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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Preliminary Version	Sep 01
1.1	First Release	Oct 01
1.2	Rear panel changed, Jumper numbers updated, general cleanup	Mar 02
1.3	Added sections on Breakout Panel, updated Jumper information Corrected pin designations on DB15	Apr 02
1.4	Support for separate monitoring of AES1 and AES2	Jun 02
1.4.1	Added section on configuring RS422 communications as Controller/Tributary Added 8 new CWDM wavelengths	Dec 02
1.5	Corrected Jumper designations on Figure 4	Jan 03
1.6	Added Applications Configuration Table Added Combined 7707MR & 7707MT–F2 Block Diagram	May 04
1.7	Added –W version. Fixed errors in Application Config Chart	Jun 04
1.8	Updated features, specs & *Vista*LINK® description. Fixed format	Nov 08

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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 7707MT DWDM cards directly with a short fiber optic cable. The 7707MT DWDM cards produce +7dBm of power which will damage the receiver if connected directly.

1. OVERVIEW

The 7707MT Multi-Signal Fiber Transmitter is a *Vista*LINK® enabled, fiber transmitter for SDI Video, AES Audio, RS422 control and GPIO. This single card module transports one uni-directional SDI Video plus two uni-directional AES Audio plus one bi-directional RS422 plus two bi-directional GPI's and GPO's. These signals are combined using Time Domain Multiplex (TDM) technology and transmitted over a single fiber. The companion 7707MR Multi-Signal Fiber receiver de-multiplexes the signals and converts them back to their original formats.

The 7707MT and companion 7707MR will transparently pass incoming SDI video feeds with embedded AES audio or any other data in the horizontal or vertical ancillary data space. Minimal Audio to Video latency over the transport interface is also achieved.

The fiber output is available in an assortment of optical wavelengths, accommodating 1310nm/1550nm, CWDM and DWDM transmission schemes.

The 7707MT 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:

- SDI Video, 2 AES Audio, 1 bi-directional RS-232/422 and 2 GPI/O fiber optic transmitter
- Supports 525 or 625 line 4:2:2 component SDI signals
- Supports SDTi signals
- Supports 32, 44.1, 48kHz AES audio inputs
- Dolby-E™ compatible
- Supports bi-directional RS-422 signals at baud rates up to 3Mb/s
- AES audio inputs can be synchronous or asynchronous to each other and/or to input video
- Reclocked SDI output for additional signal distribution
- Signal transport over fiber uninterrupted by loss of input SDI, AES, Serial Data or GPI/O feeds
- Low Audio to Video latency over transport interface
- Comprehensive signal and card status monitoring via four digit card edge display or remotely through SNMP and *Vista*LINK®
- *Vista*LINK® capability is available when modules are used with the 3RU 7700FR-C or 350FR frame and a 7700FC *Vista*LINK® Frame Controller module in slot1 of the frame
- Local display of optical signal strength, video, audio, and data presence, video and AES formats, EDH errors, GPI and GPO status
- Automatic coaxial input equalization to 300m at 270Mb/s (Belden 1694A)
- Fully hot-swappable from front of frame with no fiber disconnect/reconnect required
- Bi-directional optical input/output
- Accepts any wavelength in the 1270nm to 1610nm range
- 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 multi-mode and single mode fiber optic cable

Different versions of the 7707MT allow the user to choose the optimal function / price / performance ratio to suit a particular application. Versions with no suffix are the lowest cost, but have higher insertion losses as they receive and transmit on the same wavelength (1310nm) over a single fiber. The W versions are designed to receive (1310nm) and transmit on different wavelengths (1550nm) over a single fiber and have a lower insertion loss. The F2 versions have the lowest insertion loss and are designed to receive and transmit over separate fibers.

The following chart shows some typical applications and power budget calculations for the 7707MT:

Fiber Type	Fibers	Optical/Link Budget	Transmit Side		Receive Side		Description
			Ordering Product Info	TX Power	Ordering Product Info	RX Sensitivity	
Multi-Mode	2	< 3km	7707MT13-F2	-7dBm	7707MR13-F2	-28dBm	1310nm on Tx & Rx fibers
Single-Mode	2	21dB/60km	7707MT13-F2	-7dBm	7707MR13-F2	-28dBm	1310nm on Tx & Rx fibers
Single-Mode	1	14dB/40km*	7707MT13	-10dBm	7707MR13	-24dBm	1310nm, bi-directional, one fiber
Single-Mode	1(WDM)	25dB/71km	7707MT15-W	-1dBm	7707MR13M-W	-26dBm	1310nm/1550nm, WDM, bi-directional on one fiber
Single-Mode	1(CWDM)	24dB/96km**	7707MTxx-F2	0dBm	7707MRyy-F2	-28dBm	Different CWDM wavlenghts on Tx & Rx, with 8 channel CWDM Mux/Demux**
Single-Mode	1(DWDM)	30dB/105km**	7707MTDxxx-F2	+7dBm	7707MRDyyy-F2	-28dBm	Different DWDM wavlenghts on Tx & Rx, with 8 channel DWDM Mux/Demux**

*With >20dB return loss on fiber Interface
**Assume 8 Ch CWDM Mux/Demux loss of 3.5dB
*** Assume 8 Ch DWDM Mux/Demux loss of 5dB

Tx Power/Rx Sensitivity are nominal values ±1dBm
Fiber Loss = 0.35/0.25dB per km @1310nm/1550nm

Table 1-1: Typical Application Configurations

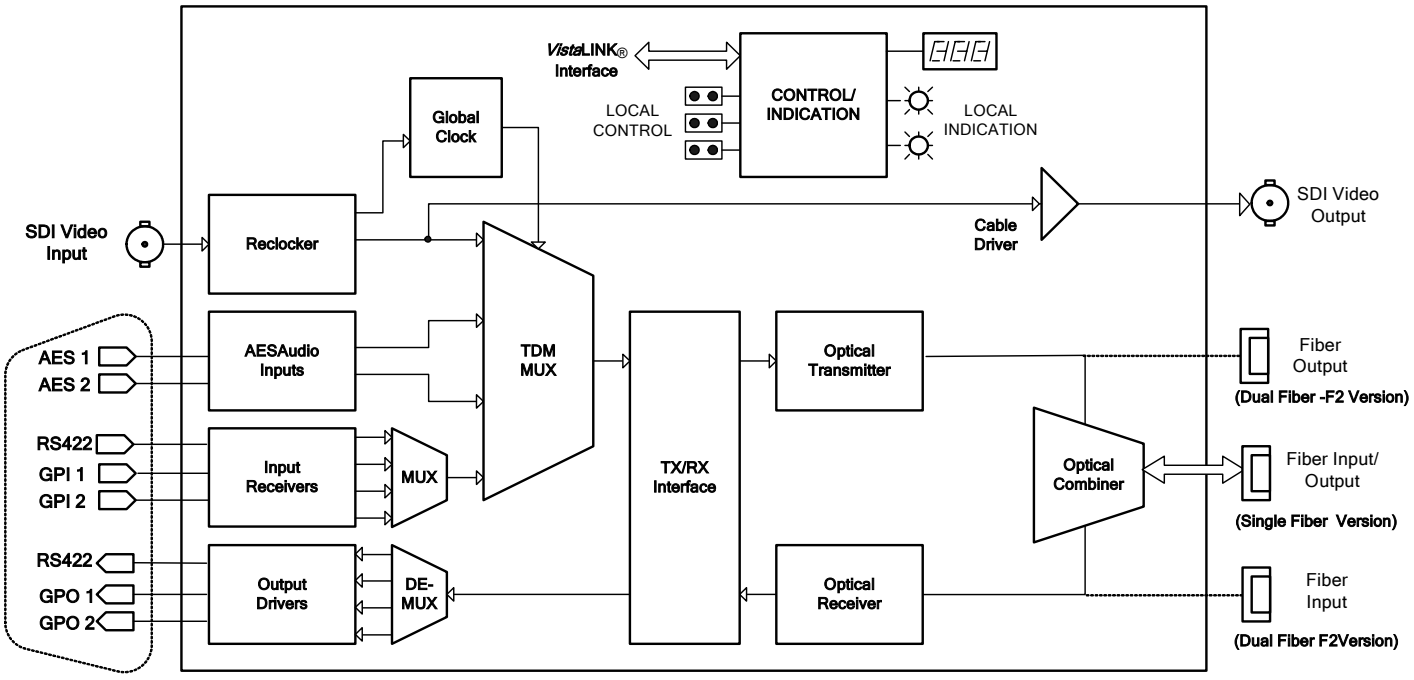

Figure 1-1: 7707MT (-F2) Block Diagram

2. INSTALLATION

The 7707MT comes with a companion rear plate that has two BNC connectors, one female DB15 and one SC/PC, SC/PC with cover (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.

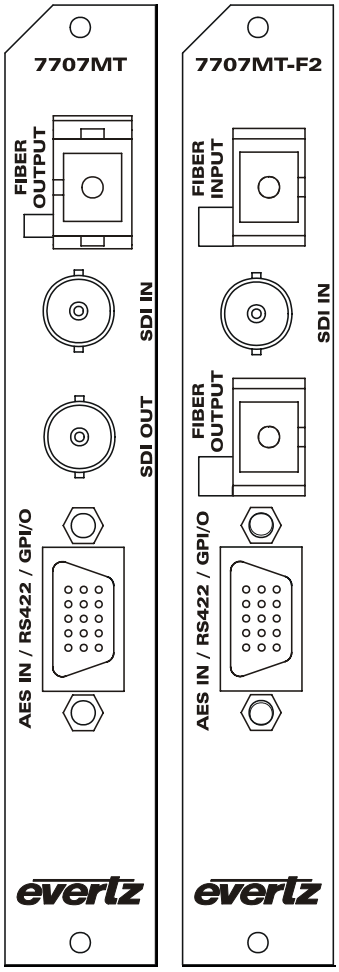

Figure 2-1: 7707MT and 7707MT-F2 Rear Panels

SDI IN: Input BNC connector for 10-bit serial digital video signals, compatible with the SMPTE 259M, or SMPTE 305M standards. Optional support for DVB-ASI signals. This input provides adaptive equalization compensation for up to 300m of industry standard Belden 1694 cable, at 270Mb/s.

SDI OUT: Output BNC connector for reclocked serial digital component video signal, compatible with the SMPTE 259M, or SMPTE 305M standards.

Single Fiber Version

OPTICAL I/O: There is one SC/PC, SC/PC with cover (shown), ST/PC or FC/PC female connector. This optical I/O contains the input SDI video signal, the AES audio present at the AES1 and AES2 inputs and the bi-directional Serial Data and GPI/O 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. This connector also serves as the optical input for the bi-directional serial data and GPI/O signals

Dual Fiber (-F2) Version

FIBER IN: There is one SC/PC (shown), ST/PC or FC/PC female connector with the optical input to the module. This connector should be connected to the FIBER OUT connector of a dual fiber 7707MR module at the destination end with a suitable fiber optic cable. The dual fiber 7707MT versions receive on wavelengths in the 1270 to 1610nm range.

FIBER OUT: There is one SC/PC (shown), ST/PC or FC/PC female connector with the optical output from the module. This connector should be connected to the FIBER IN connector of a dual fiber 7707MR module at the destination end with a suitable fiber optic cable. The dual fiber 7707MT versions transmit on the wavelength marked on the rear panel and are designed to work with either single-mode or multi-mode fiber optic cable.

2.1. AES AUDIO AND AUXILLIARY I/O

A 15 pin High Density D connector labeled **AES IN/RS422/GPIO** contains 2 AES Audio inputs, a bi-directional Serial Data port, 2 GPI inputs and 2 GPO relay contact outputs.

Pin #	Name	Description
1	GPO2A	General Purpose Output 2 Contact
2	GPI2	General Purpose Input 2
3	GPO1A	General Purpose Output 1 Contact
4	AES1-	Balanced AES1 – Input
5	AES1+	Balanced AES1 + or Unbalanced AES 1 Input
6	GPI1	General Purpose Input 1
7	GPO2C	General Purpose Output 2 Common
8	GPO1C	General Purpose Output 1 Common
9	SOUT1(-)	RS232 Port 1 Transmit out or RS422 Transmit - out
10	SOUT2(+)	RS232 Port 2 Transmit out or RS422 Transmit + out
11	GND	Signal Ground
12	SIN1(-)	RS232 Port 1 Receive In or RS422 Receive – in
13	SIN2(+)	RS232 Port 2 Receive In or RS422 Receive + in
14	AES2-	Balanced AES2 – Input
15	AES2+	Balanced AES2 + or Unbalanced AES 2 Input

Table 2-1: AES IN/RS422/GPIO Connector Pin Definitions

2.1.1. Connecting the AES Inputs

AES INPUT: 4 Pins on the DB15 connector are used to carry balanced or unbalanced AES audio inputs for channels 1&2 (AES 1) and 3&4 (AES 2) of an audio group. Each input occupies two pins (+, -) on the DB15 with a shared GND pin. AES inputs can be synchronous or asynchronous to each other and/or input SDI video.

For Balanced AES signals connect the + and – signals to the respective input pins. The AES Term Jumpers J26 and J27 must be set to the 110 position for proper termination of the balanced AES inputs. The AES LEVEL jumpers J24 and J25 are normally set to the HI position for balanced AES signal levels of 2 to 7 volts. For signal levels below 2 volts, move the AES LEVEL jumpers to the LO position.

Unbalanced AES signals should be connected to the AES+ input pin with the ground connected to the AES- input pin. The AES Term Jumpers J26 and J27 must be set to the 75 position for proper termination of the unbalanced AES inputs. The AES LEVEL jumpers J24 and J25 should be in the LO position when the TERM jumpers are in the 75 position.

2.1.2. Connecting the RS232/422 Serial Data Port

RS232/422: 4 Pins on DB15 connector are used for a bi-directional serial data port conforming to RS422 signal levels when the SERIAL jumper is set to the RS422 position. When the SERIAL Jumper is set to the RS232 position these pins are configured as two RS-232 bi-directional serial data ports. See section 6.3 and 6.3.1 for information on configuring the serial data port.

2.1.3. Connecting the GPI Inputs and GPO Outputs

GPI's: 2 pins on the DB 15 connector are used for two General Purpose inputs (GPI). The GPIs are active low with an internal pull up (10k ohm) resistor to +5V or +12V. The user can activate GPIs simply by connecting the GPI input pins to Ground. This can be done with a button, switch, relay or an open collector transistor. See section 6.8 for information on selecting the pull-up voltage.

GPO's: 4 pins on the DB15 connector are used for two General Purpose Outputs (GPO). Each GPO output can be configured as a normally open or normally closed relay contact pair. They can be used to pass simple contact closure information along with the video signal. See section 6.9 for information on setting the jumpers for normally open or closed contacts.

2.2. INSTALLING THE BULKHEAD BREAKOUT PANEL

The 7707MX-BHP Bulkhead breakout panel is an accessory that provides you with a convenient way of connecting the audio, RS232/422 and GPIO signals into the HD DB-15 connectors on the rear of the modules. This panel occupies 2 rack units of rack space and is designed for mounting at the rear of your rack panel. The breakout panel can be used to connect any combination of up to fifteen 7707MT or 7707MR modules. Each of the fifteen sets of connectors on the breakout panel is fitted with two BNCs for unbalanced AES audio in or out (not on –B version of breakout panel), one six position terminal strip for balanced AES audio in or out, one eight position terminal strip for the GPIO signals and one 9 pin female D connector for the RS-232/422 signals. Figure 2-2 shows one section of the breakout panel. On the rear of the breakout panels are fifteen male HD DB-15 connectors.

To connect the module to the breakout panel, connect the 15 pin extender cables supplied with the breakout panel between the 15 pin female D connector on the rear of the module and the appropriate D connector on the breakout panel. Make sure that you secure the connectors with the screws supplied. The balanced AES audio and GPIO cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel and secured using the two hold-down screws.

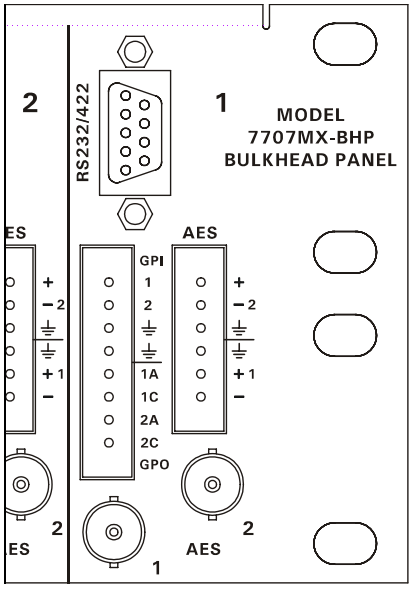

Figure 2-2: Breakout panel for Wiring Connections

2.2.1. Connecting the Breakout Panel AES Inputs

BALANCED AES INPUTS: For Balanced AES signals connect the + and – signals to the respective input pins on the AES terminal strip. The AES Term Jumpers J26 and J27 must be set to the 110 position for proper termination of the balanced AES inputs. The AES LEVEL jumpers J24 and J25 are normally set to the HI position for balanced AES signal levels of 2 to 7 volts. For signal levels below 2 volts, move the AES LEVEL jumpers to the LO position.

UNBALANCED AES INPUTS: Unbalanced AES signals should be connected to the respective AES BNCs. In addition, the respective AES- pin on the AES terminal strip must be connected to one of the ground pins by using a short wire jumper. This will connect the unused side of the transformer input to ground. The AES Term Jumpers J26 and J27 must be set to the 75 position for proper termination of the unbalanced AES inputs. The AES LEVEL jumpers J24 and J25 should be in the LO position when the TERM jumpers are in the 75 position.

2.2.2. Connecting the Breakout Panel RS232/422 Serial Data Port

RS232/422: A 9 pin female D connector is used for a bi-directional serial data port conforming to RS422 signal levels when the SERIAL jumper is set to the RS422 position. When the SERIAL Jumper is set to the RS232 position this connector is configured as two RS-232 bi-directional serial data ports. The pin descriptions of the RS232/422 connector are shown for both RS-232 and RS-422 jumper settings. See section 6.3 and 6.3.1 for information on configuring the serial data port.

Pin #	RS232 Pin Function	RS422 Pin Function
1	Ground	Ground
2	RS-232 Port 1 Tx Output	RS-422 Tx-(a) Output
3	RS-232 Port 2 Rx Input	RS-422 Rx+(b) Input
4	Ground	Ground
5	n/c	n/c
6	Ground	Ground
7	RS-232 Port 2 Tx Output	RS-422 Tx+(b) Output
8	RS-232 Port 1 Rx Input	RS-422 Rx-(a) Input
9	Ground	Ground

Table 2-2: Breakout Panel RS232/422 Connector Pin Definitions

2.2.3. Connecting the GPI Inputs and GPO Outputs

GPI's: The four top pins on the 8 pin terminal strip are used for two General Purpose inputs (GPI). The GPIs are active low with an internal pull up (10k ohm) resistor to +5V or +12V. The user can activate GPIs simply by connecting the GPI input pins to one of the ground pins provided. This can be done with a button, switch, relay or an open collector transistor. See section 6.8 for information on selecting the pull-up voltage.

GPO's: The four bottom pins on the 8 pin terminal strip are used for two General Purpose Outputs (GPO). Each GPO output can be configured as a normally open or normally closed relay contact pair. They can be used to pass simple contact closure information along with the video signal. See section 6.9 for information on setting the jumpers for normally open or closed contacts.

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 inadequate space 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: 7707MT13, 7707MT15W, 7707MT13-F2,
  7707MTxx, (xx = 27, 29, 31, 33, 35, 37, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61)
  7707MTDyyy (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 the user 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 regarding 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-C, 525 or 625 line component, SMPTE 305M
Connector: 1 BNC per IEC 61169-8 Annex A
Equalization: Automatic to 300m @ 270 Mb/s with Belden 1694A or equivalent cable
Return Loss: > 15 dB up to 270 Mb/s

3.2. SERIAL VIDEO OUTPUT (Not available on dual fiber '-F2' version)

Number of Outputs: 1 Per Card reclocked
Connector: 1 BNC per IEC 61169-8 Annex A
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 900ps nominal
Overshoot: < 10% of amplitude
Return Loss: > 15 dB at 270 Mb/s
High Freq. Jitter: < 0.2UI

3.3. AES AUDIO INPUTS

Number of Inputs: 2
Standard: Jumper selectable for balanced or unbalanced input
  Unbalanced AES: SMPTE 276M
  Balanced AES: AES3-1992 balanced AES
  Other: Dolby-E™ compatible
Connector: 4 pins on female high density DB-15
Signal Level:
  Unbalanced: 1V p-p ±0.1V
  Balanced: 2 to 7 Vp-p with Level Jumper set to HI, 1 to 2 V p-p with level jumper set to LO
Equalization: 500m @ 48kHz with Belden 1800B or equivalent cable
Resolution: up to 24 bits
Sampling Rate: 32, 44.1, 48 kHz
Intrinsic Jitter: < 20ns
Impedance:
  Unbalanced: 75 Ω
  Balanced: 110 Ω

3.4. OPTICAL INPUT/OUTPUT

Number:	1 (Single fiber version) 2 (Dual fiber version)
Connector:	Female SC/PC, SC/PC with cover, ST/PC or FC/PC
Return Loss:	> 20 dB
Rise and Fall Time:	200ps nominal
Maximum Input Power:	0 dBm
Input Optical Sensitivity:	
WDM (-w version):	-26dBm
Standard:	-28dBm
Output Jitter:	< 0.2 UI
Wavelengths:	
Single Fiber Standard:	1310nm
Single Fiber W Version:	1550nm
CWDM:	1270nm to 1610nm
DWDM:	C-Band (ITU-T G.694.1 compliant)
Output Power:	
1310nm FP:	-7dBm ±1dBm
1310nm (-W):	-1dBm ±1dBm
1550nm, CDWM (DFB):	0dBm ± 1dBm
DWDM (DFB):	+7dBm ± 1dBm
Fiber Size:	9 μm core / 125 μm overall

3.5. SERIAL DATA PORT

Number of Ports:	1 RS-422 or 2 RS-232 – Jumper Selectable
Connector:	4 pins (plus ground) on female high density DB-15
Baud Rate:	Up to 3 Mb/s (Determined by incoming data)

3.6. GENERAL PURPOSE INPUTS

Number of Inputs:	2
Type:	Opto-isolated, active low with internal pull-ups to +5 or +12V (jumper selectable)
Connector:	2 pins (plus ground) on female high density DB-15
Signal Level:	Open or closure to ground

3.7. GENERAL PURPOSE OUTPUTS

Number of Outputs:	2
Type:	“Dry Contact” relay closure
Connector:	2 pins per output on female high density DB-15
Signal Level:	normally closed or normally open (jumper settable)

3.8. SYSTEM PERFORMANCE

Video Input to Output Delay: < 1.5 µs
Audio to Video delay: < 1µs with SoftSwitch™ disabled on 7707MR
< 2ms with SoftSwitch™ enabled on 7707MR

3.9. ELECTRICAL

Voltage: +12VDC
Power: 12 Watts (Non DWDM)
14 Watts (DWDM)

3.10. PHYSICAL

7700 or 7701 frame mounting:
Number of slots: 1

3.11. 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 INDICATORS AND DISPLAYS

The 7707MT 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 6-2 shows the location of the LEDs and card edge controls.

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 during the absence of a valid optical input signal, if a laser fault exists, 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 optical input signal is present, and the laser and board power are good.

There are four small LEDs on the back of the board that indicate the presence of video, audio and data signals:

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

AES1 PRESENT: This Green LED indicates the presence of a valid AES1 signal.

AES2 PRESENT: This Green LED indicates the presence of a valid AES2 signal.

DATA ACTIVITY: This Green LED indicates the presence of a Serial Data activity.

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 in the alphanumeric display. Each time the toggle switch is pressed up/down, the display advances to the next/previous display. A message indicating what display mode is active is shown for one second. After one second without the toggle switch being pressed, the selected display data is shown. The card edge pushbutton is used to select sub-items where applicable. The following display messages indicate what is being displayed. The details of the each of the displays are described in the sections 4.2.1 to 4.2.9.

LINK ERR	Loss of optical link
PWR	Input optical power
VSTD	Video standard in use
A1S	AES clock rate in use on AES1
A2S	AES clock rate in use on AES2
DATA	Activity on RS232/422
GPO1	GPO1 state
GPO2	GPO2 state
GPI1	GPI1 state
GPI2	GPI2 state
DISP	Set orientation of text in the card edge display
S/W	Display firmware version

The details of each of the displays are described in the sections 4.2.1 to 4.2.9.

4.2.1. Displaying the Link Activity

When there is no valid optical link between the 7707MT and its companion 7707MR the display will alternately show **LINK** and **ERR**. This message will override any of the other display messages.

4.2.2. Displaying Optical Power

The 7707MT detects the input optical power and displays this on the four-digit card edge display. The following list describes possible displays and their meaning.

OK	Indicates optical input power is within acceptable range (> -10 dB)
-10 to –28	Numerical value of optical input power

4.2.3. Displaying the Video Standard

The 7707MT detects the Video standard of the input signal and displays this on the four-digit card edge display. The following list describes possible displays and their meaning:

N270 SMPTE 259M-C, 270 Mb/s 4:2:2 Component 525 line.

P270 SMPTE 259M-C, 270 Mb/s 4:2:2 Component 625 line.

LSV Indicates that no valid video signal is present on the input. This message overrides the normal video standard message.

EDH Indicates that there is an EDH error. This message overrides the normal video standard message.

When the user is displaying one of the Video Standard messages, pressing and holding the pushbutton for 3 seconds will turn off the card edge EDH error indication. The display will show **EDH↓** momentarily to indicate that EDH local reporting has been turned off and then the normal video standard message will be displayed. This does not affect the monitoring of EDH errors and reporting through SNMP over the *Vista*LINK® interface.

Pressing and holding the pushbutton for 3 seconds will turn on the card edge EDH error indication. The display will show **EDH↑** momentarily to indicate that EDH local reporting has been turned on.

4.2.4. Displaying the Audio Presence

The 7707MT detects the Audio sample rate of the audio on the AES inputs and displays this on the four-digit card edge display. The following list describes possible displays and their meaning.

32K AES Audio with 32 kHz sample rate is being received and output.

44K AES Audio with 44.1 kHz sample rate is being received and output.

48K AES Audio with 48 kHz sample rate is being received and output.

LSA1 Indicates that no valid AES1 signal is being received. This message overrides the normal audio sample rate message.

LSA2 Indicates that no valid AES2 signal is being received. This message overrides the normal audio sample rate message.

4.2.5. Displaying the Serial Data Activity

The 7707MT detects activity on the RS232/422 serial data channel on the input signal and displays this on the four-digit card edge display. The following list describes possible displays and their meaning:

ACT There is Rx or Tx activity on the serial data channel.

NACT There is no Rx or Tx activity on the serial data channel.

4.2.6. Displaying the State of the General Purpose Outputs

The **GPO1** and **GPO2** displays show the current state of the General Purpose outputs. The General Purpose outputs can be configured for normally closed or open using jumpers on the I/O assembly (see section 6.9). The following table describes possible displays and their meaning for Normally Closed or open relay contacts:

		I/O Board Jumper Setting	
Display	**Meaning**	**NC**	**NO**
ON	GPO is Active	Open	Closed
OFF	GPO is Inactive	Closed	Open

4.2.7. Displaying the State of the General Purpose Inputs

The **GPI1** and **GPI2** displays show the current state of the General Purpose inputs. The GPIs are active low with an internal pull up (10k ohm) resistor to +5V or +12V. See section 6.8 for information on selecting the pullup voltage. The following list describes possible displays and their meanings:

OFF The GPI input is open or pulled up to the GPI pullup voltage (inactive)
ON The GPI input is closed to ground (active)

4.2.8. Setting the Orientation of the LED Display

The **DISP** display 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.

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.

4.2.9. Displaying the Firmware Version

The **S/W** display shows the firmware version and build number of the 7707MT firmware. The message will scroll across the display.

For example: VER 1.0 BLD 067

5. CARD EDGE CONTROLS

The 7707MT is equipped with a three position, return to center toggle switch which is used to select the various card edge displays and is also used in conjunction with a momentary pushbutton to select some sub-items of the displays. Please refer to section 4.2 for information about the card edge displays.

6. JUMPERS

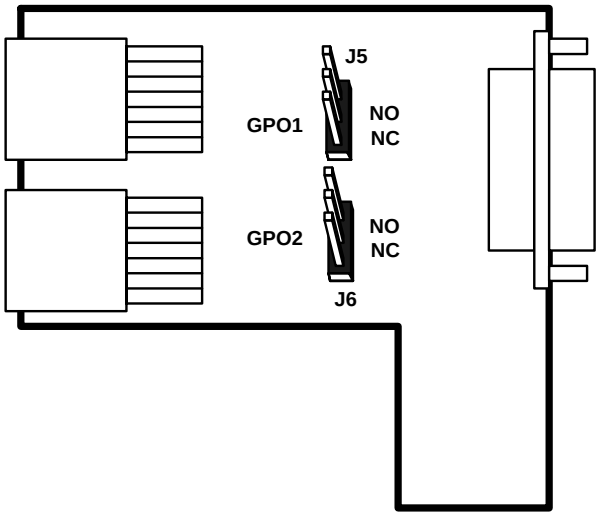

Figure 6-1: Location of Jumpers – I/O Module

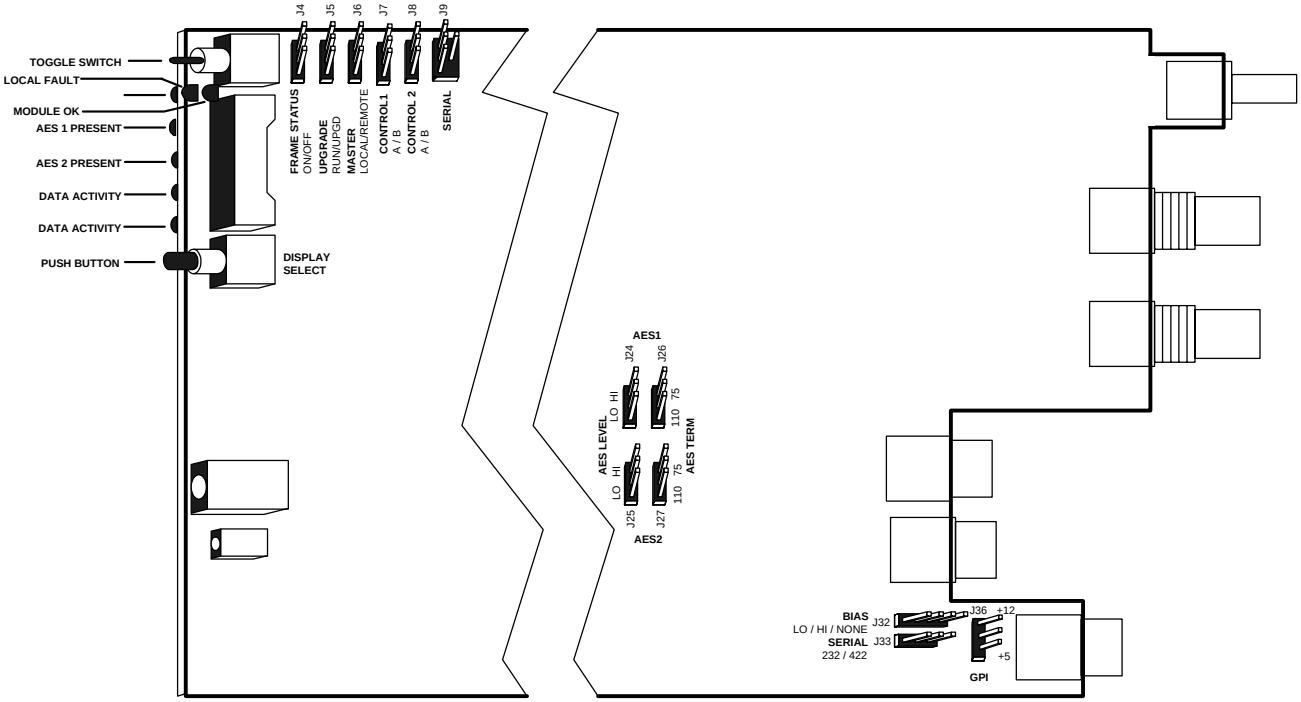

Figure 6-2: Location of Jumpers – Main Module

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

The FRAME STATUS jumper J4 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.

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

The MASTER jumper J6 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 controls.

When this jumper is installed in the REMOTE position, the card functions are controlled through the *Vista*LINK® interface.

6.3. SELECTING THE DATA COMMUNICATIONS STANDARD (RS-232 OR RS-422)

The SERIAL jumper J33 located at the rear of the module is used to configure whether the serial data channel will operate in the RS-232 or RS-422 standard. The 15 pin D connector has a pair of inputs, a pair of outputs and a ground connection for the Serial Data Channel.

SERIAL: To set the serial data inputs and outputs to operate in the RS-232 standard install the jumper in the RS-232 position. In this mode the input and output pins will be configured as two RS-232 Rx/Tx ports (Port 1 and Port 2).

To set the serial data inputs and outputs to operate in the RS-422 standard install the jumper in the RS-422 position. In this mode the input and output pins will be configured as one RS-422 Rx/Tx port.

6.3.1. Configuring RS422 Device Communication between a Controller and Tributary

SMPTE Standard 207M defines the electrical and mechanical characteristics of the device interface used in transferring data and control signals between production and post-production equipment. Each interface system consists of a single bus-controller and one or more tributaries. The bus-controller controls the communication flow to all tributaries connected to it, while a tributary transmits data to an operational device.

A 7707MT/7707MR pair can be configured to interface between a bus-controller and a tributary if configured as follows:

Controller DB9 PIN #	Transmitting 7707MT DB15 PIN #
2	9
3	13
7	10
8	12

Receiving 7707MR DB15 PIN #	Tributary DB9 PIN #
12	2
10	3
13	7
9	8

6.4. SELECTING THE DEFAULT BEHAVIOUR OF THE INPUTS WHEN THERE IS NO SIGNAL CONNECTED

The BIAS jumper J32 located at the rear of the board controls the behaviour of the RS-422 inputs when there is no signal connected. This is not critical for most applications, and the setting will not typically affect performance. Figure 6-3 shows a simple schematic of the receiver input. The RS-422 receiver device has a pulldown to ground on the Rx+ input and a pullup to +5v on the Rx- input.

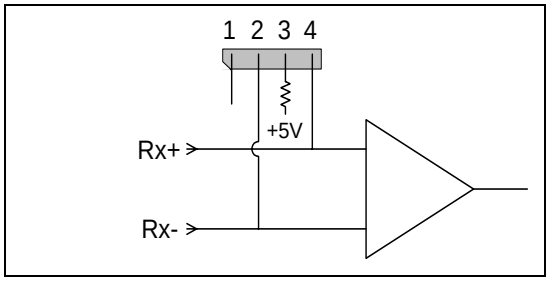

Figure 6-3: Receiver Input Pull-up Configuration

If the user wants to override the default pull-ups set the appropriate jumper as shown in the chart below:

Label	Jumper on pins	Function
None	1 & 2	Default pull-ups (Rx+ low, Rx- high)
HI	2 & 3	Rx- pulled up to +5 volts, Rx+ default (low)
LOW	3 & 4	Rx+ pulled up to + 5 volts, Rx- default (high)

6.5. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

UPGRADE: The UPGRADE jumper J5 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 in the front of this manual binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move the UPGRADE jumper into the *UPGD* 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 in the front of this manual binder. 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.

6.6. SELECTING THE AES INPUT CONFIGURATION (BALANCED OR UNBALANCED)

The AES TERM jumpers J26 and J27 located near the rear of the module are used to configure whether AES inputs are balanced (110 ohm) or unbalanced (75 ohm).

AES TERM: To configure the AES inputs for use with balanced AES signals that conform to AES3-1992, set the jumpers to the 110 position. The AES LEVEL jumpers must also be set correctly for the signal levels being used by the user.

To configure the AES inputs for use with unbalanced AES signals conforming to SMPTE 276M, set the jumpers to the 75 position. The AES LEVEL jumpers must also be set to the LO position.

6.7. SETTING THE BALANCED AES INPUT LEVEL SENSITIVITY

When the AES TERM jumpers are in the 110 position, the AES LEVEL jumpers J24 and J25 control the sensitivity of the inputs. When the AES TERM jumpers are in the 75 position, the AES LEVEL jumpers should be set to the LO position.

AES LEVEL: These jumpers are normally set to the HI position for use with 2 to 7 volt balanced signal levels. For signals levels 1 to 2 volt range, set these jumpers to the LO position.

6.8. SELECTING THE GPI PULLUP VOLTAGE

The GPI jumper J36, located at the rear of the module, selects whether the general purpose inputs will be pulled up to +5 volts or +12 Volts. Figure 6-4 shows the jumper configuration and the GPI input schematic.

GPI: To set the pull-up voltage to +5 volts set the jumper to the +5 position.

To set the pull-up voltage to +12 volts set the jumper to the +12 position.

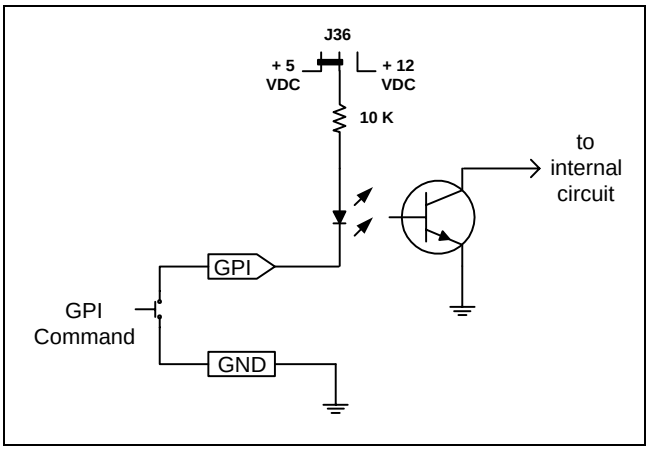

Figure 6-4: GPI Input Circuitry

6.9. SELECTING NORMALLY OPEN OR CLOSED GPOS

The GPO1 and GPO2 jumpers J13 and J14, located on the I/O assembly select whether the General Purpose output relay contacts will be open or closed when they are active. The **GPO1** and **GPO2** displays indicate the state of the GPOs. The following table describes possible displays and their meaning for Normally Closed or open relay contacts:

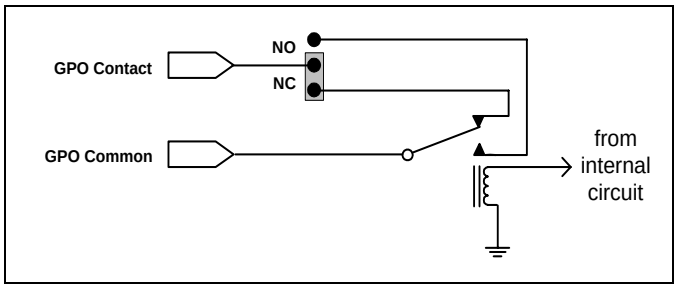

Figure 6-5: Selecting Normally Open or Closed GPO Configuration

		I/O Board Jumper Setting	
Display	**Meaning**	**NC**	**NO**
ON	GPO is Active	Open	Closed
OFF	GPO is Inactive	Closed	Open

7. *VISTA*LINK® REMOTE MONITORING/CONTROL

7.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® 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. *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 *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.

7.2. *VISTA*LINK® MONITORED PARAMETERS

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

Parameter	Description
Link OK	Indicates presence of a valid optical link with a 7707MR module.
Optical Power	A range of values describing optical power at the fiber input.
Video Standard	A range of values describing the detected video standard.
Video Present	Indicates the presence of a valid video input signal (the state of the VIDEO PRESENT LED).
AES1 Audio Present	Indicates the presence of an AES1 input signal (the state of the AES1 PRESENT LED).
AES 2 Audio Present	Indicates the presence of an AES2 input signal (the state of the AES2 PRESENT LED).
AES1 Rate Detect	Indicates the AES1 Sample Rate.
AES2 Rate Detect	Indicates the AES2 Sample Rate.
RS232/422 Data Activity	Indicates the presence of data activity on the Serial data channel (the state of the DATA ACTIVITY LED).
EDH Error	The status of Full Field EDH errors present in the input signal.
Laser Fault	Indicates deficient operation of the optical output laser.
GPI1 State	Indicates the state of the GPI1 input.
GPI2 State	Indicates the state of the GPI2 input.
GPO1 State	Indicates the state of the GPO1 output.
GPO2 State	Indicates the state of the GPO2 output.

Table 7-1: *Vista*LINK® Monitored Parameters

7.3. *VISTA*LINK® CONTROLLED PARAMETERS

There are currently no parameters that can be remotely controlled through the *Vista*LINK® interface.