



Flashlink Compact

**FC-3G-EO-14
FC-3G-EO-28
FC-3G-OE-14
FC-3G-OE-28
FC-3G-EO-OE-28**

3G/HD/SD-SDI optical/electrical converter

User manual

Rev. 1

Nevion Support

Nevion Europe

P.O. Box 1020
3204 Sandefjord, Norway
Support phone 1: +47 33 48 99 97
Support phone 2: +47 90 60 99 99

Nevion USA

1600 Emerson Avenue
Oxnard, CA 93033, USA
Toll free North America: (866) 515-0811
Outside North America: +1 (805) 247-8560

E-mail: support@nevion.com

See <http://www.nevion.com/support/> for service hours for customer support globally.

Revision history

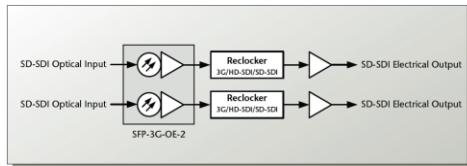
Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
1	0	2010-12-17	AA/AJM	Added Declaration of Conformity. Added description of unlocking options (Ch. 5).
0	A	2010-08-18	AJM	Corrected ordering number for SFP-3G-OE-2 and SFP-3G-EO-2-13T. Corrected the operating temperature specification. Updated SFP part number.
A	-	2010-05-20	AJM	First release

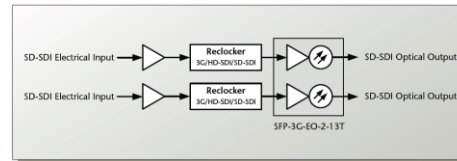
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1 Product overview



FC-3G-OE



FC-3G-EO

The Flashlink compact is a range of low power, low price and small form factor optical to electrical converters. It can convert up to 28 channels of 3G-SDI in a 1U 19" space. Both EO and OE converters have an SD/HD/3G-SDI reclocker and supports bypass for none broadcast bitrates. The Flashlink Compact can be controlled and monitored by Multicon Gyda or configured to be a standalone converter. The optical is based on Nevion's hot pluggable SFP modules. The Flashlink Compact is equipped with an extra power inlet for dual power supply redundancy, either from an extra SL-PWR-40 or battery pack.

1.1 Product versions

FC-3G-EO-14	14 channel electrical to optical converter
FC-3G-EO-28	28 channel electrical to optical converter
FC-3G-OE-14	14 channel optical to electrical converter
FC-3G-OE-28	28 channel optical to electrical converter
FC-3G-EO-OE-28	14 channel electrical to optical converter and 28 channel optical to electrical converter

All variants can be delivered with dual power supply and Multicon Gyda control and monitoring as options.

The Multicon Gyda option does not include a Multicon Gyda module. It only unlocks the Flashlink Compact to be able to talk to a Multicon Gyda. One option for each Flashlink compact is necessary.

2 Specifications

General

Power	+15V DC / 26W, max
Weight	2.0kg, 2.4kg with dual power
Size	1.7" x 19" x 3.1" (H x W x D) 43.4mm x 482.6mm x 80.0mm (H x W x D)
Control	Options for Multicon Gyda control and status BITE (Built-In Test Equipment) Status LED in front Configurations DIP in front
Operating temperature	0 to +30 °C
Data rate reclocked:	270, 1485, 1485/1.001, 2970, 2970/1.001 Mbps
Data rate non-reclocked:	19.4 to 2970 Mbps

Supported standards

SD, 270Mbps	SMPTE259M
HD, 1485Mbps	SMPTE292-2008
3G, 2999Mbps	SMPTE424M
DVB-ASI	EN50083-9.
Fiber Transmission	SMPTE297-2006
Electrical connector, BC	IEC 61169-8

Optical SDI input

See Nevion SFP datasheets for specification.

Optical SDI output

See Nevion SFP datasheets for specification.

Electrical SDI input

Connectors	BNC, IEC 61169-8
Impedance	75ohm
Cable equalization	Automatic; 150m @270Mbps w/Belden 8281 100m @1485Mbps w/Belden 1694A 70m @1485Mbps w/Belden 1694A
Input Return loss	>15dB, 5-1485MHz >10dB, 1485-2970MHz

Electrical SDI outputs

Connectors	BNC, IEC 61169-8
Impedance	75ohm
Output signal level	800mV +/- 10%
Output signal rise / fall time	20% - 80% - SD, 0.4ns – 1.5ns, <0.5ns rise/fall variation - HD/3G, < 270ps, <100ps rise/fall variation
DC-offset	0V +/-0,5
Amplitude overshoot	<10%
Output return loss	>15dB, 5-1485MHz >10dB, 1485-2970MHz

2.1 Front view

2.1.1 FC-3G-EO-14



- Power A indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
 - Orange: No or none working power supply connected
 - Red: The lower converter is malfunction. Please contact Nevion support for advice.
- Power B indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
 - Orange: No or none working power supply connected
 - Red: The lower converter is malfunction. Please contact Nevion support for advice.
- 1 to 14 indicators:** Gives status on each electrical to optical converter.
- Green: Valid input signal and reclocker in lock or bypass.
 - Orange: Valid input signal but reclocker not in lock.
 - Red: No valid input signal.
 - No light: No valid Nevion SFP present.
- DIP 1 to 14:** Configures the Flashlink Compact. See chapter 3 for more information.

2.1.2 FC-3G-EO-28



- Power A indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
 - Orange: No or none working power supply connected
 - Red: The lower converter is malfunction. Please contact Nevion support for advice.
- Power B indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
 - Orange: No or none working power supply connected
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2.1.3 FC-3G-EO-14



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- DIP 1 to 14:** Configures the Flashlink Compact. See chapter 3 for more information.

2.1.4 FC-3G-OE-28



- Power A indicator:** Gives status on power supply connected to the Power A connector on the back side.
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 - Orange: No or none working power supply connected
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 - Red: No valid input signal.
 - No light: No valid Nevion SFP present.
- DIP 1 to 14:** Configures the Flashlink Compact. See chapter 3 for more information.

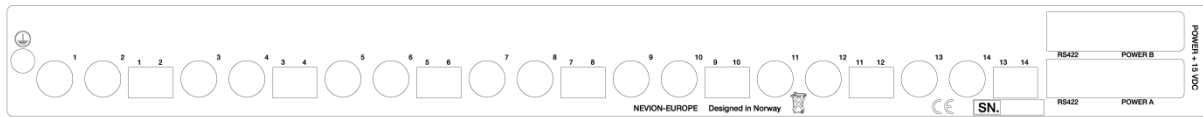
2.1.5 FC-3G-EO-OE-28



- Power A indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
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 - Red: The lower converter is malfunction. Please contact Nevion support for advice.
- Power B indicator:** Gives status on power supply connected to the Power A connector on the back side.
- Green: Power supply connected
 - Orange: No or none working power supply connected
 - Red: The lower converter is malfunction. Please contact Nevion support for advice.
- 1 to 14 indicators:** Gives status on each electrical to optical and optical to electrical converter.
- Green: Valid input signal and reclocker in lock or bypass.
 - Orange: Valid input signal but reclocker not in lock.
 - Red: No valid input signal.
 - No light: No valid Nevion SFP present.
- DIP 1 to 14:** Configures the Flashlink Compact. See chapter 3 for more information.

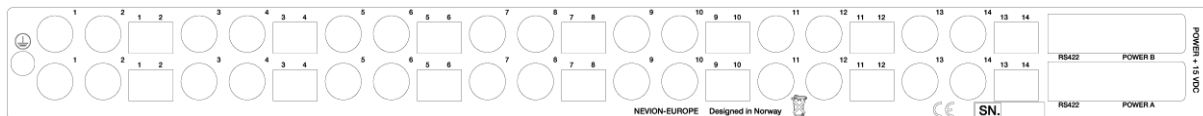
2.2 Rear view

2.2.1 FC-3G-EO-14



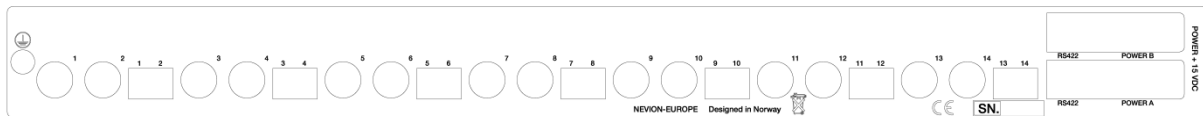
- Earth point: For connection to internal earth bar in 19"
- BNC: Electrical 3G/HD/SD-SDI inputs.
- SFP: Cage for fitting dual optical transmitters.
- Upper RS422: TP45 connector for connection for Multicon Gyda.
- Lower RS422: TP45 connector for daisy chaining more Flashlink Compact. This must be terminated when not used.
- Power A: Main DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.
- Power B: Spare/redundancy DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.

2.2.2 FC-3G-EO-28



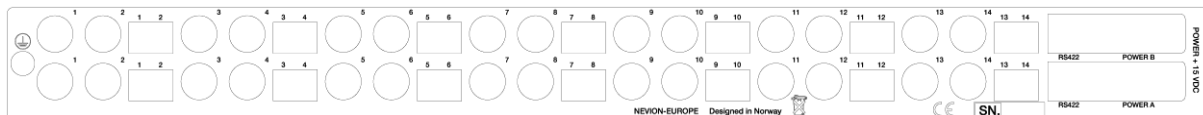
- Earth point: For connection to internal earth bar in 19"
- Upper BNC: Electrical 3G/HD/SD-SDI inputs.
- Upper SFP: Cage for fitting dual optical transmitters.
- Lower BNC: Electrical 3G/HD/SD-SDI inputs.
- Lower SFP: Cage for fitting dual optical transmitters.
- Upper RS422: TP45 connector for connection for Multicon Gyda.
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2.2.3 FC-3G-OE-14



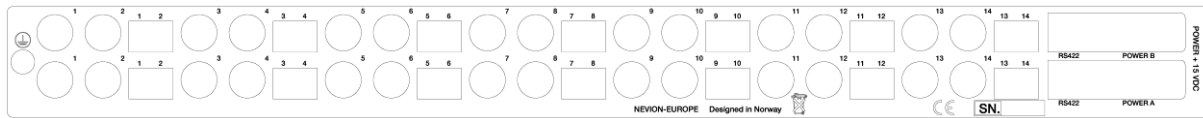
- Earth point: For connection to internal earth bar in 19"
- BNC: Electrical 3G/HD/SD-SDI outputs.
- SFP: Cage for fitting dual optical receivers.
- Upper RS422: TP45 connector for connection for Multicon Gyda.
- Lower RS422: TP45 connector for daisy chaining more Flashlink Compact. This must be terminated when not used.
- Power A: Main DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.
- Power B: Spare/redundancy DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.

2.2.4 FC-3G-OE-28



- Earth point: For connection to internal earth bar in 19"
- Upper BNC: Electrical 3G/HD/SD-SDI outputs.
- Upper SFP: Cage for fitting dual optical receivers.
- Lower BNC: Electrical 3G/HD/SD-SDI outputs.
- Lower SFP: Cage for fitting dual optical receivers.
- Upper RS422: TP45 connector for connection for Multicon Gyda.
- Lower RS422: TP45 connector for daisy chaining more Flashlink Compact. This must be terminated when not used.
- Power A: Main DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.
- Power B: Spare/redundancy DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.

2.2.5 FC-3G-EO-OE-28



The optical to electrical is always the upper row and the electrical to optical is always the lower row.

- Earth point: For connection to internal earth bar in 19"
- Upper BNC: Electrical 3G/HD/SD-SDI outputs.
- Upper SFP: Cage for fitting dual optical receivers.
- Lower BNC: Electrical 3G/HD/SD-SDI inputs.
- Lower SFP: Cage for fitting dual optical transmitter.
- Upper RS422: TP45 connector for connection for Multicon Gyda.
- Lower RS422: TP45 connector for daisy chaining more Flashlink Compact. This must be terminated when not used.
- Power A: Main DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.
- Power B: Spare/redundancy DC input connector. Standard 9pin DSUB. Pin 4 is positive voltage and pin 1 is ground.

3 Configuration

Flashlink Compact can operate in two modes. Stand alone and Multicon Gyda controlled mode. This setting is set by switch 8 on the front of the Flashlink Compact.

If Flashlink Compact does not appear in Multicon Gyda, check that switch 8 is set to on.

3.1 Stand alone mode

The Flashlink Compact is configured to transport SD/HD/3G-SDI with reclocked set to auto.

Switch 1 to 7 has no function in this mode.

3.2 Multicon Gyda mode

In this mode configuration and monitoring can be done by Multicon Gyda. This function also has to be unlocked by the Multicon Gyda options sold separately. See chapter 5 Unlocking options

The Flashlink Compact can be seen as a two slot Flashlink frame populated with 14 OE or 14 EO converters. Each slot must be set to a unique sub-rack and slot address. This is done with switch 1 to 7 on the front of the product.

In order to ensure proper operation of the system, it is important that no sub-racks or Flashlink Compact controlled by the same Multicon Gyda have the same address set.

3.2.1 Address setting

For communication with Multicon Gyda the addresses on the Flashlink Compact has to be set. Depending on the product one or two unique address has to be set. This is done by the switches in front of the product.

The first 3 switches set the sub-rack address:

SW1	SW2	SW3	Sub-rack
OFF	OFF	OFF	0
ON	OFF	OFF	1
OFF	ON	OFF	2
ON	ON	OFF	3
OFF	OFF	ON	4
ON	OFF	ON	5
OFF	ON	ON	6
ON	ON	ON	7

The next 4 switches set the slot address:

SW4	SW5	SW6	SW7	Slot
OFF	OFF	OFF	OFF	1
ON	OFF	OFF	OFF	2
OFF	ON	OFF	OFF	3
ON	ON	OFF	OFF	4
OFF	OFF	ON	OFF	5
ON	OFF	ON	OFF	6
OFF	ON	ON	OFF	7
ON	ON	ON	OFF	8
OFF	OFF	OFF	ON	9
ON	OFF	OFF	ON	Not allowed
OFF	ON	OFF	ON	Not allowed
ON	ON	OFF	ON	Not allowed
OFF	OFF	ON	ON	Not allowed
ON	OFF	ON	ON	Not allowed
OFF	ON	ON	ON	Not allowed
ON	ON	ON	ON	Not allowed

A power recycling is need after a change in address.

3.2.2 Multicon Gyda configuration

The Flashlink Compact does not store configuration set from Multicon Gyda.

This means that the Flashlink Compact will after a power recycling receive stored parameters from Multicon Gyda.

3.2.2.1 Card label

Card label		Locate Card	sec
-------------------	--	-------------	--

Assigns a name. When the locate is pushed all indicators on front of the Flashlink Compact will flash for 120 seconds, alternative an period can be enter into the sec box.

3.2.2.2 Firmware upgrade

Firmware upgrade	Upload file: None
-------------------------	--

Updates the firmware on Flashlink Compact. The firmware file first has to be uploaded to Multicon Gyda by ftp. See user manual on Multicon Gyda for help on uploading.

3.2.2.3 Electrical input

Electrical input 1	☒ Normal ☐ EQ Bypass
---------------------------	---

For SDI signal set the electrical input to normal. For MADI and other low bitrate none SDI signal set this to EQ bypass.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Electrical input 1			☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the electrical input can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button.

3.2.2.4 Electrical output

Electrical output 1	☐ On ☐ Auto ☒ Off
----------------------------	--

Turns on and off the output signal. When in auto mode the state of reclocker controls the output state. If reclocker is in lock then output is on, else output is off. If reclocker is in bypass the output is on.

3.2.2.5 Reclocker

Reclocker 1	☒ Enable ☐ Bypass	Autobypass: ☒ On ☐ Off
--------------------	--	---

For SDI signal set to enable, else set to bypass. Autobypass only works if the reclocker is enabled. With autobypass on the reclocker will set the reclocker in bypass mode when none SDI signal is detected.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Reclocker 1			☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the reclocker can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button.

3.2.2.6 Optical input

No configurable parameters.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Optical input 1			☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the optical input can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button.

3.2.2.7 Optical output

Optical output 1	☒ On ☐ Off
-------------------------	---

Turns on or off the optical output. For safety reason turn off none used optical ports.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Optical output 1			☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the optical output can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button.

3.2.2.8 Voltage (15.0)

This is the external DC power inlet on the backside of the Flashlink Compact.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Voltage (15.0V)	17000	10000	☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the external voltage can be can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button. The voltage threshold can also be changes, voltages is in mV.

3.2.2.9 Voltage (3.3)

This is the internal voltage in Flashlink Compact.

Alarm	Upper limit	Lower limit	Alarm	SNMP trap
Voltage (3.3V)	3500	3100	☒ Normal ☐ Ignore	☐ Send ☒ Ignore

The alarm handling for the external voltage can be can be turn on or off by the normal and ignore radio button. Also the SNMP alarm trap can be turn on or off by send or ignore radio button. The voltage threshold can also be changes, voltages is in mV.

3.2.2.10 Card version

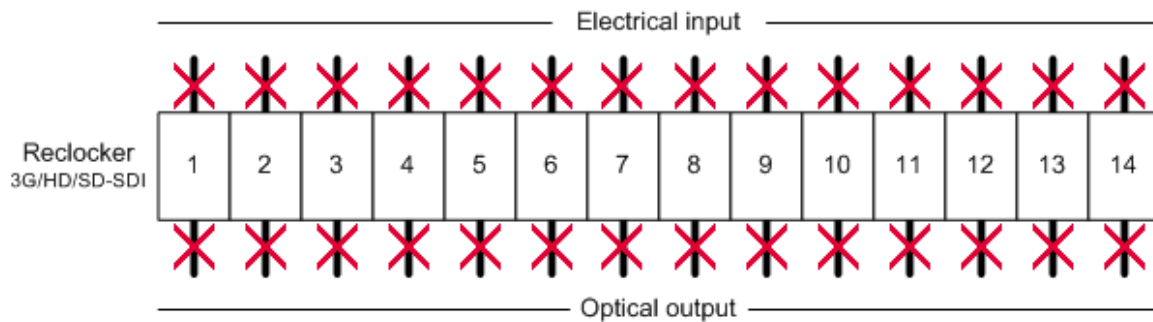
This box gives information on the firmware used in the Flashlink compact. Always state this when contacting Nevion support.

Card version	
hw	1.0
lib	1.1.29
sw	1.1.1

3.2.3 Multicon Gyda information



Flashlink Compact EO converter



On top of the Multicon Gyda information tab a dynamical picture of the Flashlink Compact is displayed. The red cross will automatically update reflecting the status on the Flashlink Compact. Table below describe the meaning of the red cross:

Electrical input:	Red cross means no electrical input present.
Electrical output:	Red cross means reclocker not in lock or electrical output turned off.
Optical input:	Red cross means no optical input present or no SFP present.
Optical output:	Red cross means reclocker not in lock or no SFP present.

4 Upgrade firmware

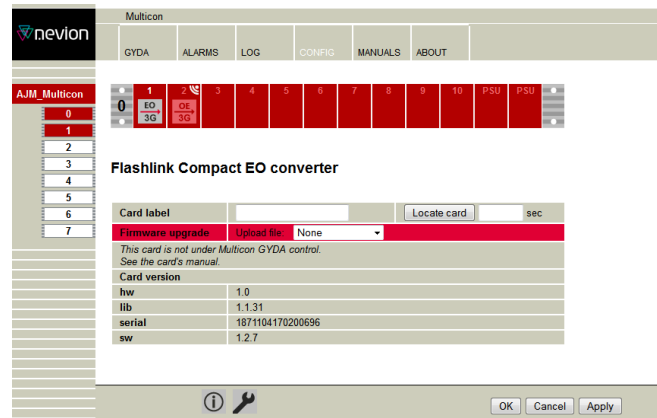
For upgrading the firmware the switch 8 has to be set to on; Multicon Gyda mode. The address also has to be set correctly according to chapter 3.2.1. See Multicon Gyda manual for instructions on upgrading Flashlink card.

The Multicon Gyda option is not needed for firmware upgrade

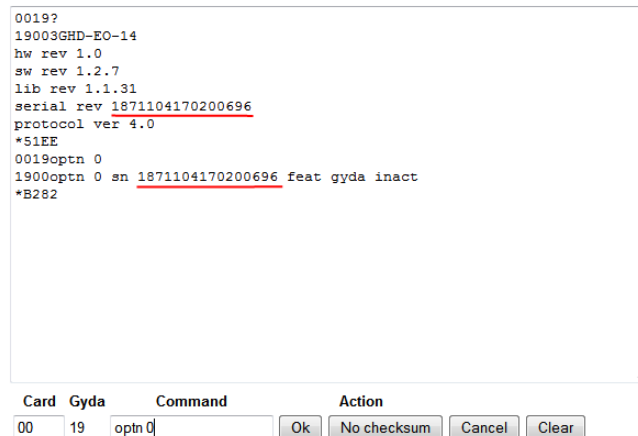
5 Unlocking options

Only available from firmware version 1.2.7.

For unlocking options Nevion needs the serial number of the card/product. This can be found in the configuration pan in Multicon Gyda or by sending the “?” or “optn 0” command in the debug terminal. See screen shots from Multicon Gyda below.

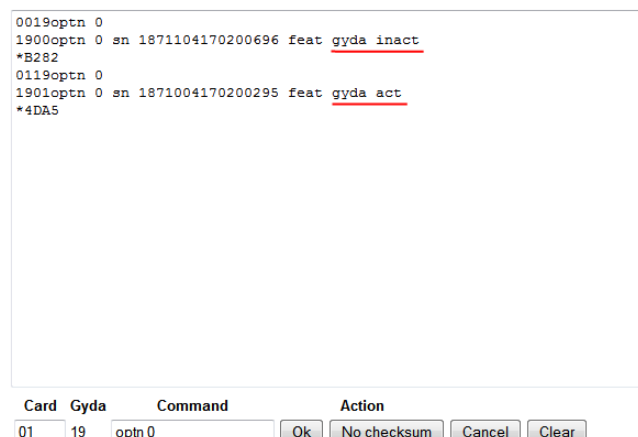


Debug terminal



To check which options are installed the “optn 0” command in Multicon Gyda debug terminal can be used. Below is a screen shoot from two cards, one with Gyda enabled and one without Gyda options.

Debug terminal



The received unlock key from Nevion has to be sent to the card using the debug terminal in Multicon Gyda. An unlock key consist of the command “optn 0” followed by six 10 digit keys.

optn 0 1836889408 141478916 1458913010 806395448 859561046 154663979

After sending this key to the card the card will response with status of options.

See screen shot below.

Debug terminal

```
0019optn 0 1836889408 141478916 1458913010 806395448 859561046 154663979
1900optn 0 sn 1871104170200696 feat gyda act
*A0AA
```

Card	Gyda	Command	Action			
00	19	optn 0 1836889408 1414	Ok	No checksum	Cancel	Clear

6 Nevion SFP

A list of valid Nevion SFP for the Flashlink Compact with Nevion ordering number.:

Ordering code	Name	Description
19145	SFP-3G-OE-2	Dual receiver SFP
19144	SFP-3G-EO-2-13T	Dual 1310 nm transmitter SFP
19244	SFP-3G-EO-2-C1310/C1550	Dual Transmitter LC, 1310/1550nm
19245	SFP-3G-EO-2-C1270/C1290	Dual Transmitter LC, 1270/1290nm
19246	SFP-3G-EO-2-C1310/C1330	Dual Transmitter LC, 1310/1330nm
19247	SFP-3G-EO-2-C1350/C1370	Dual Transmitter LC, 1350/1370nm
19248	SFP-3G-EO-2-C1390/C1410	Dual Transmitter LC, 1390/1410nm
19249	SFP-3G-EO-2-C1430/C1450	Dual Transmitter LC, 1430/1450nm
19250	SFP-3G-EO-2-C1470/C1490	Dual Transmitter LC, 1470/1490nm
19251	SFP-3G-EO-2-C1510/C1530	Dual Transmitter LC, 1510/1530nm
19252	SFP-3G-EO-2-C1550/C1570	Dual Transmitter LC, 1550/1570nm
19253	SFP-3G-EO-2-C1590/C1610	Dual Transmitter LC, 1590/1610nm

Changing SFP can be done without removing power

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 30°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 40°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)	鎘 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)
FC-3G-EO/OE-14/28	O	O	O	O	O	O
SL-PWR-40	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.

EC Declaration of Conformity



MANUFACTURER	Nevion Europe AS P.O. Box 1020, 3204 Sandefjord, Norway	
AUTHORIZED REPRESENTATIVE (Established within the EEA)	Not applicable	
MODEL NUMBER(S)	FC-3G-EO-14 FC-3G-EO-28 FC-3G-OE-14 FC-3G-OE-28 FC-3G-EO-OE-28	
DESCRIPTION	3G/HD/SD-SDI optical/electrical converter	
DIRECTIVES this equipment complies with	Low voltage (EU Directive 2006/95/EC) EMC (EU Directive 2004/108/EC) RoHS (EU Directive 2002/95/EC) China RoHS ¹ WEEE (EU Directive 2002/96/EC) REACH	
HARMONISED STANDARDS applied in order to verify compliance with Directive(s)	EN 55103-1:2010 EN 55103-2:2010	
TEST REPORTS ISSUED BY	Notified/Competent Body	Report no:
	-	-
TECHNICAL CONSTRUCTION FILE NO	Not applicable	
YEAR WHICH THE CE-MARK WAS AFFIXED	2010	
TEST AUTHORIZED SIGNATORY		
MANUFACTURER	AUTHORIZED REPRESENTATIVE (Established within EEA)	Date of Issue
		2010-12-17
		Place of Issue
	Not applicable	Sandefjord, Norway
 NEVION EUROPE AS O.nr. 976 584 201 MVA		
Name	Thomas Øhrbom	
Position	QA Director, Nevion Europe (authorized signature)	

¹ Administration on the Control of Pollution Caused by Electronic Information Products