
1550nm Optical Transmitter Operation Manual

(VER1.0)

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Dear Customers

Thanks for your selecting optical products of our company. From now on you can get satisfactory technical support and services. At the same time, if you have any proposal or suggestion, please do not hesitate to tell us.

To make sure that you can operate this equipment correctly, please read this manual carefully first.

Caution

These servicing instructions are for use by qualified personnel only. To reduce the risk of electrical shock, do not perform any servicing other than that contained in the installation and troubleshooting instructions. You should obey the following instructions:

- This product contains DFB LD module, an electrostatic sensitive device. You should abide by precautions on electrostatic sensitive devices in handle and operation. If not, perpetual degrade can be encountered.
- Do not look into Output Connector in the back panel of the transmitter with power applied. Laser output is invisible, and eye damage.
- Turn off power supply and clean terminal surface of SC/APC or FC/APC connector by cotton-dipped alcohol, if it is contaminated.
- Avoid shock of pulse from power supplies, and don't turn on or turn off the equipment frequently, if not, operating life of laser diode will be much reduced.
- Operating life of LD has direct relation with temperature. The equipment room must be breezy with moderate temperature.

The company reserves the right to revise this publication and to make change in content from time to time without obligation to provide notification of such revision or change.

The company provides this manual without warranty of any kind, including, but not limited, to the implied warranties of merchantability and fitness for a particular purpose. The company may make improvements or changes in the products described in this manual at any time.

This series internal-modulated transmitter performs RF-to-optical signal conversions in 1550nm transmission link.

Features:

1U 19' standard case with liquid crystal display (LCD/VFD) in front panel;

Frequency bandwidth: 47—750 / 862MHz;

Output power from 4 to 10mw;

Advanced pre-distortion correction circuit;

AGC/MGC;

Automatic power control (APC) and Automatic temperature control (ATC) circuit.

Specifications

Parameter	Value
Wave length (nm)	1550±5
Output Power (mW)	4, 6, 8, 10
Link Losses (dBm)	6, 8, 9, 10
CNR (dB)	51
CTB (dBc)	65
CSO (dBc)	60
Connector	SC/APC or FC/APC

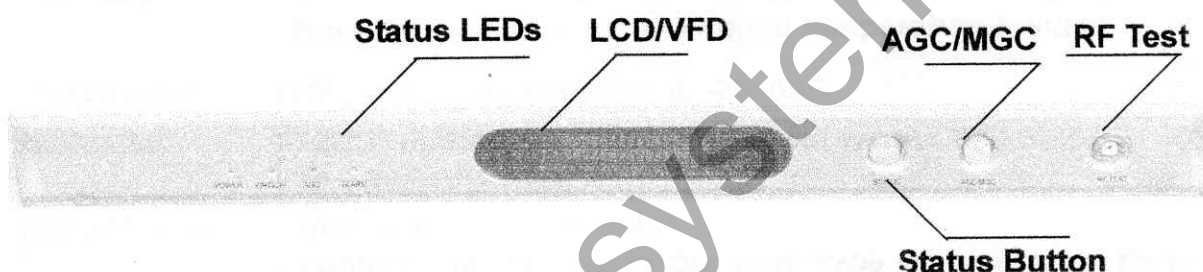
RF Parameter

Parameter	Value	
Bandwidth (MHz)	47~750	47~862
Input Impedance (Ω)	75	
Input Return Loss (dB)	≥ 14	≥ 12
Input Level Range (dB μ V)	80±5	
Level adjustable range (dB)	0~20	
In-band Flatness (dB)	±0.75	±1
Level of Test Point (dB μ V)	Similar to input level (1IC) Input Level +12 (2ICs)	

General parameter

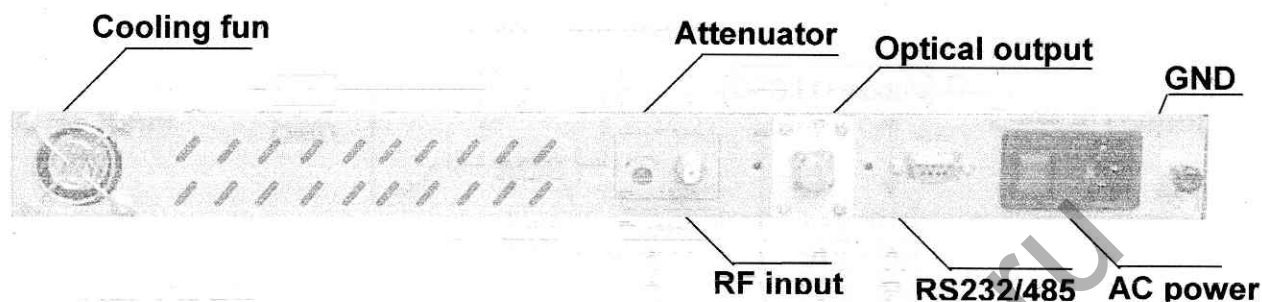
Parameter	Value
Input voltage (V)	AC 80~145/ 150~260
Current Consumption (A)	0.3
Operating Temperature (°C)	0~+50
Dimensions (mm)	483(L)×340(W)×45(H)

■ Front Panel



Item	Explanation
Power	LED on: The power supply works. LED off: The power supply doesn't work.
Optical	LED on: With optical output power. LED off: Without optical output power.
AGC	LED on: at AGC mode. LED off: at MGC mode.
Alarm	LED on: RF input level is too high: AGC mode, RF input level is higher than:95dBuV(*1 IC)/ 85dBuV(*2 IC) ; MGC mode, RF input level is higher than:90dBuV (*1 IC)/80dBuV(*2 IC);
Status Bottom	Select status of LCD/VFD displaying.
AGC/MGC	Switch mode of gain control.
RF TEST	RF test port, 75Ω F connector, RF level of this test port is about 12dB higher than input port.

■ Back Panel

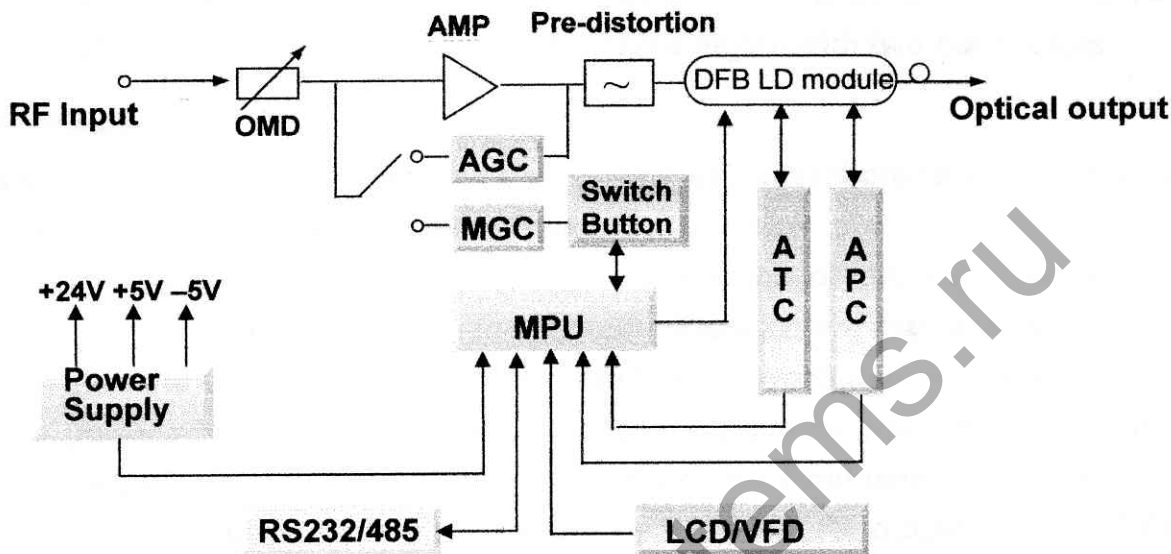


Item	Explanation
Cooling fan	When internal temperature of laser module extends 30℃, the fan will begin to work and adjust temperature inside.
Attenuator	RF input level adjustment, -20~0dB
RF input	75Ω F connector. Typical RF input range: $80 \pm 5\text{dBuV}$ (1 IC), $70 \pm 5\text{dBuV}$ (2 ICs).
Optical output	Optical output connector. Confirm you are using the right type of connector before connect the equipment. When the connector is idle, be sure to place a dust cover on the connector to protect the surface from dust or damage. Do not look into Optical Output Connector in the back panel of the transmitter with power applied.
RS232/RS485	RS232/485 communication interface.
AC POWER	Switch, socket and fuse tube. ON/OFF: Power supply is turned on/off. Type of Fuse tube: 1.5A/250V. To replace fuse tube, please turn off the switch first, then open the cover and change it. For continued protecting against fire, replace all fuses only with fuses having the same electrical ratings.
GND	Grounded terminal. Make sure ground wire is connected to the actual surface of the earth.

Remarks:

1. When voltage of power supply is abnormal or RF input level is too high, AGC mode: $> 85\text{dBuV}$ and MGC mode: $> 80\text{dBuV}$, the buzzer will make sound, and 'ALARM' LED in front panel will be lit.
2. At the same time, to protect laser module, the circuit of laser module will be cut off when RF level is too high.
3. To protect laser module, the power supply of laser module will be cut off when RF level is too high.

■ Functional Diagram



Going through amplifier module and AGC circuit, RF input signal is amplified and controlled in gain, this ensures high sensitivity and allows low-level RF input. Adjusting the attenuator can change the optical modulation degree.

MPU (Micro processor unit) controls ATC (Automatic temperature control) & APC (Automatic power control circuits) and keeps watch on main status of laser module. Main operating parameters: optical power, interior temperature, +24V, $\pm 5V$ are displayed by LCD/VFD.

■ Accessories

Make sure the following accessories for the product is provided.

Accessory	Quantity
AC power supply wire	1pc
Operation manual	1pc

■ Preparation

1. Make a RF cable with F plug in each end, then insert one end into output port of head-end equipment. RF output level must be $80 \pm 5\text{dBuV}$ (1 IC) or $70 \pm 5\text{dBuV}$ (2 ICs).
2. Splice the transportation fiber cable to a pigtail with FC/APC or SC/APC connector (the same kind as the output port of transmitter). Fusion splicing is recommended because it has low insertion loss and is the most reliable method.

Splicing should be done by a technician experienced in splicing fiber.

3. Prepare a Field-intensity meter or spectrum analyzer or other instrument that can test RF level, an optical power meter and a pigtail with two connectors.

■ Installation

1. Install the transmitter in a steady place and verify that there is enough space for heat sinking at the back of transmitter.
2. Connect grounded terminal to the actual surface of the earth through a ground wire and ensure that ground resistance is no more than 4 ohms.
3. Make sure the 'AC POWER' switch is off before connecting power wire.
4. Plug power wire into the socket (The socket should be well grounded). Turn on the 'AC POWER' switch. Then 'power' LED on the front panel will be lit.
5. Connect RF input port of transmitter to the head-end RF output. Then 'RF IN' LED on the front panel will be lit.
6. Connect the optical output port to the power meter.
7. Connect RF test port to Field-intensity meter. Read RF level from Field-intensity meter and slowly adjust RF input attenuator is 75-85dB μ V (1IC) or 77-87dB μ V (2IC).
8. Turn on the optical power meter and verify if the reading accords with nominal value of the transmitter.
9. Check the readings of LCD/VFD on the front panel.
10. If all items are all right. connect the necessary cables correctiv. and now the transmitter can be put into service.

Caution

- To ensure the lowest loss in connection. please confirm surface of the connector is clean. if not. you should clean it.

To clean the connector:

1. Laser output is invisible. and eve damage result. Make sure 'AC POWER' switch on the back panel is off before cleaning the connector.
2. Caretully clean the optical connector using a suitable optical connector cleaning kit. if an optical connector cleaning kit is not available. clean the connector using pure isopropyl alcohol (99%) and a lint-free wipe. Dry it naturally in the air or with filtered compressed air.

■ Operation

The procedure of operation is:

1. Turn on 'AC POWER' switch on the back panel, then 'POWER' LED on the front panel is lighted.
2. When RF input signal and power supply both work normally, the laser module will be initiated and has optical signal output; and 'OPTICAL' LED on the front panel is lighted.
3. The red 'alarm' LED on the front panel is off in normal status. When RF input level is too high or the power supply is out of order, 'alarm' LED will be lighted and the buzzer will make an alarm sound.
4. The equipment has been adjusted to the best status before leave factory.

■ LCD/VFD Display

The equipment monitors the main working parameter: power supply output, optical output power, working current of laser module, internal temperature of laser module, modulation ratio, cooling current of laser module and displays them through LCD/VFD on the front panel.

Steps

- 1) Turn on 'AC POWER' switch on the back panel
- 2) In 2-3 seconds, it displays:

WELCOME TO YOU

- 3) Then displays +24V output of power supply.

+24 read 23.9V

It indicates actual value of +24V output is +23.9V.

- 4) Press Button up/ Button down to know other parameters. Take button down for example:

Press Button down, LCD/VFD displays optical modulation degree:

OMD read 2.6%

It indicates actual value of optical modulation degree is 2.6%.

5) Press Button down, LCD/VFD displays +5V output of power supply:

+5 read 5.1v

It indicates actual value of +5V output is +5.1V.

6) Press Button down, LCD/VFD displays -5V output of power supply:

-5 read 5.0V

It indicates actual value of -5V output is -5.0V.

7) Press Button down, LCD/VFD displays optical output of laser module:

POW read 14.2mW

It indicates actual value of output power is 14.2mW.

8) Press Button down, LCD/VFD displays operating current of laser module:

BIAS read 49.2mA

It indicates actual value of operating current is 49.2mA.

9) Press Button down, LCD/VFD displays internal temperature of laser module:

TEMP read 29°C

It indicates actual value of temperature is 29°C.

10) Press Button down, LCD/VFD displays cooling or heating current of laser module:

C&H read 0.02A

It indicates actual value of cooling/heating current is 0.02A.

■ Troubleshooting

Only the following steps are allowed for users to solve simple failure. If the fault remains, please contact our company or the supplier. Do not repair the equipment or open the case privately by yourself.

Fault	Settlement
POWER LED is off and the equipment doesn't work.	<ol style="list-style-type: none"> 1. Check if 'AC POWER' switch on the back panel is on. 2. Make sure power wire is ok, if not, change a new one. 3. Check if the fuse tube is broken. If that, please change a new one (1.5A/250V).
RF LED is off.	Check if RF input cable is correctly connected.
Optical output power is low.	<ol style="list-style-type: none"> 1. Make sure you use the right kind of connector. 2. Clean terminal surface of APC connector carefully. 3. Take off the connector and properly plug it back into the optical output port.
Quality of television program gets worse.	The same as above.

Note: Any repair or modification of internal circuit is not permitted. Our company shall have no responsibility for any defect or damage caused by unauthorized modification, or for any product that has been repaired or altered by anyone other than Our Company or its authorized representative.

Guarantee Policy

Guarantee period of optical equipments is one year.

The company guarantees that all products are free to be repaired in materials (except modules & laser diode) and workmanship for a period of one year from the date of delivery to the original buyer, when used under normal operating conditions and within the service conditions for which they were designed.

The company shall have no responsibility for any defect or damage caused by improper storage, improper installation, unauthorized modification, misuse, neglect, accident or for any product which has been repaired or altered by anyone other than our company or its authorized representative.