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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Mar 01
1.1	Added information for 7702AT-2 and 7705AT-LTC-2 versions	July 01
1.2	Added information for 7705AT-LTC versions Corrected pinout of DB25 on 7705AT version	Aug 01
1.2.1	Corrected LED descriptions	Aug 01
1.3	LTC Output included in all units	Oct 01
1.4	Added information for 7705AT-8 version	Jul 02
1.5	Added eight new CWDM wavelengths	Dec 02
1.6	Updated formatting	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.

1. OVERVIEW

The 7705AT series AES Audio Transmitter Multiplexors and 7705AR series AES Audio Receiver Demultiplexors provide an economical method of transmitting up to six AES audio signals (twelve mono), one RS-232/422 control signal, and linear Time Code (LTC) or eight AES audio signals (sixteen mono) using a single wavelength on a fiber optic cable, with minimum latency. AES audio reclocking is provided on the 7705AR for jitter reduction. The 7705AT series modules are available in 3 different versions to meet a variety of applications. Two versions have six single-ended AES audio inputs an LTC input and one uni-directional RS-232/422 output while the third has eight single-ended AES audio inputs.

Model	AES Audio Inputs		LTC Input	RS232/422	Slots
	Number	Connector			
7705AT	6	DB 25	1	1	1
7705AT-2	6	BNC	1	1	2
7705AT-8	8	DB 25	---	---	1

The fiber optic output of the 7705AT is available with different laser output configurations to meet a variety of applications. (See section 3 on specifications for complete information) There are sixteen configurations with built in isolators specifically suited to coarse wave-division multiplexing (CWDM) applications.

	Model Number		
Optical Transmitter	7705AT	7705AT-2	7705AT-8
1310 nm FP	7705AT13	7705AT13-2	7705AT13-8
1550 nm DFB	7705AT15	7705AT15-2	7705AT15-8
1270 nm DFB (CWDM)	7705AT27	7705AT27-2	7705AT27-8
1290 nm DFB (CWDM)	7705AT29	7705AT29-2	7705AT29-8
1310 nm DFB (CWDM)	7705AT31	7705AT31-2	7705AT31-8
1330 nm DFB (CWDM)	7705AT33	7705AT33-2	7705AT33-8
1350 nm DFB (CWDM)	7705AT35	7705AT35-2	7705AT35-8
1370 nm DFB (CWDM)	7705AT37	7705AT37-2	7705AT37-8
1430 nm DFB (CWDM)	7705AT43	7705AT43-2	7705AT43-8
1450 nm DFB (CWDM)	7705AT45	7705AT45-2	7705AT45-8
1470 nm DFB (CWDM)	7705AT47	7705AT47-2	7705AT47-8
1490 nm DFB (CWDM)	7705AT49	7705AT49-2	7705AT49-8
1510 nm DFB (CWDM)	7705AT51	7705AT51-2	7705AT51-8
1530 nm DFB (CWDM)	7705AT53	7705AT53-2	7705AT53-8
1550 nm DFB (CWDM)	7705AT55	7705AT55-2	7705AT55-8
1570 nm DFB (CWDM)	7705AT57	7705AT57-2	7705AT57-8
1590 nm DFB (CWDM)	7705AT59	7705AT59-2	7705AT59-8
1610 nm DFB (CWDM)	7705AT61	7705AT61-2	7705AT61-8

Features:

- Six channel versions have six single-ended AES audio inputs with one balanced linear time code input and uni-directional RS-232/422 data input
- Sixteen channel version has eight single-ended AES audio inputs
- Supports SMPTE compliant AES audio signals with 48KHz or 96KHz sampling rate
- Low channel latency for 7705AT/AR pair
- Monitoring of AES audio via stereo head phone jack and pushbutton channel selector at card edge
- Supports multi-mode or single-mode fiber
- Fully hot-swappable from front of frame with no fiber or data channel disconnect required
- SC/PC, ST/PC or FC/PC connector options
- Card edge LEDS indicate module health, optical failure
- Tally output on Frame Status bus upon loss of input signal

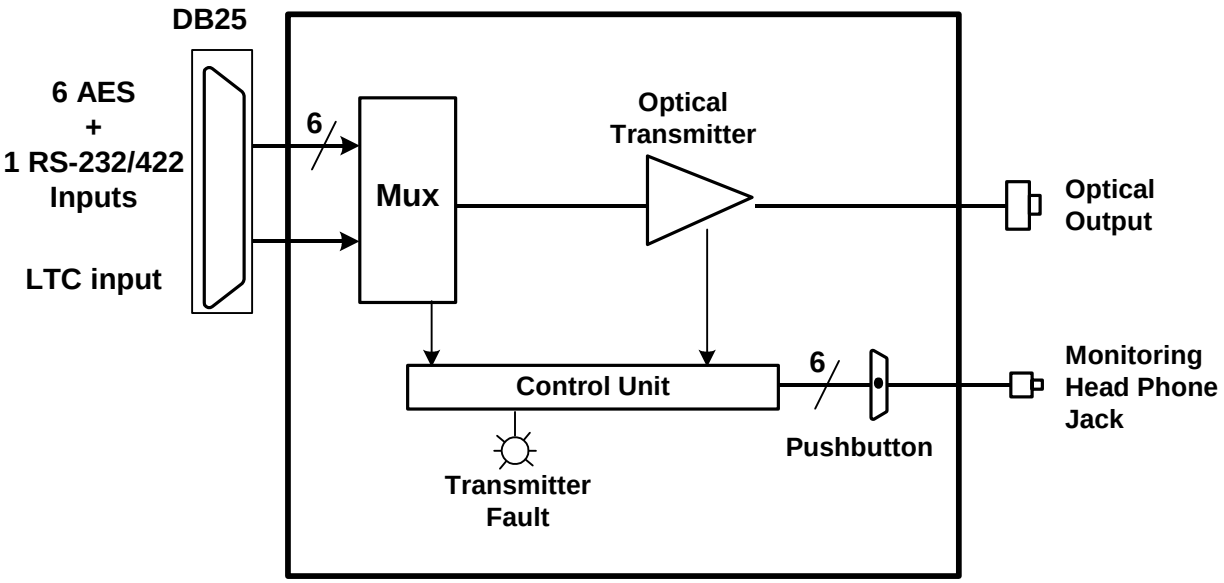

Figure 1-1: 7705AT Block Diagram

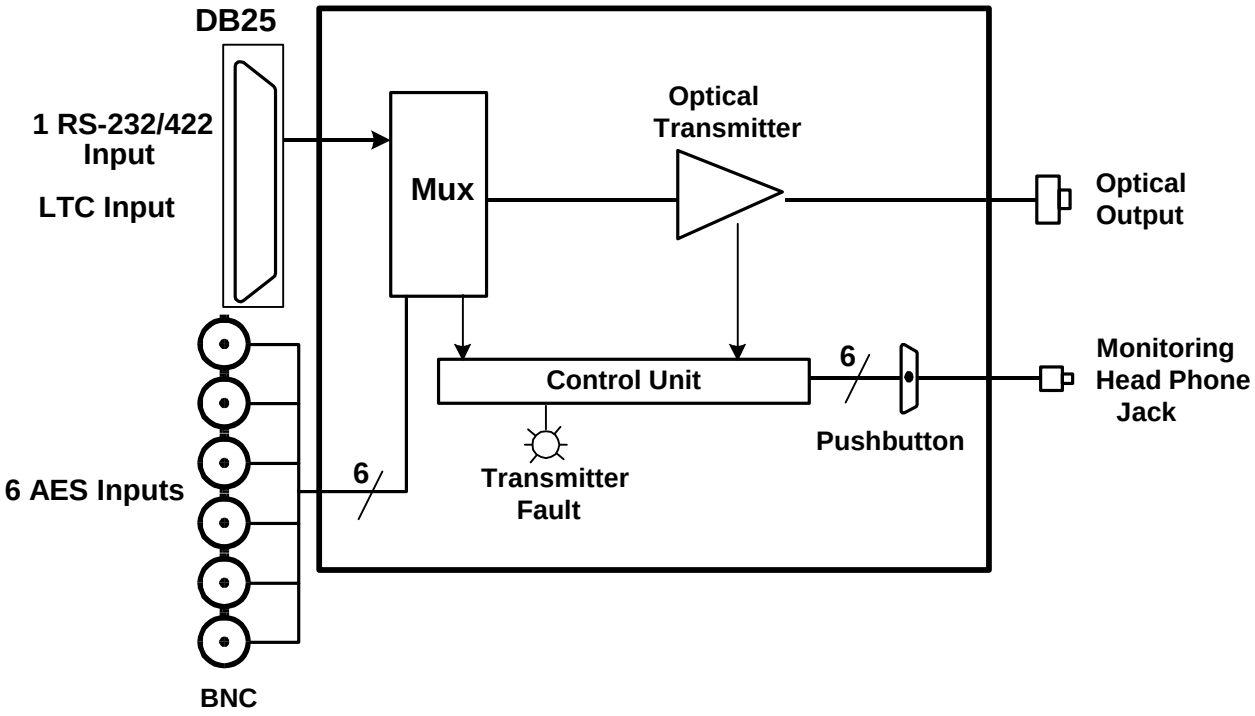

Figure 1-2: 7705AT-2 Block Diagram

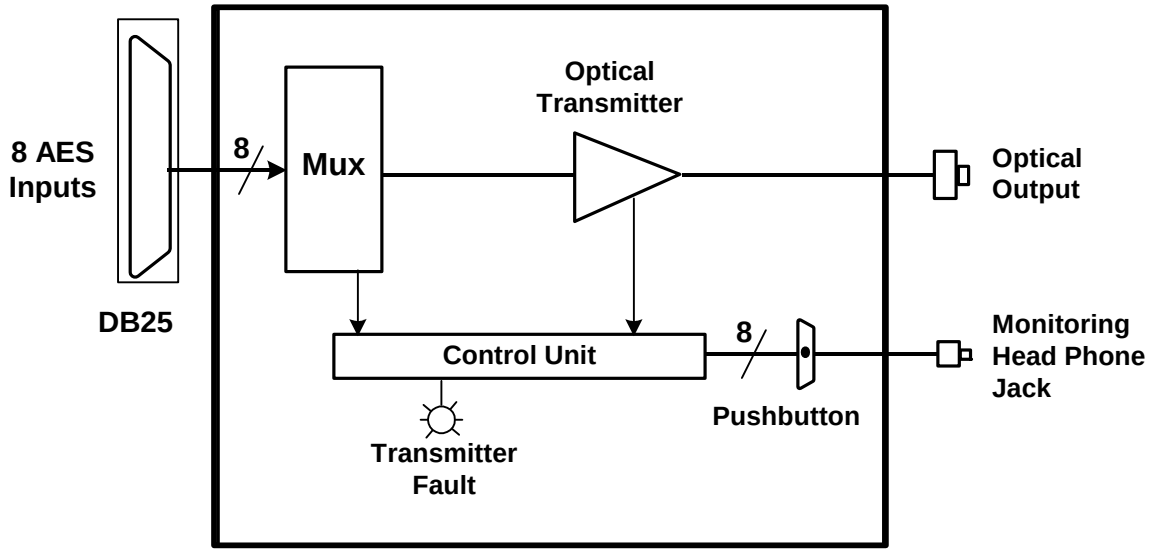

Figure 1-3: 7705AT-8 Block Diagram

2. INSTALLATION

The one slot 7705AT and 7705AT-8 versions come with a companion rear plate that has a 25 pin female D connector and one SC/PC (shown), ST/PC or FC/PC optical connector. The two slot 7705AT-2 version also has 6 BNC connectors for the audio. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

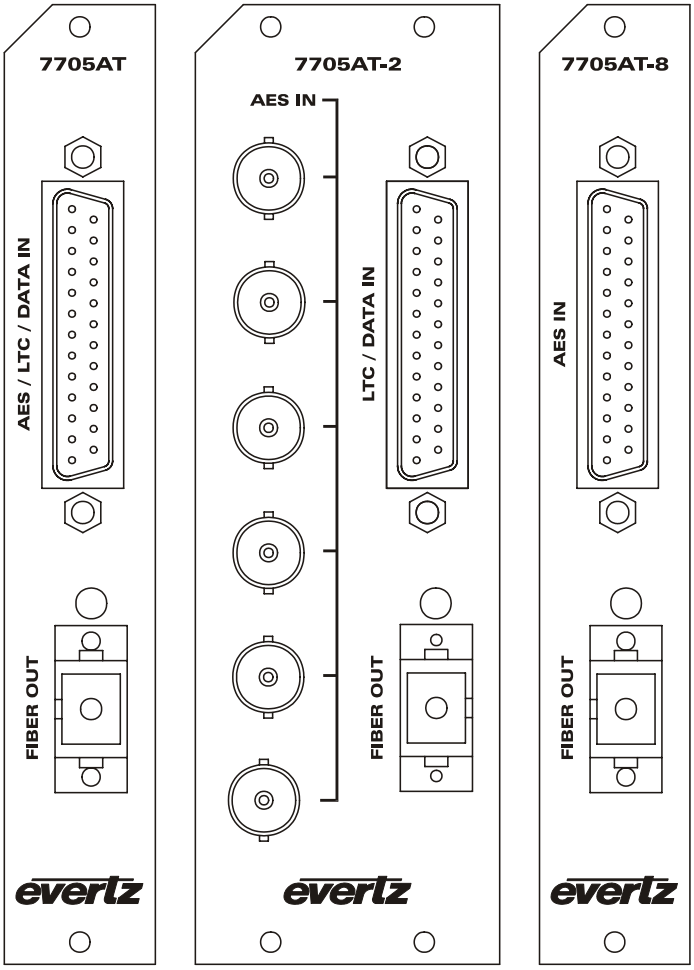

Figure 2-1: 7705AT Rear Panels

2.1. AES AUDIO AND RS-232/422 SERIAL PORT CONNECTIONS

The specific connector configuration depends on the version of the module that you have.

AES IN: On the 7705AT-2 there are 6 BNC connectors for connection of 6 unbalanced AES channels.

On the 7705AT-8 there is a 25 Pin D connector for connection of 8 unbalanced AES channels. Table 2-1 shows the pin definitions of the AES IN connector.

AES/DATA/LTC IN: On the 7705AT there is a 25 Pin D connector for connection of 6 unbalanced AES channels, 1 RS-232/RS-422 data channel, and one differential time code channel. The serial port portion of the connector consists of 2 in pins and 1 ground pin. The SEL 4 jumper located at the rear of the module determines whether the port will be operated as a balanced RS-422 Receive channel, or one RS-232 Receive channel (See section 5.2 for location of the SEL jumper). Table 2-1 shows the pin definitions for each version of the modules.

DATA/LTC IN: On the 7705AT-2 there is a 25 Pin D connector for connection of 1 RS-232/RS-422 data channel, and one differential time code channel. The serial port portion of the connector consists of 2 in pins and 1 ground pin. The SEL 4 jumper located at the rear of the module determines whether the port will be operated as a balanced RS-422 Receive channel, or one RS-232 Receive channel (See section 5.2 for the location of the SEL jumper). Table 2-1 shows the pin definitions for each version of the modules.

When the input is configured as an RS-422 input, jumper J21 allows you to determine the default state of the input when there is no signal connected. See section 5.3 for information about setting the jumper.

	Model					
Pin #	**7705AT**		**7705AT-8**		**7705AT-2**	
Sel 4	**RS232**	**RS422**	**RS232**	**RS422**	**RS232**	**RS422**
1	Ground	Ground	Ground	Ground	Ground	Ground
2	---	---	---	---	---	---
3	---	---	---	---	---	---
4	Ground	Ground	Ground	Ground	Ground	Ground
5	---	---	---	---	---	---
6	---	---	---	---	---	---
7	Ground	Ground	Ground	Ground	Ground	Ground
8	---	---	---	---	---	---
9	---	---	---	---	---	---
10	LTC + In	LTC + In	---	---	LTC + In	LTC + In
11	---	---	---	---	---	---
12	---	---	---	---	---	---
13	Ground	Ground	Ground	Ground	Ground	Ground
14	---	Rx + In	AES In 7	AES In 7	---	Rx + In
15	RX In	Rx - In	AES In 8	AES In 8	RX In	Rx - In
16	Ground	Ground	Ground	Ground	Ground	Ground
17	AES In 5	AES In 5	AES In 5	AES In 5	---	---
18	AES In 6	AES In 6	AES In 6	AES In 6	---	---
19	Ground	Ground	Ground	Ground	Ground	Ground
20	AES In 3	AES In 3	AES In 3	AES In 3	---	---
21	AES In 4	AES In 4	AES In 4	AES In 4	---	---
22	LTC - In	LTC - In	---	---	LTC - In	LTC - In
23	AES In 1	AES In 1	AES In 1	AES In 1	---	---
24	AES In 2	AES In 2	AES In 2	AES In 2	---	---
25	Ground	Ground	Ground	Ground	Ground	Ground

Table 2-1: DB25 Pin Connections

2.2. OPTICAL CONNECTIONS

The 7705AT modules are designed to work with either single mode or multi mode optical fiber.

FIBER OUT: There is one SC/PC (shown), ST/PC or FC/PC female connector with the optical output from the 7705AT as shown in section 3.1. This connector should be connected to the FIBRE IN connector of a 7705AR module at the destination end with a suitable fiber optic cable. The 7705AT transmits on the wavelength marked on the rear panel.

2.3. CARE AND HANDLING OF OPTICAL FIBER

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 chapter in the front of the binder.

2.3.1. Safety

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

The laser modules used in the 7705AT modules are Class I, with a maximum output power of 2mW.

3. SPECIFICATIONS

3.1. AES AUDIO INPUTS

Number of Inputs:
- **7705AT:** 6
- **7705AT-2:** 6
- **7705AT-8:** 8

Standard: SMPTE 276M, single ended synchronous or asynchronous AES (synchronous AES required when sample rate converter is disabled.)
Signal Level: 1V p-p ±0.1V
Connector:
- **7705AT:** Female DB-25
- **7705AT-2:** 6 BNC per IEC 169-8
- **7705AT-8:** Female DB-25

Resolution: 20 bits
Sampling Rate: 48KHz or 96KHz
Impedance: 75 Ohms unbalanced

3.2. DATA INPUT (7705AT and 7705AT-2 ONLY)

Number of Ports: 1 unidirectional RS 232 or RS 422 – jumper selectable
Connector: Female DB-25
Baud Rate: Determined by incoming data

3.3. LTC INPUT (7705AT and 7705AT-2 ONLY)

Standard: SMPTE 12M
Connector: Female DB-25.
Level: 0.2 to 4V p-p, balanced or unbalanced

3.4. OPTICAL OUTPUT

Connector: SC/PC, ST/PC or FC/PC female housing
Return Loss: < 14 dB
Rise and Fall Time: 400-700 ps
Wide Band Jitter: < 0.2 UI
Fiber Size: 9 μm core / 125 μm overall
Fiber Type: Single mode or multi mode

Optical Characteristics:

Model	Nominal Transmit Wavelength	Laser Feedback Structure	Line Width	Optical Power
7705AT13-xxx-x	1310 nm	FP	< 4.5 nm	-7.5 dBm
7705AT15-xxx-x	1550 nm	DFB	< 1 nm	0 dBm
7705AT27-xxx-x	1270 nm	DFB	< 1 nm	0 dBm
7705AT29-xxx-x	1290 nm	DFB	< 1 nm	0 dBm
7705AT31-xxx-x	1310 nm	DFB	< 1 nm	0 dBm
7705AT33-xxx-x	1330 nm	DFB	< 1 nm	0 dBm
7705AT35-xxx-x	1350 nm	DFB	< 1 nm	0 dBm
7705AT37-xxx-x	1370 nm	DFB	< 1 nm	0 dBm
7705AT43-xxx-x	1430 nm	DFB	< 1 nm	0 dBm
7705AT45-xxx-x	1450 nm	DFB	< 1 nm	0 dBm
7705AT47-xxx-x	1470 nm	DFB	< 1 nm	0 dBm
7705AT49-xxx-x	1490 nm	DFB	< 1 nm	0 dBm
7705AT51-xxx-x	1510 nm	DFB	< 1 nm	0 dBm
7705AT53-xxx-x	1530 nm	DFB	< 1 nm	0 dBm
7705AT55-xxx-x	1550 nm	DFB	< 1 nm	0 dBm
7705AT57-xxx-x	1570 nm	DFB	< 1 nm	0 dBm
7705AT59-xxx-x	1590 nm	DFB	< 1 nm	0 dBm
7705AT61-xxx-x	1610 nm	DFB	< 1 nm	0 dBm

3.5. AUDIO MONITORING OUTPUT

Number of Ports: 1
Connector: 3.5mm female audio jack
Audio Level: User adjustable with card edge potentiometer

3.6. SYSTEM PERFORMANCE

Input to Output Latency: < 1μs

3.7. ELECTRICAL

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

3.8. PHYSICAL

7700 or 7701 frame mounting:
Number of slots:
7705AT: 1
7705AT-2: 2
7705AT-8: 1

4. STATUS LEDS

4.1. MODULE STATUS LEDS

LOCAL FAULT (LD1): This Red LED will be On when there is an optical transmitter failure or when there is a fault in the module power supply. When the FRAME STATUS jumper is set to the ON position the FRAME STATUS bus will also be asserted. (See section 5.1)

MODULE OK (LD6): This Green LED will be On when the module is operating properly.

LINK (LD3): This Amber LED will be On when there is a valid link established with a 7705AR at the receiving end of the fiber optic link.

OPTICAL FAULT (LD4): This Red LED will be On when there is failure in the optical transmitter.

4.2. AUDIO MONITOR STATUS LEDS

Six LEDs (eight on the 7705AT-8) located on the lower end of the module (opposite the headphone jack) indicate which AES channel is currently being monitored on the analog monitoring headphone jack. AES LED 1 is located closest to the center of the module. See section 5.4 for information about operating the audio monitor.

5. JUMPERS AND USER ADJUSTMENTS

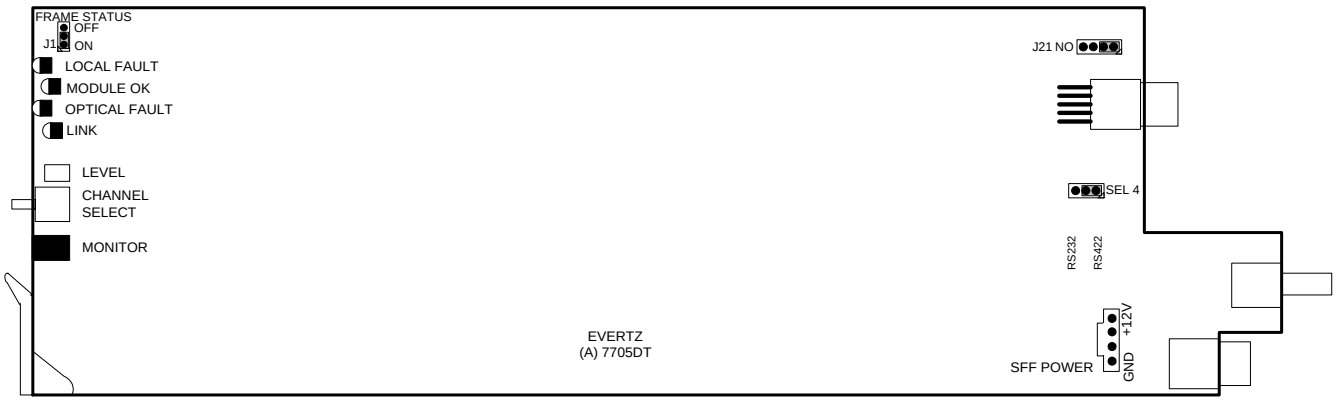

Figure 5-1: Jumper Locations

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

The FRAME STATUS jumper J1 located at the 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 PS 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 DATA COMMUNICATIONS STANDARD (RS-232 OR RS-422)

Jumper SEL 4 located at the rear of the module is used to configure whether the data port will operate in the RS-232 or RS-422 standard. The data port on the 25 pin D connector consists of a pair of inputs and a pair of grounds as shown in Table 2-1.

SEL 4: To set the port inputs to operate in the RS-232 standard, install the jumper in the RS-232 position.

To set the port inputs to operate in the RS-422 standard, install the jumper in the RS-422 position.

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

Jumper J21 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 5-2 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.

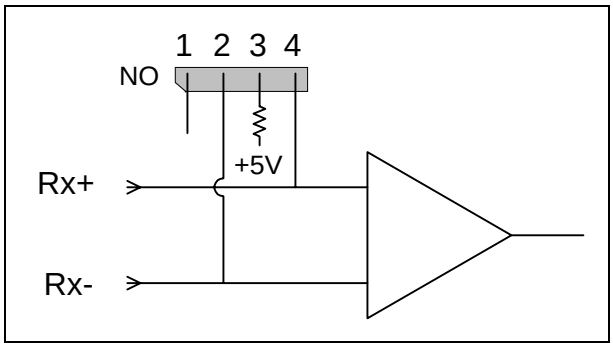

Figure 5-2: Receiver Input Pullup Configuration

If you want to override the default pullups set the appropriate jumper as shown in the chart below.

Jumper on pins	Function
1 & 2	Default pullups (Rx+ low, Rx- high)
2 & 3	Rx- pulled up to +5 volts, Rx+ default (low)
3 & 4	Rx+ pulled up to + 5 volts, Rx- default (high)

5.4. MONITORING THE AES AUDIO

A stereo headphone jack located at the front of the module is used to monitor the individual AES channels. Six LEDs located on the bottom of the module opposite the headphone jack indicate the AES channel currently being monitored. The AES1 LED is closest to the centre of the card. When the module powers up the audio monitor jack is turned off. Press the pushbutton to select AES1 channel pair for monitoring. The AES CH1 LED will come on. The monitoring volume level can be adjusted by turning the level potentiometer located beside the headphone jack. Press the pushbutton one or more times to monitor other AES channels. The appropriate LED will come on indicating which AES channel is currently being monitored.

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