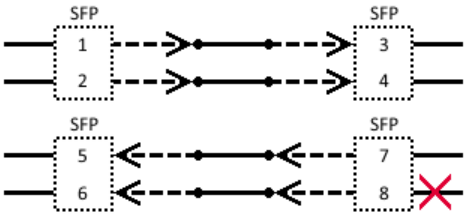
The status of the module can be monitored in three ways.

4. Multicon GYDA System Controller (optional).
5. GPI at the rear of the sub-rack.
6. LEDs at the front and back of the sub-rack.

Of these three, the GPI and the LEDs are mounted on the module itself, whereas the Multicon GYDA System Controller is a separate module giving detailed information on the card status.

5.1.1 Multicon GYDA status interface

Quad channel SFP converter



Optical input 1	Signal detected		0.2 dBm	
Optical input 2	Signal detected		-0.4 dBm	
Electrical output 3	Signal			
Electrical output 4	Signal			
Optical output 5	On	1450nm	1.2dBm	CWDM
Optical output 6	On	1430nm	1.0dBm	CWDM
Electrical input 7	Signal detected			
Electrical input 8	Loss of signal			
GPIO-1	Output		Low	
GPIO-4	Output		Low	
GPIO-5	Output		Low	
GPIO-6	Output		Low	
GPIO-7	Output		Low	
GPIO setup selector	Setup 1			
Voltage (5V)	5.10 V (5.2 V)	0.60 A (1.3 A)	3.04 W (7.0 W)	
Voltage (15V)	15.57 V (15.0 V)	0.00 A (0.5 A)	0.00 W (7.0 W)	
Voltage (3.3V)	3.31 V			
Temperature	27.0 C			

Alarms		
Electrical input 8	NEW	Acknowledge

Figure 10: Status tab example (varies with different SFP types).

Changing SFP type by hot-swap will trigger “Card lost” in Multicon GYDA so that graphics and text blocks in both Status tab and Configuration tab is updated. The module is not rebooted and will not interrupt other functions.

The on-board temperature measurement is a feature used for monitoring variations in temperature over time and can be accessed thru SNMP. The absolute value of the temperature measurement has little value of its own as it does not reflect the temperature inside the electronics nor the ambient frame temperature.

6 Products and SFP specification

There are 14 products in addition to the CONV-SFP-4. 13 products comes bundled with SFPs and one product is bundled/installed in the N-BOX enclosure:

Sales number	Product name	Description
24028	CONV-SFP-4	Quad Channel SFP Converter supporting Video and GbE SFPs
24029	CONV-HW-3G-CWDM-2	Dual re-clocked 3G-SDI electrical to optical CWDM converter.
24030	CONV-HW-3G-OE-L-2	Dual reclocked 3G-SDI optical to electrical long haul converter.
24031	CONV-HW-3G-13T-2	Dual non-reclocked 3G-SDI electrical to optical 13T converter.
24032	CONV-HW-3G-OE-S-2	Dual non-reclocked 3G-SDI optical to electrical short haul converter.
24033	CONV-HW-3G-13T-S	3G-SDI electrical to optical 13T converter and optical to electrical short haul converter.
24034	CONV-HW-3G-CWDM-L	3G-SDI electrical to optical CWDM converter and optical to electrical long haul converter.
24035	CONV-HW-ETH-CWDM-ER	Gigabit Ethernet electrical to optical CWDM, extended reach converter.
24036	CONV-HW-ETH-CWDM-ZR	Gigabit Ethernet electrical to optical CWDM, ultra-extended reach converter.
24037	CONV-HW-ETH-13T-LR	Gigabit Ethernet electrical to optical 13T, long reach converter.
24038	CONV-HW-ETH-13T-ER	Gigabit Ethernet electrical to optical 13T, extended reach converter.
24039	CONV-HW-NBOX	Hardware enclosure for CONV-SFP-4.
To be defined	CONV-HW-CVBS-T-2	Digital to analog video converter, re-clocked.
To be defined	CONV-HW-CVBS-R-2	Analog to digital video converter, re-clocked.
To be defined	CONV-HW-CVBS-TR	Analog to digital **and** Digital to analog video converter, re-clocked.

List of bundled SFPs:

Product name	Bundled SFP 1	Bundled SFP 2
CONV-SFP-4	-	-
CONV-HW-3G-CWDM-2	SFP-3G-RX-2-RCL-DIN/HDBNC	SFP-3G-EO-2-C1xxx/C1xxx
CONV-HW-3G-OE-L-2	SFP-3G-TX-2-RCL-DIN/HDBNC	SFP-3G-OE-2-L
CONV-HW-3G-13T-2	SFP-3G-RX-2-DIN/HDBNC	SFP-3G-EO-2
CONV-HW-3G-OE-S-2	SFP-3G-TX-2-DIN/HDBNC	SFP-3G-OE-2
CONV-HW-3G-13T-S	SFP-3G-TR-DIN/HDBNC	SFP-3G-EO-OE-13T-S
CONV-HW-3G-CWDM-L	SFP-3G-TR-RCL-DIN/HDBNC	SFP-3G-EO-OE-C1xxx-L
CONV-HW-ETH-CWDM-ER	SFP-1GE-RJ45	SFP-TR1-C1xxx-ER
CONV-HW-ETH-CWDM-ZR	SFP-1GE-RJ45	SFP-TR1-C1xxx-ZR
CONV-HW-ETH-13T-LR	SFP-1GE-RJ45	SFP-TR1-13T-LR
CONV-HW-ETH-13T-ER	SFP-1GE-RJ45	SFP-TR1-13T-ER
CONV-HW-NBOX	-	-
CONV-HW-CVBS-T-2	SFP-3G-RX-2-RCL-DIN/HDBNC	SFP-CVBS-TX-2-DIN/HDBNC
CONV-HW-CVBS-R-2	SFP-3G-TX-2-RCL-DIN/HDBNC	SFP-CVBS-RX-2-DIN/HDBNC
CONV-HW-CVBS-TR	SFP-3G-TR-RCL-DIN/HDBNC	SFP-CVBS-TR-DIN/HDBNC

6.1 SFP-3G-RX-2-RCL-DIN/HDBNC

The SFP-3G-RX-2-RCL-DIN/HDBNC is an re-clocked electrical SFP dual receiver module designed to receive two SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN/HD-BNC connectors. Equalizer features DC restoration to compensate for the DC content of SMPTE pathological test patterns.

The SFP-3G-RX-2-RCL-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-RX-2-RCL-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2R-LNR (DIN) / EB30HD2R-LNR (HD-BNC).

6.1.1 specifications

Power	typical 1360mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2970Mbps	SMPTE424M
DVB-ASI, 270Mbps	EN50083-9
Rx Equalizer	270Mbps typical 200m (Belden 8281)
	1485Mbps typical 200m (Belden 1694A)
	2970Mbps typical 110m (Belden 1694A)
Amplitude	800 mV (±100mV)

Electrical SDI input

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.2 SFP-3G-TX-2-RCL-DIN/HDBNC

The SFP-3G-TX-2-RCL-DIN/HDBNC is an electrical SFP dual transmitter module with re-clockers designed to transmit two SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN or HD-BNC connectors. The cable driver provides two selectable slew rates (automatic) in order to achieve compliance to SMPTE 424M, SMPTE 292M and SMPTE 259M.

The SFP-3G-TX-2-RCL-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-TX-2-RCL-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2T-LNR (DIN) / EB30HD2T-LNR (HD-BNC).

6.2.1 Specifications

Power	typical 1100mW
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0°C to +70°C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
DVB-ASI (270Mb/s)	EN50083-9.

Electrical SDI output

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.3 SFP-3G-RX-2-DIN/HDBNC

The SFP-3G-RX-2-DIN/HDBNC is an non-re-clocked electrical SFP dual receiver module designed to receive two SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN/HD-BNC connectors. Equalizer features DC restoration to compensate for the DC content of SMPTE pathological test patterns.

The SFP-3G-RX-2-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-RX-2-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2R-LN (DIN)/ EB30HD2R-LN (HD-BNC).

6.3.1 Specifications

Power	typical 615mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2970Mbps	SMPTE424M
DVB-ASI, 270Mbps	EN50083-9
Rx Equalizer	270Mbps typical 325m (Belden 8281)
	1485Mbps typical 200m (Belden 1694A)
	2970Mbps typical 120m (Belden 1694A)

Electrical SDI input

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.4 SFP-3G-TX-2-DIN/HDBNC

The SFP-3G-TX-2-DIN/HDBNC is an non-re-clocked electrical SFP dual transmitter module designed to transmit two SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN or HD-BNC connectors.

The SFP-3G-TX-2-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-TX-2-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2T-LN (DIN) / EB30HD2T-LN (HD-BNC).

6.4.1 Specifications

Power	typical 0,4W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0°C to +70°C
Slewrate	max 135ps (HD slewrate)

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
DVB-ASI	EN50083-9.

Electrical SDI output

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.5 SFP-3G-TR-DIN/HDBNC

The SFP-3G-TR-DIN/HD-BNC is a non-re-clocked electrical transceiver SFP. Designed to transmit and receive SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN or HD-BNC connectors. This SFP is ideal for mixing electrical and optical (optional) signals in a system (electrical to optical and vice versa). Equalizer features DC restoration to compensate for the DC content of SMPTE pathological test patterns.

The SFP-3G-TR-DIN/HD-BNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-TR-DIN/HD-BNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CSRT-LN (DIN) / EB30HDRT-LN (HD-BNC).

6.5.1 specifications

Power	typical 485mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C
Slewrate	max 135ps (HD slewrate)

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2970Mbps	SMPTE424M
DVB-ASI, 270Mbps	EN50083-9
Rx Equalizer	270Mbps typical 325m (Belden 8281)
	1485Mbps typical 140m (Belden 1694A)
	2970Mbps typical 120m (Belden 1694A)

Electrical SDI input/output

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.6 SFP-3G-TR-RCL-DIN/HDBNC

The SFP-3G-TR-RCL-DIN/HDBNC is a re-clocked electrical transceiver SFP. Designed to transmit and receive SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN or HD-BNC connectors. This SFP is ideal for mixing electrical and optical (optional) signals in a system (electrical to optical and vice versa). Equalizer features DC restoration to compensate for the DC content of SMPTE pathological test patterns.

The SFP-3G-TR-RCL-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-3G-TR-RCL-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CSRT-LNR (DIN) / EB30HDRT-LNR (HD-BNC).

6.6.1 specifications

Power	typical 1216mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +80 °C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292M
3G, 2970Mbps	SMPTE424M
DVB-ASI, 270Mbps	EN50083-9
Rx Equalizer	270Mbps typical 300m (Belden 8281)
	1485Mbps typical 200m (Belden 1694A)
	2970Mbps typical 120m (Belden 1694A)

Electrical SDI input/output

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.7 SFP-1GE-RJ45

SFP-1GE-RJ45 is a 10/100/1000BASE-T Copper SFP. It is compliant with the Gigabit Ethernet standard as specified in IEEE STD 802.3 and can fully satisfy the 10/100/1000BASE-T application.

SFP-1GE-RJ45 is the Nevion name for the SFP, this is equivalent to Embrionix EOLT-C12-02A.

6.7.1 specifications

Power	< 1.20W
Size	MSA compliant, SFP.
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Connector	RJ45
Link type	Cat5
Data Rate	10/100/1000M
Ethernet standard	IEEE STD 802.3
Link distance	< 80 meters

6.8 SFP-3G-EO-2-C1xxx/C1xxx

SFP-3G-EO-2-C1xxx/C1xxx is an range of CWDM optical transmitter SFP's with two optical ports. The SFP have been specially designed to handle pathological pattern that occurs in uncompressed video signals. These patterns occurs in both SD-SDI, HD-SDI and 3G-SDI, and Nevion has carefully chosen designs that withstands these patterns without any penalty in performance. The SFP's have the ability to report information such as signal presence, output power level and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.8.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
SD, 540 Mbit/s	SMPTE344M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
Fiber Transmission	SMPTE297-2006

Optical SDI output

Connector	LC/UPC single mode
Wavelength	1290nm to 1610nm in 20nm steps
Spectral width	1nm
Power	0dBm to +3dBm
Extinction Ratio	Typical 7,5dB (min -5dB)
Jitter	3G @2970Mbps <60ps
	HD @1485Mbps <100ps
	SD @270Mbps <180ps

6.9 SFP-3G-OE-2

SFP-3G-OE-2 is an optical video SFP with two optical receiver ports for short to medium haul. This SFP have been specially designed to handle pathological pattern that occurs in uncompressed video signals. These patterns occurs in both SD-SDI, HD-SDI and 3G-SDI, and Nevion has carefully chosen designs that withstands these patterns without any penalty in performance. The SFP's have the ability to report information such as signal presence, received signal level and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.9.1 Specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
SD, 540 Mbit/s	SMPTE344M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
Fiber Transmission	SMPTE297-2006

Optical SDI input

Connector	LC/UPC single mode
Wavelength	1260nm to 1620nm
Sensitivity	
3G-SDI	-18dBm
HD-SDI	-20dBm
SD-SDI	-20dBm
Overload	-3dBm

6.10 SFP-3G-OE-2-L

SFP-3G-EO-2-L is an long haul optical video SFP with two optical receiver ports. The SFP have been specially designed to handle pathological pattern that occurs in uncompressed video signals. These patterns occurs in both SD-SDI, HD-SDI and 3G-SDI, and Nevion has carefully chosen designs that withstands these patterns without any penalty in performance. The SFP's have the ability to report information such as signal presence, received signal level and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.10.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
SD, 540 Mbit/s	SMPTE344M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
Fiber Transmission	SMPTE297-2006

Optical SDI input

Connector	LC/UPC single mode
Wavelength	1260nm to 1620nm
Sensitivity	3G-SDI -26dBm
	HD-SDI -28dBm
	SD-SDI -28dBm
	DVB-ASI -28dBm
Overload	>-9dBm

6.11 SFP-3G-EO-2

SFP-3G-EO-2 is an 13T optical transmitter SFP with two optical ports. The SFP have been specially designed to handle pathological pattern that occurs in uncompressed video signals. These patterns occur in both SD-SDI, HD-SDI and 3G-SDI, and Nevion has carefully chosen designs that withstands these patterns without any penalty in performance. The SFP's have the ability to report information such as signal presence, output power level and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.11.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
SD, 540 Mbit/s	SMPTE344M
HD, 1485Mbps	SMPTE292M
3G, 2999Mbps	SMPTE424M
Fiber Transmission	SMPTE297-2006

Optical SDI output

Connector	LC/UPC single mode
Wavelength	1310nm (1290-1330nm)
Power	-10dBm to -3dBm
Extinction Ratio	Typical 7,5dB (min -5dB)
Jitter	3G @2970Mbps <60ps
	HD @1485Mbps <100ps
	SD @270Mbps <180ps

6.12 SFP-3G-EO-OE-13T-S

SFP-3G-EO-OE-13T-S is an optical video SFPs with one optical transmitter and one short haul optical receiver. The SFP's have the ability to report information such as wavelength, signal presence, received signal level, and launch power. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.12.1 specifications

Power	< 1.5W
Size	SFP compliant with SFF-8472, dimensions defined by the SFP Multi-Sourcing Agreement (MSA).
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292-2008
3G, 2999Mbps	SMPTE424M
DVB-ASI	EN50083-9.
Fiber Transmission	SMPTE297-2006

Optical input

Connector	LC/UPC single mode
Wavelength (center)	1260nm to 1630nm
Sensitivity	-22dBm (SD, Colorbar and checkfield)
	-21dBm (HD/3G, Colorbar)
	-20dBm (HD/3G, Checkfield)
Overload	-3dBm

Optical output

Connector	LC/UPC single mode
Center wavelength	1310nm
Extinction ratio	min 5dB
Power	0 to 3dBm

6.13 SFP-3G-EO-OE-C1xxx-L

SFP-3G-EO-OE-C1xxx-L is an optical video SFPs with one optical transmitter and one long haul optical receiver. The SFPs have been specially designed to handle pathological pattern that occurs in uncompressed video signals. These patterns occurs in both SD-SDI, HD-SDI and 3G-SDI, and Nevion has carefully chosen designs that withstands these patterns without any penalty in performance. The SFP's have the ability to report information such as wavelength, signal presence, received signal level and launch power. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.13.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292-2008
3G, 2999Mbps	SMPTE424M
DVB-ASI	EN50083-9.
Fiber Transmission	SMPTE297-2006

Optical SDI input

Connector	LC/UPC single mode
Wavelength	1260nm to 1620nm
Sensitivity	-31dBm (SD, Colorbar)
	-30dBm (SD, Checkfield)
	-30dBm (HD, Colorbar)
	-29dBm (HD, Checkfield)
	-29dBm (3G, Colorbar)
	-28dBm (3G, Checkfield)
Overload	-6dBm

Optical SDI output

Connector	LC/UPC single mode
Center wavelength	1270nm to 1610nm in 20nm step
Center offset	+/- 7.5nm
Extinction ratio	min 7dB
Power	0 to 4dBm, typ 2dBm

6.14 SFP-TR1-C1xxx-ER

SFP-TR1-C1xxx-ER is a 1 gigabit SFP transceiver that consist of an optical transmitter and an optical receiver. They are available with 18 CWDM wavelengths at 20nm spacing enabling transport of 18 signals over one single-mode fiber and are well suited for medium long haul applications.

The SFP's have the ability to report information such as wavelength, signal presence, received signal level, launch power and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.14.1 specifications

Power	< 1.5W
Size	SFP compliant with SFF-8472, dimensions defined by the SFP Multi-Sourcing Agreement (MSA).
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Ethernet	Gigabit Ethernet

Optical input

Connector	LC/UPC single mode
Wavelength (center)	1260nm to 1630nm
Optical budget	24dB
Sensitivity	-24dBm
Overload	-3dBm

Optical output

Connector	LC/UPC single mode
Center wavelength spacing	20 nm
Extinction ratio	min 8.2dB
Power	0 to 5dBm

1270	1290	1310	1330	1350	1370
1390	1410	1430	1450	1470	1490
1510	1530	1550	1570	1590	1610

Figure 11: 3 Available CWDM wavelengths.

6.15 SFP-TR1-C1xxx-ZR

SFP-TR1-C1xxx-ZR is a 1 gigabit SFP transceiver that consist of an optical transmitter and an optical receiver. SFP-TR1-C1xxx-ZR are available with 18 CWDM wavelengths at 20nm spacing enabling transport of 18 signals over one single-mode fiber and are well suited for long haul applications.

The SFP's have the ability to report information such as wavelength, signal presence, received signal level, launch power and internal temperature. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.15.1 Specifications

Power	< 1.5W
Size	SFP compliant with SFF-8472, dimensions defined by the SFP Multi-Sourcing Agreement (MSA).
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Ethernet	Gigabit Ethernet

Optical input

Connector	LC/UPC single mode
Wavelength (center)	1260nm to 1630nm
Optical budget	34dB
Sensitivity	-34dBm
Overload	-10dBm

Optical output

Connector	LC/UPC single mode
Center wavelength spacing	20 nm
Extinction ratio	min 8.2dB
Power	0 to 5dBm

1270	1290	1310	1330	1350	1370
1390	1410	1430	1450	1470	1490
1510	1530	1550	1570	1590	1610

Figure 12: 3 Available CWDM wavelengths.

6.16 SFP-TR1-13T-LR

SFP-TR1-13T-LR is an optical gigabit Ethernet SFP with one 1310nm optical transmitter and one optical receiver. –LR stands for Long Reach with a distance up to 10Km with 9/125 µm SMF fiber. The SFP's have the ability to report information such as wavelength, signal presence and received signal level. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.16.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Gigabit Ethernet	1000BASE-LX/1000BASE-T
100Mbps electrical	100BASE-T
10Mbps electrical	10BASE-T

Optical SDI input

Connector	LC/UPC single mode
Wavelength	1260nm to 1600nm
Sensitivity	-21dBm
Overload	-3dBm

Optical SDI output

Connector	LC/UPC single mode
Center wavelength	1310nm +/- 50nm
Extinction ratio	min 9dB
Power	-3 to -9dBm

6.17 SFP-TR1-13T-ER

SFP-TR1-13T-ER is an optical gigabit Ethernet SFP with one 1310nm optical transmitter and one optical receiver. –ER stands for Extended Reach with a distance up to 40Km with 9/125 µm SMF fiber. The SFP's have the ability to report information such as wavelength, signal presence, received signal level and launch power. This information is available in some of Nevion's SFP based products presented through their respective element management system.

6.17.1 specifications

Power	<1.5W
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Gigabit Ethernet	1000BASE-LX/1000BASE-T
100Mbps electrical	100BASE-T
10Mbps electrical	10BASE-T

Optical SDI input

Connector	LC/UPC single mode
Wavelength	1260nm to 1600nm
Sensitivity	-24dBm
Overload	-3dBm

Optical SDI output

Connector	LC/UPC single mode
Center wavelength	1310nm +/- 50nm
Extinction ratio	min 9dB
Power	-2 to +3dBm

6.18 SFP-CVBS-TX-2-DIN/HDBNC

The SFP-CVBS-TX-2-DIN/HDBNC is an electrical SFP Dual transmitter module designed to encode and decode composite signals over 75Ω coaxial cables via HD-BNCTM connectors. The module encodes the SD-SDI signal to NTSC/PAL composite.

The SFP-CVBS-TX-2-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-CVBS-TX-2-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2T-AN (DIN) / EB30HD2T-AN (HD-BNC).

6.18.1 Specifications

Power	typical 934mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +65 °C

Supported standards

Composite Standards	NTSC M, NTSC J, NTSC 4.43
	PAL B/G/H/I/D, PAL M, PAL N, PAL 60
Tx Channel	10-bit SD-SDI to Composite video encoder
	Up to 16x oversampling (216MHz)
	Multiple Chroma & Luma filters
	Test Pattern generation

Electrical SDI output

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.19 SFP-CVBS-RX-2-DIN/HDBNC

The SFP-CVBS-RX-2-DIN/HDBNC is an electrical SFP Dual Receiver module designed to decode two video composite (CVBS) signals over 75Ω coaxial cables via DIN/HD-BNC connectors. The module decodes NTSC\PAL composite inputs and converts to SD-SDI signal.

The SFP-CVBS-RX-2-DIN/HDBNC is hot-pluggable solution for in field system upgrade and maintenance.

SFP-CVBS-RX-2-DIN/HDBNC is the Nevion name for the SFP, this is equivalent to Embrionix EB30CS2R-AN2 (DIN) / EB30HD2R-AN2 (HD-BNC).

6.19.1 specifications

Power	typical 1027mW (+3,3V)
Size	SFP compliant, INF-8074i
Control	Multicon Gyda control and status
Operating temperature	0 to +70 °C

Supported standards

Composite Standards	NTSC M, NTSC J, NTSC 4.43
	PAL B/G/H/I/D, PAL M, PAL N, PAL 60
Rx Channel	10-bit Composite to SD-SDI video decoder
	4x oversampling (54MHz)
	Test Pattern generation

Electrical input

Connector	2x DIN 1.0/2.3 or 2x HD-BNC connectors (75Ω)

6.20 SFP-CVBS-TR-DIN/HDBNC

To be released.

6.20.1 specifications

General environmental requirements for Nevion equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:
   - Operating room temperature range: 0°C to 45°C
   - Operating relative humidity range: <90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:
   - Temperature range: -10°C to 55°C
   - Relative humidity range: <95% (non-condensing)

Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Nevion, which are available on the company web site:

www.nevion.com

Appendix A Materials declaration and recycling information

A.1 Materials declaration

For product sold into China after 1st March 2007, we comply with the “Administrative Measure on the Control of Pollution by Electronic Information Products”. In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 **Part Name**	**Toxic or hazardous substances and elements**					
	鉛 **Lead (Pb)**	汞 **Mercury (Hg)**	镉 **Cadmium (Cd)**	六价铬 **Hexavalent Chromium (Cr(VI))**	多溴联苯 **Polybrominated biphenyls (PBB)**	多溴二苯醚 **Polybrominated diphenyl ethers (PBDE)**
CONV-SFP-4	O	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

This is indicated by the product marking:

A.2 Recycling information

Nevion provides assistance to customers and recyclers through our web site http://www.nevion.com/. Please contact Nevion’s Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Nevion or its agents for recycling, the following general information may be of assistance:

- Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.
- All major parts are marked or labeled to show their material content.
- Depending on the date of manufacture, this product may contain lead in solder.
- Some circuit boards may contain battery-backed memory devices.