

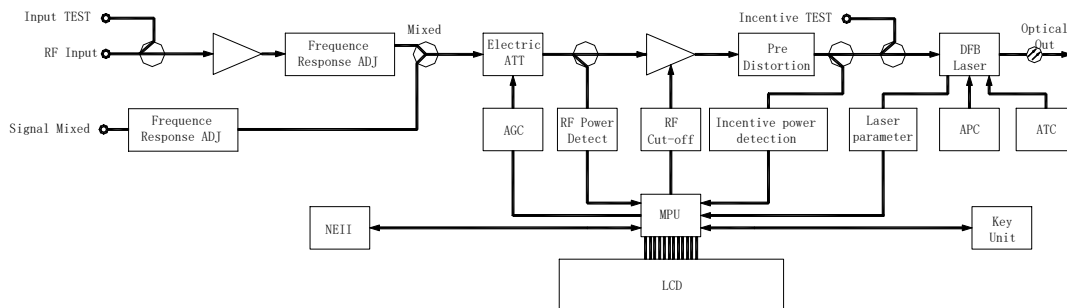
# 1310nm Optical Transmitter



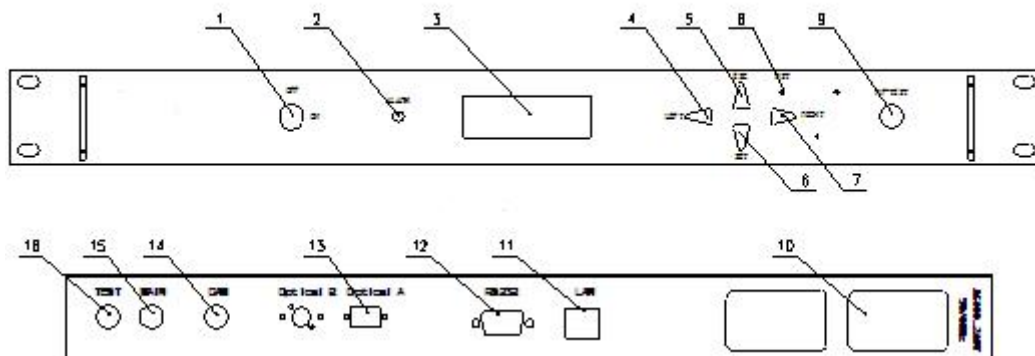
## 1. Features

- Switchable AGC and MGC function, support remote control by webmaster
- LCD real-time displays working parameters
- Sound-light alarm
- Two options for national standard webmaster transponder

## 2. Diagram



## 3. Surface Structure



NO.	Item	Specification
1	Key Switch	ON: Turn on OFF: Turn off
2	Alarm Light	Red light: Wrong parameters Green light: Correct parameters
3	Display Screen	Display working status and parameters of device
4	LEFT Button	Menu page turning, reducing attenuation value
5	ESC Button	Exit menu item
6	SET Button	Set menu item
7	RIGHT Button	Menu page turning, adding attenuation value
8	RST Button	Reset button, if system crashed when communicating or LCD operating, press this button to reset without cutting off signal
9	Drive Signal Detecting Port	RF excited detecting port (-20dB)
10	Power Socket	220V Power connection
11	Ethernet Port	Two kinds transponder Ethernet ports (optional)
12	RS232/RS485 port	RS232 port or RS485 port (optional)
13	Optical Signal Output	FC or SC(optional)
14	Hybrid Input Port	Input of narrow-band signal
15	RF Signal Output	75(+3/-2)dBuV Input
16	RF Input Signal Detecting Port	RF input signal detecting (-20dB)

## 4. Basic Parameter

### 4.1 Optical Parameter

NO.	Item	Specification
1	Optical Wavelength	1290~1330nm(ITU-T optional)
2	Optical Connector	FC/APC or SC/APC
3	Optical Reflection Loss	>45.0dB

**Estimated Link Loss:**

Power(mW)	Estimated Link Loss (dB)	Power(mW)	Estimated Link Loss (dB)
06	8.8	14	12.5
07	9.5	15	12.8
08	10.0	16	13.0
09	10.0	17	13.3
10	11.0	18	13.6
11	11.4	19	13.8
12	11.7	20	14.0
13	12.1		

Remark1: Estimated Link Loss is the sum of 10km fiber loss and passive loss

**4.2 RF Parameter**

RF Band	47~1000 MHz
RF Input Level	75(±3)dBuV
Level Difference between Narrow Band Port and Main Port	8~20.0dB(select)
Entitled RF Input Impedance	75Ω
RF Input Reflection Loss	<ul style="list-style-type: none"> <li>➤ ≥16dB(47~550MHz)</li> <li>➤ ≥14dB(550~1000MHz)</li> </ul>
Flatness	≤±0.75dB
Level Detecting	-20dB±1dB

**4.3 Link Performance**

<b>C/N</b>	≥51
<b>C/CSO</b>	≥60
<b>C/CTB</b>	≥65

Rmark:

- C/N、C/CTB and C/CSO are tested with meeting estimated link condition
- C/N is tested with PAL-D loading 59 TV channels in 550MHz
- C/CTB and C/CSO is the typical value when 59 TV channels are configured in 550MHz, regardless of receiver distortion

#### 4.4 General Parameter

Power Supply	AC: 100~240V
Interior Direct Current Consumption	30W
Power Consumption	+24V 0.9A, +5V 0.5A, -5V 0.1A
Working Environment	-5°C~45°C
Storage Temperature	-25°C~+65°C
Size (Length x Width x Height)	483mm×320mm×44mm
Reference Net Weight	4Kg

## 5. Operation Overview

HF200-3613 series indoor 1550 optical transmitter of Network Technology LTD. Panel operating and displaying function are added based on former similar optical transmitter, user can view almost all working parameters of device locally through LCD, these operations are all based on multi-level function menu, simple and clear HMI achieved “simpleton operation.”

### 5.1 LCD and Keyboard

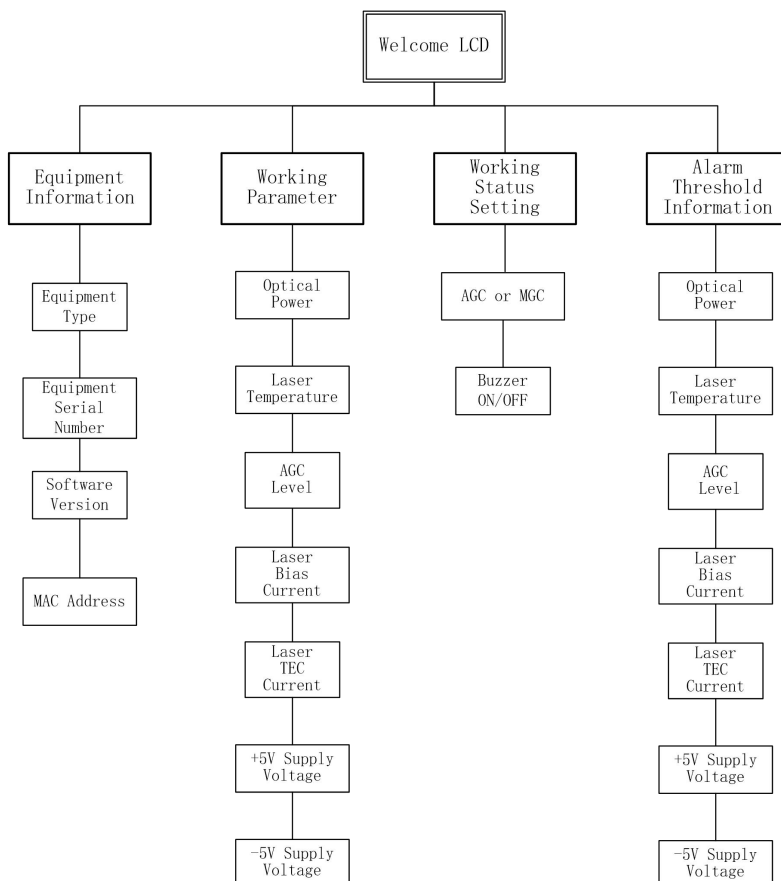
HF200-3613 series indoor 1550 optical transmitter adopts 122x32 crystal lattice, blue screen liquid crystal, English and Chinese can be both displayed. Optical platform keyboard has 4 buttons including “SET”, “ESC”, “LEFT” and “RIGHT.” With LCD displaying, use these 4 buttons to view and set device parameters.

In factory default settings, after power on-self test, LCD will show “Welcom screen”, it will return to the welcome screen too if there is no operation for a long time.

In default settings, LCD backlight will be turned on when operating, it will turn off after a long time without operations, so that the working life of LCD will be extended.

Menu structure showed on LCD as below, bold rectangle is level1 menu, below the level1 menu there are submenus under the primary menu.

To ensure the safety and prevent irrelevant people from operating wrongly, alarm settings can not be changed on the menu showed on LCD, only through webmaster can it be changed



## 5.2 National Standard Class 2 Transponder

HF200-3613 series indoor 1310 optical transmitter can optionally configure with national standard class 2 transponder (refers to NE2 in the following). With webmaster that meets national standard, remote control for devices can be achieved. Moreover, management content in webmaster is more than the content in LCD menu.

Factory default IP address of NE2 is: 192.168.0.1. User need to change it to meet user local network. Two ways to change IP, Telnet and Console, the former is convenient to use, but if the IP address is lost, then the latter must be used. Details on this part please refer to the content in the below.

After setting the correct IP address, then devices can connect to webmaster, easy and convenient.

Without NE2, device can connect to PC through RS232 port or RS485 port (this function will be disabled with NE2 configured). One PC can connect to

multiple same model receivers, receivers will be recognized by their MAC address as each device has different MAC address, which can be checked on LCD.

## **6. Keyboard Operation**

Keyboard has 4 buttons including “SET”, “ESC”, “LEFT” and “RIGHT”

### **6.1 SET**

Enter key, mainly has following functions:

- Enter next level menu
- Save and enable changed user settings
- Refresh current working parameters

### **6.2 ESC**

Exit button, return to previous menu and cancel changed user settings

### **6.3 LEFT and RIGHT**

Left button and right button, menu items switching in the same level menu and parameters switching in the same menu item

## **7. Menu Function Specification**

### **7.1 Welcome Screen**

After Power On Self-Test, LCD firstly will show “Welcome Screen”. There are three contents as below:

- Device works normally, show network company name and device name
- Device exception, show alarms
- When key switch is turned off, show notice

### **7.2 Device Information**

Submenu will show following content:

- Device model
- Device serial number
- Software version
- MAC address (show console login/password when NE2 is configured)

### **7.3 Working Parameters**

Show optical transmitter working parameter list, and mark normal or not (“normal”, “too high”, “too low”). Including:

- Optical power
- Laser temperature
- Laser drive level
- Laser bias current
- Laser constant temperature current
- Power voltage

Attention: When key switch is not turned off, part of parameters will not be displayed, “Please turn on the key switch” will show up

### **7.4 Working Status Configuration**

Following parameters are configurable:

- Gain control method: AGC (automatic) or MGC (manual)
- Buzzer turn on/off: Buzzer is on after factory, once error occurs on device, sound will be made to alarm. This function can turn on/off the buzzer. Once turned off, before being turned on again manually, it will not make any sound alarm when error occurs.
- Configuration of above functions will be saved automatically, it will not disappear when power off.

Attention: When key switch is not turned off, this function is not valid, “Please turn on the key switch” will show up

### **7.5 Alarm Threshold Information**



All alarm threshold parameters can be inquired including high alarm threshold and low threshold.

To ensure the security, the threshold only can be changed by webmaster. LCD keyboard can not operate on it locally. To avoid wrong settings to damage laser, even in webmaster, key alarm thresholds are not allowed to be changed (like laser drive level).

## **8. Network Management**

There are two kinds of network management: Industrial bus mode or national standard class 2 transponder mode. Either-or choice, should be made before leaving factory, user can not change it again.

### **8.1 Industrial Bus Mode**

Without NE2, OT10U series indoor 1310 optical transmitter can connect to PC through RS232 port or RS485 port (this function will be disabled with NE2 configured). One PC can connect to multiple same model receivers, receivers will be recognized by their MAC address as each device has different MAC address, which can be checked on LCD.

### **8.2 National Standard Class 2 Transponder Mode**

HF200-3613 series indoor 1310 optical transmitter can configure with NE2 optionally, with webmaster that meets national standard, remote control for optical transmitters can be achieved.

To connect webmaster, optical transmitter must configure correct IP address based on user network situation.

NE2 factory default IP address is: 192.168.0.1. There are two ways to change IP.:

#### **Telnet Method**

If user know the IP of the device, set the IP of PC in the same net segment

with the device, but it can not be the same IP address, then use UTP to connect device through Telnet.

- Username: sysadmin
- Password: admin

Attention: There is case sensitive

After logging in the device, use command “ip” to set new IP address, like: ip 192.168.1.211

It means changing the device IP to 192,168.1.211

Command “ip” also can check the current IP address of the device

Use command “exit” to exit the connection after configuration. (Note: If command “exit” is not used to exit the connection, device will exit the connection automatically if there is no commands operation after 5 minutes. Before exiting connection, device will not accept new connection from other PC.

### **Console Method**

Telnet method is convenient for using, but if the IP address is lost (like when IP is set wrongly or is forgotten). Then console method must be applied, through console port, device connects PS with RS232 bus, please operate as following steps:

1) Turn off the device (plugging with power on is not allowed)

Prepare one standard 9 pin RS232 parallel line, respectively connects RS232 port of PC and console port of device

2) Open “Hyper Terminal” in PC, following settings should be ensured:

- Baud Rate: 38400
- Data Bit: 8 bits
- Check Bit: none
- Stop Bit: 1 bit
- Flow Control: none
- Other settings can be arbitrary

### 3) Open device

PC hyper terminal will show the prompt requiring username, if it does not show up please press "Enter" in the keyboard

### 4) Log in device, change IP address

The same operation as Telnet method

Log-in account/password of console port can be checked by command "device infor"

## 9. Installation

### 9.1 Mechanical Installation and Power Connection

Turn off the key switch on front panel, then insert optical transmitter to the slot of the rack, after ensuring the correct installation position, use straight screwdriver to twist mounting screws on the front panel until the optical transmitter is fixed on the rack.

Turn off power switch, then connect 220V power

### 9.2 Fiber and RF signal Connection

#### Fiber Connection

Clean all connecting fiber connectors and flanges. Cleaning steps as below:

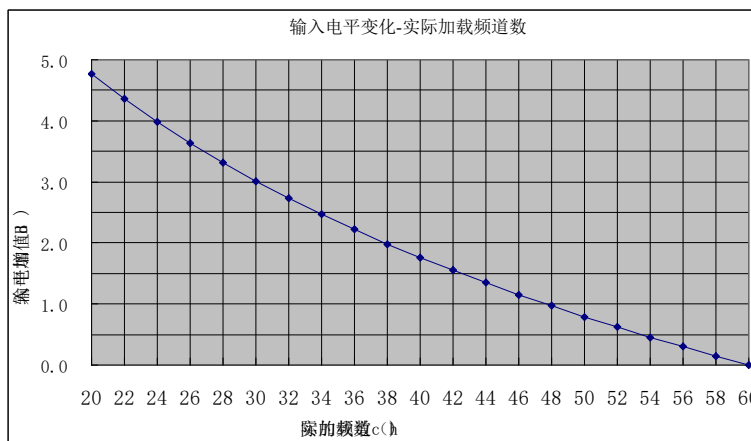
- ① Take off the dust cover of fiber connector FC/APC, use clean anhydrous alcohol wipes to clean the end face of FC/APC connector
- ② Take off the dust cover of FC/APC connecting flange on device panel
- ③ Use compressed air to clean FC/APC connector and connecting flange
- ④ If there is no compressed air to use, dedicated cotton sliver can also be used to clean SC/APC connecting flange on the machine

#### Input RF Signal Connection

- ① Check whether input RF signal is in the range regulated by this manual
- ② Connect suitable RF signal to [RF signal input port]

## ③ RF input signal requirements:

- Nominal RF input signal of this transmitter is  $75(+3/-3)$ dBuV for each channel with loading 59 channels. To achieve ideal transmission characteristics, transmitting signal level difference among channels should be within  $\pm 0.5$ dB
- It is particularly stressed that RF input level in each channel can not be more than 82dBuV, or the laser might be damaged
- Generally one test report will be offered, in which there is laser RF drive level of this device, detection port on the front panel is the -20dB detection port of drive level that is stated above
- Before RF signal goes into the RF input of optical transmitter, carefully adjust the level of drive signal by frequency spectrometer and RF level meter, to ensure RF input level in each channel in  $75(+3/-3)$ dBuV
- Attention, the RF level we stated above is the level with 59 channels loaded, in actual usage, the quantity of loaded channel might change, then the RF level requirement on each channel will change too, please refer to the following picture for specific changes and correspondences: It means different loading channel number corresponds different RF level for each channel, but this device can always remain laser general optical modulation constant when there is at least 5dB input level difference.



## **Starting-up and Debugging**

After finishing all above preparation works, electrical test can be processed.

Turn on the power switch on back panel, indicator shows red light, screen lights up, it means the whole device is powered up normally.

Then turn on the key switch on front panel and adjust the button on it, select necessary working status.

Output optical power tested by optical power meter should equal or higher than nominal output power. Through the screen and buttons of system controller, key parameters like output optical power, laser bias current, cooling current and laser temperature of current unit can be viewed.

Attention: Without specialized equipment, we do not suggest user adjusting modulation degree. Our devices are already adjusted modulation degree to the groove before leaving factory.

## **10. Notes for Using**

Optical transmitter is precise optoelectronic equipment, it is required to strictly follow the requirements of operation specification when using, if it is operated incorrectly, it might damage the transmitter and cause personal injury.

During the process of working or testing of optical transmitter, it is not allowed to directly watch optical output port and bare fiber, or else it will damage retina and cause blindness accident.

To prevent laser damage from overdriving RF, it is seriously forbidden to input signal that is more than 82dBuV, RF connector insertion and extraction when working normally and incorrect power-up operation are forbidden as well,

Performance of optical connector has big influence on the performance of

optical transmitting link, this device applies good quality FC/SC connector, it must apply good quality active fiber connector in the same specification to ensure system working stably and reliably. Cleanness of All active connectors need to be ensured as well. It is required to clean active connectors by compressed air or specialized alcohol for each reconnection.

Without specialized equipment, please do not adjust laser drive level (modulation degree)