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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Feb 02
1.0	Added 8 new CWDM wavelengths	Dec 02
1.1	Removed preliminary watermark, minor typos fixed	Oct 03
1.2	Added 7707EO-E3	Jul 04
1.3	Corrected HI/LO Jumper Error	May 05
1.4	Updated safety section and added assembly and labeling sections	Aug 05
1.5	Updated specifications and features	Nov 08

WARNING

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

> Do not hook up the 7707EO-DS3 or 7707EO-E3 DWDM cards directly with a short fiber optic cable. The 7707EO-DS3 and 7707EO-E3 DWDM cards produce +7dBm of power, which will damage the receiver if connected directly.

1. OVERVIEW

The 7707EO-DS3 and 7707EO-E3 are *Vista*LINK® enabled, electrical to optical converter for DS3 (44.736 Mb/s) and E3 (34.368Mb/s) signals. Monitoring and control of card status and parameters is provided locally at the card edge, and remotely via *Vista*LINK® capability. The 7707EO-DS3 and 7707EO-E3 provides automatic coaxial cable equalization, reclocking and optical conversion to an assortment of optical wavelengths, accommodating standard, or CWDM transmission schemes. The 7707EO-DS3 and 7707EO-E3 accepts a B3ZS-encoded Alternate Mark Inversion (AMI) input signal and provides two reclocked G.703 compliant output signals, and one scrambled optical output signal.

Both the 7707EO-DS3 and 7707EO-E3 occupies one card slot and can be housed in either a 1RU frame that will hold up to three modules or a 3 RU frame that will hold up to 15 modules.

Features:

- Electrical to optical converter for DS3 (44.736Mb/s)
- Automatic cable equalization for up to 300m of high quality 75Ω coaxial cable
- Signal reclocking and jitter attenuation
- Output wave shaping for G.703 standards compliance
- Loss of signal (LOS) detection/indication (ANSI T1.231-1999 and ITU G.775)
- Electrical output drive level control for enhanced distance
- Transformer coupled inputs/outputs
- Optical output wavelengths of 1310nm, 1550nm, and up to sixteen CWDM wavelengths (ITU-T G.694.2 compliant)
- DWDM wavelengths (ITU-T G.694.1 compliant) also available
- Supports single-mode and multi-mode fiber optic cable
- Fully hot-swappable from front of frame
- Occupies one card slot and can be housed in a 1RU frame that will hold up to 3 modules, a 3RU frame that will hold up to 15 modules, a 350FR portable frame that will hold up to 7 modules or a standalone enclosure which holds 1 module
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and VistaLINK®
- VistaLINK® capability is available when modules are used with the 3RU 7700FR-C or 350FR frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame
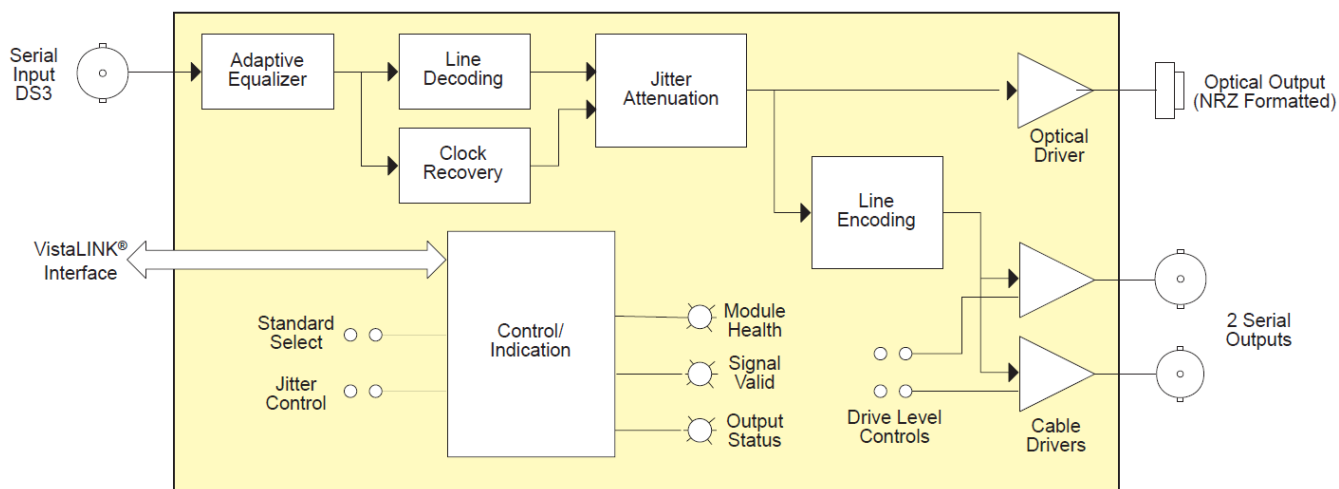
Figure 1-1: 7707EO-DS3 or 7707EO-E3 Block Diagram

2. INSTALLATION

The 7707EO-DS3 and 7707EO-E3 comes with a companion rear plate that has 3 BNC connectors. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

2.1. 7707EO-DS3 CONNECTIONS

Figure 2-1 displays the 7707EO-DS3 rear plate.
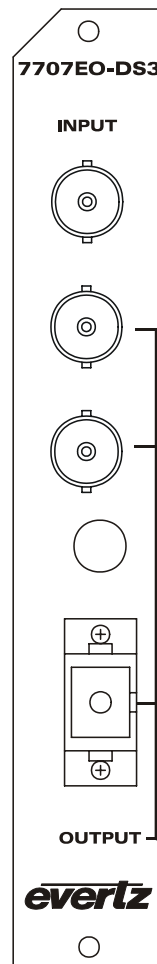
Figure 2-1: 7707EO-DS3 Rear Panels

INPUT: Isolated input BNC for DS3 (44.736 Mb/s) signals. This input is also transformer coupled to meet G.703 requirements. A jumper is available on the main board, to allow the isolated BNC shield to be connected to DC ground or AC ground.

OUTPUT: There are two BNC connectors with transformer coupled, reclocked outputs. The output drive levels for each output are independently jumper selectable for driving different cable lengths.

There is one SC/PC (shown), ST/PC or FC/PC female connector with the DS3 output converted to a scrambled optical signal as specified in section 3.3.

2.2. 7707EO-E3 CONNECTIONS

Figure 2-2 displays the 7707EO-E3 rear plate.
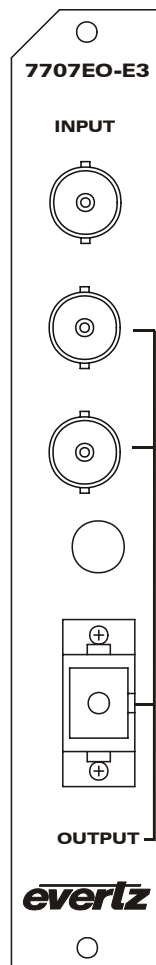
Figure 2-2: 7707EO-E3 Rear Panels

INPUT: Isolated input BNC for E3 (34.368Mb/s) signals. This input is also transformer coupled to meet G.703 requirements. A jumper is available on the main board to allow the isolated BNC shield to be connected to DC ground or AC ground.

OUTPUT: There are two BNC connectors with transformer coupled, reclocked outputs. The output drive levels for each output are independently jumper selectable for driving different cable lengths.

There is one SC/PC (shown), ST/PC or FC/PC female connector with the E3 output converted to a scrambled optical signal as specified in section 3.3.

2.3. CARE AND HANDLING OF OPTICAL FIBER

2.3.1. Safety

⚠ !

┌───┐
│   │
│   **CLASS 1 LASER PRODUCT**   │
│   │
└───┘

Background colour: yellow
Triangular band: black
Symbol: black

2.3.2. Assembly

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

2.3.3. 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 one of: 7707EO13-DS3, 7707EO15-DS3, 7707EO13-E3.
- 7707EOxx-DS3, 7707EOxx-E3 (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61) 7707EODyyy-DS3, 7707EODyyy-E3 (Dyyy represents ITU Grid Channel: D200, D210, D220, D230, D240, D250, D260, D270, D280, D290, D300, D310, D320, D330, D340, D350, D360, D370, D380, D390, D400, D410, D420, D430, D440, D450, D460, D470, D480, D490, D500, D510, D520, D530, D540, D550, D570, D580, D590, D600)
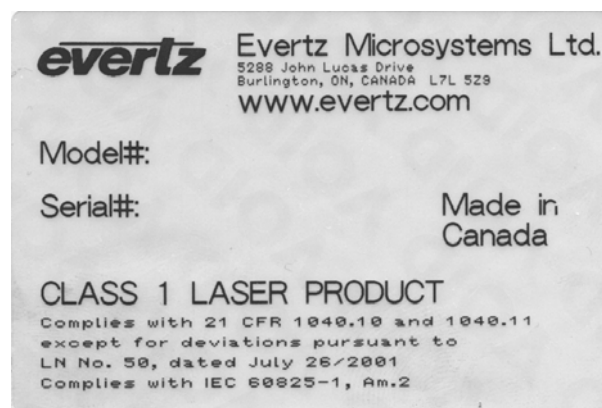
Figure 2-3: Reproduction of Laser Certification and Identification Label

2.3.4. 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. ELECTRICAL INPUTS

Standard:	G.703 @ 44.736Mb/s
Connector:	1 Isolated BNC input
Equalization:	Automatic to 300m with Belden 8281or equivalent cable
Return Loss:	> 20dB up to 44Mb/s

3.2. ELECTRICAL OUTPUTS

Standard:	G.703 @ 44.736Mb/s
Number of Outputs:	2 Per Card-Reclocked
Connector:	1 BNC per IEC 61169-8 Annex A
Waveform:	Conforms to G.703 compliant masks
Return Loss:	> 15dB up to 44.736Mb/s
Drive Level:	
High:	For driving cable lengths > 70m
Low:	For driving cable lengths < 70m

3.3. OPTICAL OUTPUT

Number of Outputs:	1 Scrambled DS3 @ 44.736Mb/s
Connector:	Female SC/PC, ST/PC or FC/PC
Return Loss:	> 14dB
Fiber Size:	$9\mu m$ core/$125\mu m$ overall
Wavelengths:	(See ordering information)
Output Power:	
1310nm FP:	-7dBm ±1dB
1550nm/CWDM DFB:	
	0dBm ±1dB
DWDM DFB:	7dBm ±1dBm

3.4. ELECTRICAL

Voltage:	+ 12VDC
Power:	6W (Non-DWDM), 9W (DWDM)
EMI/RFI:	Complies with FCC regulations for class A devices.
	Complies with EU EMC directive.

3.5. PHYSICAL

7700 or 7701 frame mounting:	
Number of slots:	1

3.6. COMPLIANCE

Electrical Safety: CSA Listed to UL 60065-03, IEC 60065
Complies with CE Low voltage Directive
Laser Safety: Class 1 laser product
Complies with 24 CFR 1040.10 and 1040.11
IEC 60825-1
EMI/RFI: Complies with FCC Part 15, Class A
EU EMC directive

4.   STATUS LED'S

MODULE OK: This Green LED will be On when the module is operating properly.

LOCAL FAULT: This Red LED will be On when the Signal Valid is Off, or Output Fault On or when there is a fault in the module power supply.

SIGNAL VALID: This Green LED will be On when the input signal satisfies amplitude requirements.

OUTPUT FAULT: This Red LED will be On when an electrical or optical output fault or coaxial output connection error exists.
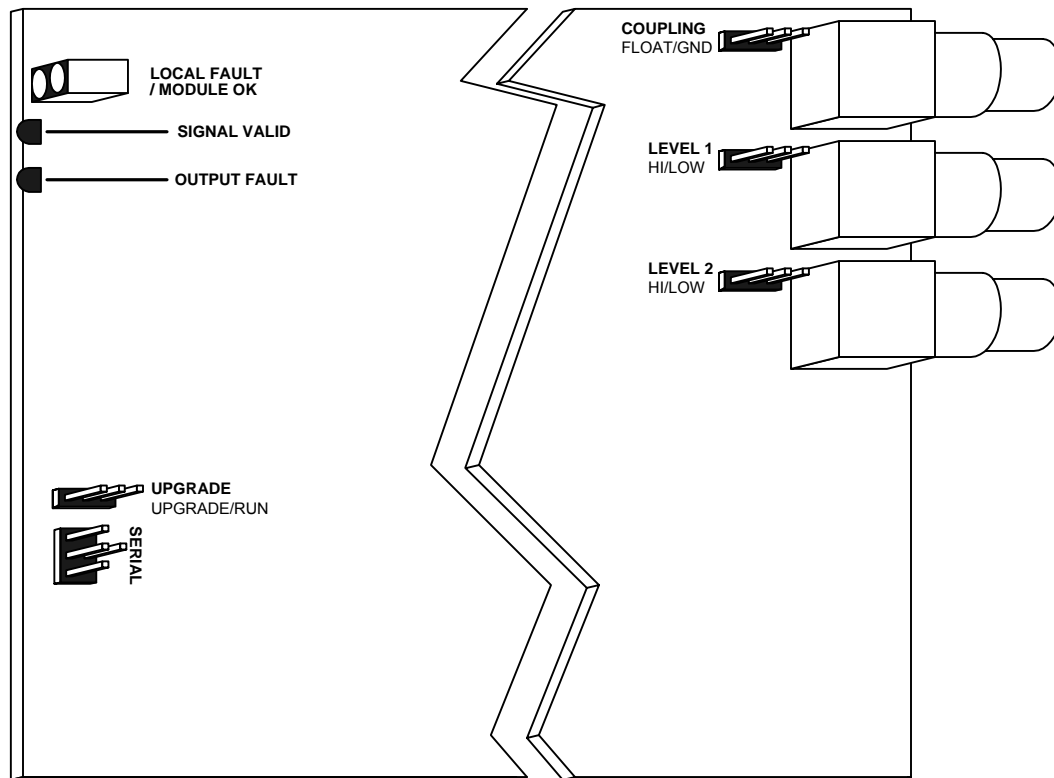
5.   JUMPERS AND USER ADJUSTMENTS

Figure 5-1: Jumper Locations

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

The FRAME STATUS jumper J7, located at the top front of the module 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.   SELECTING THE INPUT ISOLATION MODE

The COUPLING jumper J30, located at the rear of the module beside the input BNC, is a two position jumper that sets whether the shield of the input BNC connector will be AC or DC coupled to ground. Figure 5-2 shows a schematic of the input configuration.

COUPLING: When set to the **GND** position, the shield of the input BNC will be connected directly to the logic ground of the module.

When set to the **FLOAT** position, the shield of the input BNC will be AC coupled to the logic ground of the module.
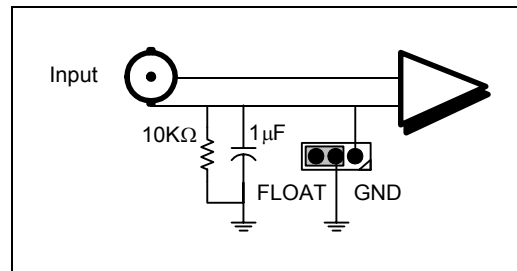
Figure 5-2: Input Isolation Jumper

5.3.   SETTING THE TRANSMIT LEVEL

The two LEVEL jumpers, J17 and J19, located at the rear of the module beside the four output BNCs, configure the transmit level for the signal on the adjacent BNC output connector.

LEVEL: When the cable length connected to the output is less than 225 feet (68.5 meters) set the jumper to the **LOW** position in order to meet the DSX-3 pulse specification.

When the cable length connected to the output is greater than 225 feet (68.5 meters) set the jumper to the **HIGH** position in order to meet the DSX-3 pulse specification.

5.4. 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 NOTE 1). See the *Upgrading Firmware* section of this manual for more information.

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

6. *VISTA*LINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® 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. *Vista*LINK® 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 *Vista*LINK® 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, *Vista*LINK® 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 *Vista*LINK® enabled fiber optic products.

2. Managed devices (such as 7707EO and 7707OE 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, 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 *Vista*LINK® network, see the 7700FC Frame Controller chapter.

6.2. *VISTA*LINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the *Vista*LINK® interface.

Parameter	Description
Signal Valid	Indicates the presence of a valid input signal. (The state of the SIGNAL VALID LED)
Output Fault	Indicates the presence of an output fault condition. (The state of the OUTPUT FAULT LED)

Table 6-1: *Vista*LINK® Monitored Parameters

6.3. *VISTA*LINK® CONTROLLED PARAMETERS

There are no *Vista*LINK® controlled parameters.