1550nm Directly Modulated Optical Transmitter

CATV AM Laser Transmitter

1. Product overview

According to the Next Generation Broadcasting (NGB) planning and PON standards, 1550nm is defined as the transmission wavelength for HFC downstream. The high cost of 1550nm external modulated transmitter and dispersion effects of 1550nm directly modulated make network transformation difficult. Thus, we create the 1550nm directly modulated optical transmitter with electronically controlled dispersion compensation. It supports up to 1.2GHz band and DOCSIS 3.1 system. With two RF inputs and high isolation, it enables the signal transmission of QAM and IPQAM smoothly. Support a transmission distance of 50KM with electronically controlled dispersion compensation. Built-in CWDM is optional for multi-wavelength networking.

2. Performance Characteristics

➢ 1.2GHZ band, support DOCSIS 3.1 system.

➢ The AGC and MGC gain control modes are optional.

➢ Two inputs with 50dB isolation for high quality RF insertion.

➢ Dual power supply; hot backup; a variety of power supply options are available, optional AC220V and DC48V.

➢ Laser output power, bias current and cooling current are detected in real time.

➢ Optional CWDM for optical signal insertion.

➢ Electronically controlled dispersion compensation can support a transmission distance of 50KM.

➢ Low-cost solution is comparable to the performance of external modulated transmitter.

➢ ITU standard wavelength is optional.

3. Block Diagram
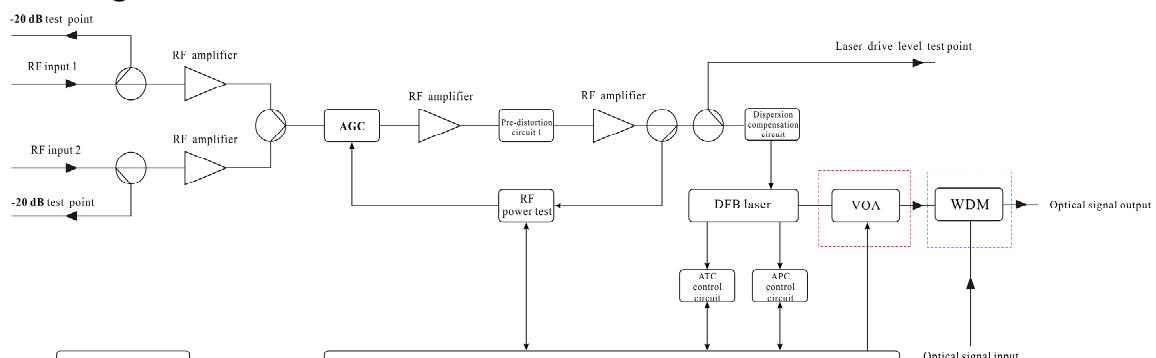
Note: The optical attenuator in the red dashed box and the wavelength division multiplexer in the blue

4. Technique Parameters

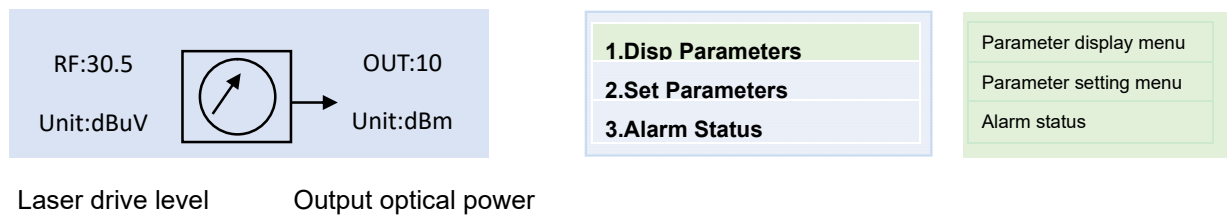| Item	Unit	Parameter	
Optical part			
Optical wavelength	nm	ITU wavelength	
Laser type		Butterfly-typed DFB laser	
Optical modulation mode		Direct optical intensity modulation	
Optical connector type		FC/APC or SC/APC	
Output optical power	mW	10	The insertion loss of the VOA and CWDM is excluded.
External optical signal input	dBm	-5～10	
RF part			
Frequency range	MHz	47～870/1003/1218	
RF input level	dBuV	77± 5	
Flatness in band	dB	± 0.75	
Input return loss	dB	≥ 16	
RF AGC control range	dB	±5	
RF MGC adjustable range	dB	0～20	
RF input isolation	dB	≥ 50	Isolation between two RF inputs
RF input test port	dB	-20±1	
Laser drive level test port	dB	-20±1	
Electronically controlled optical attenuator tolerance	dB	≤1: ATT 0-15dB	
		≤3: ATT 16-20dB	
CNR	dB	≥ 48	550MHZ 59CH analog signal 77dBuV/CH
C/CSO	dB	≥ 58	550-870MHZ 40CH digital signal 67dBuV/CH
C/CTB	dB	≥ 63	25 Km, -1dBm input
CNR	dB	≥ 46	550MHZ 59CH analog signal 77dBuV/CH
C/CSO	dB	≥ 55	550-870MHZ 40CH digital signal 67dBuV/CH
C/CTB	dB	≥ 63	50Km, -1dBm input
MER	dB	≥ 40	25 Km, -1dBm input, 96CH digital 77dBuV/CH
		≥ 39	50 Km, -1dBm input, 96CH digital 77dBuV/CH
Others			
Maximum power consumption	W	≤10	
Operating temperature	℃	-5 ～ + 55	
Storage temperature	℃	-30 ～ + 70	
Weight	Kg	5.5	

5. Operation Instructions of the Display Menu

▲▼ key: The cursor can be moved left or right or up and down, and the selected module or menu is highlighted.

Enter key: Press **Enter** to enter the next submenu or set the parameters in the submenu. Press **Enter** to confirm.

ESC key: Exit or return to the previous menu.

The menu displayed after power on: Press Enter to enter the first level submenu:

RF:30.5   OUT:10
Unit:dBuV   Unit:dBm

Laser drive level   Output optical power

1.Disp Parameters	Parameter display menu
2.Set Parameters	Parameter setting menu
3.Alarm Status	Alarm status

Disp Parameters, the second level submenu:

Laser Output	xx dBm	Laser output optical power
Voa Input	xx dBm	Optical power after attenuation (without WDM, no this menu)
Master Input	xx dBm	External optical signal power (without WDM, no this menu)
Laser Bias	xx mA	Laser bias current
Laser Temp	xx ℃	Internal temperature of the laser
Tec current	xx A	Laser cooling current
RF Chan No	xx	Transmission channel numbers
Laser RF	xx dBuV	Laser drive level
RF Ctrl Mode	AGC	RF control mode
AGC Ref	x dB	AGC offset (in AGC mode)
MGC ATT	x dB	MGC attenuation (in MGC mode)
Wave Length	1550	+5V monitoring voltage
+5V Read	x v	-5V monitoring voltage
-5V Read	x v	+24V monitoring voltage
+24V Read	x v	Equipment wavelength
S/N		Serial number
BOX Temp	xx ℃	Current internal temperature
IP Address		Equipment IP address
Mask		Equipment subnet mask
GTW		Equipment gateway
Mac		Equipment MAC address
Soft Ware Ver		Equipment software version number

Set Parameters, the second level submenu:

Set Laser Output Unit	dBm	Optical power unit: dBm, mW optional	
Set Buzzer Alarm	ON	Buzzer alarm: ON, OFF optional	
Set RF Control Mode	AGC	RF control mode: AGC, MGC optional	
Set MGC ATT	XX dB	MGC attenuation: 0-20 optional	
Set AGC Ref	XX dB	AGC offset: ±3dB optional	
Set OPT ATT Mode	AUTO	Set the optical power attenuation mode: AUTO or Manu optional	Without WDM, no this menu
Set OPT ATT	XX dB	Set the optical power attenuation value: 0~15dB optional	
Set OPT Delta	XX dB	Set the difference between the main optical power and the inserted optical	
Set Fiber C Length	xxKM	Set transmission distance: 0~50KM optional, 1KM stepping.	
Set Channel Number	XX	Set the channel number: 0-100 optional	
Set IP Addr		Set the equipment IP address	
Set Subnet Mask		Set the subnet mask	
Set Gate Way		Set the gateway	
Restore Factory Config		Reset to the default	

Alarm Status, the second level submenu:

|	
Laser RF	Laser level alarm: The default normal range is 80~110dBuV, which can be set through the network
Laser Temp	Laser temperature alarm: The default normal range is 25±10°C, which can be set through the network
Laser Bias	Laser bias current alarm: The default normal range is 20~90mA, which can be set through the network
Laser TEC	Laser cooling current: The default normal range is -1.5~1.5A, which can be set through the network
Laser Output	Output optical power alarm: The default normal range is 2 to 25 mW, which can be set through the network
+5V Alarm	+5V alarm: The default normal range is 5±1V, which can be set through the network management.
-5V Alarm	-5V alarm: The default normal range is -5±1V, which can be set through the network management.
+24V Alarm	+24V alarm: The default normal range is 24±2V, which can be set through the network management.

6. Structure Description
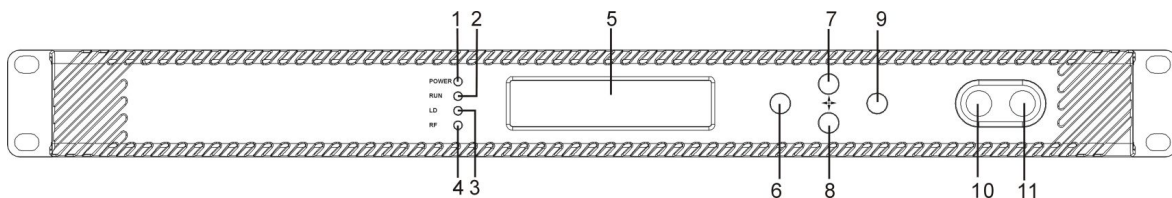
Front panel

| 1	Power indicator
2	Device running indicator: This indicator will flash by 1Hz frequency after the device start running normally.
3	Laser working status indicator:

	Steady green light: The laser is operating normally. Steady red light: The laser is not turned on. Blinking red light: The device has a parameter alarm. You can view the alarm in the Alarm Status, the second level submenu.
4	Laser drive level indicator: Steady green light: Drive level is normal. Blinking red light: Drive level alarm. You can view the alarm in the Alarm Status, the second level submenu.
5	160×32 dot-matrix LCD screen: used to display all the parameters of the machine.
6	Display the exit or cancel key of the setup menu.
7	Display the up or increase key of the setup menu.
8	Display the down or decrease key of the setup menu.
9	Display the enter key of the setup menu.
10	Laser switch: ON: The laser is on. OFF: The laser is off. Keep the laser off before the device is powered on and turn on the laser after the self-inspection is completed when power on.
11	Laser drive level test port: -20dB
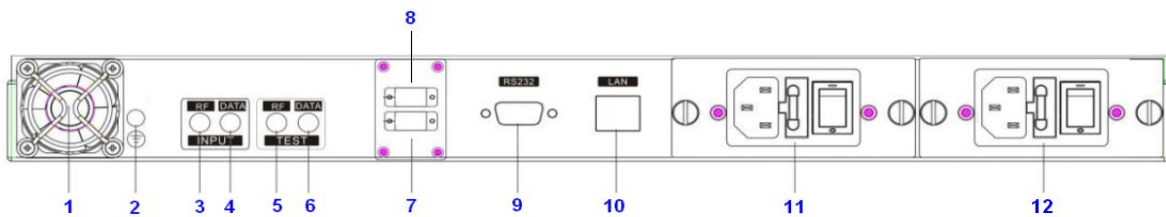
Rear panel

1	Fan	7	Optical signal output
2	Ground stud, ensure good grounding before power on	8	Optical signal input: without WDM, no this port
3	RF input 1	9	RS232 interface
4	RF input 2	10	LAN interface
5	RF input 1 test port -20dB	11	Power module 1, hot swappable
6	RF input 2 test port -20dB	12	Power module 2, hot swappable

7. Dimension
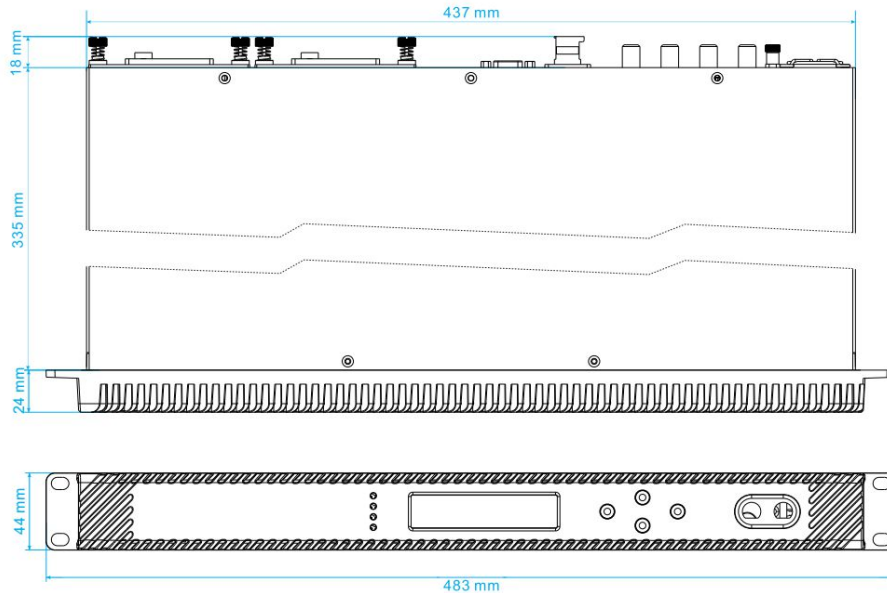
8. Attention

➢ Ensure the package is not defaced. If you think the equipment has been damaged, please don't electrify to avoid worse damage or do harm to the operator.

➢ Before the equipment is power on, make sure the housing and the power socket is reliably grounded. The grounding resistance should be <4Ω, so as to effectively protect against surges and static electricity.

➢ Optical transmitter is professional equipment. Its installation and debugging must be operated by special technician. Read this manual carefully before operating to avoid damage to equipment caused by fault operation or accident harm to the operator.

➢ While the optical transmitter is working or debugged, there is an invisible laser beam from the optical output adapter on the front panel. Avoiding permanent harm to the body and eye, the optical output should not aim at the human body and people should not look directly at the optical output with the naked eye!

LASER RADIATION

➢ When the fiber connector is not in use, it should be put on the dust jacket to avoid dust pollution and keep the fiber tip clean.