

WT-1550-DM
Intelligent Direct Modulated
Optical Transmitter Operating Manual



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1. Overview

1.1 About This Manual

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

This manual applies to WT-1550-DM optical transmitter.

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

1.2 Product Description

WT-1550-DM intelligent directly modulated optical transmitter is mainly used in 1550nm optical fiber transmission system. Adopt advanced electronic dispersion compensation technology, accurately compensate according to the actual transmission distance by 1km stepping. The maximum compensated distance up to 50km.

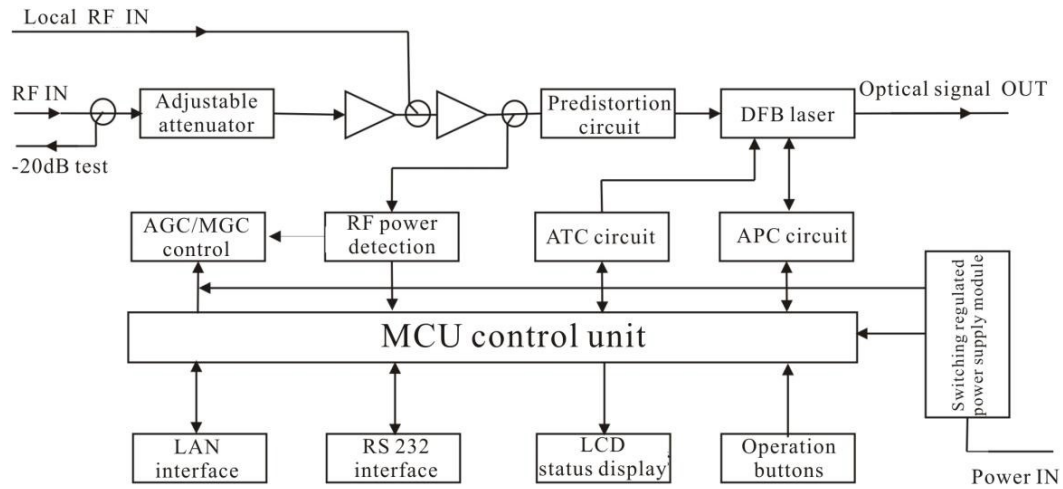
WT-1550-DM intelligent directly modulated optical transmitter is the most important equipment to construct the CATV network. It mainly used for the value-added services of TV image signal, digital television signal, telephone voice signal and data (or compressed data) signal. By built-in WDM, multiplex the inter-cut optical signal and the main optical signal then output. After setting required optical difference, the perfect adjustable optical attenuation function can automatic control the inserted optical signal according to the main optical signal, realize inter-cut system full automatic adjustment. Provide high quality low cost solution for all-optical relay 1550 optical fiber CATV system, and local value-added services inter-cut.

Characteristics:

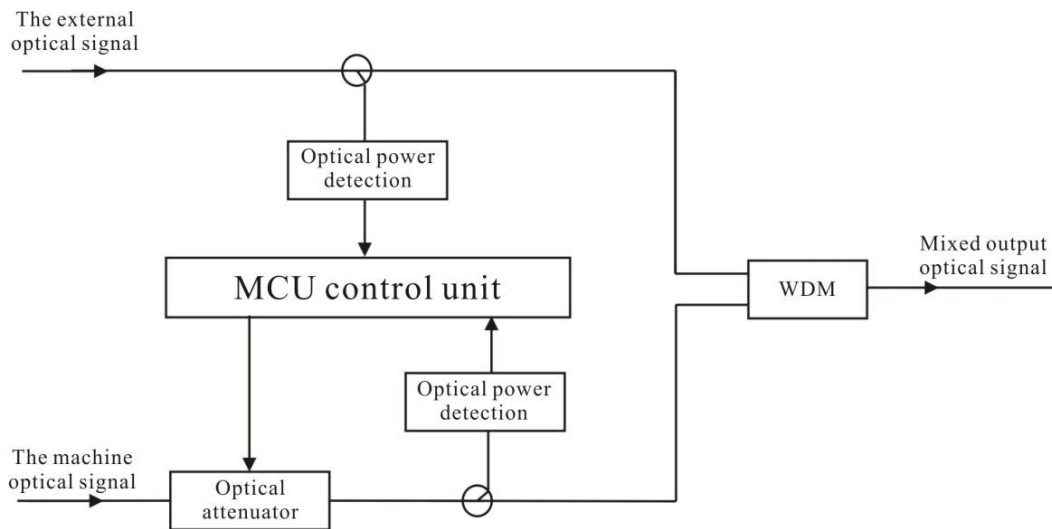
1. Patent pre-distortion circuit.
2. The optical fiber distance is adjustable according to the actual use condition by 1km stepping.
3. WT-1550-DM II: Built-in WDM, multiplex the inserted optical signal and the main optical signal then output.
4. WT-1550-DM III: Built-in WDM and adjustable attenuator.

WT-1550-DM Intelligent Direct Modulated Optical Transmitter

Block Diagram



WT-1550-DM directly modulated optical transmitter block diagram



WT-1550-DM inter-cut part block diagram

1.3 Product Applications

- 1550nm Optical fiber transmission system
- Construct the CATV network
- Local value-added services inter-cut

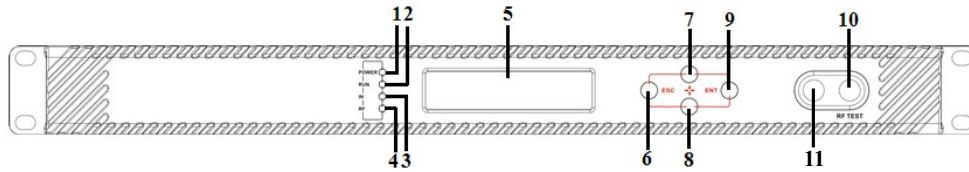
2. Technique Parameters

Item	Unit	Technique Parameters	
Output optical power	mW	10	
Optical wavelength	nm	1550±10 (have to be ITU wavelength when with inter-cut function)	
Dispersion compensation distance	Km	≤50	
Laser type		DFB laser	
Optical modulation mode		Direct optical intensity modulation	
Optical connector type		FC/APC or SC/APC	
Frequency range	MHz	47-862/1003	
RF input level	dBuV	75-85	
Flatness in band	dB	±0.75	
RF input impedance	Ω	75	
Input return loss	dB	≥ 16	
C/CSO	dB	≥ 60	25Km optical fiber, 0dB received
C/CTB	dB	≥ 65	
C/N	dB	≥ 51	
AGC control range	dB	±5	
MGC control range	dB	0-20	
Supply voltage	V	AC 110V-250V (50Hz)	
Consumption	W	30	
Operating temperature	°C	0 -- 45	
Storage temperature	°C	-20 -- +65	
Relative humidity	%	Max 95% no condensation	
Dimension	mm	483 (L) ×380 (W) ×44 (H)	

Special instructions: The performance parameters of this manual according to the measuring method of GY/T 143-2000 <Specifications and methods of measurement on AM optical transmitter and receiver used in CATV systems>, and tested under the specified test conditions.

3. Panel Interface and Menu System Description

3.1 Front Panel



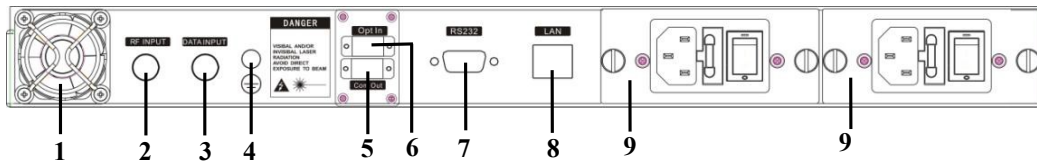
Front panel schematic diagram

1	Power indicator	2	Running indicator	3	Laser indicator
4	RF input indicator	5	LCD	6	ESC key
7	UP key	8	DOWN key	9	Enter key
10	RF output test port	11	Laser switch		

3.1.1 Indicator Description

Power indicator (POWER)	Power on	LED green
Running indicator (RUN)	Run normally	LED flash green
Laser indicator	Laser OFF Laser ON	LED red LED green
RF input indicator (RF)	No output or exceed the normal range Normal	LED flash red LED green

3.2 Rear Panel

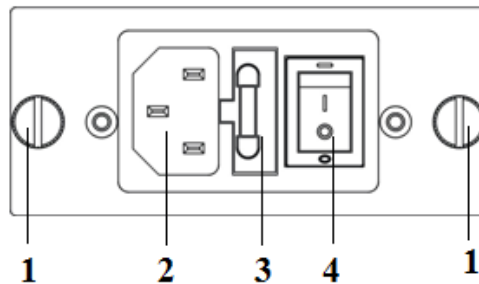


Rear Panel schematic diagram

No.	Name	Remark
1	Fan	
2	RF input	
3	Local RF input	Generally reserved
4	Ground stud	Used for the connection of device and ground wire
5	Optical input	Inserted optical signal input (without inter-cut function, no this port)
6	Optical signal output	This interface is the optical signal output port of the device (If select inter-cut function, this port is mixed output)
7	RS232 interface	Used for configuring the network management parameters.
8	LAN interface	Correspond to IEEE802.3 10Base-T, used for network management.
9	Switching power supply	Hot plug

3.3 Power Module

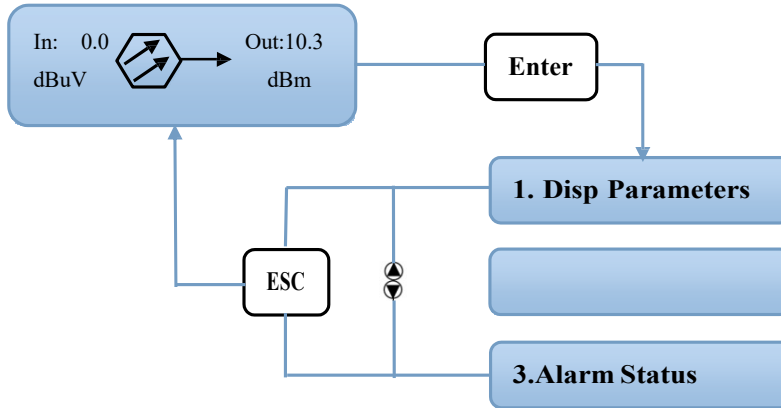
3.3.1 220V Power Module

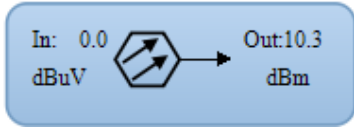


1	Mounting screws	2	220V/110V power outlet	3	Fuse
4	Power switch				

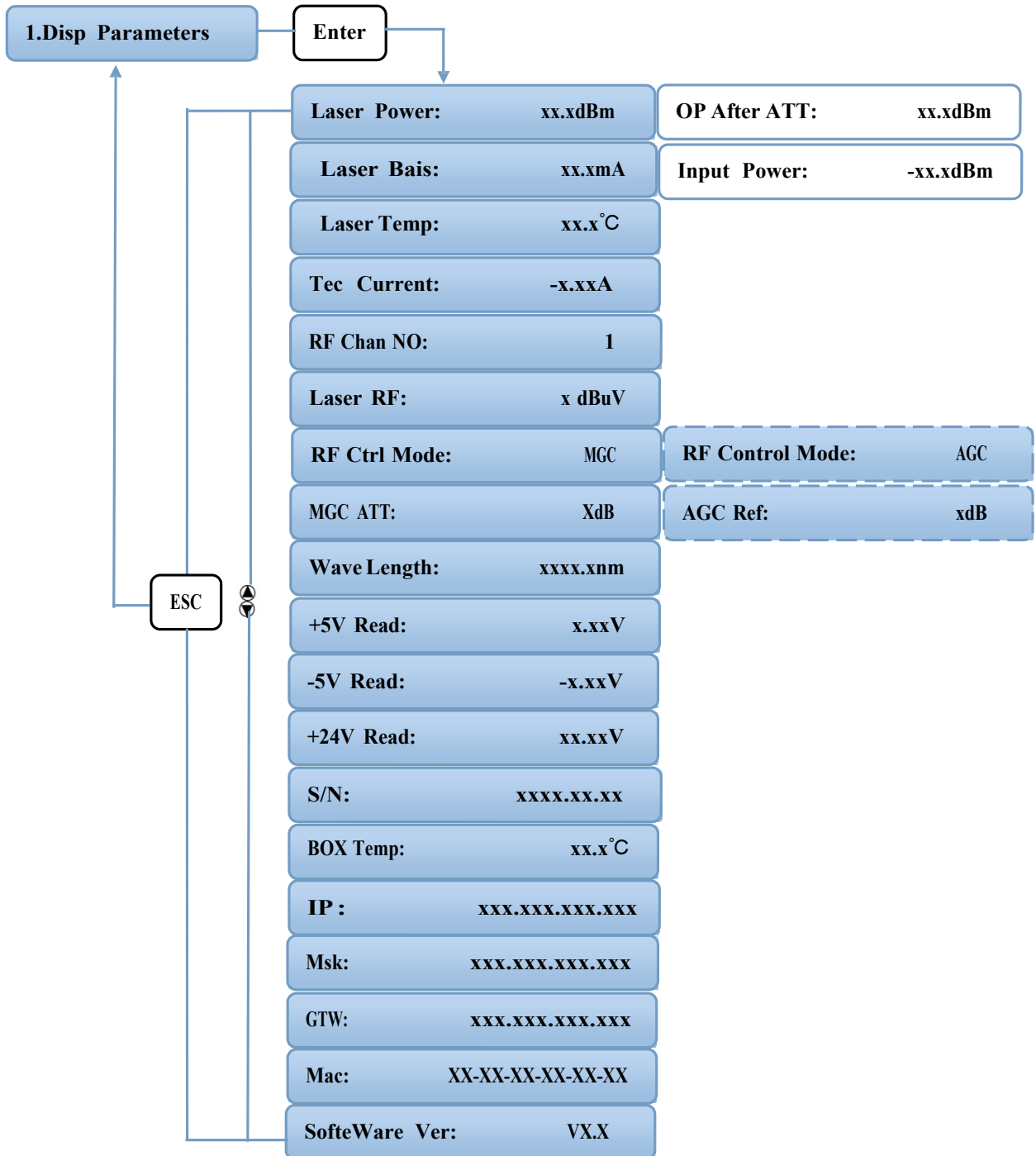
3.4 Menu Operation

3.4.1 Main Menu



Displayed parameters	Comments
	Boot display
1.Disp Parameters	Menu one: Display parameters
2.Set Parameters	Menu two: Set parameters
3.Alarm Status	Menu three: Alarm status

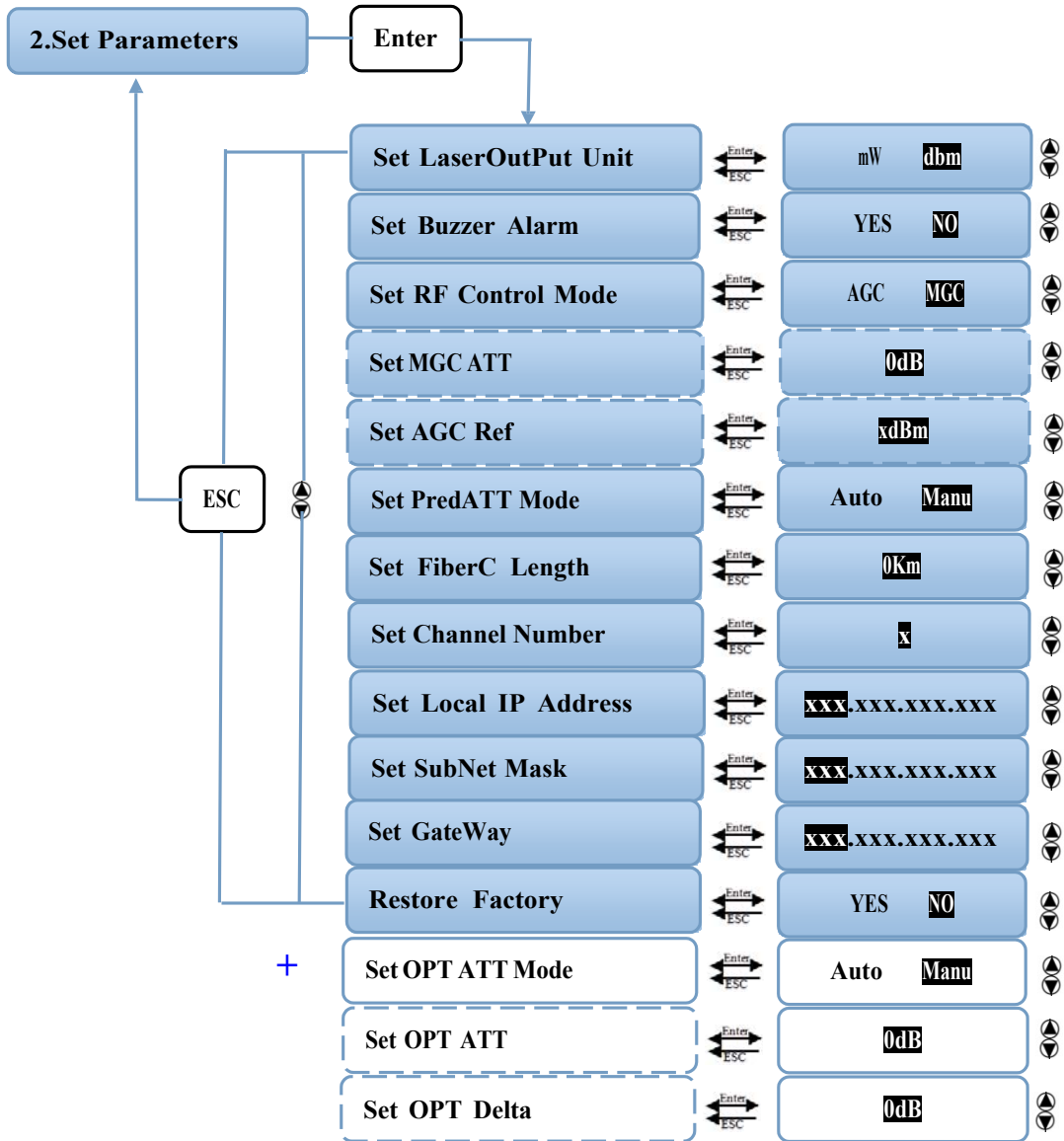
3.4.2 Display Menu



WT-1550-DM Intelligent Direct Modulated Optical Transmitter

Displayed parameters	Comments
Laser Power	Laser output optical power
OP After ATT	Optical power after attenuation (without inter-cut function, no this menu)
Input Power	External optical signal power (without inter-cut function, no this menu)
Laser Bais	Laser bias current
Laser Temp	Laser temperature
Tec Current	Cooler current
RF Chan NO	Channel number
Laser RF	Laser RF power
RF Ctrl Mode	RF control mode
MGC ATT	MGC attenuation (in MGC mode)
AGC Ref	AGC deviator (in AGC mode)
Wave Length	Wavelength
+5V Read	+5V monitoring voltage
-5V Read	-5V monitoring voltage
+24V Read	+24V monitoring voltage
S/N	Serial number
BOX Temp	Temperature
IP	IP
Msk	Subnet mask
GTW	Gateway
Mac	MAC address
SofteWare Ver	Version number

3.4.3 Set Menu



WT-1550-DM Intelligent Direct Modulated Optical Transmitter

Displayed parameters	Comments	Remarks
Set LaserOutPut Unit	Set the unit of output optical power	
Set Buzzer Alarm	Set the buzzer alarm	YES is on, NO is off
Set RF Control Mode	Set the RF control mode	AGC and MGC two modes selectable
Set MGC ATT	Set the ATT in MGC mode	Adjustable range 0~20dB
Set AGC Ref	Set the deviator in AGC mode	Adjustable range ± 3 dB
Set PredATT Mode	Set the predistortion control mode	Two modes: Auto is automatic control mode; Manu is manual control mode.
Set FiberC Length	Set the transmission distance in automatic control mode	1km stepping
Set Channel Number	Set the channel number	
Set Local IP Address	Set the IP address	
Set SubNet Mask	Set the subnet mask	
Set GateWay	Set the gateway	
Restore Factory	Restore factory settings	
Set OPT ATT Mode	Set the optical power ATT mode	Without inter-cut function, no this menu
Set OPT ATT	Set the optical power attenuation	Without inter-cut function, no this menu
Set OPT Delta	Set the difference between the main optical power and the inserted optical power	Without inter-cut function, no this menu

3.4.4 Alarm Menu

The displayed alarm content	Comment
RF Alarm	RF alarm
Laser Temp	Laser temperature alarm
Laser Bais	Laser bias current alarm
Laser Tec	Laser cooling current alarm
Output Alarm	Output optical power alarm
+5V Alarm	+5V alarm
-5V Alarm	-5V alarm
+24V Alarm	+24V alarm

4. Installing the WT-1550-DM Optical Transmitter


4.1 Receiving and Inspecting


As you unpack your unit, inspect the shipping container and equipment for damage. Save the shipping material for future use. If the container or the equipment is damaged, notify both the freight carrier and us.

<p>CAUTION: To protect yourself from potential injury and to protect the equipment from further damage, do not perform any operational tests if the equipment appears to be damaged.</p>

4.2 Precautions

Heed the following precautions when working with the **WT-1550-DM**.

 Warning	Read the installation instructions before connecting the system to the power source.
---	--

 Warning	The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.
---	--

4.3 Mounting WT-1550-DM

4.3.1 Mounting the WT-1550-DM in the Rack

Mounting the WT-1550-DM in the standard 19 inch equipment rack:

1. Place the equipment in the rack.
2. Use four screws fixed the mounting lug on the WT-1550-DM front panel to the rack.
3. Reliably ground the equipment. The ground terminal is on the rear panel.
4. Visually inspect each key (button) on the front panel to ensure that it is not trapped under the edge of its hole. If a key is trapped, tap the key to enable it to move freely.

4.3.2 Connecting the RF Cables

Verify the RF input F connector type according to the ordering information, then screw on the matched RF cable.

4.3.3 Connecting the Optical Fiber Cables

WT-1550-DM has one or two optical connectors.

DANGER: The fiber carries invisible laser radiation. **AVOID DIRECT EXPOSURE TO BEAM.** Never operate the unit with a broken fiber or with a fiber connector disconnected.

1. Verify the matched **WT-1550-DM** fiber cable connector type according to the ordering information.
2. Verify that the fiber cable connector has been cleaned properly. If the fiber cable connector needs to be cleaned, follow the cleaning procedure outlined in “Cleaning Patch Cord or Pigtail Fiber Optical Connectors”.
3. Verify that the **WT-1550-DM** optical connector has not been exposed to any contamination.

NOTE: Any contamination of optical connector can significantly degrade optical link performance. This degradation will most likely manifest itself as poor signal-to-noise (SNR) performance.

4. Note to butt the nick of the connectors and align them accordingly.

4.3.4 Connecting the Ethernet Cable

You can connect the **WT-1550-DM** to your TCP/IP network in order to monitor and control the transmitter remotely. After you complete the installation procedures described in this chapter, you can use a network management system (NMS) to monitor and control the **WT-1550-DM**.

To connect the **WT-1550-DM**, you must use a shielded and grounded Category 5 Ethernet cable.

To connect the Ethernet cable:

1. Connect an Ethernet cable to the transmitter’s RJ-45 Ethernet port. The Ethernet port is on the rear panel of the transmitter.
2. Verify that the green Link LED is illuminated, indicating that there is a connection.

4.3.5 Connecting Power

The **WT-1550-DM** is available in an AC220V power model. After mounting the **WT-1550-DM** in a rack, follow the power connection procedure below for the model that you are installing.

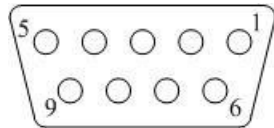
Can be equipped with two 220V power supply that requires input voltage 150~265VAC, at 50~60Hz single phase. The AC power plug is located on the rear panel.

Turn on the power source. It takes about 60 seconds for all systems to operate.

5. Communication Setup

5.1 RS232 Communication Interface Description

Adopt DB9 standard connector, the pin definitions as follow:



- 1: No Connect
- 2: TX
- 3: RX
- 4: No Connect
- 5: GND
- 6: No Connect
- 7: No Connect
- 8: No Connect
- 9: No Connect

The serial communication uses the standard NRZ form, 1 starts bit, 8 data bits, 1 stop bit and the baud rate is 38400.

5.2 Set up the Hyper Terminal

If you have not setup the Hyper Terminal in your Windows system, follow the steps:
Click “start menu →program→ accessory→communication→Hyper Terminal”:
This results in the following screen:

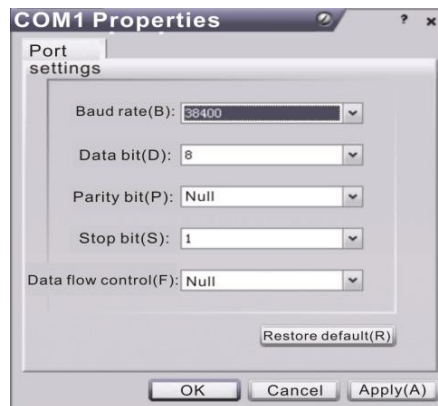


Then you input your connection name, such as “SNMP38400” , and choose the serial port to connect with your equipment. As follows:

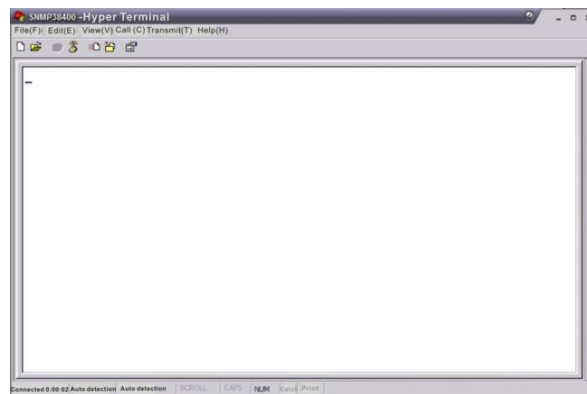
WT-1550-DM Intelligent Direct Modulated Optical Transmitter



Press the “OK” button shows the configuration page of serial port. As follows:



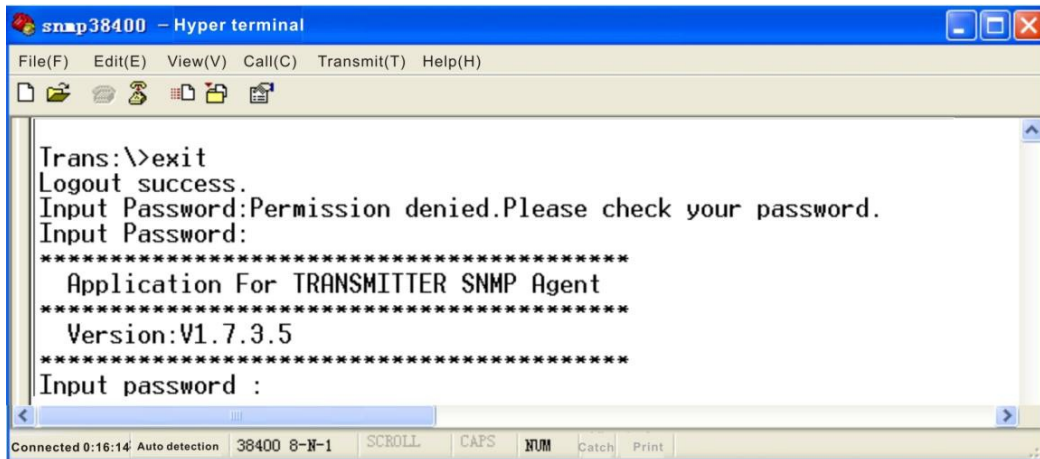
Change the serial port configuration to 38400-baud rate, 8 data bits, no parity bit, 1 stop bit, no data flow control, press the “OK” button, you have set up the Windows serial port Hyper Terminal.



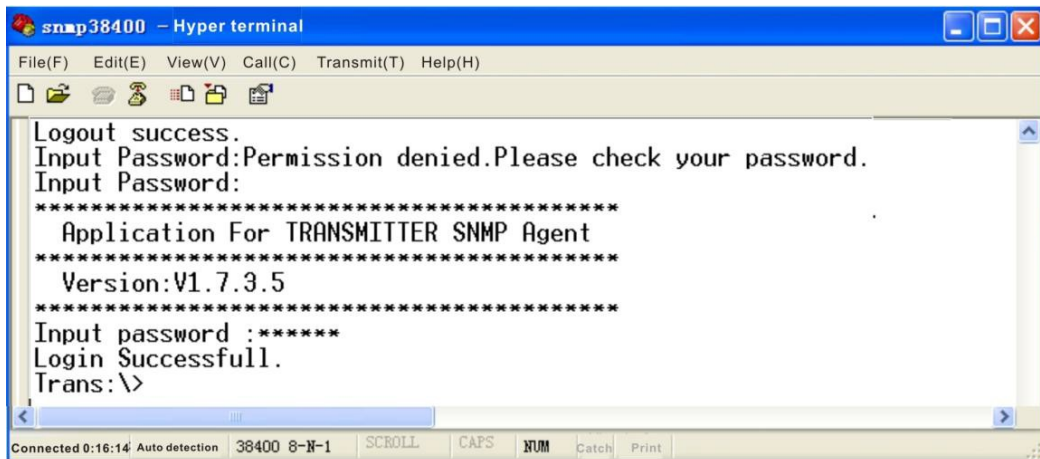
You can click “file→save” menu to save this configuration of Hyper Terminal for later using.

5.3 Operating Parameters Configuration

Under the condition of power off, use the serial port lines to connect the RS232 port with the computer port. Open the Windows Hyper Terminal which you have set up. Then turn on the power, you will see the page as follows. Enter the password to enter the configuration interface.



Enter the password, display the following screen:



You can input your command in this page, and then configure the operating parameter of the application program.

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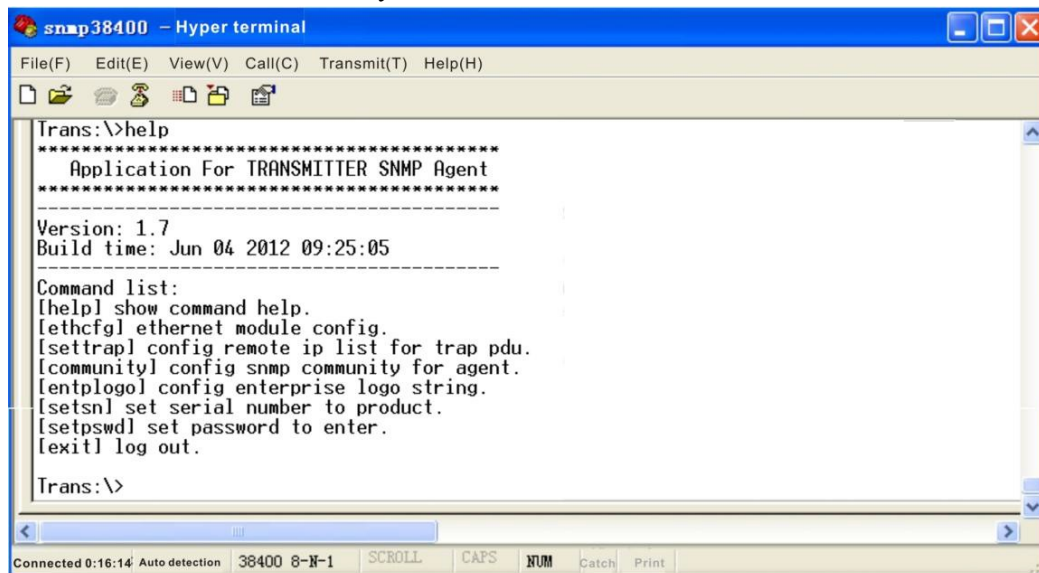
System supports the following commands:

help	List internal commands of the system;
ethcfg	Configure the Ethernet operating parameters;
settrap	Configure the aim host IP address of the SNMP Trap;
community	Configure the SNMP group name;
Restore	Restore the factory default values;
setsn	Set the serial number;
setpswd	Set the login password;
entplogo	Set the logo and equipment model;
Exit	Log out.

Specific using as follows:

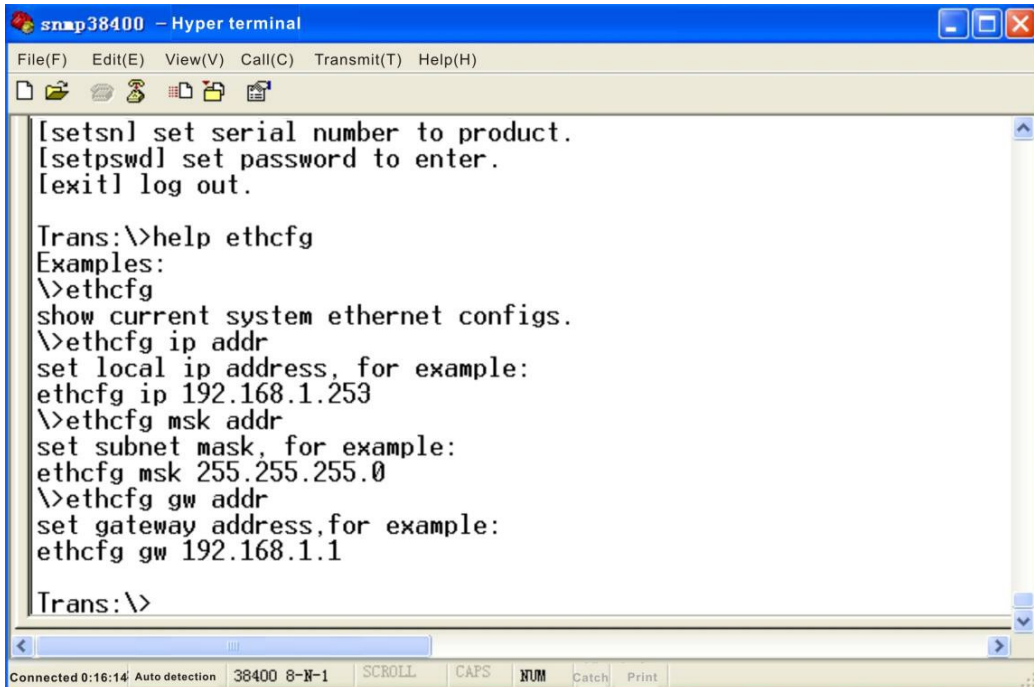
help

This command shows current application program version, program name and the internal commands list of the system as follows:



```
snmp38400 - Hyper terminal
File(F) Edit(E) View(V) Call(C) Transmit(T) Help(H)
Trans:\>help
*****
Application For TRANSMITTER SNMP Agent
*****
Version: 1.7
Build time: Jun 04 2012 09:25:05
-----
Command list:
[help] show command help.
[ethcfg] ethernet module config.
[settrap] config remote ip list for trap pdu.
[community] config snmp community for agent.
[entplogo] config enterprise logo string.
[setsn] set serial number to product.
[setpswd] set password to enter.
[exit] log out.
Trans:\>
```

You can also use the “help” command to show help information of other commands, such as “help ethcfg” , ethcfg’s help information appears as follows:



```
[setsn] set serial number to product.
[setpswd] set password to enter.
[exit] log out.

Trans:\>help ethcfg
Examples:
\>ethcfg
show current system ethernet configs.
\>ethcfg ip addr
set local ip address, for example:
ethcfg ip 192.168.1.253
\>ethcfg msk addr
set subnet mask, for example:
ethcfg msk 255.255.255.0
\>ethcfg gw addr
set gateway address, for example:
ethcfg gw 192.168.1.1

Trans:\>
```

ethcfg

This command configures the Ethernet parameters, including IP address, subnet mask and gateway. You can refer to the help information for its using.

settrap

This command shows or modifies the aim host IP address list of the SNMP Trap, IP address of 0.0.0.0 and 255.255.255.255 don't exist. SNMP Trap does not send to these two addresses.

community

This command configures the read-only group name and read-write group name. "Group name" is the concept of SNMP agreement like the password. Use the command "community ro" to configure the read-only, and "community rw" for the read-write. For example, input "community rw public", "public" is the read-write group name. The group name for read-only and read-write are both "public" as the equipment default setting from factory.

setpswd

This command is used to modify the login password.

entplogo

This command is used to set the logo and equipment model.

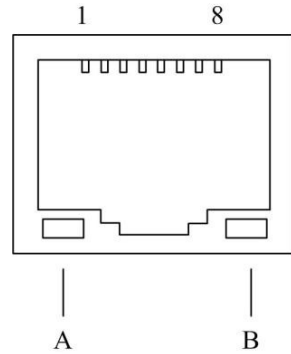
Exit

This command is used to log out.

5.4 Remote Monitoring: SNMP

LAN communication interface

Adopt RJ45 standard connector, the pin definitions as follow:



- 1: TX+
- 2: TX-
- 3: RX+
- 4: No Connect
- 5: No Connect
- 6: RX-
- 7: No Connect
- 8: No Connect

A: Green indicator flashing means that the LAN port is sending data.

B: Yellow indicator means that the network connection is normal.

SNMP basic background

Simple Network Management Protocol (SNMP) is an application layer protocol. It makes the management information between network devices exchange easier. It is part of the TCP / IP protocol group. SNMP enables the end-users to manage network performance, find and solve network problems, and arrange for future network upgrades.

Management Information Base (MIB) is the organized hierarchical information set. Use SNMP to visit these MIB. They are composed of manageable information, and identified by the object identifier.

SNMP

Transmitter configuration of network communication

When the transmitter initial work, the IP address and gateway are in the default state, you need to configure them. The configuration of initial state can be achieved through the RS-232 interface or the front panel keys. Other configurations see our <Network management operation manual>.

6. Maintenance and Troubleshooting

6.1 Cleaning Fiber Optic Connectors

DANGER: The fiber optic connector carries invisible laser radiation while working, so should avoid charged operation.

Dirty optical connectors are the leading source of poor performance in a broadband optical fiber network. Dirty optical connectors lead to optical signal loss and reflections, which in turn can seriously degrade signal-to-noise (SNR) performance and, in some cases, distortion performance. We recommend that you clean all mating fiber connectors before connecting them to an optical transmitter.

In addition, if you suspect that the optical connector of WT-1550-DM may have been exposed to contamination (by a dirty fiber cable connector, for example), you should properly clean the WT-1550-DM optical connector before connecting the optical fiber.

CAUTION: Improper cleaning of an optical connector can do more harm than good. Never spray a clean-air product onto the surface of an optical connector. Spraying air onto an optical connector can cause condensation on the connector surface, leaving water spots and trapping dust. Failing to wipe a connector on dry lens paper immediately after wiping on paper wet with isopropyl alcohol can also lead to condensation on the connector. Using low-grade cleaning paper or other cloth to wipe an optical connector can leave microscopic fibers on the optical connector surface.

6.1.1 Cleaning Patch Cord or Pigtail Fiber Optical Connectors

To clean optical connectors, we recommend using a fiber optic connector cleaning cartridge (such as NTT Cleto). If a cleaning cartridge is not available, follow these steps.

To clean the optical connector of a patch cord or pigtail:

1. Fold a piece of unused dry lens cleaning paper twice, for a four-ply thickness.
2. Use a drop of high-grade isopropyl alcohol to wet part of the paper.
3. Lay the connector on the lens cleaning paper with the tip touching the paper.
4. In one continuous motion, pull the connector from the wet part of the paper to the dry part.

6.2 Troubleshooting

Should a problem occur, see if the symptoms are listed in Table 6-1.

Table 6-1: Troubleshooting Solutions

Indicator status	Alarm menu content	Fault phenomenon	Solution
Power indicator is off			Verify the switch is on and the power supply is connected. If that does not correct the problem, contact Customer Service.
Run indicator is off			Contact Customer Service.
RF input indicator is flash red	RF Alarm:	RF alarm	Verify the input connector is normal connected. If that does not correct the problem, contact Customer Service.

6.3 After-sales Service Description

1. If the equipment fault is resulted from the users' improperly operation or unavoidable environment reasons, we will responsible maintenance but ask suitable material cost.
2. When the equipment breaks down, immediately contact local distributor or directly call our technical support hotline 86-0571-82576002, 18967160936.
3. The site maintenance of the fault equipment must be operated by professional technicians to avoid worse damage.

Special notice: If the equipment has been maintained by users, we will not responsible free maintenance. We will ask suitable maintenance cost and material cost.

6.4 Disclaimer

We reserve the right to change any products described herein at any time, and without prior notice. We assume no responsibility or liability arising from the use of the products described herein, except as expressly agreed to in writing by us. The use and purchase of this product does not convey a license under any patent rights, copyrights, trademark rights, or any intellectual property rights of us. Nothing hereunder constitutes a representation or warranty that using any products in the manner described herein will not infringe any patents of third parties.