

Inotech

1550nm external modulated optical transmitter operating manual



Table of Contents

Table of Contents.....	- 1 -
Safety Instruction.....	- 2 -
1. Overview.....	- 3 -
1.1 About This Manual.....	- 3 -
1.2 Product Description.....	- 3 -
1.3 Product Applications.....	- 4 -
2. Technique Parameters.....	- 5 -
2.1 Optical Parameters.....	- 5 -
2.2 Model Test Indicators.....	- 5 -
2.3 Test Condition.....	- 6 -
2.4 Technical Data Sheet.....	- 6 -
3. Panel Interface and Menu System Description.....	- 7 -
3.1 Front Panel.....	- 7 -
3.1.1 Indicator Description.....	- 7 -
3.2 Rear Panel.....	- 8 -
3.3 Power Module.....	- 8 -
3.3.1 220V Power Module.....	- 8 -
3.3.2 48V Power Module.....	- 8 -

Safety Instruction



1. Overview

1.1 About This Manual

This instruction manual is a complete guide to install and operate the (1RU) WT-1550-EM30 series 1550nm external modulated optical transmitter. Please read the entire manual before beginning installation.

This manual applies to WT-1550-EM30 series external modulated optical transmitter.

- Chapter 1 gives general information about the WT-1550-EM30 series 1550nm external modulated optical transmitter.
- Chapter 2 describes the complete technical specifications of WT-1550-EM30.
- Chapter 3 describes the front/rear panel interfaces and menu system.
- Chapter 4 tells you how to install WT-1550-EM30 series external modulated optical transmitter.
- Chapter 5 tells you the communication setting of WT-1550-EM30.
- Chapter 6 describes maintenance and what to do in the event of problems.

1.2 Product Description

WT-1550-EM30 series optical transmitter is a 1550nm DFB laser external modulated transmitter. It is specially developed for the CATV signal that satisfies HFC network, and the long-distance transmission of cable phone and cable data.

Working principle

WT-1550-EM30 series transmitter has 7 function modules: RF control, DFB laser, optical modulator, SBS control, CSO control, communication/display control and power supply.

Automatic gain control circuit (AGC) or manual gain control circuit (MGC) amplifies the RF signal. AGC or MGC control makes the optical modulator maintain a suitable input level. Use the detected RF root-meansquare(RMS)-total power to calculate the optical modulation index(OMI).

In general we recommend using the AGC function, and special users can use the MGC function to adjust the CNR/CSO/CTB performance indexes.

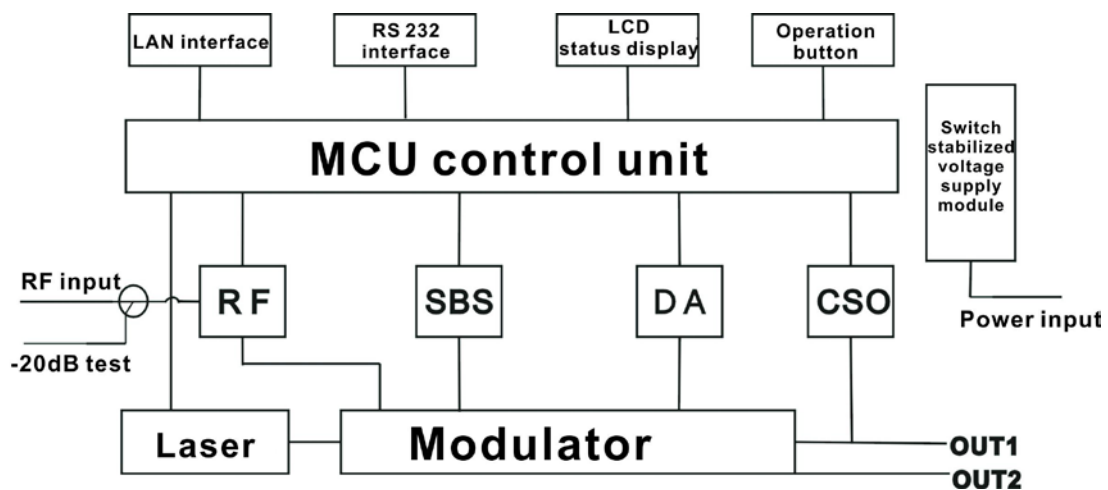
The core of transmitter is the optical modulator. The 1550nm signal input the optical modulator, make the laser intensity changed follow the external RF signal voltage, and then generate the AM optical signal.

Stimulated Brillouin Scattering (SBS) occurs, when the optical input power is greater than a certain threshold value. SBS generate the lower frequency backscattered light which will attenuate the transmission light and return to the laser while destroying its performance. Causing optical power fluctuation, generates large noise, and seriously deteriorates the system carrier to noise ratio (CNR). To improve the SBS threshold, WT-1550-EM30 series optical transmitter adopts SBS control technology which is independent researched and developed by ourselves. The threshold value can be set up to 19dBm.

The optical modulator has a two-way optical signal output. Parts of that signal are routed to an InGaAs photodiode. This detection of the optical signal has two functions:

- 1) Detect whether the laser is normal working. Once the output optical power is 2dB lower than standard power, alarm will be set off.
- 2) Detect CSO distortion to optimize the bias point of the optical modulator. For working normal the detector circuit needs at least two carrier signal inputs with an interval of 24MHz. There is a CSO initialization program in the boot process. If the CSO install failed, the RF indicator will flash red, see details in **6.2 Troubleshooting**.

Block Diagram



1.3 Product Applications

- High-performance long-distance transmission
- High-power distribution network
- Redundancy loop architecture
- FTTx network
- RFOG application
- DWDM network

2. Technique Parameters

2.1 Optical Parameters

Item	Unit	Value
Optical Wavelength	nm	1545~1560 (or specified by the user)
Side-mode Suppression ratio	dB	>30
Relative Intensity Noise	dB/Hz	<-160
Wavelength Adjustment Range	GHz	+/-50GHz
Optical Power	dBm	2*7, 2*8, 2*9, 2*10
SBS Threshold Value	dBm	+13~+19 (Continuously adjustable)
Laser Linewidth	MHz	0.3

2.2 Model Test Indicators

Test Model	C42	D59	D84	D84
Channel Plan	CENELEC42	PAL D59	PAL D84	PAL D
Channel Number TV/FM/QAM64	42/0/0	59/0/0	84/0/0	30/0/48
Bandwidth Noise	5	5	5	5
CNR Tx/Rx	55.5	54.0	52.5	54.5
CNR Link 1	55.0	53.5	52.0	54.0
CNR Link 2	53.0	52.5	50.5	52.5
CNR Link 3	50.5	50.5	49.0	51.0
CSO Tx/Rx and Link 1	64	65	65	70
CSO Link 2	63	65	65	70
CSO Link 3	62	64	63	65
CTB	65	65	65	68

2.3 Test Condition

	First stage EDFA	First paragraph fiber length	Second stage EDFA	Second paragraph fiber length	RX	SBS (dBm)
Tx/Rx	No	No	No	no	0dBm	13.5
Link 1	No	35km	no	no	0dBm	13.5
Link 2	16dBm	65km	no	no	0dBm	16
Link 3	13dBm	50km	13dBm	50km	0dBm	13.5

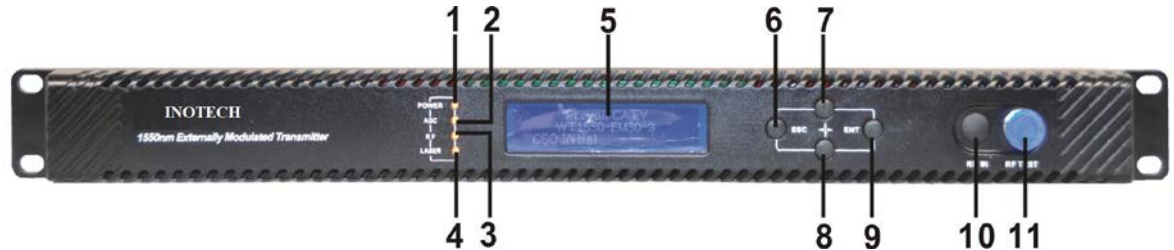
Rx with 8 pA/ÖHz input noise current density; EDFA with 5dB noise figure; RF input level at 80 dBµV / TV channel;

2.4 Technical Data Sheet

Item	Unit	Technical Parameters
RF range	MHz	47~1003
RF flatness	dB	+/-0.75
RF return loss	dB	>16
RF input impedance	Ω	75
RF input connector type		F type
Rated input level	dBµV	80
Input level range	dBµV	78~96 (AGC mode, modulating signal)
AGC control range	dB	+3~-3
MGC adjustable range	dB	0~15
Optical connector		SC/APC, FC/APC
Operating temperature	°C	-5~45
Storage temperature	°C	-30~+70
Power Source Specification	V	90~265VAC
		36~72VDC
Consumption	W	≤60
Dimension	mm	483(L) × 455(W) × 44(H)
Total Weight	kg	5.5

3. Panel Interface and Menu System Description

3.1 Front Panel

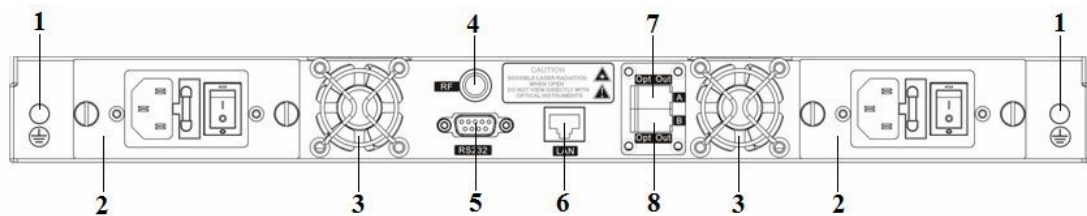


1	Power indicator	2	AGC indicator	3	RF modulation degree indicator
4	Laser indicator	5	LCD	6	ESC key
7	UP key	8	DOWN key	9	Enter key
10	RF input port (or on the rear panel, optional)	11	-20dB RF input test port		

3.1.1 Indicator Description

Power indicator	One power supply	LED yellow
	Two power supplies	LED green
AGC indicator	AGC mode	LED green
	MGC mode	LED off
RF modulation degree indicator	Normal	LED green
	Abnormal	LED flash red
Laser indicator	Bias current, cooling current and output power are all normal	LED green
	At least one of bias current, cooling current and output power is abnormal	LED flash red

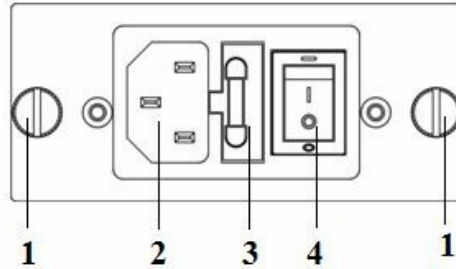
3.2 Rear Panel



1	Ground stud	2	Power module	3	Fan
4	RF input port (or on the front panel, optional)	5	RS232 interface	6	LAN interface
7	Optical output interface A (or on the front panel, optional)	8	Optical output interface B (or on the front panel, optional)		

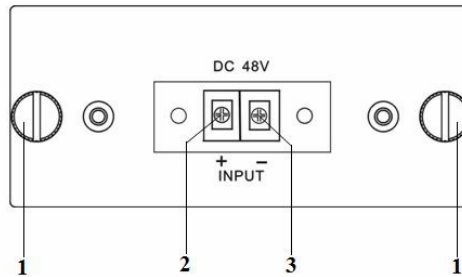
3.3 Power Module

3.3.1 220V Power Module



1	Mounting screws	2	220V power outlet	3	Fuse
4	Power switch				

3.3.2 48V Power Module



1	Mounting screws	2	+ Positive terminal block	3	- Negative terminal block
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