LYNXTechnik AG®

Broadcast Television Equipment

Reference Manual

O TR 5840

3GBit/s Dual SDI to Fiber Optic Transceiver

Revision 1.0
November 2012

This Manual Supports Device Revisions:	
O TR 5840 Firmware Revision	526
Control System GUI Release	6.2.0

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Contents

Warranty

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If this product proves defective during the warranty period, LYNX Technik AG at its option will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

THIS WARRANTY IS GIVEN BY LYNX TECHNIK WITH RESPECT TO THIS PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. LYNX TECHNIK AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LYNX TECHNIK`S RESPONISIBILITY TO REPAIR AND REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. LYNX TECHNIK AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTIAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER LYNX TECHNIK OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Regulatory information

Europe

Declaration of Conformity

We LYNX Technik AG
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Germany

Declare under our sole responsibility that the product

TYPE: **O TR 5840**

To which this declaration relates is in conformity with the following standards (environments E1-E3):

EN 55103-1 /1996
EN 55103-2 /1996
EN 60950-1 /2006

Following the provisions of 89/336/EEC and 73/23/EEC directives.

Winfried Deckelmann

Weiterstadt, November 2012

Place and date of issue *Legal Signature*

USA

FCC 47 Part 15

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense

Getting Started

Most CardModules are installed into the rack frames and system tested in the factory. If this is an upgrade part, or service exchange item then the module is supplied in a padded cardboard carton which includes the CardModule, rear connection plate and mounting screws.

Packaging

The shipping carton and packaging materials provide protection for the module during transit. Please retain the shipping cartons in case subsequent shipping of the product becomes necessary. Do not remove the module from its protective static bag unless observing adequate ESD precautions. Please see below.

ESD Warning

This product is static sensitive. Please use caution and use preventative measures to prevent static discharge or damage could result to module.

Preventing ESD Damage

Electrostatic discharge (ESD) damage occurs when electronic assemblies or the components are improperly handled and can result in complete or intermittent failure.

Do not handle the module unless using an ESD-preventative wrist strap and ensure that it makes good skin contact. Connect the strap to any solid grounding source such as any exposed metal on the rack chassis or any other unpainted metal surface.

Caution
Periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 Megohms.

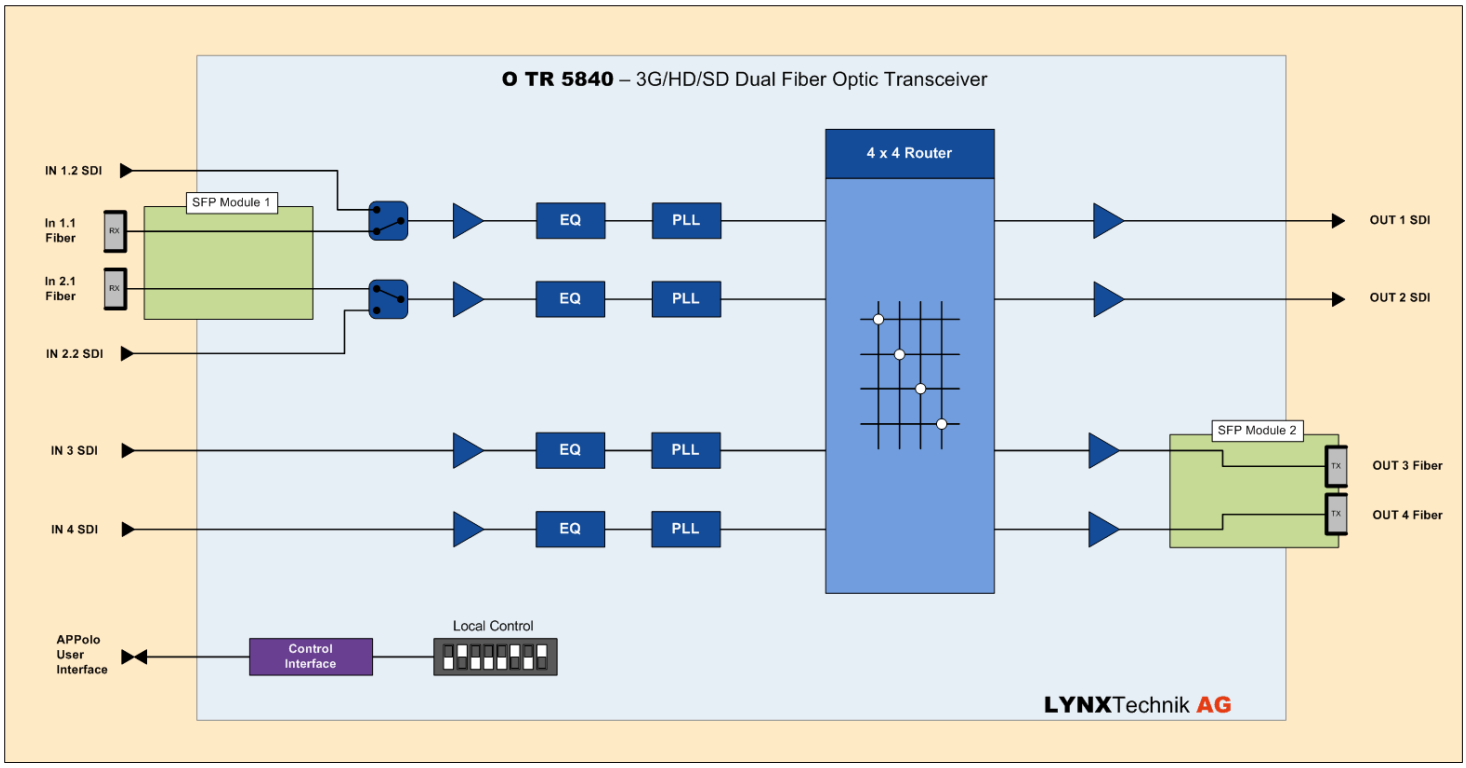
Product Description

The O TR 5840 is a high quality Dual 3GBit/s / HD / SD SDI to Fiber Optic Transceiver (2 x RX, 2 x TX) primarily for broadcast and professional applications.

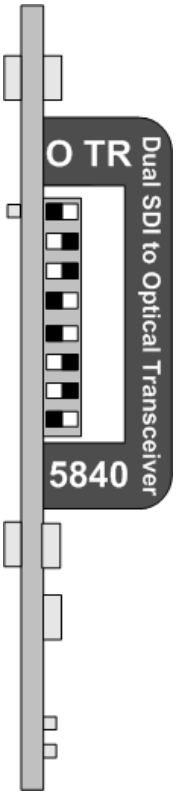
The O TR 5840 provides two channels of SDI to Fiber Optic conversion and two channels of Fiber Optic to SDI conversion with two additional SDI inputs on BNC connectors, The SDI and fiber outputs can be mapped individually to any of the SDI or Fiber inputs. Inputs can be reclocked, or non-reclocked with auto detection of multirate digital video bit rates in reclocked mode (270Mbit/s, 1.485 GBit/s or 2.985GBit/s).

The O TR 5840 is part of the series 5000 of CardModules, which offer high quality, modularity and flexibility in a small form factor ideal for applications where space is at a premium.

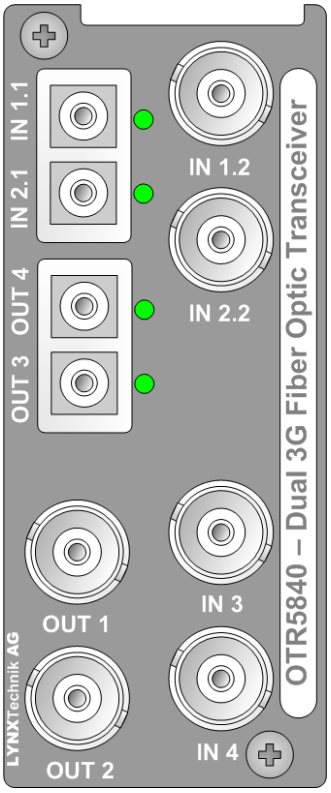
Functional Diagram



Module Layout

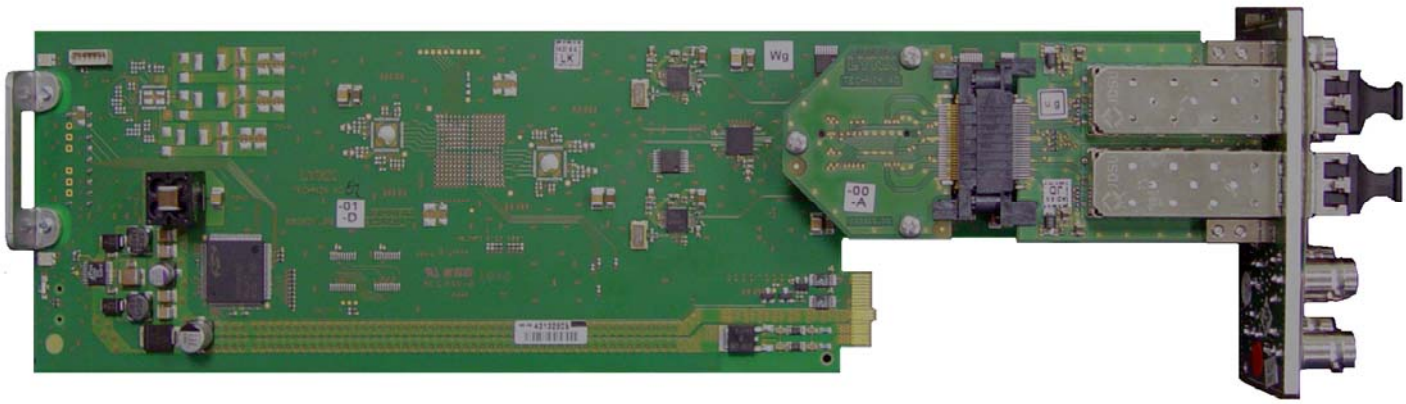


Module Front



Termination Panel

Unused BNC inputs and BNC outputs should be terminated with 75Ohm to avoid any RF interference



CardModule

Connections

BNC Video

The O TR 5840 uses standard 75 Ohm BNC connectors. We recommend the use of high quality video cable for digital video connections to reduce the risk of errors due to excessive cable attenuation. Max cable lengths the module will support are shown below.

SDTV = 250m Belden 8281 (270Mbits/s)
HDTV = 140m Belden 1694A (1.485Gbits/s)
3GBit/s = 80m Belden 1694A (2.97Gbits/s)

Note. *Due to the compact design of the connection plate it will be necessary to use a connection tool to secure the BNC video connectors.*

Unused BNC inputs and BNC outputs should be terminated with 75Ohm to avoid any RF interference

Optical Fiber

The O TR 5840 provides LC/PC connectors for single mode fiber cables.
Multimode fiber cables can also be used, but this will limit the max. fiber length to approx. 1km.

NOTE: *Please take care that surfaces of fiber cables and LC connectors are always protected against scratching and dust if no fiber cables are connected. Dust and/or scratches will lead to high attenuation of the optical power transmitted.*

Installation

If this module was supplied as part of a system it is already installed in the rack enclosure. If the module was supplied as a field upgrade please follow the installation procedure below.

NOTE *Observe static precautions when handling card. Please see ESD warnings on Page 5.*

Each Card Module is supplied with a rear connection panel and two mounting screws. Please follow the following procedure for installation of the card module into the Series 5000 Card Frame.

1. Select a slot in the card frame where the CardModule will be located.
2. Remove the blank connection panel from the rear of the rack (if fitted)
3. Install the rear connection panel using the screws supplied. Do not tighten the screws fully
4. Slide the CardModule into the card frame and carefully check the CardModule connects to the rear connection plate. The card should fit easily and should not require excessive force to insert, if you feel any resistance, there could be something wrong with the rear connection panel location. Do not try and force the connection. This may damage the connectors. Remove the rear connection panel and check alignment with the CardModule.
5. Insert and remove the CardModule a few times to ensure correct alignment and then tighten the two screws to secure the rear connection plate.

Settings and Control

The O TR 5840 has an integrated micro-controller, which enables the module to be configured and controlled locally via the dip-switch or from remote when using one of the optional controllers and control software.

Once set, all settings are automatically saved in non-volatile internal memory. (Flash RAM) The module will always recall the settings used prior to power down.

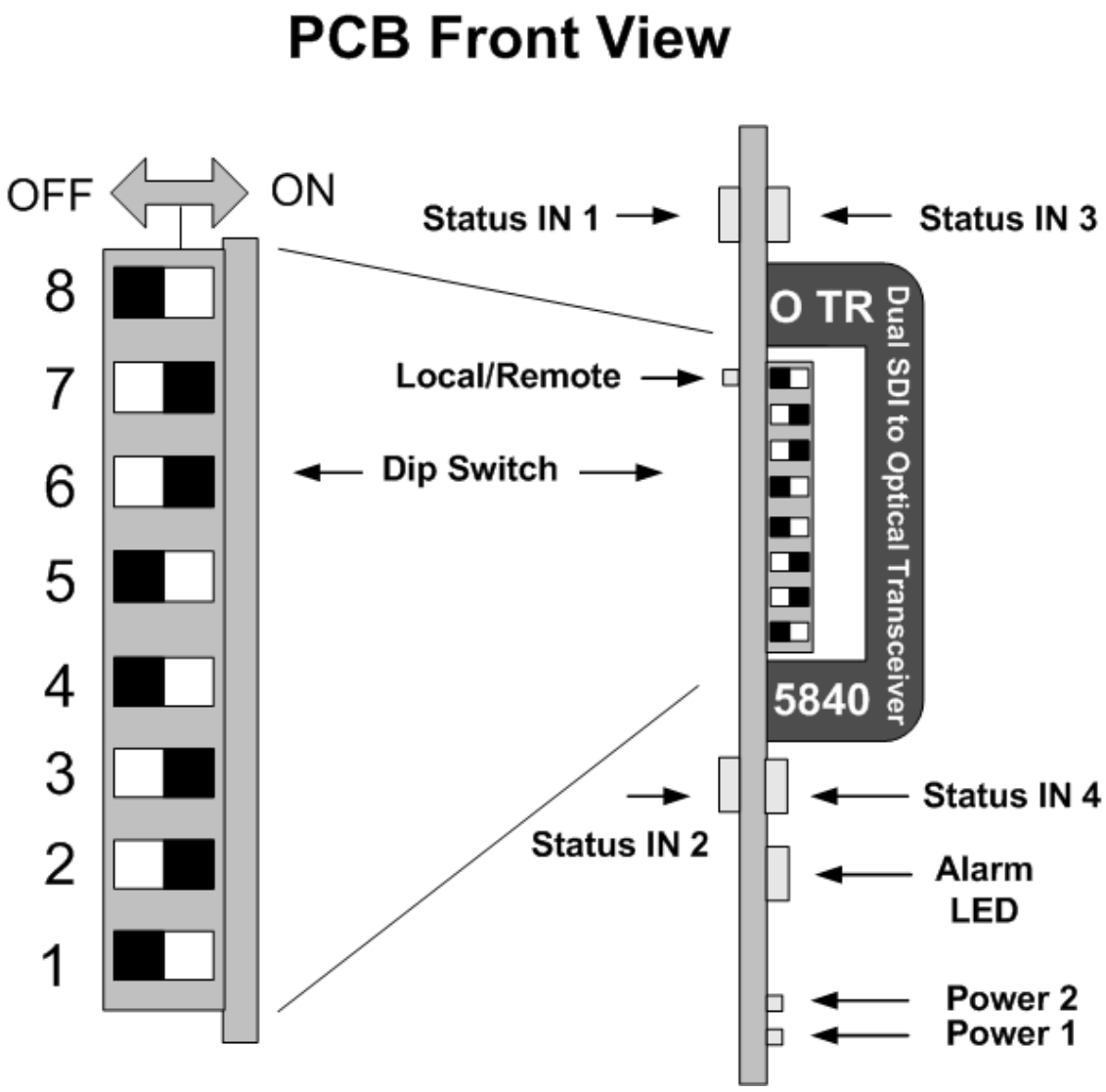


Figure 3 – Switch and LED locations

Switch Settings

Below the switch settings for the 8-position dip-switch are defined.

Switch	Setting	Function
1	ON	Enable Local Adjustment
	OFF	Disable Local Adjustment
2	ON	Input 1 reclocked
	OFF	Input 1 non-reclocked
3	ON	Input 2 reclocked
	OFF	Input 2 non-reclocked
4	ON	Input 3 reclocked
	OFF	Input 3 non-reclocked
5	ON	Input 4 reclocked
	OFF	Input 4 non-reclocked
6		Not used
		Not used
7		Not used
		Not used
8	ON	Slew rate “fast” in non-reclocked mode
	OFF	Slew rate “slow” in non-reclocked mode

Switch Function Detail

Dip Switch 1

This switch is used to enable or disable local adjustments. Set to **ON** enables the setting of the other dip switches to configure the module. Set to **OFF** will prevent any switch settings taking effect.

Note. The module has a microcontroller and Flash RAM. When this switch 1 is set to **ON** any configuration settings made on the module with the dip switches will automatically be written into Flash RAM and stored. (see Auto Store) The module will function normally with the switch left in the **ON** position but it is recommended to set it to **OFF** to prevent accidental changes to the stored module configuration if the switches are moved.

Dip Switch 2

This switch configures input 1 be reclocked or non reclocked. **ON** sets reclocked, **OFF** sets non-reclocked

Dip Switch 3

This switch configures input 2 to be reclocked or non reclocked. **ON** sets reclocked, **OFF** sets non-reclocked

Dip Switch 4

This switch configures input 3 to be reclocked or non reclocked. **ON** sets reclocked, **OFF** sets non-reclocked

Dip Switch 5

This switch configures input 4 to be reclocked or non reclocked. **ON** sets reclocked, **OFF** sets non-reclocked

Dip Switch 6-7

Not used

Dip Switch 8

In non-recklocked mode the slew rate of the SDI outputs is not set automatically. With Dip Switch 8 set to **ON** the slew rate is set to fast (e.g. for HD signals), set to **OFF** the slew rate is set to “slow” (e.g. for SD signals)

Factory Preset Condition

The O TR 5840 is delivered programmed and preset for the following mode of operation:

Switch 1 **ON** Local Adjustment Enabled
Switch 2 -5 **ON** All inputs reclocked
Switch 8 **ON** Slew rate “fast” in non-reclocked mode
If this is the required mode of operation, then no adjustments are necessary.

Auto Store

If no parameters are changed for 10 seconds then the current settings will be written into the flash memory automatically. This can be seen by the channel status LEDS flashing yellow four times.

Alarm/LED Status Indicators

The O TR 5840 module has integral LED indicators, which serve as alarm and status indication for the module. Function is described below.

Channel Condition Indicators

4 status LEDs are provided on the front edge of the module, one for each channel (figure 3).

LED Color	Indication
Green	Input present
Red	Input missing

Alarm Indicator

There is also a single alarm LED on the lower edge of the module (figure 3). This is visible through the card frame front cover and provides a general indication of the module status.

LED Color	Indication
Green	All Input Signals Present (locked) and both PSUs present
Yellow	1 or more input signal missing or 1 PSU missing
Red	No input signal present

LED **OFF** indicates power is lost, or there is a power supply fault.

Power Indication

There are two LEDs on the lower edge of the module indicating the presence of the two power supply voltages (main power supply and redundant power supply).

LED 1	Indication
Green	Power from Main PSU ok
off	No power from Main Power Supply

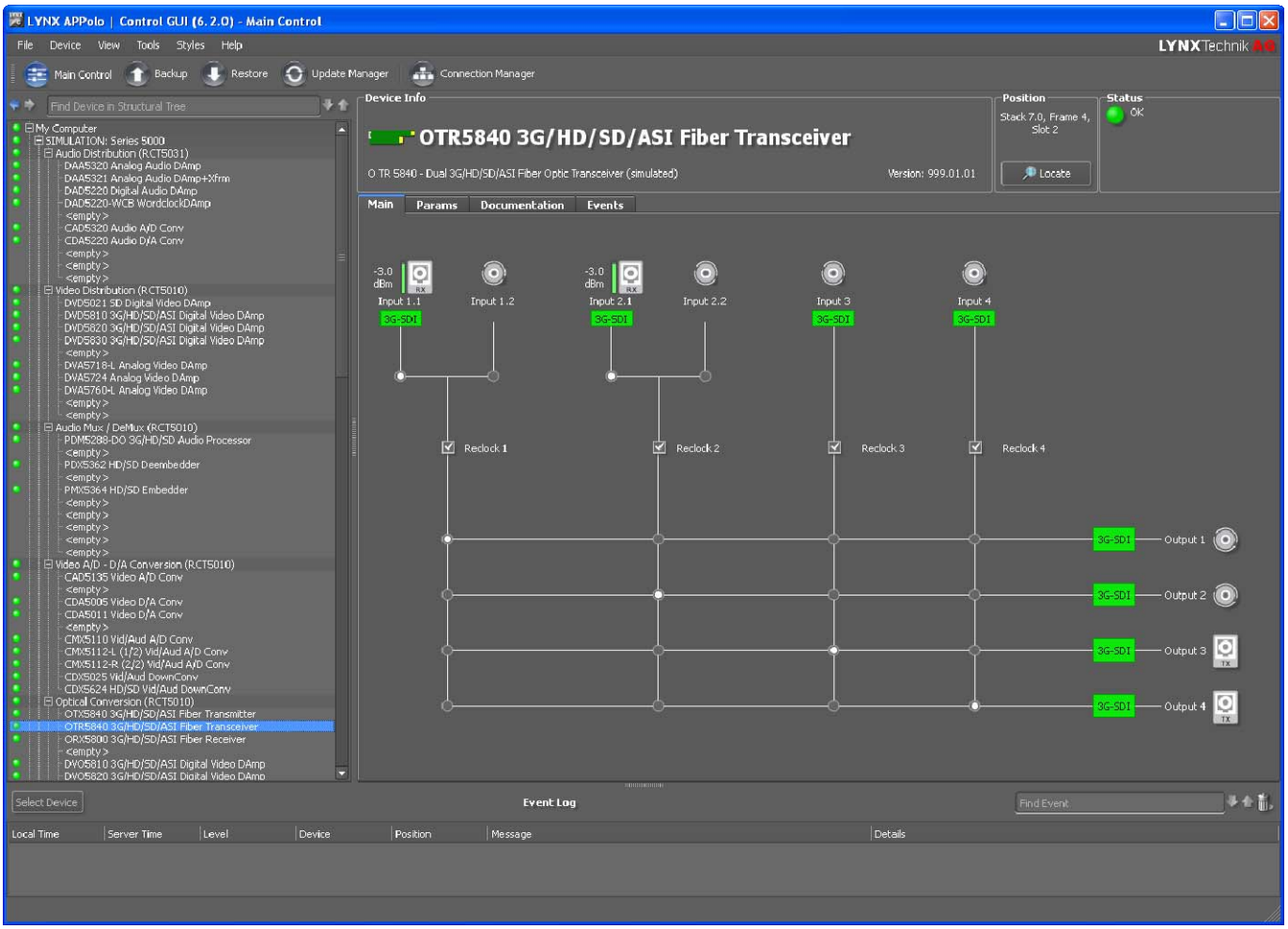
LED 2	Indication
Green	Power from Redundant PSU ok
off	No power from Redundant PSU

Local/remote LED

LED Color	Indication
Green	Local control via DIP switches active, all settings according to local DIP switches
off	Current settings may be overwritten through remote control

Control System GUI

When using the module in a system with the optional LYNX control system, all module settings are available on an intuitive Windows GUI interface.
Any settings made using the control system will override any settings made locally. All settings are stored automatically in the module's flash RAM.



The above screenshot shows the complete GUI of the module. The Device Info area contains information about the module including name and firmware revision. If used as part of a larger system (using the LYNX central control system) the module's position and physical location is displayed above the "locate" button.

> ***Note.*** *The "locate" function is a tool used to quickly identify a module in larger systems. Selecting "locate" will flash the module alarm LED yellow. (This does not effect module operation)*

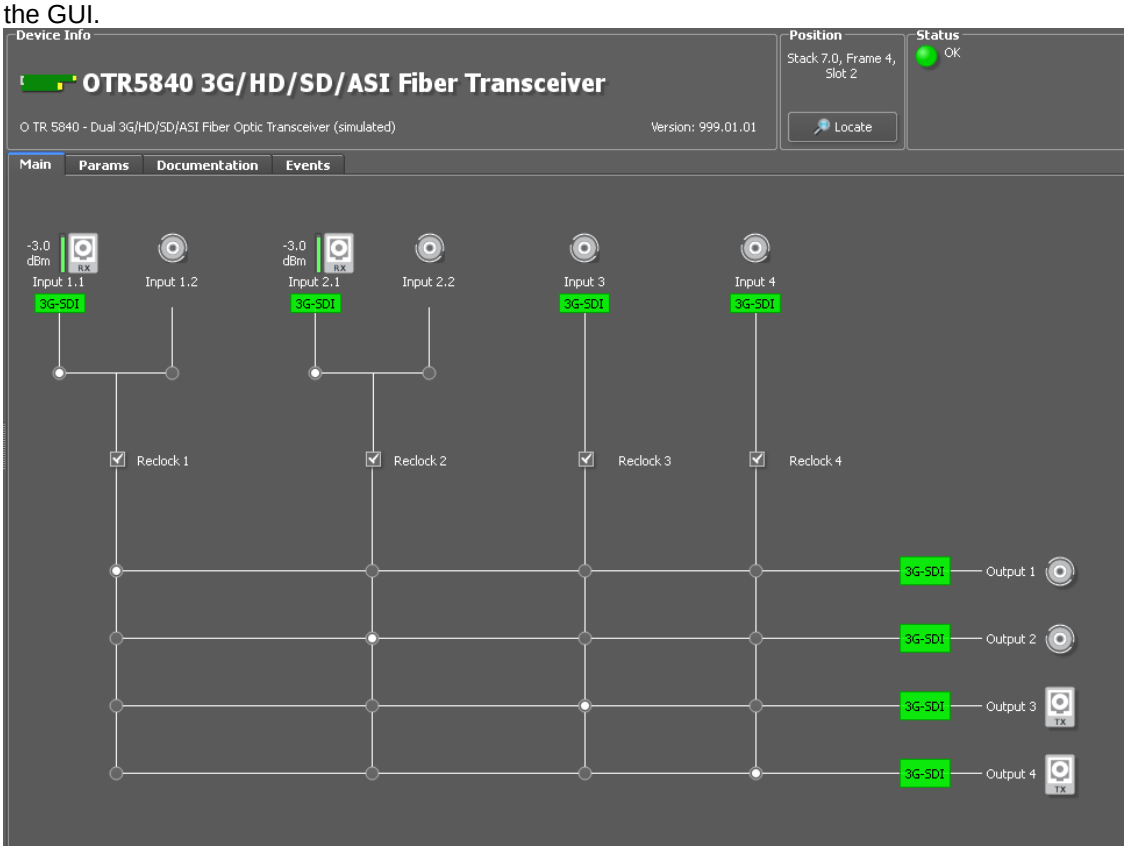
The first screen displayed when the module is selected is the ***Main Tab.*** This is a graphical representation of the module's overall function and signal flow.

The area at the bottom of the screen is the error log. Any fault condition (or event) will be time stamped and entered into the log.

There are a number of "Tabs" along the top of the screen, which splits up the module settings into a number of logical displays. The various GUI screens and primary functions are described below.

Main Tab

This screen is the main interface and is presented first when the module is displayed in the GUI.



The input detection indicates the bit rate (SD-SDI = 270MBit/s, HD/3G-SDI = 1.5 GBit/s or 3GBit/s) of a connected signal. If no signal is detected the color of the input detection will turn red and declare the input as missing.

For input 1 and 2 radio buttons for selection in between the electrical and optical input are provided.

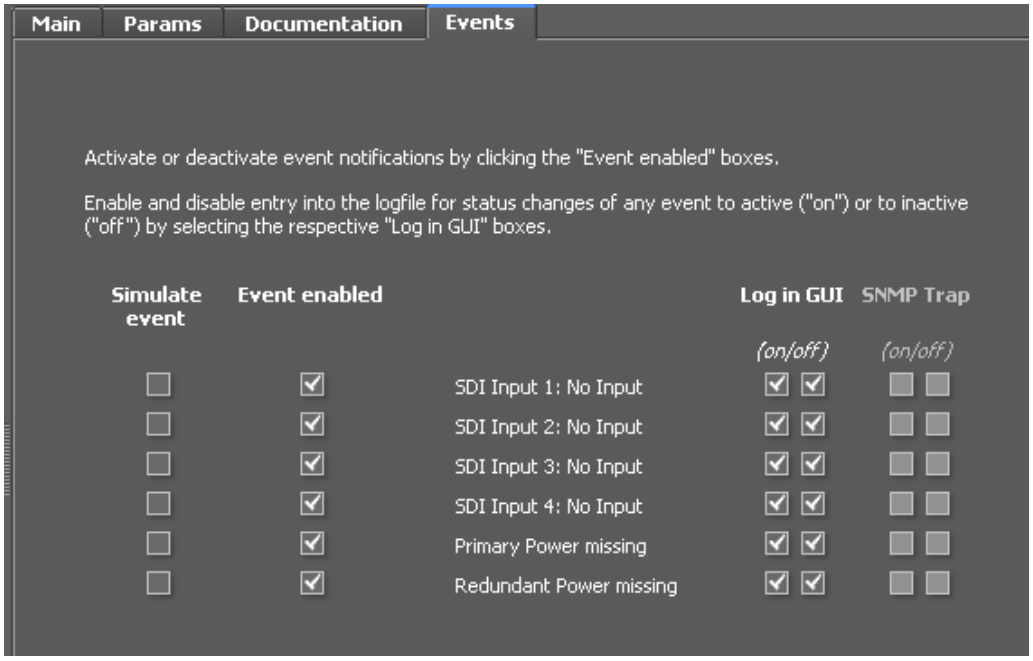
The received power of the optical inputs is indicated in dBm

The four check boxes enable or disable the input reclocking of the respective input.

The 16 radio buttons form a small router, which can be used to map the outputs to any of the inputs.

Events Tab

The Events Tab is where the module alarming and error notifications are configured for the module.



The GUI has an integrated error log, which is a simple text log file stored in the controller PC. This will record an event and timestamp it. The log can be seen at the bottom of the GUI screen and can be scrolled through using the scrolling bar.

Log in GUI Function

Events are selectable and you can choose if you want to record a particular event in the log (or not) or configure it to only record one part of the event. (*For example you might want to log when a SDI input was removed but do not want to log when it comes back*). The ON/OFF trigger can be configured for each of the available events shown in the list and is set up using the checkboxes provided.

Event Enabled

By default all alarm conditions are activated (checked), by de-selecting a specific alarm condition in this column, you are telling the module to ignore this condition completely. It will not color the Alarm LED, log an event in the GUI or send an SNMP trap. This is useful if for example you never have anything connected to input 2 and want the card to ignore this input condition completely, you would simply de-select “SDI Input 2 No Input” and it will be ignored.

SNMP Support

If the system is using an RCT 5031 Master Controller and the SNMP option is installed then the “SNMP Trap” columns become available.

Here you can configure what events are to be transmitted as an “SNMP trap” into the network. (This has no impact or influence over the internall error log maintained by the LYNX control system)

(Internal LYNX error logging and external SNMP traps can be configured independently).

> **Note.** *The simulated event is part of the GUI simulator and allows us to force a particular error condition for testing and demonstration purposes.*

Specifications

Video Inputs (BNC)	
Signal Type	Serial digital video SMPTE 292M, 259M-C, 424M, DVB-ASI and SMPTE 310
No. of inputs	4
Connector	BNC / 75 Ohm
Cable Equalization	Up to 250m Belden 8281 (270MBit/s) Up to 140m Belden 1694A (1.485GBit/S) Up to 80m Belden 1694A (2.97GBit/s)
Return Loss	> 15 dB (270MBit/s); > 10dB (1.485GBit/s)
Digital Video Outputs (BNC)	
No. of inputs/ Signal Type	2 x Serial digital video SMPTE 259M-C, 292M, 424M, DVB-ASI
Connector	BNC / 75 Ohm
Jitter	< 0.2 UI (270MHz) ; < 0.2 UI (Alignment Jitter); < 1.0 UI (Timing Jitter); (1.485GHz) < 0.3 UI (Alignment Jitter); < 2.0 UI (Timing Jitter); (2.97GHz)
Return Loss	> 15 dB (1.5GBit/s)
Video Inputs (Fiber)	
No. of inputs/ Signal Type	2 x SMPTE 297M-2006
Connector	LC/PC (single mode dual receivers – duplex connection)
Wavelength	1260nm – 1620nm
Sensitivity	-16dBm
Max. Overload	-3dBm
Digital Video Outputs (Fiber)	
No. of inputs/ Signal Type	2 x SMPTE 297M-2006
Connector	LC/PC (single mode dual transmitter – duplex connection)
Transmission power	Standard: 1310nm (non-CWDM):-5dBm, other wavelengths for CWDM as option: -1dBm
Control	
Local Controls	Dip Switch
Remote Control	Remote control and status monitoring supported when used with a LYNX Controller option
Electrical Specifications	
Power	<6W @ 12V
Safety	IEC 60950/ EN 60950/ VDE 0805
Mechanical	
Size	283mm x 78mm
Weight	CardModule 150g, connector plate 70g
Ambient	
Temperature	5°C to 40°C Maintaining specifications
Humidity	90% Max non condensing

Service

Parts List

Due to the very dense design and high level of integration there the module is not user serviceable. Please contact LYNX for repairs or to request an exchange unit.

Technical Support

If you are experiencing problems, or have questions please contact your local distributor for further assistance.

Technical support is also available on our website.

Please do not return products to LYNX without an RMA. Please contact your authorized dealer or reseller for more details.

More detailed product information and product updates may be available on our web site:

www.lynx-technik.com

Contact Information

Please contact your local distributor; this is your local and fastest method for obtaining support and sales information.

LYNX Technik can be contacted directly using the information below.

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LYNX Technik manufactures a complete range of high quality modular products for broadcast and Professional markets, please contact your local representative or visit our web site for more product information.

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