TABLE OF CONTENTS

Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Version	July 03
1.1	Updated safety section and added assembly and labeling section	July 05

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 7707VT-4 DWDM cards and 7707VR-4 cards directly with a short fiber optic cable. The 7707VT-4 DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7707VT-4 cards that output more than -7dBm of power (see 7707VT-4 specifications for output power of various laser types) and 7707VR-4-H high sensitivity receiver cards directly with a short fiber optic cable. The 7707VT-4 cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7707VT-4 is a *Vista*LINK™ enabled, fiber transmitter for SDI, DVB-ASI or SDTi video signals. This single card combines up to four SDI, DVB-ASI or SDTi signals using Time Domain Multiplex (TDM) technology and transmits them over a single fiber. The companion 7707VR-4 Quad SDI Receiver demultiplexes the signals and converts them back to separate SDI video feeds

The 7707VT-4 and companion 7707VR-4 will transparently pass incoming SDI video feeds with embedded AES audio or any other data in the horizontal or vertical ancillary data space. Monitoring and control of card status and parameters is provided locally at the card edge or remotely via *Vista*LINK™.

The fiber output is available in an assortment of optical wavelengths, accommodating standard, or CWDM transmission schemes. (See Specifications for complete information)

7707VT13-4	1310 nm FP	-7.5dBm output, suitable for distances up to 50 Km
7707VT15-4	1550 nm DFB	0dBm output, suitable for distances up to 75 Km

There are several versions with built in isolators specifically suited to coarse wave division multiplexing (CWDM) applications. These versions all have 0dBm output and are suitable for distances up to 75 Km.

7707VT27-4	1270 nm DFB
7707VT29-4	1290 nm DFB
7707VT31-4	1310 nm DFB
7707VT33-4	1330 nm DFB
7707VT35-4	1350 nm DFB
7707VT37-4	1370 nm DFB
7707VT43-4	1430 nm DFB
7707VT45-4	1450 nm DFB
7707VT47-4	1470 nm DFB
7707VT49-4	1490 nm DFB
7707VT51-4	1510 nm DFB
7707VT53-4	1530 nm DFB
7707VT55-4	1550 nm DFB
7707VT57-4	1570 nm DFB
7707VT59-4	1590 nm DFB
7707VT61-4	1610 nm DFB

There are several versions with built in isolators specifically suited to dense wave division multiplexing (DWDM) applications. The DWDM versions are suitable for distances >50 Km (for DWDM applications contact factory).

7707VTDyyy-4	DWDM DFB laser output, yyy – ITU channel number

The 7707VT-4 occupies one card slot and can be housed in either a 1RU frame, which will hold up to three modules, or a 3 RU frame, which will hold up to 15 modules.

Features:

- Single card multiplexor for four synchronous or asynchronous 270Mb/s SDI, DVB-ASI or SDTi video signals
- Signal transport uninterrupted by loss of any SDI, DVB-ASI or SDTi input feed
- Transparently passes embedded AES or any other data in the horizontal or vertical ancillary data space
- Comprehensive signal and card status monitoring via four-digit card-edge display
- *Vista*LINK™ –enabled for remote monitoring and control when installed in a 7700FR-C frame with 7700FC *Vista*LINK™ Frame Controller
- Automatic coaxial equalization up to 250m at 270Mb/s (Belden 8281)
- Fully hot swappable from front of frame with no fiber/coax disconnect/reconnect required
- Supports single-mode and multi-mode fiber optic cable
- Optical output wavelengths of 1310nm, 1550nm and up to 16 CWDM wavelengths
- DWDM wavelengths also available
- SC/PC, ST/PC, FC/PC fiber connectors available

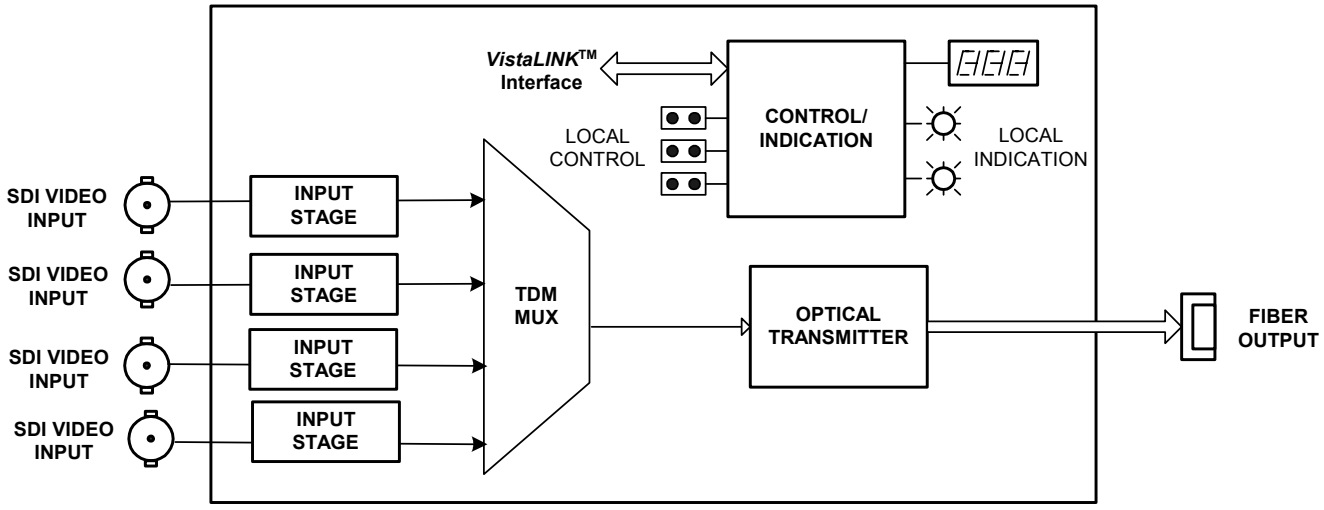

Figure 1: 7707VT-4 Block Diagram

2. INSTALLATION

The 7707VT-4 comes with a companion rear plate that has four BNC connectors and one SC/PC (shown), ST/PC or FC/PC optical connector. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.

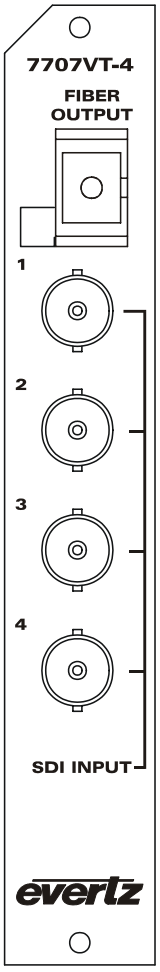

Figure 2: 7707VT-4 Rear Panel

SDI INPUT Four independent BNC input connectors for 10-bit serial digital video signals compatible with the SMPTE 259M, DVB-ASI or SMPTE 305M standards. These inputs provide adaptive compensation for up to 250m of industry standard Belden 8281 cable, at 270Mb/s.

OPTICAL OUTPUT Output SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This optical output contains the four input SDI video signals. Any ancillary data (e.g. embedded audio, closed captioning, etc) present in the input SDI video stream prior to multiplexing, is transparently passed through to the output.

2.1. CARE AND HANDLING OF OPTICAL FIBER

2.1.1. Safety

CLASS 1 LASER PRODUCT

Background colour: yellow
Triangular band: black
Symbol: black

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 no 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: 7707VT13-4, 7707VT15-4,
  7707VTxx-4, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
  7707VTDyyy-4 (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 3: 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 INPUT

Standards: SMPTE 259M, SMPTE 305M, DVB-ASI.
Number of Inputs: 4 independent SDI, DVB-ASI or SMPTE 305M 270Mb/s signals
Connector: 4 BNC input per IEC 169-8
Equalization: Automatic 250m (min) @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: > 15 dB up to 270 Mb/s

3.2. OPTICAL OUTPUT

Number of Outputs: 1
Connector: Female SC/PC, ST/PC or FC/PC
Return Loss: > 14 dB
Rise and Fall Time: 200 ps nominal
Wide Band Jitter: < 0.20UI
Fiber Size: 9 μm core / 125 μm overall
Wavelengths:
- **Standard:** 1310nm, 1550nm (nominal)
- **CWDM:** 1270nm to 1610nm (See ordering information)
- **DWDM:** ITU channel 20 to 60 wavelengths (ITU-T G.694.1 compliant)

Output Power:
- **1310nm FP:** -7dBm ± 1dBm
- **CWDM:** 0 dBm ± 1dBm
- **DWDM:** +7dBm ± 1dBm

3.3. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts (Non DWDM)
13 Watts (DWDM)

3.4. 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
Complies with IEC 60825-1
EMI/RFI: Complies with FCC Part 15, Class A, EU EMC directive.

3.5. PHYSICAL

7700 or 7701 frame mounting:
Number of slots: 1

4. STATUS INDICATORS AND DISPLAYS

The 7707VT-4 has 6 LED Status indicators and a 4 digit alphanumeric display on the front card edge to show operational status of the card at a glance. The card edge pushbutton is used to select various displays on the alphanumeric display. Figure 4 shows the locations of the indicators and pushbutton.

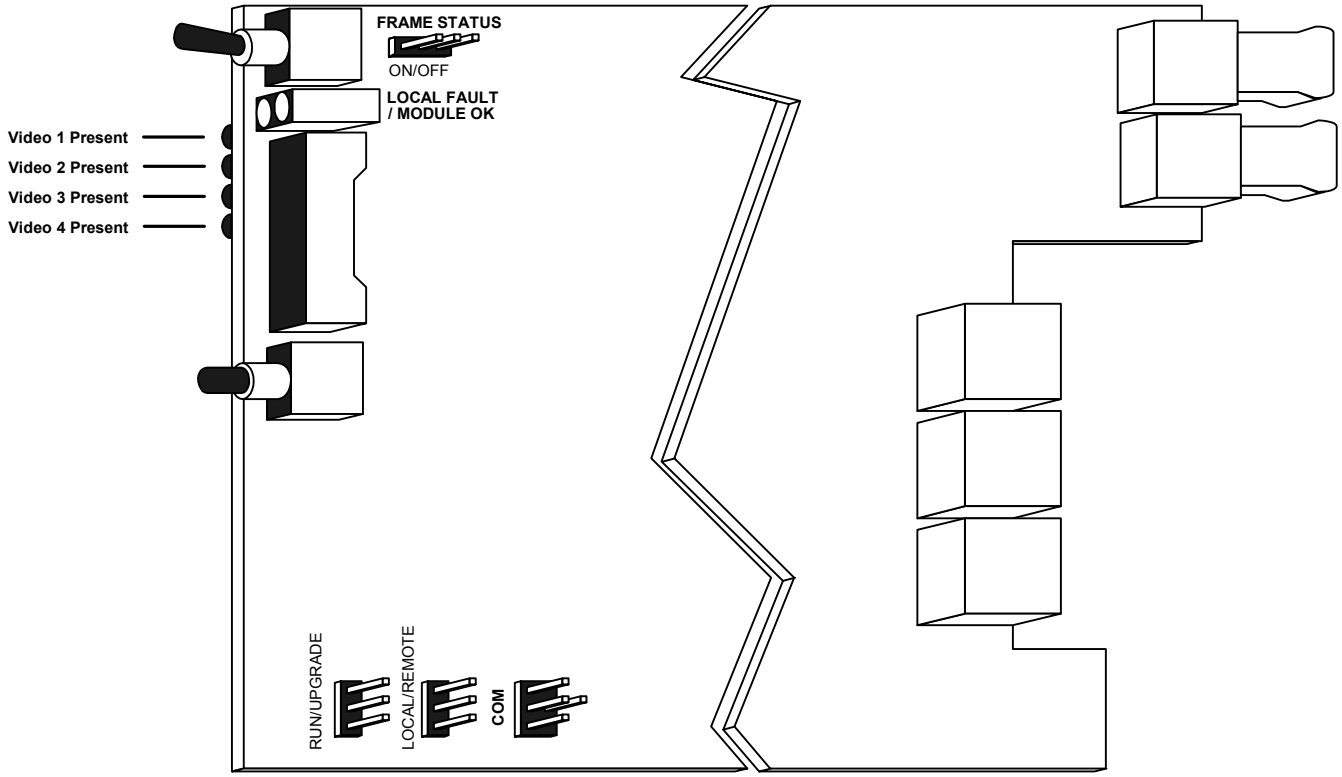

Figure 4: Location of Status Indicators and Jumpers

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: This Red LED indicates poor module health and will be On during the absence of a valid input signal, if a laser fault exists, or if a local input power fault exists (ie: 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, and the laser and board power are good.

On the 7707VAT-4 there are four small LEDs on the back of the board that indicate the presence of video signals.

VIDEO 1 PRESENT: This Green LED indicates the presence of a valid signal on the Video 1 input.

VIDEO 2 PRESENT: This Green LED indicates the presence of a valid signal on the Video 2 input.

VIDEO 3 PRESENT: This Green LED indicates the presence of a valid signal on the Video 3 input.

VIDEO 4 PRESENT: This Green LED indicates the presence of a valid signal on the Video 4 input.

4.2. DOT-MATRIX DISPLAY

Additional signal and card status monitoring is provided via the 4-digit dot-matrix display located on the card edge. The card-edge pushbutton is used to select which data is being displayed in the alphanumeric display. Each time the pushbutton is pressed, the display advances to the next available display. A message indicating what display mode is active is shown for one second. After one second without the pushbutton being pressed, the selected display data is shown.

The following display messages indicate what is being displayed.

VSD1	Video Standard in Use On Channel 1
VSD2	Video Standard in Use On Channel 2
VSD3	Video Standard in Use On Channel 3
VSD4	Video Standard in Use On Channel 4
EQ1	Input Equalization Strength On Channel 1
EQ2	Input Equalization Strength On Channel 2
EQ3	Input Equalization Strength On Channel 3
EQ4	Input Equalization Strength On Channel 4
PSWD	Sets/configures password for enabling/disabling video channels
DISP	Sets the orientation of the text displayed on the card edge
VER	Displays the present Firmware version
UPGR	Sets the card into run/upgrade mode

4.2.1. Displaying the Video Standard

The 7707VT-4 detects the Video standards of the signal present at its input. To display the Video Standard, press the pushbutton one or more times until the VSD1, VSD2, VSD3 or VSD4 message is shown on the display. After one second the detected video standard will be shown. The following list describes possible displays and their meaning.

N270	SMPTE 259M-C, 270 Mb/s 4:2:2 Component 525 line, 4:3 or SMPTE 305M
P270	SMPTE 259M-C, 270 Mb/s 4:2:2 Component 625 line, 4:3 or SMPTE 305M
DVB	Indicates DVB-ASI Signal at Input
LSV	Indicates that there is no signal to input
UNKN	270Mb/s unrecognized format

4.2.2. Displaying The Equalization Strength

To display the Equalization strength, press the pushbutton one or more times until the EQ1, EQ2, EQ3 or EQ4 message is shown on the display. After one second the applied equalization strength will be shown represented as a percentage of the maximum equalizer capability.

0% to 100%	Indicates applied equalization.
LSV	Indicates that no valid input signal is present.

4.2.3. Signal BLOCK Configuration

Depress the pushbutton and select the PSWD option. Actuate the toggle switch to achieve the correct code number (Factory Default = 7154).

PWSD Store a new passcode (0-9999) required for BLOCK configuration. This menu is not available without entering the correct passcode.

VCH1 Enable / Disable. When Disabled the data input signal 1 is not placed on the fiber link data stream. This menu item is not modifiable without entering the correct passcode, though its current state is viewable.

Similar functionality for menu selections **VCH2** through **VCH4**

4.2.4. Setting the Orientation of the Text on the Card Edge Display

On the 7707VT-4 the DISP display allows you to set a horizontal or vertical orientation for the card edge display messages. After one second the display will show a message indicating the current orientation of the display. When this message is showing, press the pushbutton to change the orientation of the display.

HOR	Horizontal display used when the module is housed in the 1 rack unit 7701FR frame or the stand-alone enclosure.
VERT	Vertical display used when the module is housed in the 3-rack unit 7700FR frame.

4.2.5. Displaying the Firmware Version

The VER display shows the firmware version and build number of the 7707VT-4 firmware. The message will scroll across the display.

For example: **VER 1.0 BLD 067**

4.2.6. Upgrade mode

The UPGR display allows you to set the 7707VT-4 into upgrade mode for firmware upgrade. When in UPGR menu, press the pushbutton and use toggle switch to set the mode of the card.

YES Card is in upgrade mode.

NO Card is in run mode.

5. JUMPERS AND LOCAL CONTROLS

Several jumpers, located at the front of the module are used to preset various operating modes. Figure 4 shows the locations of the jumpers.

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. SELECTING WHETHER MODULE WILL BE CONTROLLED FROM THE LOCAL CONTROLS OR THROUGH THE *VISTA*LINK™ INTERFACE

The MASTER jumper selects whether the module will be controlled from the local user controls or through the *Vista*LINK™ interface.

MASTER When this jumper is installed in the LOCAL position, the card functions are controlled through the local jumpers.

When this jumper is installed in the REMOTE position, the card functions are controlled through the *Vista*LINK™ interface. The adjacent yellow LED will be On when *Vista*LINK™ control in enabled. This LED is intended to alert the user that local controls are not currently active.

5.3. 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* 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's remote monitoring and control capability 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. For monitoring there needs to be a detecting device that automatically reports all errors to a central alarm and error logging station. We also need to be able to interrogate individual detector devices from the central station to determine the status of individual channels. Finally, we need to be able to configure devices in the network from the 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 7707VT-4 and 7707VR-4 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 *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
Video 1,2,3,4 Standard	A range of values describing the detected video standard
Video 1,2,3,4 Cable Length	Indicates input cable length in percentage.
Local Remote jumper	Indicates whether the card is in Local or Remote mode (the position of master jumper)

Table 1: *Vista*LINK™ Monitored Parameters

6.3. VISTALINK™ CONTROLLED PARAMETERS

The following parameters can be remotely controlled through *Vista*LINK™ interface.

Parameter	Description
Change Password	Allows user to change password that is needed in order to enable/disable video channels
Video 1,2,3,4 Channel Enable	Enables or disables a video channel
Cable Length Alarm Threshold	Sets cable length alarm threshold

Table 2: *Vista*LINK™ Controlled Parameters

6.4. *VISTA*LINK™ TRAPS

The following traps can be remotely monitored through *Vista*LINK™ interface.

Trap	Description
Video 1,2,3,4 Not Present	Triggers when there is a loss of video signal
Video 1,2,3,4 EDH Errors Present	Triggers when there is a EDH error present in video signal
Video 1,2,3,4 Cable Length Alarm	Triggers when cable length exceeds set threshold
Laser Not Ok	Triggers on laser fault condition

Table 3: *Vista*LINK™ Traps