

## TABLE OF CONTENTS

1.	OVERVIEW.....	1
2.	INSTALLATION.....	3
2.1.	CARE AND HANDLING OF OPTICAL FIBER.....	4
2.1.1.	Safety .....	4
2.1.2.	Assembly.....	4
2.1.3.	Labeling.....	4
2.1.4.	Handling and Connecting Fibers.....	5
3.	SPECIFICATIONS.....	6
3.1.	SERIAL VIDEO INPUTS .....	6
3.2.	OPTICAL OUTPUTS .....	6
3.3.	ELECTRICAL .....	6
3.4.	PHYSICAL .....	6
3.5.	COMPLIANCE .....	6
4.	STATUS INDICATORS AND DISPLAYS .....	7
4.1.	STATUS INDICATOR LEDS.....	7
4.2.	DOT-MATRIX DISPLAY .....	8
4.2.1.	Displaying the Input Cable Length .....	8
5.	JUMPERS AND LOCAL CONTROLS .....	9
5.1.	SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS .....	9
5.2.	CONFIGURING THE MODULE FOR FIRMWARE UPGRADES .....	9
6.	VISTALINK® REMOTE MONITORING/CONTROL .....	10
6.1.	WHAT IS VISTALINK®? .....	10
6.2.	VISTALINK® MONITORED PARAMETERS .....	10
6.3.	VISTALINK® CONTROLLED PARAMETERS .....	10



**Figures**

Figure 1-1: 7707EO-3-HD Block Diagram ..... 2

Figure 2-1: 7707EO-3-HD Rear Panel..... 3

Figure 2-2: Reproduction of Laser Certification and Identification Label..... 4

Figure 4-1: Location of Status Indicators and Jumpers ..... 7

**Tables**

Table 6-1: VistaLINK® Monitored Parameters..... 10

## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	Original Version	Apr 03
1.1	Updated safety section and added assembly and labeling sections	Aug 05
1.2	Updated specs, features and format	Oct 08

Information contained in this manual is believed to be accurate and reliable. However, Evertz assumes no responsibility for the use thereof nor for the rights of third parties, which may be effected in any way by the use thereof. Any representations in this document concerning performance of Evertz products are for informational use only and are not warranties of future performance, either express or implied. The only warranty offered by Evertz in relation to this product is the Evertz standard limited warranty, stated in the sales contract or order confirmation form.

Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

## WARNING



Never look directly into an optical fiber. Non-reversible damage to the eye can occur in a matter of milliseconds.

## 1. OVERVIEW

The 7707EO-3-HD offers three independent channels of electrical to optical conversion, economically, in a single module. Each independent channel accepts one serial video input, complying with SMPTE 292M (1.485Gb/s), SMPTE 259M (143-360Mb/s), SMPTE 310M (19.4Mb/s), SMPTE 344M (540Mb/s), M2S or DVB-ASI (270Mb/s), and provides one fiber output, with an optical wavelength of 1310nm.

The 7707EO-3-HD is designed as a companion to the 7707OE-3-HD optical to electrical converter. The 7707EO-3-HD provides convenient indication of input cable length for each channel. Monitoring and control of card status and parameters is provided locally at the card edge, and remotely via VistaLINK®. The 7707EO-3-HD can be housed in either a 1RU frame, that will hold up to three modules, or a 3RU frame, that will hold up to fifteen modules, providing 45 channels of optical conversion in a single 3RU frame.

### Features:

- Three independent channels of electrical to optical conversion that support all SMPTE 292M standards at 1.485Gb/s
- Supports all SMPTE 259M standards with operation from 143Mb/s - 360Mb/s
- Supports additional standards of SMPTE 305M (SDTi), SMPTE 310M (19.4Mb/s), SMPTE 344M (540Mb/s), M2S and DVB-ASI (270Mb/s)
- Automatic cable equalization to 300m @ 270Mb/s and 75m @ 1.485Gb/s with Belden 1694A (or equivalent) cable
- Fully hot-swappable from front of frame, with no fiber or BNC disconnect/reconnect required
- High density - accommodates up to 45 independent channels of optical conversion, in a single 3RU frame
- Signal and card status monitoring via four-digit card-edge display, or remotely through SNMP and VistaLINK® available
- Detection and display of input cable length
- Supports single-mode and multi-mode fiber optic cable
- SC/PC, ST/PC or FC/PC connector options
- Tally output on Frame Status bus upon loss of input signal
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and VistaLINK®
- Can be housed in either a 1RU frame which will hold up to 3 modules, a 3RU frame which will hold up to 15 modules, 350FR portable frame that holds up to 7 modules or a standalone frame which will hold 1 module
- VistaLINK® capability is available when modules are used with the 3RU 7700FR-C or 350FR portable frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame

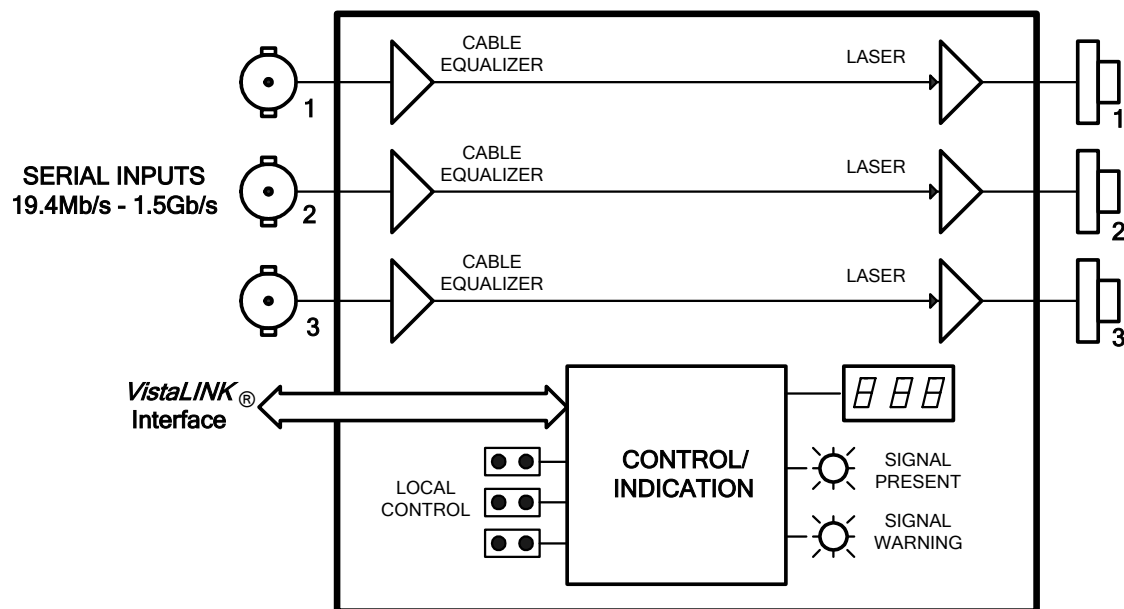
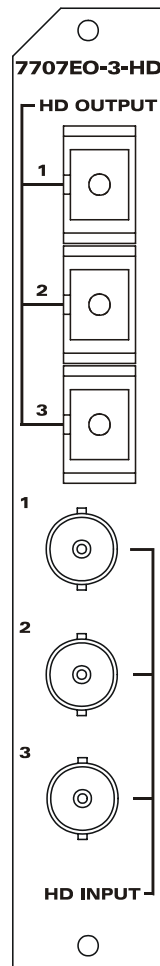


Figure 1-1: 7707EO-3-HD Block Diagram

## 2. INSTALLATION

The 7707EO-3-HD comes with a companion rear plate that has three BNC connectors and three SC/PC (shown), ST/PC or FC/PC optical connectors. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.



**Figure 2-1: 7707EO-3-HD Rear Panel**

**SDI INPUT:** Input BNC connectors for 10-bit serial digital video signals compatible with the SMPTE 292M (1.485Gb/s), SMPTE 259M, SMPTE 305M, SMPTE 344M, DVB-ASI or SMPTE 310M standards. These inputs provide adaptive compensation for up to 300m of industry standard Belden 1694 cable, at 270Mb/s, or up to 100m of Belden 1694 cable at 1.485Gb/s.

**SDI OUTPUT:** There are three SC/PC (shown), ST/PC or FC/PC female optical connectors with the video output converted to an optical signal as specified in section 3.2.

## 2.1. CARE AND HANDLING OF OPTICAL FIBER

### 2.1.1. Safety



Background colour: yellow  
Triangular band: black  
Symbol: black

**CLASS 1 LASER PRODUCT**

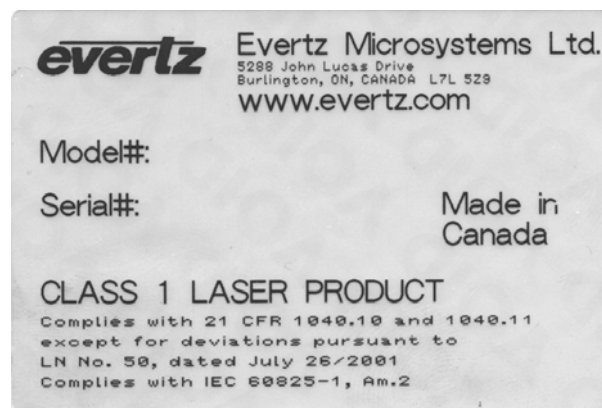
### 2.1.2. Assembly

Assembly or repair of the laser sub-module is done only at Evertz facility and performed only by qualified Evertz technical personnel.

### 2.1.3. Labeling

Certification and Identification labels are combined into one label. As there is not enough room on the product to place the label it is reproduced here in the manuals.

- There is no date of manufacture on this label as it can be traced by bar code label placed on the Printed circuit board of each Evertz plug-in module
- The Model number is: 7707EO13-3-HD



**Figure 2-2: Reproduction of Laser Certification and Identification Label**



#### 2.1.4. Handling and Connecting Fibers



**Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end face of a connector before making a connection.**

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. The Evertz fiber optic modules come with cable lockout devices, to prevent the user from damaging the fiber by installing a module into a slot in the frame that does not have a suitable I/O module. For further information about care and handling of fiber optic cable see section 3 of the Fiber Optics System Design section of this manual binder.

### 3. SPECIFICATIONS

#### 3.1. SERIAL VIDEO INPUTS

<b>Standards:</b>	SMPTE 292M, SMPTE 259M A, B, C, D, SMPTE 297M, SMPTE 305M, SMPTE 310M, SMPTE 344M, M2S, DVB-ASI
<b>Number of Inputs:</b>	3 (independent channels)
<b>Connector:</b>	3 BNC per IEC 61169-8 Annex A
<b>Equalization:</b>	Automatic to 75m @ HD (1.485Gb/s) and 300m @ SD (270Mb/s) with Belden 1694A (or equivalent)
<b>Return Loss:</b>	> 14 dB up to 1.5 Gb/s

#### 3.2. OPTICAL OUTPUTS

<b>Standard:</b>	SMPTE 297M
<b>Number of Outputs:</b>	3 (independent channels)
<b>Connector:</b>	SC/PC, ST/PC, FC/PC female housing
<b>Return Loss:</b>	> 14 dB
<b>Rise/Fall Time:</b>	270ps nominal
<b>Jitter:</b>	< 0.2 UI
<b>Nominal Wavelength:</b>	1310nm 1550nm
<b>Optical Power:</b>	-7dBm $\pm$ 1dBm @ 1310nm 0dBm $\pm$ 1dBm @ 1550nm

#### 3.3. ELECTRICAL

<b>Voltage:</b>	+12VDC
<b>Power:</b>	6 Watts
<b>EMI/RFI:</b>	Complies with FCC regulations for class A devices. Complies with EU EMC directive.

#### 3.4. PHYSICAL

<b>7700 or 7701 frame mounting:</b>	
<b>Number of slots:</b>	1

#### 3.5. COMPLIANCE

<b>Electrical Safety:</b>	CSA Listed to UL 60065-03, IEC 60065 Complies with CE Low voltage Directive
<b>Laser Safety:</b>	Class 1 laser product Complies with 24 CFR 1040.10 and 1040.11 IEC 60825-1
<b>EMI/RFI:</b>	Complies with FCC

## 4. STATUS INDICATORS AND DISPLAYS

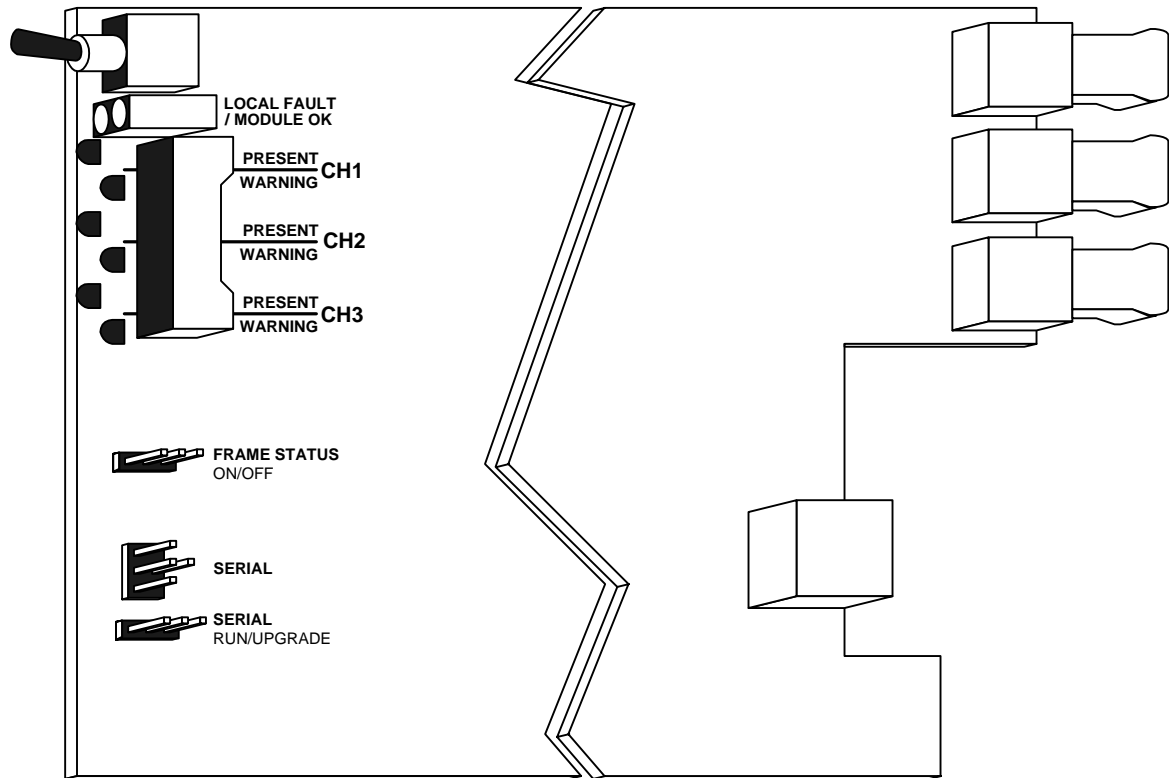


Figure 4-1: Location of Status Indicators and Jumpers

### 4.1. STATUS INDICATOR LEDs

Two large LEDs on the front of the board indicate the general health of the module

**LOCAL FAULT:** This Red LED indicates poor module health and will be On if there is no valid input signal on all 3 inputs, if a laser fault exists on any channel, or if a local input power fault exists (i.e.: a blown fuse). The LOCAL FAULT indication can also be reported to the frame through the FRAME STATUS jumper.

**MODULE OK:** This Green LED indicates good module health. It will be On when a valid input signal is present on at least one of the input channels, and all the lasers and board power are good.

There are three pairs of small LEDs that indicate the status for each channel.

**PRESENT:** This Green LED indicates the presence of a valid input signal.

**WARNING:** This Red LED indicates poor operation of the optical output laser.

## 4.2. DOT-MATRIX DISPLAY

Additional signal and status monitoring is provided via the 4-digit dot-matrix display located on the card edge. The card-edge toggle switch is used to select which data is being displayed to the alphanumeric display. The up and down positions of the toggle switch are used to move through the display. A message indicating what display mode is active will be shown for one second. After one second without a switch toggle, the selected display data is shown.

The following display messages indicate what is being displayed.

<b>EQ1</b>	Cable length Indication for Channel 1
<b>EQ2</b>	Cable length Indication for Channel 2
<b>EQ3</b>	Cable length Indication for Channel 3
<b>S/W</b>	Indication of Software Revision

The details of the cable length indications are described in section 4.2.1.

### 4.2.1. Displaying the Input Cable Length

The 7707EO-3-HD detects and displays a range of values approximating cable length being applied to the input. To display the input cable length, toggle the switch one or more times until the **EQ1**, **EQ2** or **EQ3** message is shown on the display. After one second the cable length indication will be shown in meters. Displayed values are in increments of 10m, and are accurate to  $\pm 20$ m for up to 300m of Belden 1694 cable at 270Mb/s, or up to 150m of Belden 1694 at 1.485Gb/s. The following list describes possible displays and their meaning.

<b>0m to 300m</b>	Indicates applied cable length (calibrated to be accurate for Belden 1694 cable).
<b>LOS</b>	Indicates that no valid input signal is present.

## 5. JUMPERS AND LOCAL CONTROLS

### 5.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

The FRAME STATUS jumper determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

**FRAME STATUS:** To monitor faults on this module with the frame status indicators (on the Power Supply FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper in the On position. (default)

When this jumper is installed in the Off position local faults on this module will not be monitored.

### 5.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

**UPGRADE:** The UPGRADE jumper is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* chapter in the front of the binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move the RUN/UPGRADE jumper J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of the binder) onto SERIAL header J27 at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* chapter in the front of the binder. Once the upgrade is completed, remove the module from the frame, move J16 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

## 6. VISTALINK® REMOTE MONITORING/CONTROL

### 6.1. WHAT IS VISTALINK®?

VistaLINK® is Evertz' remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. VistaLINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager also known as a Network Management System (NMS) is a computer running special software that communicates with the devices in the network. Evertz VL-Fiber demo Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.
2. Managed devices (such as 7707EO-3-HD and 7707OE-3-HD cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® frame controller module, which serves as the Agent.
3. A virtual database known as the Management information Base (MIB) lists all the variables being monitored and which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the VistaLINK® network, see the 7700FC Frame Controller chapter.

### 6.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface.

Parameter	Description
Signal Presence	Indicates the presence of a valid input signal. (The state of the SIGNAL PRESENT LED's).
Laser Warning	Indicates deficient operation of the optical output laser. (The state of the SIGNAL WARNING LED's).
Cable Length	A range of values approximating cable length being applied to the input.

Table 6-1: VistaLINK® Monitored Parameters

### 6.3. VISTALINK® CONTROLLED PARAMETERS

The 7707EO-3-HD has no requirement for user control, and therefore has no requirement for VistaLINK® controlled parameters.