UMC-EOOE-4

Universal multi-rate optical converter for video and gigabit ethernet
with licenses for automatic change over, service probes and GbE

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	2019-02-12	MR	2.3 Features: Added information conc. GbE Added chapter; 7.12 How to apply a software key that enables new options General adjustments and corrections.
B	A	2019-01-07	MR	4 Connections: Removed figure describing backplanes C3 and C4. 6.3 Bi-Directional GPIOs: Corrected referenced chapter for details of different setups.
A	-	2016-02-12	MR	Initial revision

Contents

1 Product overview

The UMC-EOOE-4-SFP is a quad optical converter supporting 3G/HD/SD and GbE with configurable optical ports that can take any direction depending on the SFPs used.
It holds a central crosspoint that allows any input, optical or electrical, to be routed to any output, optical or electrical. The product features options for multiple automatic change-overs that each can utilize any 3 inputs. It also features options for multiple SDI signal integrity probes that can be connected to any port or change over. These options are licensed. This makes the product useful in any optical application. The product occupies only a single slot in the Flashlink frame, providing up to 40 conversions in 2RU.
The product is SFP based and uses video SFPs for optical conversion. It supports any Non-MSA video SFP, being dual transmitter, dual receiver or transceiver. The module auto-configures its functionality to the equipped SFP. This allows to change the functionality of the card in the field, by simply replacing the SFPs.
The card is also hot-swap, with pigtails connecting the SFPs to the backplane connector. This allows the user to replace the whole card including the optics, without needing to detach any cables, electrical or optical.
Multicon Gyda provides SNMP support and web interface for monitoring and configuration of the unit.

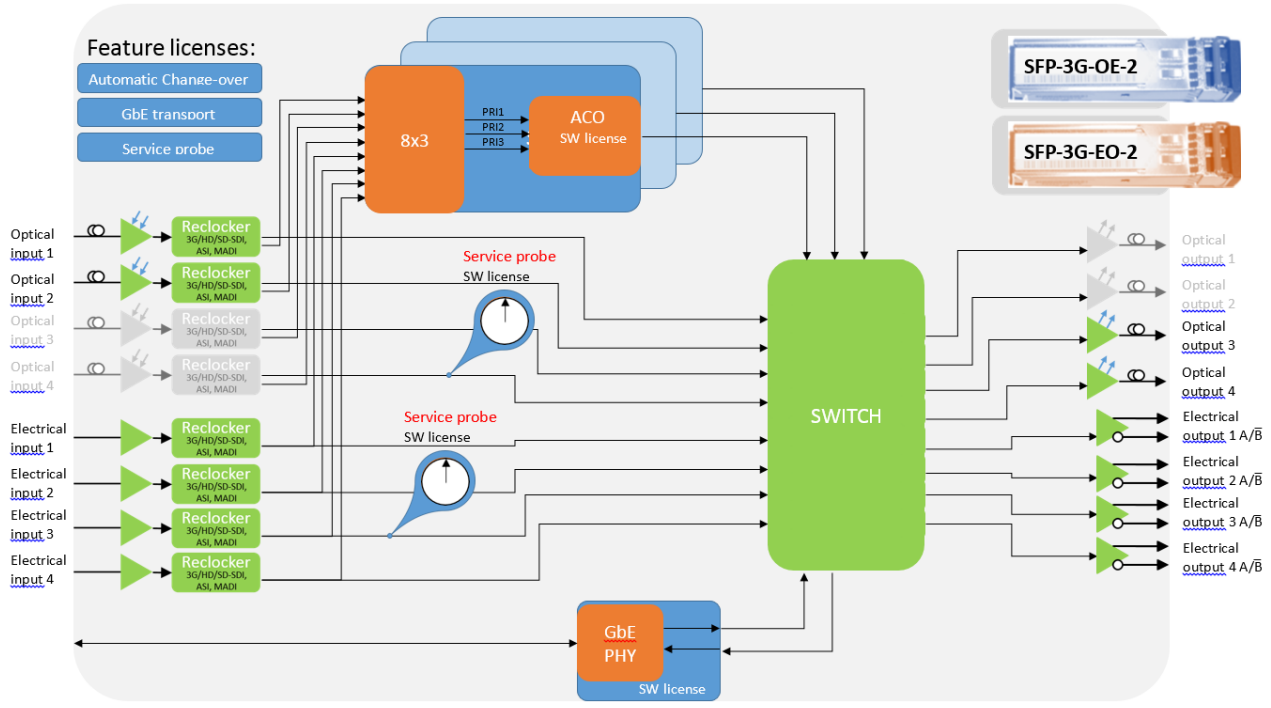

Figure 1. Overview.

2 Specifications

2.1 Electrical specifications

2.1.1 SDI inputs

Data rate	100Mbps - 2970 Mbps
Number of inputs	Max. 4 (depending on backplane solution)
Connectors	75 Ohm DIN 1.0/2.3 and HD-BNC (depending on backplane type)
Input Return loss	< -15dB, 5MHz -1.5GHz < -10dB, 1.5GHz - 3GHz
Jitter tolerance	SD limit: 10Hz-10kHz: < 1 UI 10kHz-10MHz: < 0.2 UI HD limit: 10Hz-100kHz: < 1 UI 100kHz-150MHz: < 0.2 UI 3GHD limit: 10Hz-100kHz: < 2 UI 100kHz-300MHz: < 0.3 UI
Equalized cable lengths (BER < 10E-12) Checkfield pattern Unused outputs terminated with 75ohm terminators	SD: 250m min. 275m typ. (Belden 8281) HD: 150m min. 160m typ. (Belden 1694A) 3GHD: 75m min. 80m typ. (Belden 1694A)

2.1.2 SDI outputs

Number of outputs	Max. 8 (depending on backplane solution)
Connectors	75 Ohm DIN 1.0/2.3 and HD-BNC (depending on backplane solution)
Output Return loss	< -15dB, 5MHz -1.5GHz < -10dB, 1.5GHz - 3GHz
Output signal level	800mV +/- 10%
Output signal rise / fall time (20% - 80%)	- SD limit: [0.4ns – 1.5ns]; <0.5ns rise/fall variation - HD limit: < 270ps, <100ps rise/fall variation - 3G HD limit: <135ps, <50ps rise/fall variation
Remark:	Due to Nevion's design philosophy with use of passive backplanes, the output signals pass significant PCB trace lengths between the cable drivers and output ports. This may result in a slight degradation of levels and rise/fall times compared to the listed specifications above which states launch levels at the cable drivers.
Amplitude overshoot/undershoot	<10%
Polarity	Up to 4pcs. non-inverting (DVB-ASI compliant) (depending on backplane solution) Up to 4pcs. inverting (depending on backplane sol.)

Output timing jitter	SD: < 0.2 UI HD: < 1 UI 3GHD: < 1UI
Output alignment jitter	SD: <0.15 UI HD: <0.15 UI 3GHD: <0.2UI

2.1.3 Gigabit Ethernet

According to 10BaseT/100BaseTx/1000BaseT (twisted pair cable). Auto negotiation. Only non-MSA (Video) transceiver SFP can be used for this function.

2.1.4 Bi directional GPIOs

2.1.4.1 Function

Each of the 5pcs. GPIOs can be either input or output.
Only pre-configured combinations can be chosen.

2.1.4.2 Specification

Applied voltage (DC):	15V max.
Permitted current drain in output "low" state:	150mA max.
Saturation voltage at max. permitted current drain:	Max. 100mV
Active alarm:	Output is high ohmic towards GND
Inactive alarm:	Output is low ohmic towards GND
Valid "0" in input mode:	0 to 0.500mVDC
Valid "1" in input mode:	3.000 to 15VDC
Active input:	"0"
Inactive input:	"1"

2.1.5 Power consumption

From +5V or +15V:	Typ. 9.7W (all functions turned on) Max. 11.1W (all functions turned on)

2.2 Optical specifications

2.2.1 Ports

4pcs. LC/UPC

Insertion loss: (Backplane port to SFP port, through two junctions)	Max. 1.0dB Typ. 0.3dB
Return loss:	≤ -45dB

2.2.2 Other specifications

Determined by the chosen SFPs.

See separate list of available SFPs for this product.

2.3 Features

Re-clocking:	Automatic SD, HD, 3GHD detection Automatic output slew rate adjustment according to SMPTE-259M, SMPTE-292M, SMPTE305M and SMPTE424M
Supported clock rates:	125Mbps, 270Mbps, 1.485 and 1.485/1.001Gbps, 2.97 and 2.97/1.001Gbps
MADI:	According to AES10 with the following exemption; Amplitude and rise and fall times according to SD-SDI (SMPTE-292M) at electrical outputs.
Crosspoint switch:	Electrical to Optical/Electrical: 4 x 8 Optical to Electrical/Optical: 4 x 8 Electrical ethernet to Optical: 1 x 2
Automatic change over: (Licensed feature)	Up to three independent blocks. Choice of "Main" input and up to two prioritize "Backup" inputs in each block. Selectable switching criteria; - Loss of signal - Loss of lock - Advanced settings based on signal analyzes (SDI - formats only)
GbE /Gigabit Ethernet) (Licensed feature)	Provides EO/OE media conversion of Gigabit Ethernet (With use of C1/C2 backplanes only)
Service probe: (Licensed feature)	Provides consecutive error status update for up to two input signals based on configurable and advanced signal analyzes (SDI formats only)
SFP based design:	Wide specter of available SFPs including CWDM and DWDM
Double density:	Available backplanes with double density (for FR202(-RP) only), provide space for up to 20pcs. boards in a frame as long as the frame's power limits are not violated.

2.4 Supported standards

SMPTE:	SMPTE292M, SMPTE259M, SMPTE305M and SMPTE424M
DVB-ASI:	EN50083-9
MADI:	AES10
Ethernet:	10BaseT/100BaseTx/1000BaseT on RJ-45 connectors. Compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab and IEEE 802.3z. Auto speed sensing and MDI/MDI-X.
Optical:	Ref. specifications for listed SFPs.

3 Configuration

Due to the large number of functions and signal paths this product must be configured by use of Multicon and is not configurable by DIPs.
The only function controlled by a DIP switch (not configurable from Multicon) is choice of which frame voltage to supply the board (+5VDC or +15VDC).

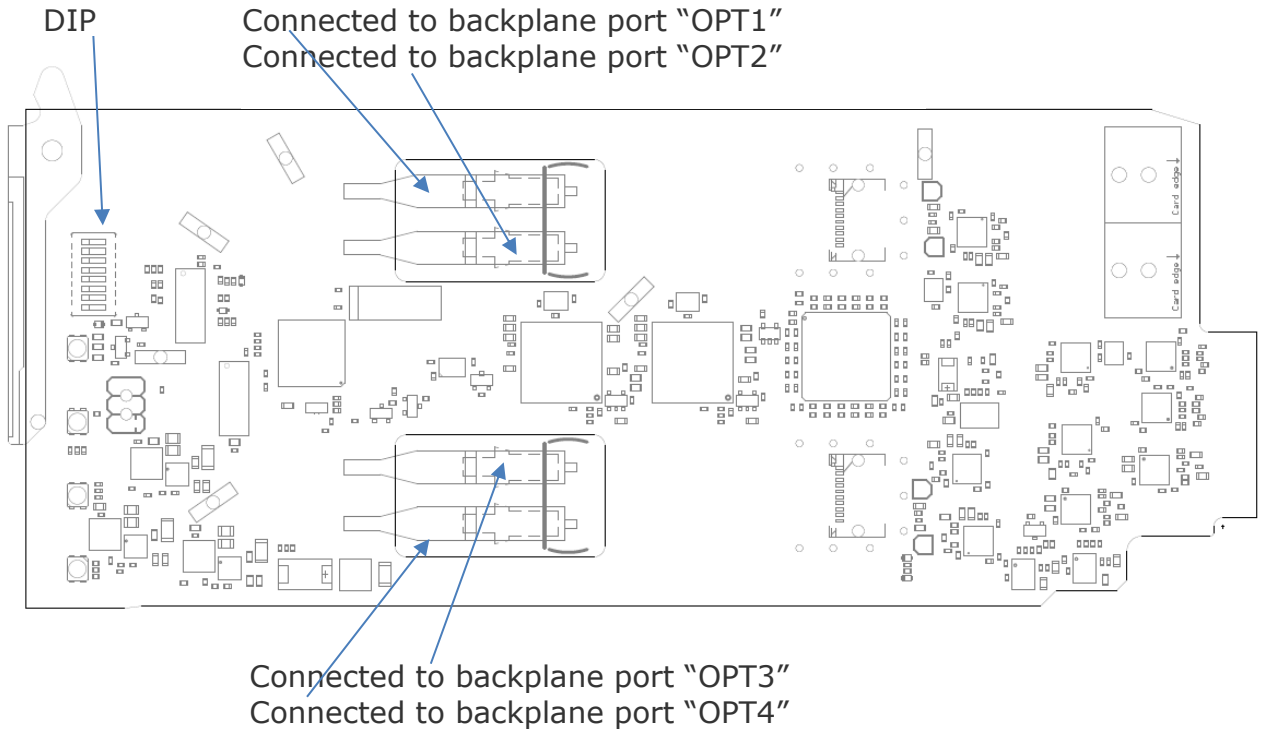

Figure 2. UMC-EOOE-4 layout

3.1 DIP switches

DIP switch configuration must be set according to table 2.
All DIP switches are off when pointing towards the release handle.

Switch #	Label	Function DIP=OFF	Function DIP=ON	Comment
1	”+15V”	Board supplied by +15VDC	Board supplied by +5VDC	Selection of power. Attention: Remark: Must be operated only when the board is unpowered.
2	”2”	N/A	N/A	Possible future use
3	”3”	N/A	N/A	Possible future use
4	”4”	N/A	N/A	Possible future use
5	”5”	N/A	N/A	Possible future use
6	”6”	N/A	N/A	Possible future use
7	”7”	N/A	N/A	Possible future use
8	”OVR”	N/A	Write protection, Multicon cannot change configuration	Possible future additional use

Table 1. UMC-EOOE-4 DIP switches

4 Connections

The electrical input signals shall be connected to the "INx" connectors.
All "OUTx" ports provide non-inverted signals and can be used for all formats included DVB-ASI.
All "OUTx" ports provide inverted signals and cannot be used for DVB-ASI.
Unused outputs should be terminated with 75ohm terminators.

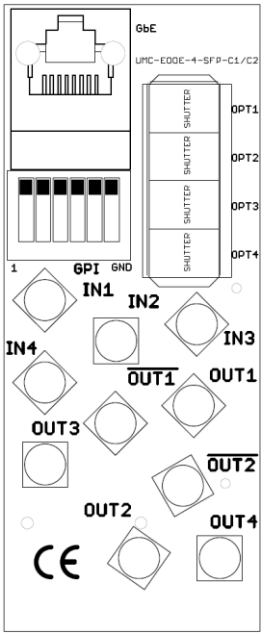

Figure 3. Layout of backplane boards UMC-EOOE-4-SFP-C1/C2

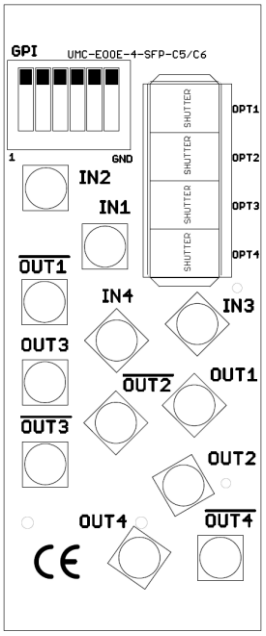

Figure 4. Layout of backplane boards UMC-EOOE-4-SFP-C5/C6

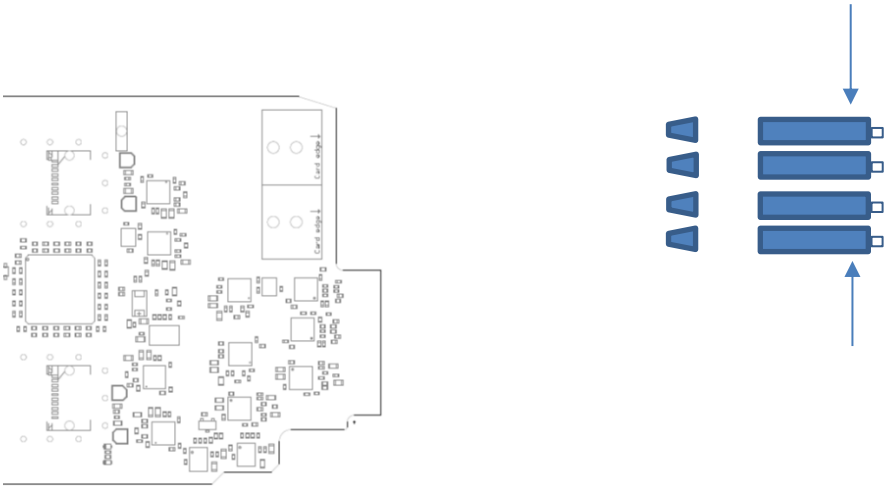

Figure 5. Getting LC connectors into correct position

If any problems with entering the backplane adapter should occur, the connectors' position should be corrected by the method shown above before a new attempt.

5 Operation

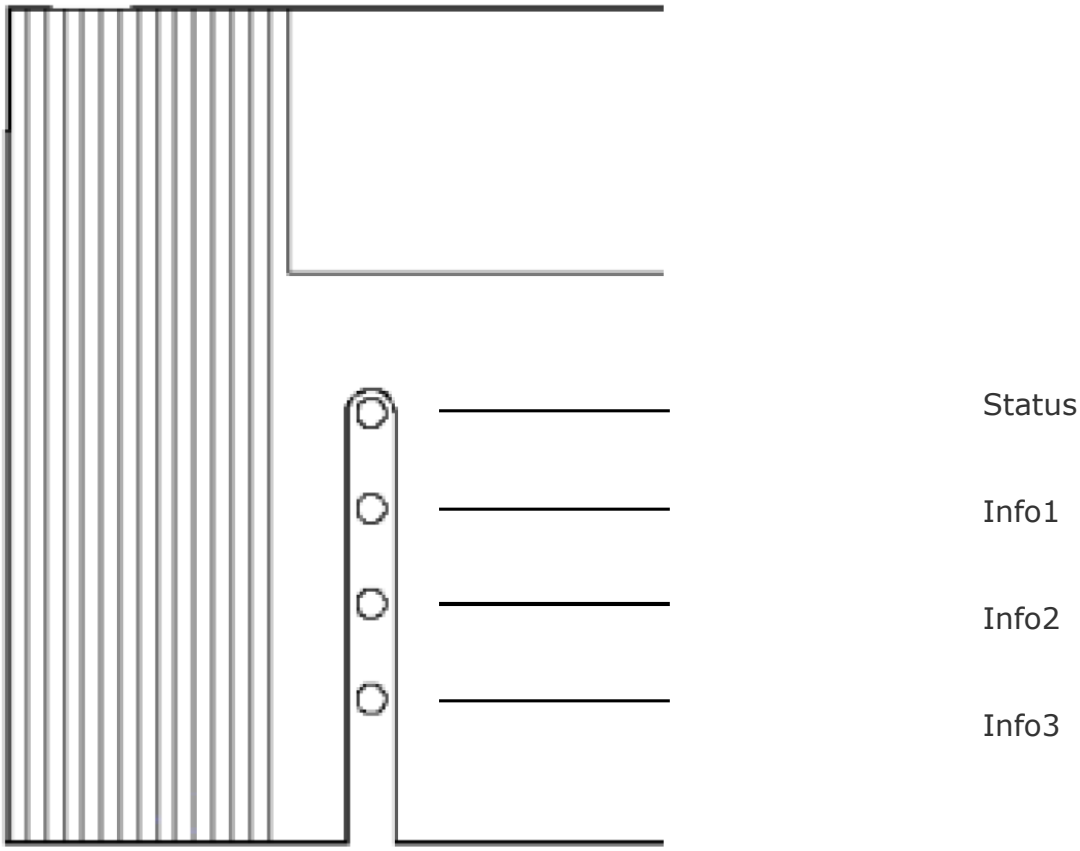

Figure 6. Panel indicator overview for UMC-EOOE-4 (text is not printed at the front panel)

The functions of the different LEDs are described in Table 3 below.
LEDs are controlled by Multicon.

LED/State	Red	Yellow	Green	No light	Comment
STATUS	Module is faulty	N/A	Module is OK Module has power	Module has no power	
IN	Alarm situation	Possible future use	OK	N/A	All Input alarms OR'ed
PROC	Alarm situation	Possible future use	OK	N/A	All processing alarms OR'ed
OUT	Alarm situation	Possible future use	OK	N/A	All output alarms OR'ed

Table 2. LED status description

6 Status from Multicon Gyda

6.1 Label and picture

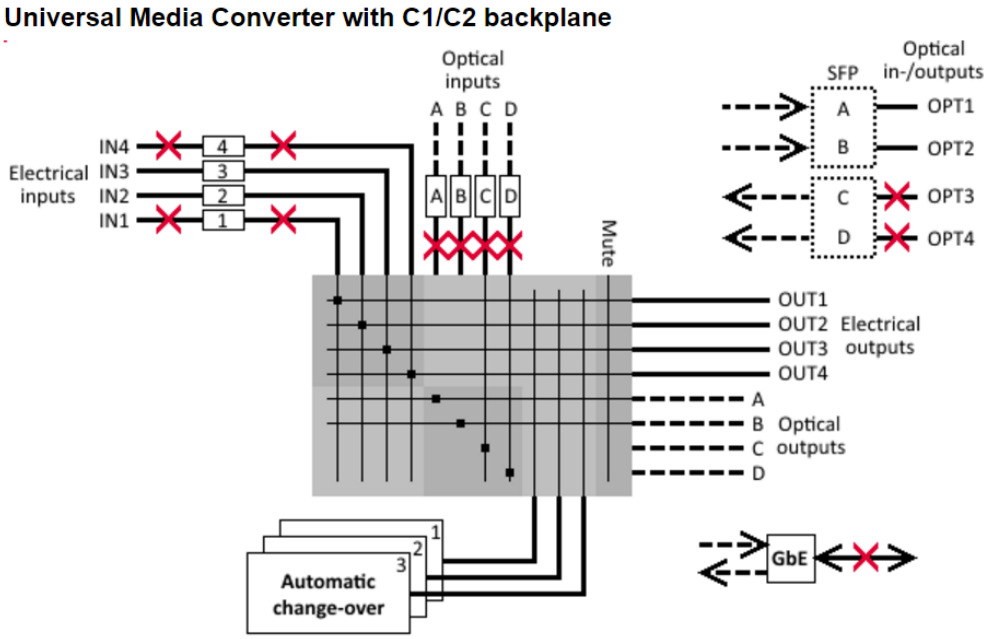

Figure 7. Label and signal paths

This picture shows the input signal status and the selected path for each of them.

6.2 Inputs

Electrical input 1	Normal	Loss of signal
Electrical input 2	Normal	Loss of signal
Electrical input 3	Normal	Signal detected
Electrical input 4	Normal	Loss of signal
Optical input 1	Absent	
Optical input 2	Absent	
Optical input 3	Absent	
Optical input 4	Absent	

Figure 8. Electrical and optical inputs, status

6.3 Bi-Directional GPIOs

GPIO-1	Output	Low
GPIO-2	Output	High
GPIO-3	Output	High
GPIO-4	Output	Low
GPIO-5	Input	High
GPIO setup selector	Setup 1	

Figure 9. GPIO status

Shows the direction (Input/Output), status as well as the chosen setup.
Outputs:
"High" means high ohmic towards GND (Alarm situation)
"Low" means low ohmic towards GND (Non-alarm situation)

For details of the different setups, see chap. 7.11.

6.4 Voltages, current drain, power consumption and temperature

Voltage (5V)	5.18 V (5.2 V)	0.00 A (1.9 A)	0.00 W (10.0 W)
Voltage (15V)	15.14 V (15.0 V)	0.42 A (0.7 A)	6.37 W (10.0 W)
Voltage (1.2V)	1.19 V		
Voltage (1.8V)	1.79 V		
Voltage (3.3V)	3.22 V		
Temperature	46.0 C		

Figure 10. Voltages

Shows the actual voltages on the module together with the nominal "( )" voltages.
Shows as well the actual and nominal "( )" current- and power drain from the frame.
Finally, the temperature at a PCB "hot spot" is shown.

6.5 Reclockers

Reclocker 1	Locked	270 Mbps	SD
Reclocker 2	Locked	270 Mbps	SD
Reclocker 3	Locked	270 Mbps	SD
Reclocker 4	Loss of lock		
Reclocker A	Loss of lock		
Reclocker B	Loss of lock		
Reclocker C	Loss of lock		
Reclocker D	Loss of lock		

Figure 11. Reclockers, status

Shows lock status, detected bit rate and video format.

6.6 Video analyzers

Service probe 1	1080/50p		Error counter: 0			Reset	
			NO_EDH	VS	FF-CRC	AP-CRC	LOCK
	CCS	YCS	CCRC	YCRC	LNUM	SAV	EAV
Service probe 1, 2nd stream (B)	Loss of signal		Error counter: 0			Reset	
							LOCK
	CCS	YCS	CCRC	YCRC	LNUM	SAV	EAV
Service probe 1 selector	EI input 3						
Service probe 2	Loss of signal		Error counter: 62852			Reset	
			NO_EDH	VS	FF-CRC	AP-CRC	LOCK
	CCS	YCS	CCRC	YCRC	LNUM	SAV	EAV
Service probe 2, 2nd stream (B)	Loss of signal		Error counter: 0			Reset	
							LOCK
	CCS	YCS	CCRC	YCRC	LNUM	SAV	EAV
Service probe 2 selector	EI output 4						

Figure 12. Video analyzer status

Shows the status of the video analyzer for each input together with the level B channel status (3GHD-SDI only). The error counter shows the number of errors that has occurred according to the video analyzer configuration. The error counter can be reset by pressing the reset button. This analyzer does not reset the changeover latch, this has to be done by the configuration tab.

6.7 Gigabit Ethernet

Ethernet	Enabled	No link	1000 Mbps Auto	Half duplex	Master	MDIX
Ethernet SFP selector	SFP 1					

Figure 13. Ethernet status

The upper row shows the current link status and configuration.
The lower row shows which SFP is chosen or whether the function is disabled.

6.8 Alarms

Alarms		
Electrical input 1	NEW	Acknowledge
Electrical input 2	NEW	Acknowledge
Electrical input 4	NEW	Acknowledge
Ethernet	NEW	Acknowledge
Optical input 1	NEW	Acknowledge
Optical input 2	NEW	Acknowledge
Optical input 3	NEW	Acknowledge
Optical input 4	NEW	Acknowledge
Reclocker 1	NEW	Acknowledge
Reclocker 2	NEW	Acknowledge
Reclocker 4	NEW	Acknowledge
Reclocker A	NEW	Acknowledge
Reclocker B	NEW	Acknowledge
Reclocker C	NEW	Acknowledge
Reclocker D	NEW	Acknowledge
Card lost	RESTORED	Acknowledge
Acknowledge all. 16 alarms	COMMON	Ack all

Figure 14. Alarms

All active alarms are shown in red and can be acknowledged by pressing the buttons at the right. The alarms then change color to yellow, meaning; all acknowledged alarms are shown in yellow. All restored alarms are shown in green, by acknowledging them, they will disappear form the list.

6.9 Optional features

Feature - Automatic change-over 1	Active
Feature - Automatic change-over 2	Active
Feature - Automatic change-over 3	Active
Feature - GbE	Active
Feature - Service probe 1	Active
Feature - Service probe 2	Active

Figure 15. Optional features, status

Shows which optional features are activated or not.

7 Configuration from Multicon Gyda

7.1 Card label

Figure 16. Card label

Assign a name to the Flashlink module, up to 31 characters. When the "locate card" button is pushed, all indicators/LED's on the front of the module will flash for 120 seconds, alternatively a period can be entered into the sec box.

7.2 Firmware upgrade

Figure 17. Firmware upgrade

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

7.3 Electrical inputs

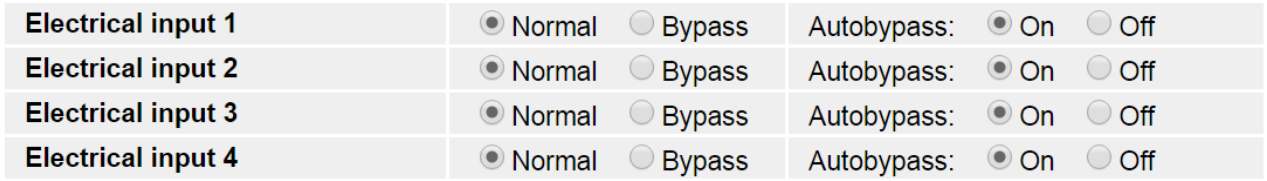

Figure 18. Electrical inputs

For SDI signals set the electrical input to "normal". For non-supported signal formats "bypass" mode may be used. The cable equalizer will then be bypassed. This may give better performance since the cable equalizer is optimized for the supported standards. The Autobypass mode ensures that all not supported signal formats are bypassed and is recommended as default mode.

7.4 Optical inputs

There are no configurable functions for the SFPs.
The firmware ensures correct configuration based on the mounted SFPs.

7.5 Reclockers

Reclocker 1	Enable	Bypass	Autobypass:	On	Off
Reclocker 2	Enable	Bypass	Autobypass:	On	Off
Reclocker 3	Enable	Bypass	Autobypass:	On	Off
Reclocker 4	Enable	Bypass	Autobypass:	On	Off
Reclocker A	Enable	Bypass	Autobypass:	On	Off
Reclocker B	Enable	Bypass	Autobypass:	On	Off
Reclocker C	Enable	Bypass	Autobypass:	On	Off
Reclocker D	Enable	Bypass	Autobypass:	On	Off

Figure 19. Reclockers, configuration.

For supported formats; set to enable, else it may be set to bypass. Autobypass only works if the reclocker is enabled. In "autobypass" mode the reclocker will bypass not supported formats.

7.6 Crosspoint switch

Output selector

	Electrical inputs				Optical inputs				Automatic change-overs			-
	1	2	3	4	1	2	3	4	1	2	3	Mute
Electrical output 1:	●											
Electrical output 2:		●										
Electrical output 3:			●									
Electrical output 4:				●								
Optical output 1:					●							
Optical output 2:						●						
Optical output 3:							●					
Optical output 4:								●				

Figure 20. Crosspoint switch

Each input signal can be set to any single output or any combination of outputs. When not in use, "Mute" may be selected to eliminate noise to output cables and SFP transmitters and to decrease the power consumption as well.
The two service probes can be set individually to any input or one of the three Automatic change over blocks.

7.7 Electrical outputs

Electrical output 1		Slewrate:	Auto	SD	HD
Electrical output 2		Slewrate:	Auto	SD	HD
Electrical output 3		Slewrate:	Auto	SD	HD
Electrical output 4		Slewrate:	Auto	SD	HD

Figure 21. Electrical outputs

With slew rate set to "Auto" the rise- and fall time of the cable driver will be automatically adjusted according to the actual signal format.

For bit rates below 270Mbps the slew rate is automatically set to SD slew rate.

For not supported signals with bitrates above 270Mbps the proper slew rate can be selected manually.

7.8 Change over blocks

7.8.1 General description

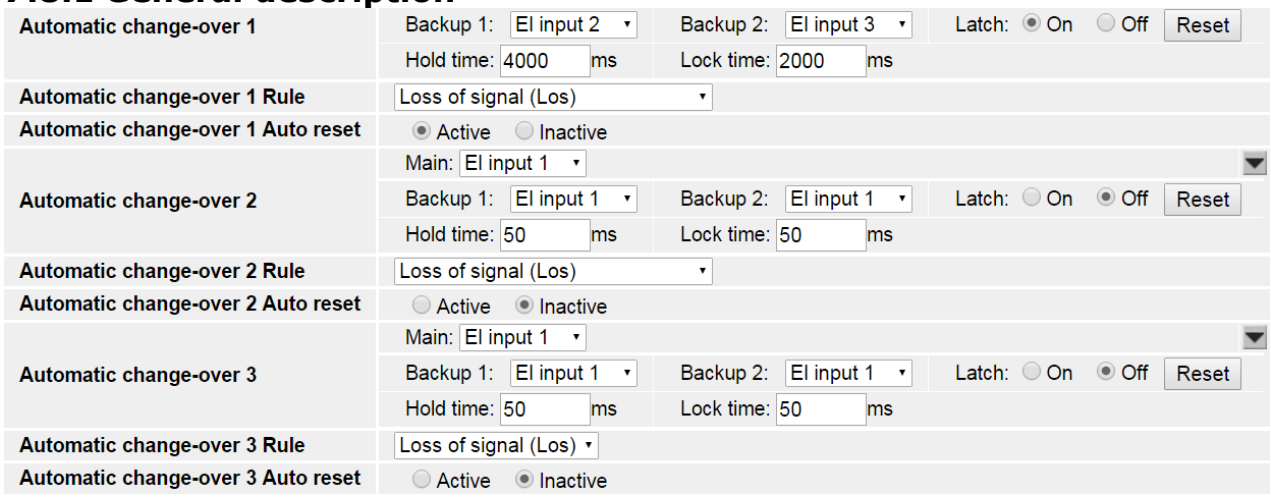

Figure 22. Change over blocks

There are three independent change over blocks where main input and up to two backup inputs can be chosen.
In addition to the eight possible inputs the backup 1 and 2 can be set to;

- Mute:
  - For selected electrical outputs the cable driver will be muted
  - For selected optical outputs the crosspoint output prior to the SFP will be muted
- "–" :
  - This input will not be included in the automatic change over function

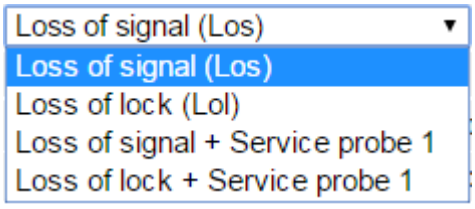

Figure 23. ACO. Criteria menu

Remark: The choice is valid for both "Main" and "Backup" 1 and 2 except for the "Service probes" which always are only connected to "Main".
There are four optional settings for change over criteria:

- Loss of signal (Los):
  - Source input changes if signal is lost on current input
- Loss of lock (Lol):
  - Source input changes if reclocker lock is lost on current input
- Loss of signal (Los) + Service probe x (Remark: Only available if the license for Service probe x is active):
  - Source input changes from Main to first Backup if signal is lost OR

    - Change over criteria for Service probe x are fulfilled
  - Loss of lock (Lol) + Service probe x (Remark: Only available if the license for Service probe x is active):
    - Source input changes from Main to first Backup if reclocker lock is lost **OR**
    - Change over criteria for Service probe x are fulfilled

How to configure the Service probes is described under chapter "Video analyzers" below.

The change over sensitivity can be configured by the two different "Hold time"s and the "Lock time" as follows:

- Hold time: Source changes from current input port to next backup input after a continuous error condition with duration exceeding the chosen hold time
- Lock time: Source changes from the current input port to input with higher priority after a continuous error free period with duration exceeding the chosen lock time

The "hold time"s and "lock time"s found under "Change over blocks" apply only to "Loss of Signal" (LoS) and "Loss of Lock" (LoL).
The two time settings are valid for any shift between ports.
The "hold time"s found under "Video triggers" apply only to the criteria chosen in that block.
Remark: This "hold time" acts also as a "lock time" for the "Video triggers", that means the "hold time" and the "lock time" always have the same value.

The range for "hold time" and "lock time" in "Change over blocks" is 0 to 4999ms.

The range for "hold time" (and "lock time") in "Video triggers" is 0 to 65500ms.

There are two possible settings for the "Latch" radio button:

- Latch on:
  - When switched from main input to any backup input, using the "Reset" button can change source back to main input
  - The function "Auto reset" can be used to override the "Reset" button.
- Latch off:
  - No latch function activated

When the chosen change criteria for the actual backup input are fulfilled, the ACO will switch back to "Main" input.

7.8.2 Describing figures

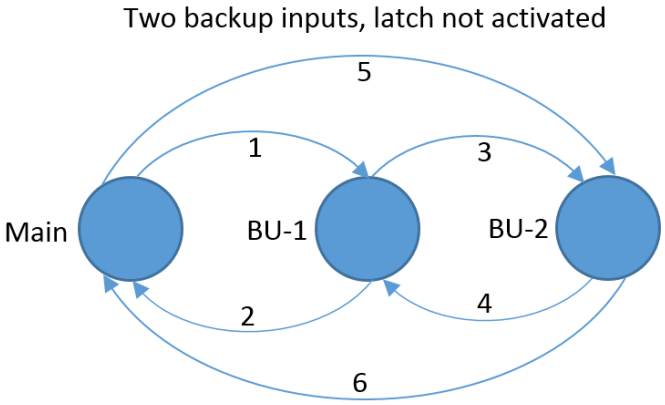

Figure 24.

1. Change criteria for ”Main” are fulfilled AND ”BU-1” is ok.
2. “Main” has been ok for specified period of time
3. “BU-1” is not ok AND “Main” is not ok
4. “Main” is not ok AND “BU-1” is ok
5. Change criteria for ”Main” fulfilled AND ”BU-1” is not ok
6. “Main” has been ok for specified period of time

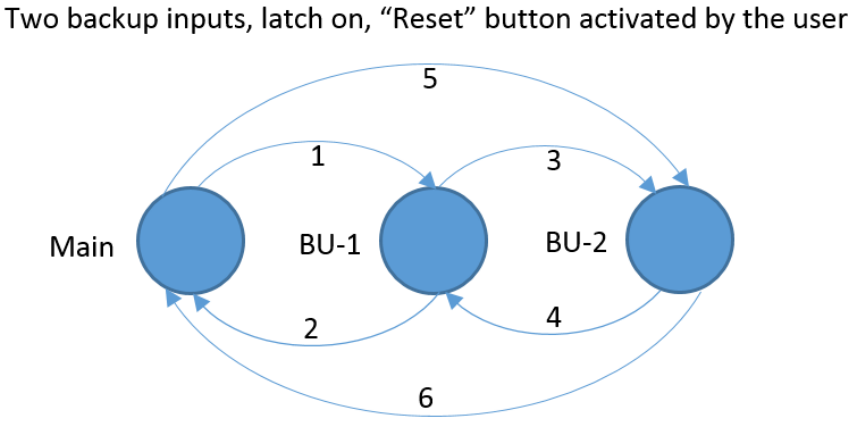

Figure 25.

1. Change criteria for ”Main” fulfilled AND ”BU-1” is ok.
2. “Reset” button pushed
3. BU-1 is not ok
4. Not valid
5. Change criteria for ”Main” fulfilled AND ”BU-1” is not ok
6. “Reset” button is pushed

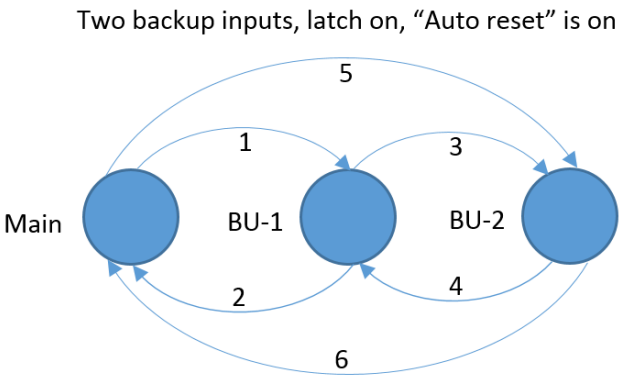

Figure 26.

1. Change criteria for ”Main” fulfilled AND ”BU-1” is ok.
2. Change criteria for ”BU-1” fulfilled AND ”Main” is ok
3. Change criteria for ”BU-1” fulfilled AND ”Main” is not ok
4. Change criteria for ”BU-2” fulfilled AND ”Main” is not ok AND ”BU-1” is ok
5. Change criteria for ”Main” fulfilled AND ”BU-1” is not ok
6. Change criteria for ”BU-2” fulfilled AND ”Main” is ok

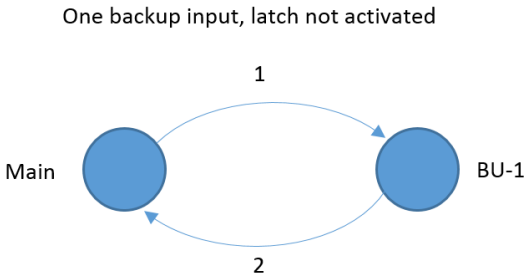

Figure 27.

1. Change criteria for ”Main” fulfilled.
2. ”Main” has been ok for specified period of time

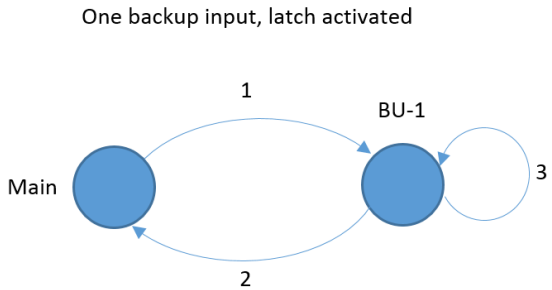

Figure 28.

1. Change criteria for ”Main” fulfilled.
2. ”Reset” button pushed OR
   (”Auto reset” is chosen AND change criteria for BU-1 are fulfilled)

7.9 Service probes

7.9.1 Port selector

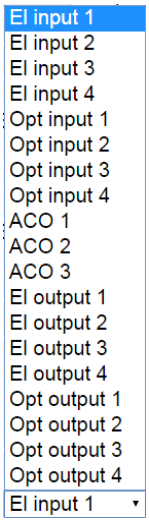

Figure 29. Service probe. Port choice menu

Each service probe can be connected to any input, output and active Automatic Change Over (ACO).
When connected to an ACO, the current used input is monitored.

Remark: If a Service Probe is chosen in the "**Automatic change-over x Rule"** menu for an ACO, this choice will overrule the choice in the Service Probe menu.

7.9.2 Video triggers

Each Service probe input has its own video trigger, called Service probe 1 and 2 trigger. In addition each channel has an A and B analyzer which reflect the level A and B in a 3GHD-SDI stream. The triggers are using the same information (and therefore have the same bit names) as the analyzers, but have separate bit masks. This means that it is possible to count one set of error types while using a different error type to control the change-over. These video triggers can trigger a change-over operation together with loss of lock or loss of signal.

Figure 30. Video triggers, configuration

EDH	No EDH packets (SD only)
VSTD	SMPTE 352 packets do not correspond to detected video standard (SD/HD only) Not supported.
FFCRC	Full Field CRC (SD only)
APCRC	Active Picture CRC (SD only)
LOCK	Analyzer chip is not locked to a bit stream (or stream 2 not present, for "Stream 2" analyzer)
CCS	Chroma channel ancillary data check sum error
YCS	Luma channel ancillary data check sum error
CCRC	Chroma channel video data check sum error
YCRC	Luma channel video data check sum error
LNUM	Line number error. Only on hardware 1.1 or newer
SAV	Start of active video flags missing or misplaced
EAV	End of active video flags missing or misplaced

Table 3. Description of error types

Errors are checked once per video field (LOCK errors are counted every 20ms when no video is present). If an error occurs, it is checked against the bit mask, and if selected for counting the error counter increments.
An SNMP tool is recommended for tracking error counts over time, with selectable limits on error rate and max count before generating a warning.
"Hold time" settings are only relevant when "Service probes" are included in the ACO criteria and not as stand-alone Service probes.

7.9.3 Video analyzers

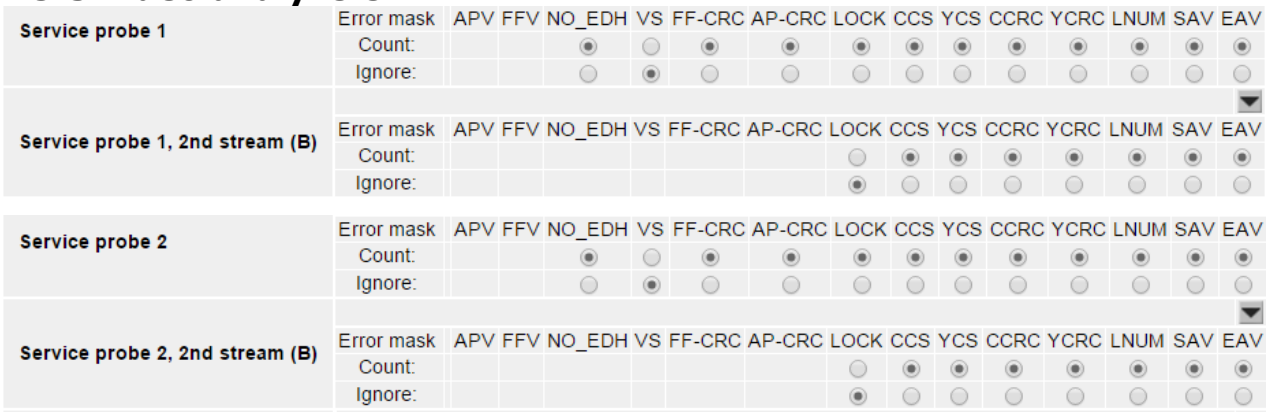

Figure 31. Video analyzers, configuration

Each service probe input has its own analyzer, called channel 1 and 2. In addition each channel has an A and B analyzer which reflect the level A and B in a 3GHD-SDI stream.
Conc. description of error types: Please refer to table 4 above.
Errors are checked once per video field (LOCK errors are counted every 20ms when no video is present). If an error occurs, it is checked against the bit mask, and if selected for counting the error counter increments.

An SNMP tool is recommended for tracking error counts over time, with selectable limits on error rate and max count before generating a warning.

7.10 Gigabit Ethernet

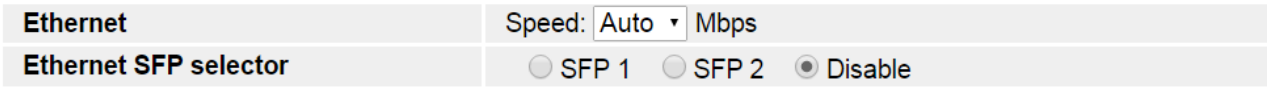

Figure 32. Gigabit ethernet configuration.

The speed options are; Auto (auto negotiation) or 10, 100 or 1000Mbps.
(Remark: The bit rate at the optical link is always 1000Mbps)
Either SFP 1 (The lower one in figure 2) or SFP 2 (The upper one in figure 2) can be chosen.
In "Disable" mode the ethernet "phy" will be in sleep mode.
Please be aware that only transceiver SFPs can be used for ethernet.

7.11 Bi-Directional GPIOs

The GPIO functions are configurable by pre-configured schemes which can be chosen between by the #GPIO setup selector", see figure below.

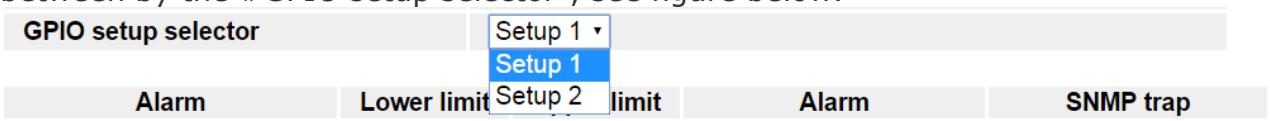

Figure 33. GPIO setup selector

The different setups are described in the tables below.

Setup 1:

GPIO#:	1	2	3	4	5
Input/Output	Output (Active high)	Output (Active high)	Output (Active high)	Output (Active high)	Not in use
Function	Board status (reflects the status LED)	Reflects "Info1" LED	Reflects "Info2" LED	Reflects "Info2" LED	

Setup 2:

GPIO#:	1	2	3	4	5
Input/Output:	Output (Active high)	Output (Active high)	Output (Active high)	Output (Active high)	Input (Active low)
Function:	Board status (reflects the status LED)	ACO 1 alarm (change over function has been activated)	ACO 2 alarm (change over function has been activated)	ACO 3 alarm (change over function has been activated)	Latch reset. Will reset the latch for those ACOs being in latch mode

7.12 How to apply a software key that enables new options

1) In Multicon Gyda, navigate to the UMC-EOOE-4-SFP module in question by first pressing the frame symbol and then pressing the icon for the UMC-EOOE-4-SFP In the example picture below, two such modules are present in the same frame, and the one in slot 2 has been selected.

Figure 34: A frame with two UMC-EOOE-4-SFP modules

2) Check which features are already enabled in the module. At the bottom of the information page that is now shown will be a table with listed available features and their status, see also chapter 6.9. In the examples shown here, all optional features are already enabled and no further upgrades are available.

3) If the customer decides to buy a feature upgrade, Nevion will need both the serial number of the module to be upgraded and a list of the new features the customer wishes to purchase for it.
The serial number can be found on the very bottom of the configuration page for the module (To navigate between the information page and the configuration page, press the “i” symbol and the wrench symbol, respectively).
Each new feature has its own order number in the price list.

Card version	
Serial	0309209510200936
hw	1.0
lib	1.3.3
sfp 1	Absent
sfp 2	Absent
sw	1.0.0

Figure 35: Where to find the serial number

4) The customer will receive a software key from Nevion. The key will be in the form of the string “optn 0” plus six groups of up to 10 digits. Like this, but with different numbers:

optn 0 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890

This software key is linked to the serial number of the module and must be sent to the module via the debug terminal in Multicon Gyda.
To access the debug terminal, first press “Config” in the top menu, and then press “Debug terminal”.

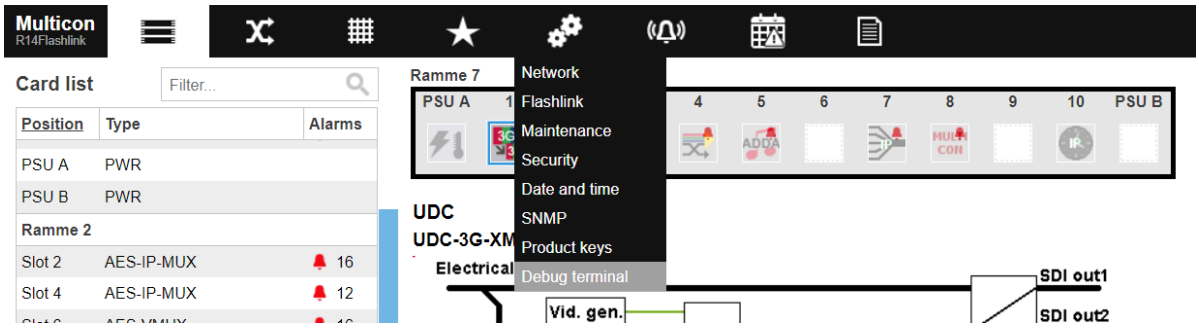

Figure 36: First step towards accessing the debug terminal

5) To address a particular module through the debug terminal, one has to take the frame number and slot number and make a unique two-digit address from them. To do this, multiply the frame number minus 1 from the Multicon GUI with 10, then add the slot number from the Multicon GUI, and finally subtract 1.
Another way of saying this is that the left digit of the address is the frame number minus one, and the right digit is the slot number minus one, i.e. slots counted from 0 to 9, instead of 1 to 10 and frames counted from 0 to 7 instead of 1 to 8 as they are displayed in the Multicon user interface.
The two modules in our example were both in frame 1, but in slots 2 and 4 respectively. This gives us the addresses “01” (0*10 + 1 - 1) and “03” (0*10 + 4 - 1).

Before trying to send the software key it could be wise to check that the addressing is indeed correct. That can be done by sending a single question mark (“?”) to the module. In the Flashlink protocol this is known as the “hello” command, and is basically a who-are-

you command. The module should identify itself with the module type, version information, and serial number. In the example below the hello command has been sent to the module in frame 1/slot 2 (that is, address “01”), and the module has replied. Then the software key “optn 0 1234567890 123 …” has been copy-pasted into the command field and is ready to be sent to the module. The command will be sent when the “Enter” button on the keyboard is pressed. The module will then reply with “ok”, and restart with the new features enabled. It will take a few seconds before Multicon Gyda rediscovers the module after the restart.

Figure 37: The debug terminal, ready to send the software key to the module

6) Remember to check that the module now has the new features enabled. Please refer to step 2).

8 Alarms on Multicon Gyda

Each alarm can be set to be ignored by the Multicon Gyda alarm handling. Also SNMP trap can be configured to send or ignore alarms. Configuring the alarms in Multicon Gyda does not change the behavior of the LEDs on the module.

8.1 Electrical inputs

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Electrical input 1			Normal	Ignore	Send	Ignore
Electrical input 2			Normal	Ignore	Send	Ignore
Electrical input 3			Normal	Ignore	Send	Ignore
Electrical input 4			Normal	Ignore	Send	Ignore

Figure 38. Electrical inputs, alarm configuration

If the electrical input is missing, this alarm will be raised.

8.2 Optical inputs

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Optical input 1			Normal	Ignore	Send	Ignore
Optical input 2			Normal	Ignore	Send	Ignore
Optical input 3			Normal	Ignore	Send	Ignore
Optical input 4			Normal	Ignore	Send	Ignore

Figure 39. Optical inputs, alarm configuration

If the optical input is missing, this alarm will be raised.

8.3 Reclockers

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Reclocker 1			Normal	Ignore	Send	Ignore
Reclocker 2			Normal	Ignore	Send	Ignore
Reclocker 3			Normal	Ignore	Send	Ignore
Reclocker 4			Normal	Ignore	Send	Ignore
Reclocker A			Normal	Ignore	Send	Ignore
Reclocker B			Normal	Ignore	Send	Ignore
Reclocker C			Normal	Ignore	Send	Ignore
Reclocker D			Normal	Ignore	Send	Ignore

Figure 40. Reclockers. Alarm configuration

If the reclocker does not lock to the incoming signal, an alarm will be raised.

8.4 Automatic change over

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Automatic change-over 1			Normal	Ignore	Send	Ignore
Automatic change-over 2			Normal	Ignore	Send	Ignore
Automatic change-over 3			Normal	Ignore	Send	Ignore

Figure 41. Automatic change overs. Alarm configuration

If the changeover has switched to a backup channel, this alarm will be raised.

8.5 Voltages

Alarm	Lower limit	Upper limit	Alarm		SNMP trap	
Voltage (5V)	4500 mV	5500 mV	Normal	Ignore	Send	Ignore
Voltage (12V - 15V)	10500 mV	16500 mV	Normal	Ignore	Send	Ignore
Voltage (1.2V)	1100 mV	1300 mV	Normal	Ignore	Send	Ignore
Voltage (1.8V)	1600 mV	2000 mV	Normal	Ignore	Send	Ignore
Voltage (3.3V)	3000 mV	3600 mV	Normal	Ignore	Send	Ignore

Figure 42. Voltages. Alarm configuration

If the voltages are out of the range, these alarms will be raised.

9 Information from Multicon Gyda

Card version	
Serial	2404400000000000
hw	0.0
lib	1.3.0
sw	0.0.34

Figure 43. Information from Multicon

On the configuration page the version of the hardware and software is shown as well as the card’s unique serial number.

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: -5°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)**
UMC-EOOE-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.