



## Product Operation Manual

### *VL-FTX FORWARD TRANSMITTER MODULE*

*Ver 1.0*



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# 1. Introduction

## 1.1 Overview

The VL-FTX series of high performance 1310nm DFB laser transmitter modules is ideal for broadcast and narrowcast optical signal transportation applications. The modules provide a wide range of optical output powers to deliver both analog and digital signals. High performance, advanced pre-distortion circuitry achieves superior CSO and CTB. All configuration parameters of these modules can be monitored by LED screens on the front panel of the module, or by the VL-EMS network management module. The VL-FTX module can also be operated in AGC or MGC modes. These modes can be set up on the front panel.

## 1.2 Features

- High performance distributed feedback (DFB) laser with pre-distortion circuit
- Hot-swap capability
- Bandwidth 50~1003MHz
- 6/8/10/13/16/20 dBm optical output power
- Automatic/manual gain control (AGC/MGC)
- Broadband and narrowband input
- RF input test point
- Short circuit protection

## 1.3 Specifications

### 1.3.1 Optical Specifications

Output Wavelength	1310±20 nm
Output Power	6, 8, 10, 13, 16, 20 dBm
Connector Type	SC/APC

### 1.3.2 RF Specifications

Operational Bandwidth	50 to 1003 MHz
Input channels	NTSC 77 channels
Input Level	15±4dBmV/ch for broadband 27±4dBmV/ch for narrowband
AGC±4 dB RF Variation	Max. 1.0 dB
CSO (Note1,2)	Max. -63 dB
CTB (Note1,2)	Max. -67 dB
Flatness	Max. 1.5 dB
Return Loss	Max. -16 dB
Impedance	75Ω
Connector Type	F Female
Test point (F Male)	-20±1dB for broadband -32±1dB for narrowband

Note1: Testing: room temperature : 25°C

Note2: Optical link (fiber 15 km + attenuator), Receiver input power: -1 dBm

### 1.3.3 CNR Link Performance

Output Power \ Link Loss (dB)	07	08	09	10	11	12	13	14	15
06mW (08 dBm)	53	52	51	50					
08mW (09 dBm)		53	52	51	50				
10mW (10 dBm)			53	52	51	50			
13mW (11 dBm)				53	52	51	50		
16mW (12 dBm)					53	52	51	50	
20mW (13 dBm)						53	52	51	50

### 1.3.4 Electrical/Environmental/Mechanical

Power Consumption	<12.5 Watt
Operational Temperature Range	0 to 50°C (32 to 122°F)
Storage Temperature Range	-40 to 70°C (-40 to 158°F)
Relative Humidity	Max. 85% non-condensing
Dimensions	2.4cm W (x1 slot) x 11.0cm H x 39.5cm D
Weight	1.2 Kg

All specifications are subject to change without notice.

## 2. Operation Panel Description

The components and features of the Forward Transmitter Module are shown in Figure 2.1 and described in Table 2.1 and 2.2.

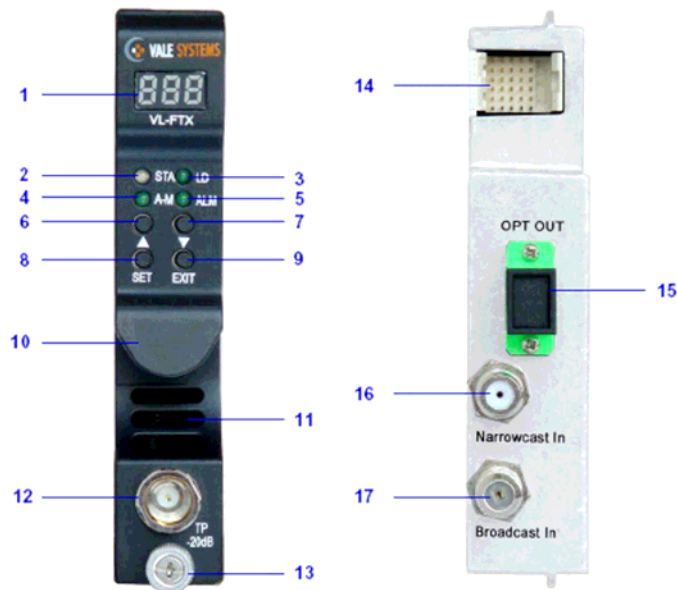


Figure 2.1 VL-FTX Operation Panels

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**Table 2.1 1310nm Forward Transmitter Components**

Component	Function
Module Housing	The enclosure, with guide rails on the top and bottom, contains the transmitter module, rear panel with connectors, and front panel.
Rear Panel	Includes the optical out/RF in ports, backplane connector, which provide signal and power connections to the chassis backplane.
Front Panel	Includes display LED, LED indicators, push buttons and test point.

**Table 2.2 VL-FTX Controls, Indicators, and Connectors**

(Refer to Figure 2.1)

Item	Description	Function
1	Display LED	Display the status, AGC&MGC value and alarm code of the transmitter
2	STA LED	Green indicates the module is operating normally. Red indicates the module has alarms
3	LD LED	Green indicates the VL-FTX module is working under the "LD" operation interface
4	A-M LED	Green indicates the VL-FTX module is working under the "AGC&MGC" operation interface
5	ALM LED	Green indicates the VL-RRX-04 module is working under the "ALM" operation interface
6	UP	Push button, for function selection or parameter setting
7	DOWN	Push button, for function selection or parameter setting
8	SET	Push button, for function selection or parameter setting confirmation
9	EXIT	Push button, exit certain operation mode
10	Handle	Used for module install and uninstall
11	Heat dissipation hole	Airflow for heat dissipation of the module
12	TP	Test point for RF output, -20dB, F type male connector
13	Thumbscrew	Fix the power supply module onto the chassis
14	30pin connector	Provides power and signals to the chassis backplane, connector type is male
15	Optical output port	Port for optical output, connector type is SC/APC
16	RF input port	Port for narrowband RF input, connector type is F-female
17	RF input port	Port for narrowband RF input, connector type is F-female

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### 3. Precautions

Failure to comply with these general safety precautions and with the specific precautions described elsewhere in this manual violates the safety standards of the design, manufacture, and intended use of the device. Vale Systems Inc. assumes no liability for the customer's failure to comply with these precautions.

**CAUTION:** Do not operate the receiver outside of its ratings. Doing so may result in unsatisfactory performance, receiver failure, shortened receiver life span, or a safety hazard.

**CAUTION:** Do not attempt to modify or service any part of a receiver module. Doing so voids the warranty. Return the unit to Vale Systems Inc. for service and repair.

**CAUTION:** Do not restrict airflow in front of or behind the chassis. The Return Receiver should be operated in an ambient environment between 0 and 50°C (32 and 122°F).

**CAUTION:** Store the module away from corrosive materials, at a temperature between -40 and +70°C (-40 and +158°F), and with no more than 85% humidity, non-condensing.

### 4. Configuring the 1310 nm Forward Path Transmitters

#### 4.1 Installation

This section describes the installation process for the Forward Path Transmitters.

1. Inspect for bent pins on the backplane connector at the rear of the module. Straighten any bent pins before installing the module.
2. Gently insert each module into a slot in the front of the chassis. Be careful to align the metal guide rails on the top and bottom of the module with the nylon guides in the interior of the chassis housing.
3. Lock the thumbscrew on the front of the module.
4. Repeat Steps 1 through 3 to install the remaining modules in the chassis.

**Note:** The narrowband input level should be 12dB higher than the input level of broadband. Ensure the frequencies are not the same when there are both narrowband and broadband input.



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### 4.3. Un-install the Forward Transmitters

**DANGER: Laser Radiation**—Avoid direct exposure to beam. Inbound laser radiation associated with this optical input jump is generated by a Class IIIb laser product. Disconnected optical connectors might emit invisible optical radiation. Laser light, visible or invisible, can seriously injure eyes and even cause blindness.

1. Disconnect the optical fiber(s) from the rear panel of the receiver.  
Immediately place protective caps over the bulkhead and fiber connector.
2. Disconnect the RF cables from the F-connectors.
3. Loosen the thumbscrew on the front panel of the module.

**CAUTION:** Do not pull on the thumbscrew to remove the module. Pull on the handle that the thumbscrew goes through to remove the module.

4. Gently pull the module from the chassis using the handle that the thumbscrew goes through.

## 5. Alarms Definition

Displayed Message	Alarm Status	System Response
001	Optical output low	STA LED turns to red
002	Optical output high	STA LED turns to red
003	Laser bias high	STA LED turns to red
004	Laser temperature high	STA LED turns to red
005	RF input low	STA LED turns to red

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## 6. Maintenance and Troubleshooting

This chapter describes the maintenance and troubleshooting information for the transmitter. Authorized personnel should undertake all maintenance and troubleshooting work mentioned hereunder. When Status light is red, operator can use "▲", "▼" and "SET" push button switch to check the alarms (as section 5 stated).

### 6.1 Troubleshooting

Problem	Steps to take
RF Input low	<ol style="list-style-type: none"><li>1. Verify the RF input total power is beyond -21.2dBm</li><li>2. If all is normal, contact manufacturer.</li></ol>
No optical power at output port	<ol style="list-style-type: none"><li>3. Clean connector.</li><li>4. Verify laser function is set on.</li><li>5. Measure the optical power at output port using required optical power meter.</li><li>6. If there is no optical power, the unit will require a factory check; contact manufacturer.</li></ol>
Optical power lower than specified	<ol style="list-style-type: none"><li>7. Ensure all connectors are clean.</li><li>8. Verify fiber cable ferrule end is used with the right type.</li><li>9. Measure the optical power at output port using required optical power meter.</li><li>10. If the optical power still is lower, the unit will require a factory check; contact manufacturer.</li></ol>

**DANGER/CAUTION:** Do not remove the cover of the transmitter under any circumstances. Removing the cover could cause irreparable damage to the unit, and will void your warranty.

**DANGER/CAUTION:** Do not attempt to modify or service any part of the device. Doing so will void the warranty. Return it to VALE SYSTEMS Inc. for service and repair. Contact the VALE SYSTEMS Inc. Customer Service Department for a return authorization number.