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REVISION HISTORY

REVISION	**DESCRIPTION**	**DATE**
1.0	First Release	Feb 09

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 7708VT-4 DWDM cards and 7708VR-4 cards directly with a short fiber optic cable. The 7708VT-4 DWDM card produces +7dBm of power which will damage the receiver if connected directly.

Do not hook up the 7708VT-4 cards that output more than -7dBm of power (see 7708VT-4 specifications for output power of various laser types) and 7708VR-4-H high sensitivity receiver cards directly with a short fiber optic cable. The 7708VT-4 cards that produce more than -7dBm of power will damage the receiver if connected directly.

1. OVERVIEW

The 7708VR-4 is a *Vista*LINK® – enabled SMPTE 292M standard fiber optic or coaxial receiver for SDI, DVB-ASI or SDTi signals. This single card module accepts a single SMPTE 292M signal and demultiplexes up to four SDI, DVB-ASI or SDTi video signals that have been Time Domain Multiplexed (TDM) by the companion 7708VT-4 Quad SDI/ASI Fiber/COAX Transmitter module.

The 7708VR-4 and companion 7708VT-4 will transparently pass 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®.

Features:

- Single card demultiplexor for four synchronous or asynchronous 270Mb/s SDI, DVB-ASI or SMPTE 305M video signals
- Accepts SMPTE 292M compatible signal
- Low jitter SDI outputs
- Independent signal outputs unaffected by loss of any other SDI or DVB-ASI input feed
- SDI video regeneration on outputs
- Signal transport over fiber uninterrupted by loss of any input video 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
- Supports single-mode and multi-mode fiber
- Accepts any wavelength in the 1270nm to 1610nm range
- SC/PC, ST/PC, FC/PC fiber connectors available
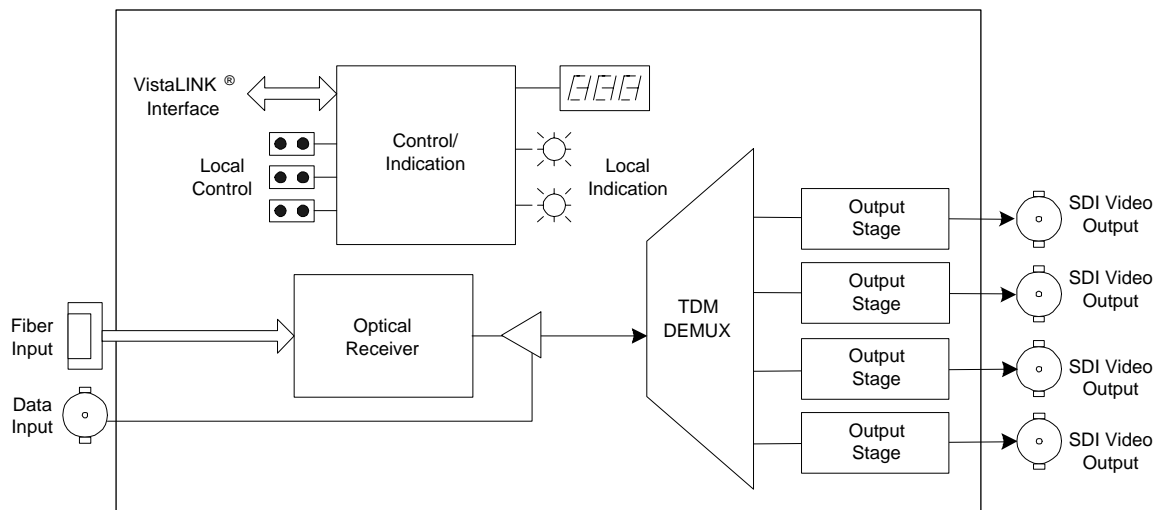
Figure 1-1: 7708VR-4 Block Diagram

2. INSTALLATION

The 7708VR-4 comes with a companion rear plate that has five 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 section 3 of the 7700FR chapter.
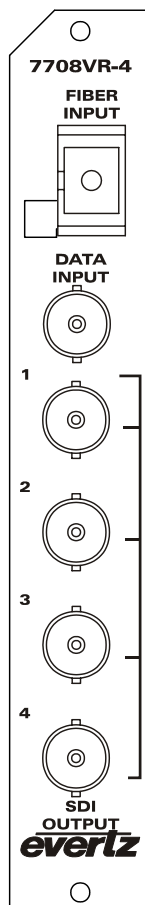
Figure 2-1: 7708VR-4 Rear Panel

OPTICAL INPUT:　　SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This wide range input accepts optical wavelengths of 1270nm to 1610nm, accommodating standard or CWDM transmission schemes.

✎　**Do not hook up the 7708VT-4 DWDM cards and 7708VR-4 cards directly with a short fiber optic cable. The 7708VT-4 DWDM card produces +7dBm of power which will damage the receiver if connected directly.**

✎　**Do not hook up the 7708VT-4 cards that output more than -7dBm of power (see 7708VT-4 specifications for output power of various laser types) and 7708VR-4-H high sensitivity receiver cards directly with a short fiber optic cable. The 7708VT-4 cards that produce more than -7dBm of power will damage the receiver if connected directly.**

DATA INPUT: One BNC connector for input of SMPTE 292M from companion 7708VT-4.

SDI OUTPUT: Four BNC outputs for four independent reclocked serial digital component video signals, compatible with the SMPTE 259M, SMPTE305M and DVB-ASI standards.

2.1.   CARE AND HANDLING OF OPTICAL FIBER

2.1.1. Assembly

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

2.1.2. 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. OPTICAL INPUT

Number of Inputs: 1
Input Standard: SMPTE 292M (not compatible with 7707VT-4)
Connector: Female SC/PC, ST/PC or FC/PC.
Return Loss: >25dB
Input Wavelength: 1270nm -1610nm.
Maximum Input Power
   Standard Version: 0dBm
   -H Version: -7dBm
Optical Sensitivity
   Standard Version: -23dBm
   -H Version: -28dBm

3.2. DATA INPUT

Standard Reclocked: SMPTE 292M
Number of Inputs: 1
Connector: BNC per IEC 61169-8 Annex A
Equalization: Automatic to 150m @ 1.485Gb/s with Belden 1694A or equivalent cable
Return Loss: >15dB to 1.5GHz

3.3. SERIAL VIDEO OUTPUTS

Standards: SMPTE 259M, SMPTE 305M, DVB-ASI
Number of Outputs: 4 Independent SDI, SDTi or DVB-ASI 270Mb/s signals
Connectors: BNC per IEC 169-8.
Signal Level: 800mV(nominal).
DC Offset: $0V \pm 0.5V$
Rise and Fall Time: 900ps(nominal).
Overshoot: < 10% of amplitude.
Return Loss: > 15dB to 540Mb/s.
Wide Band Jitter: < 0.20UI

3.4. ELECTRICAL

Voltage: +12VDC
Power: 10 Watts
EMI/RFI: Complies with FCC regulations for class A devices.
Complies with EU EMC directive.

3.5. PHYSICAL

350FR, 7700FR-C, 7800FR, or S7701FR frame mounting:
   Number of slots: 1

4.   STATUS INDICATORS AND DISPLAYS

The 7708VR-4 has 7 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 items on the alphanumeric display. Figure 4-1 shows the locations of the indicators and pushbutton.
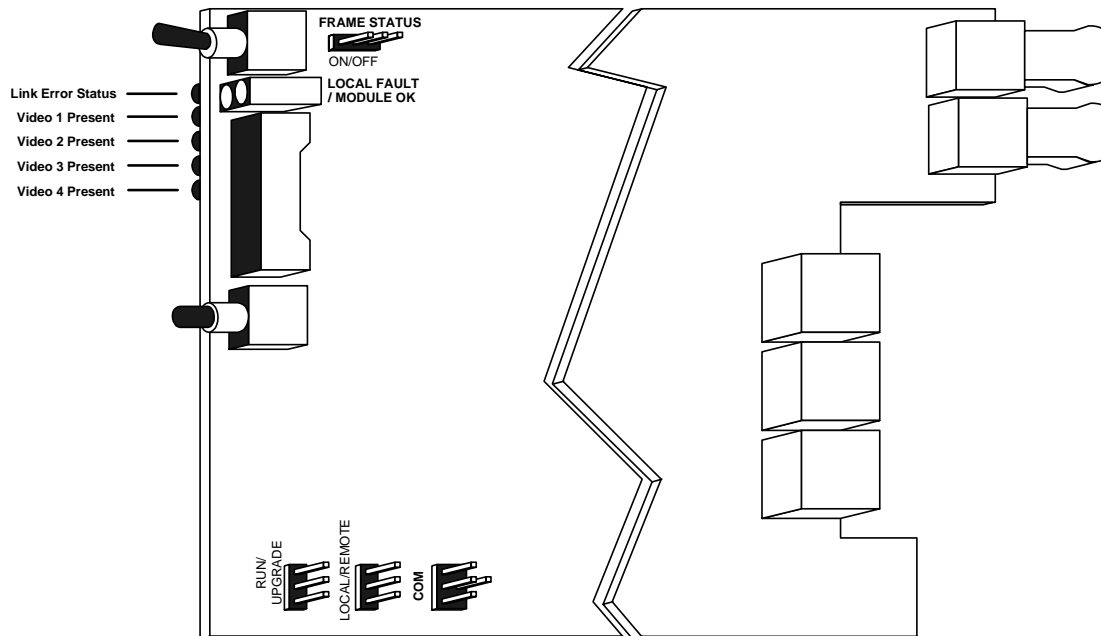
Figure 4-1: Location of Status Indicators and Jumpers

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 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, and the board power is good.

On the 7708VR-4 there are five small LEDs on the back of the board that indicate the presence of video signals.

LINK ERROR STATUS: This Green LED indicates no link errors are present while red indicates link errors are detected by 7708VR-4.

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 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.

PWR	Input Optical Power
MODE	Sets/Configures COAX or Fiber input mode
CH 1	Monitors Video Standard in Use or Sets Output on Loss Standard
CH 2	Monitors Video Standard in Use or Sets Output on Loss Standard
CH 3	Monitors Video Standard in Use or Sets Output on Loss Standard
CH 4	Monitors Video Standard in Use or Sets Output on Loss Standard
PSWD	Sets/configures password for enabling video channels
DISP	Sets the orientation of the text displayed on the card edge
VER	Displays the present Firmware version

4.2.1. Displaying the Optical Power

The 7708VR-4 module can measure and display the input optical power over a range of 0dBm to –40dBm at increments of 1dBm for the standard version and -7dBm to –40dBm in 1dBm increments for the –H version. To display the Input Optical Power press the pushbutton one or more times until the PWR message is shown on the display. After one second the detected input optical power will be shown (in units of dBm).

```
PWR
  OVER
  0 to –40
  -7 to –40
  < MIN
```

OVER	Indicates that input power is over 0dBm for standard version and over –7dBm for "H" version.
0 to –40	Optical input power within this range (Standard Version).
-7 to –40	Optical input power within this range (-H Version).
< MIN	Indicates that input power is below –40dBm.

4.2.2. Displaying the Output Video Standard

When the reclocker is enabled, the 7708VR-4 detects the Video standards of the signal present at its outputs. To display the Video Standard press the pushbutton one or more times until the CH 1, CH 2, CH 3 or CH 4 message is shown on the display. After which, toggle to VSD and press the pushbutton to show the output video standard. The following list describes possible displays and their meaning.

```
CH1
  VSD
    N270
    P270
    ASI
    NONE
    UNKN
```

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
ASI	Indicates DVB-ASI Signal at Input
NONE	Indicates that no valid output signal is present
UNKN	270Mb/s unrecognized format

4.2.3. Signal BLOCK Configuration

The PSWD function enables the user to set the signal BLOCK configuration. Press the pushbutton and select the PSWD option. Actuate the toggle switch to achieve the correct code number (Factory Default = 7154).

```
PSWD
   PWSL
   VCH1
```

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

VCH1   EN / DIS. When Disabled the data received on the fiber link intended for output 1 is not output. This menu item is not modifiable without entering the correct passcode, though its current state is viewable.

There is similar functionality for menu selections **VCH2** through **VCH4**

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

The DISP option allows the user 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.

```
DISP
   HORZ
   VERT
```

HORZ   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 7708VR-4 firmware. The message will scroll across the display.

For example: **VER 1.0 BLD 067**

5.   JUMPERS AND LOCAL CONTROLS

Several jumpers, located at the front of the module, are used to preset various operating modes. Figure 4-1 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.   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 the 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®?

VistaLINK® is Evertz's 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 *Vista*LINK® enabled fiber optic products.

2. Managed devices (such as 7708VT-4 and 7708VR-4 cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *Vista*LINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC *Vista*LINK® 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
Video 1,2,3,4 Standard	A range of values describing the detected video standard
Optical Power	A range of values describing optical power at the fiber input
Card Type	Indicates card type by name

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

6.3.   VISTALINK® CONTROLLED PARAMETERS

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

Parameter	Description
Change Password	Allows the user to change the password that is needed in order to enable/disable video channels
Video 1,2,3,4 Enable	Enables or disables an output video channel
Optical Power Alarm Threshold	Sets optical power alarm threshold
Output 1, 2, 3, 4 Standard on Loss	Selects an Output Standard to be generated on loss of Fiber Link or loss of Input Video to Input card.

Table 6-2: *Vista*LINK® Controlled Parameters

6.4.   *VISTA*LINK® TRAPS

The following traps can be remotely monitored through the *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 an EDH error present in the video signal
Optical power alert	Triggers when optical power falls below set threshold
Optical Link Not Ok	Triggers on loss of optical link with 7708VT-4

Table 6-3: *Vista*LINK® Traps