# GIGALIGHT 16 Channels 3G SDI Optical Extender + 2 Channels Independent 1000M IP + Network Gateway

## Technical Manual

**G-SDI-E-16*3G-TX-IP-NMS**
**G-SDI-E-16*3G-RX-IP-NMS**

# Content

# I: Introduction

## 1.1 Main Function

G-SDI-E-16*3G optical transceiver can transmit 16 channels 3G SDI of bit rate 2970Mbps and 2 channels independent 1000M IP. The 3G SDI compatible with HD SDI/SD SDI. Adopted modular-structure, the whole equipment meets the standard of CE. The equipment supports SMPTE178 standard and passed SDI pathology code test.

## 1.2 Characteristics

- Meets the standard of SMPTE259M，SMPTE297M，SMPTE305（SDTI）
- Self-adapt to SDI 270、1485、2970Mbps, with cable balance at input, it can make up the loss of cable transmission
- With jitter-reducing circuit, it can deal with distorted signal well
- 1000M IP support the protocol of IEEE 802.3, IEEE 802.3U, IEEE 802.3X, IEEE 802.1d
- Self-adapt to 10Mbps/100Mbps/1000Mbps
- With LCD touch screen to show working status.
- SDI supports the standard of SMPTE178，Passed the test of SDI pathology
- With LED indicators for input/output signal, optical signal, and dual power supply
- Adopted CWDM and TDM transmission method to realize the transmission of multichannel and multiple signals

## 1.3 Product Model

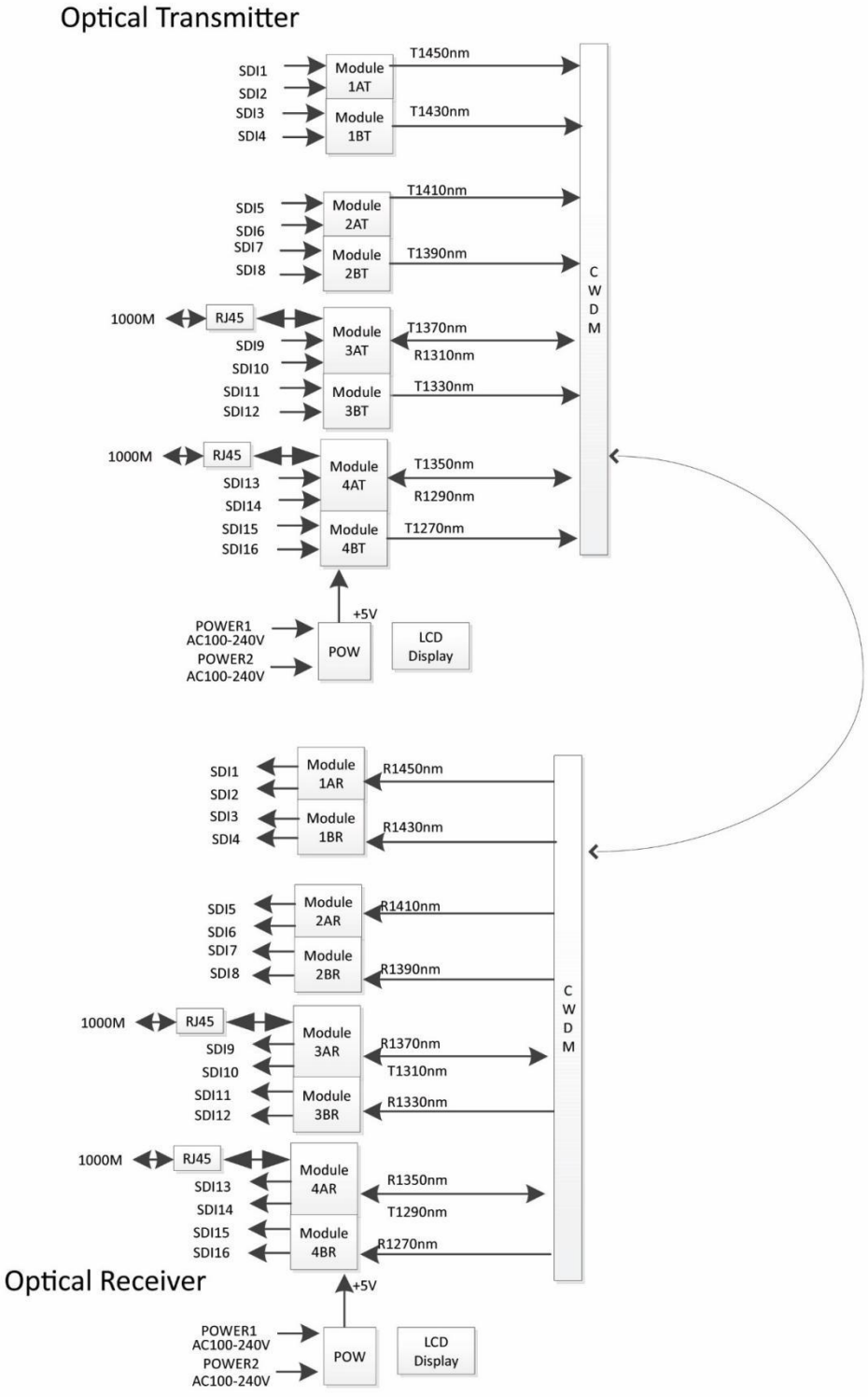
G-SDI-E-16*3G Product models are differed by transmit distance.

- 0 ~ 20 km
- 20 ~ 40 km
- 20 ~ 60 km

# Ⅱ: Working principle and operation

## 2.1 Working principle

Combined TDM and CWDM technology, this equipment can transmit 16 channels 3G SDI + 2 Channels 1000M IP via 1 fiber. The Structure is as follow:



Optical Transceiver Structure Flow Chart

## 2.2 Laser Selection

The optical transceiver of each machine is composed of receiving and transmitting two parts, the wavelength of this equipment are 1450nm, 1430nm, 1410nm, 1390nm, 1310nm, 1270nm, 1370nm, 1290nm, 1330nm, 1310nm

## 2.3 Power supply

This equipment adopts dual power supplies as a backup power supply mode. The power supply module adopts CE-certified AC/DC and DC/DC modules for high-frequency communication. With the advantage of wide input AC voltage range (AC100V~AC240V), small ripple, small size, low power consumption and high efficiency, it can ensure long-time stable operation of the whole machine. Recommend to make it work in indoor ventilated areas.

This equipment uses 220V 1.5A fuse. Excessive voltage (>240V) will cause damage to the high-frequency switching power supply module. We will not be responsible for the damage caused by incorrect power supply voltage.

On the front panel of the device, there are indicators (POW) for power supply, when power is connected and normal, and the POW indicator is green. If it is a dual power supply machine, there are two power supply working indicator lights on the left side of the panel, and POW1 and POW2 are on to indicate that the power supply is working.

## 2.4 Indicator on the panel

**1) SDI signal**

**Transmitter:**

On the right of the front panel, there are four lines indicators:

The first line are indicators of POW, S1, S2, S3, S4, the POW is indicator of power supply, S1, S2, S3, S4 correspond to input of 1st to 4th channel SDI signal;

The second line are indictors of S5, S6, S7, S8, correspond to input of 5th to 8th channel SDI signal

The third line are indictors of S9, S10, S11, S12, Op1, correspond to input of 9th to 12th channel SDI signal, OP1 is Optical signal indicator

The fourth line are indictors of S13, S14, S15, S16, Op2, correspond to input of 13th to 16th channel SDI

signal, OP2 is Optical signal indicator

**Receiver:**

On the right of the front panel, there are four lines indicators:

The first line are indicators of POW, S1, S2, S3, S4, OP1, the POW is indicator of power supply, S1, S2, S3, S4 correspond to output of 1st to 4th channel SDI signal, OP1 is Optical signal indicator.

The second line are indictors of S5, S6, S7, S8 Op2, correspond to output of 5th to 8th channel SDI signal, OP2 is Optical signal indicator.

The third line are indictors of S9, S10, S11, S12 Op3, correspond to output of 9th to 12th channel SDI signal, OP3 is Optical signal indicator.

The fourth line are indictors of S13, S14, S15, S16 Op4, correspond to output of 13th to 16th channel SDI signal, OP4 is Optical signal indicator.

When there is no optical signal input (the optical signal input is less than about -16dBm), the LED of OP indicator is red, otherwise, the indicator is off. When there is SDI signal locked and output, the corresponding indicator light is green.

For SDI input: when there is SDI input, the corresponding LED indicator is green; for SDI output: when the SDI signal has been decoded, the indicator lights is green.

**2) IP signal**

Each Gigabit Ethernet has one RJ45 interface, and each RJ45 interface has two indicators, Green and Yellow, they indicate the connection status of the signal, as follows

| | 1000M | 100M |
|---|---|---|
| Connected | Green light | Green light |
| Exchange data | Yellow Blinking | Yellow Blinking |
| Not connected | Green Yellow Off | Green Yellow OFF |

## 2.4 Indicators on the panel

On the rear panel of optical transmitter, there are 32 BNC（75Ω）( each SDI input has one loop out) and 3 RJ45 for 2 channels independent 1000M IP and 1 channel for NMS, and one optic connector, two power socket with switch.


back view of transmitter

On the rear panel of optical receiver, there are 32 BNC（75Ω）( each channel SDI has dual output ports) and 3 RJ45 for 2 channels independent 1000M IP and 1 channel for NMS, and one optic connector, two power socket with switch.


back view of receiver

## 2.5 LCD

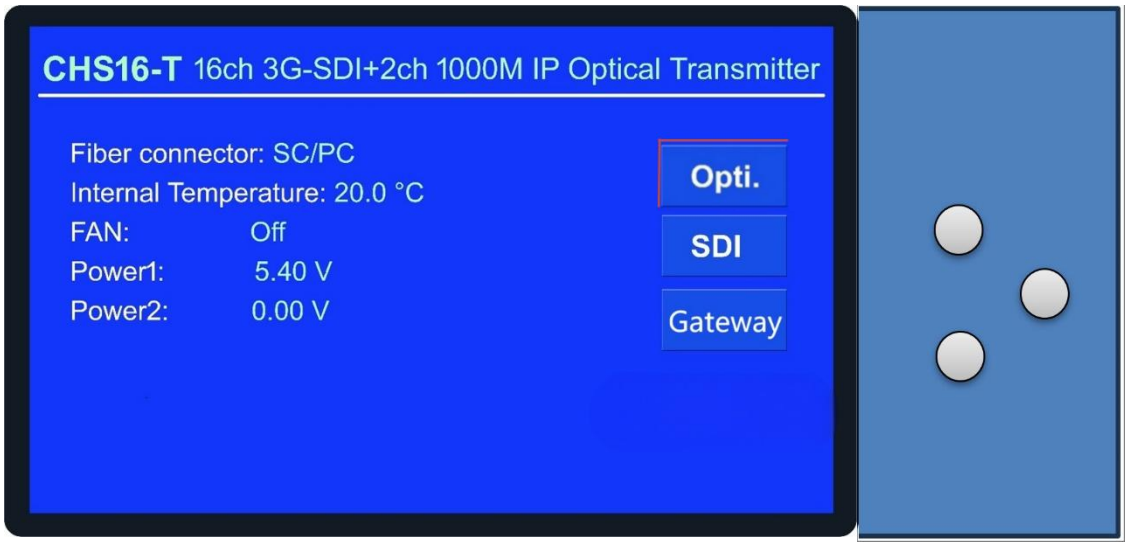
The optical transceiver are equipped with LCD touch screen, which can display the working status of the equipment.

When turn on the equipment, the Home page shows Company's logo, equipment's name, SN number. It is as the follow image:

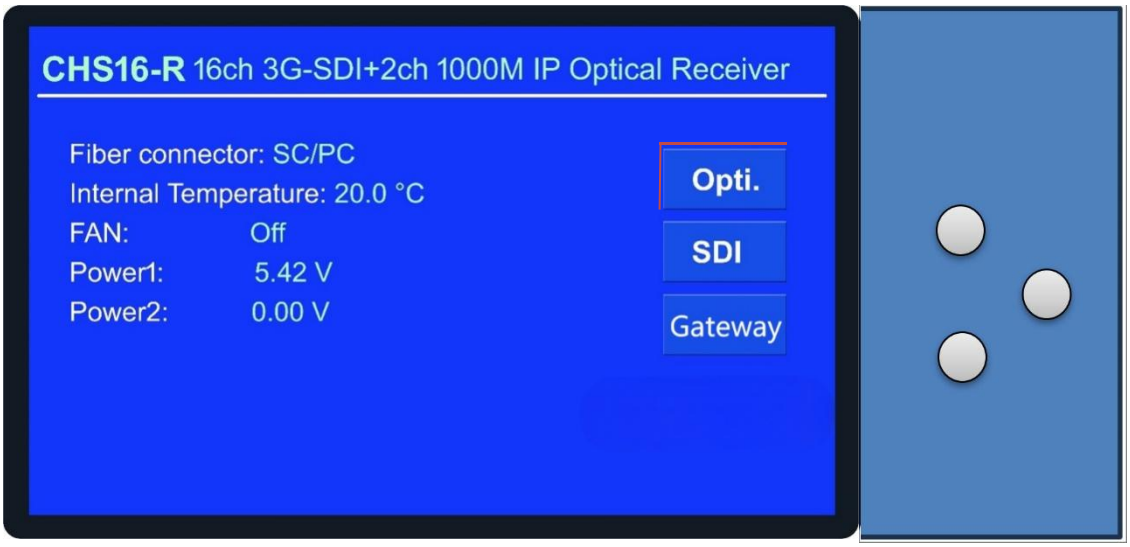

Home Page of Transmitter


Home page of Receiver

Press Enter key, after release it, it will enter into the Menu page as follow:




Menu page of Transmitter




Menu page of Receiver

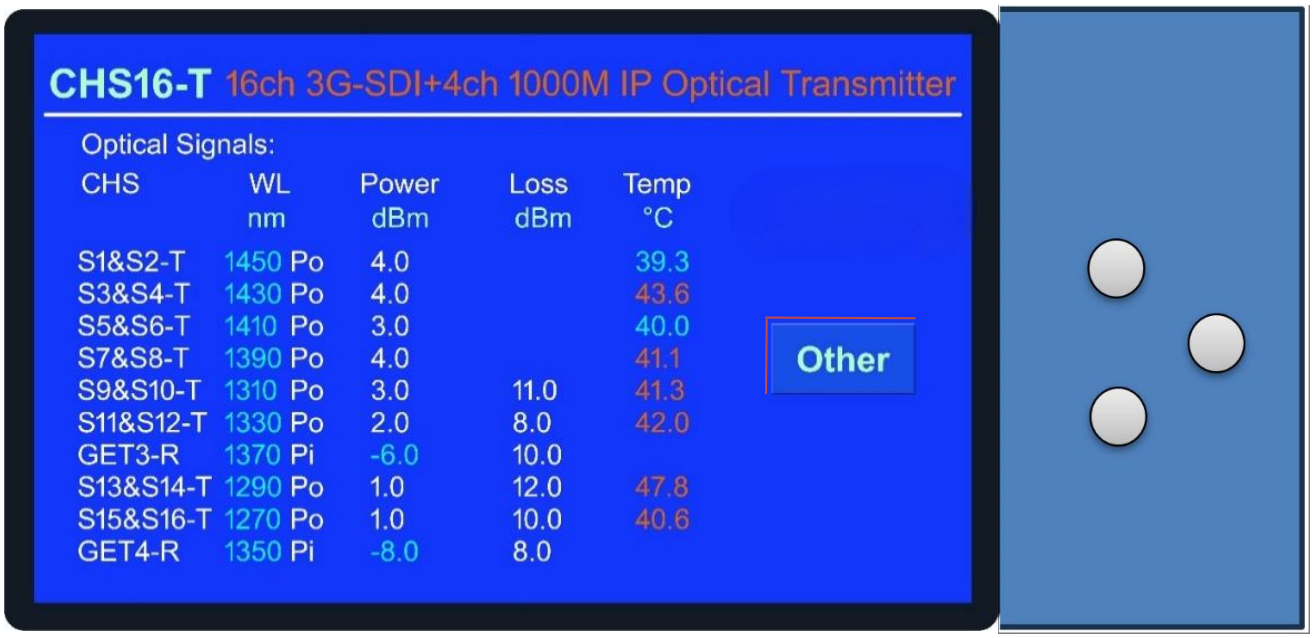
On the top of Menu page, it is equipment's Model, Name;

On the left, it shows fiber connector type, the Internal Temperature of the equipment, Fan's status (on or off), and the voltage of two power supply;

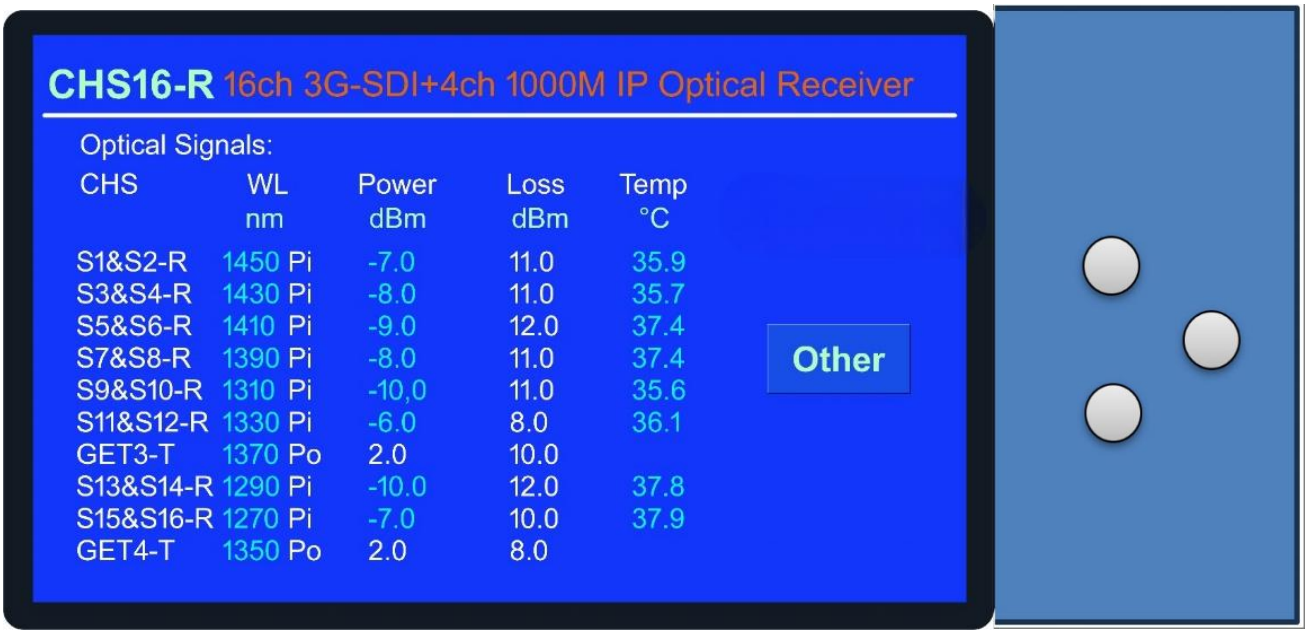
On the right, the cursor points to Opti button (highlighted by red lines). The others are SDI button, Gateway button and logo. Choose key can select different button by changing highlight lines. Currently the cursor is on Opti button, and press Enter key, it will enter into the Optical Signal of the equipment, Press Choose key and choose SDI button and press Enter key, it enters into SDI Signal page, Press Choose key and choose

Gateway button and press Enter key, it enters into Gateway setting page, Press Return key, it will return to the Home page.

Press Enter key, after release it, it will enter into **Optical Signal** Page as follow:




Optical Page of Transmitter



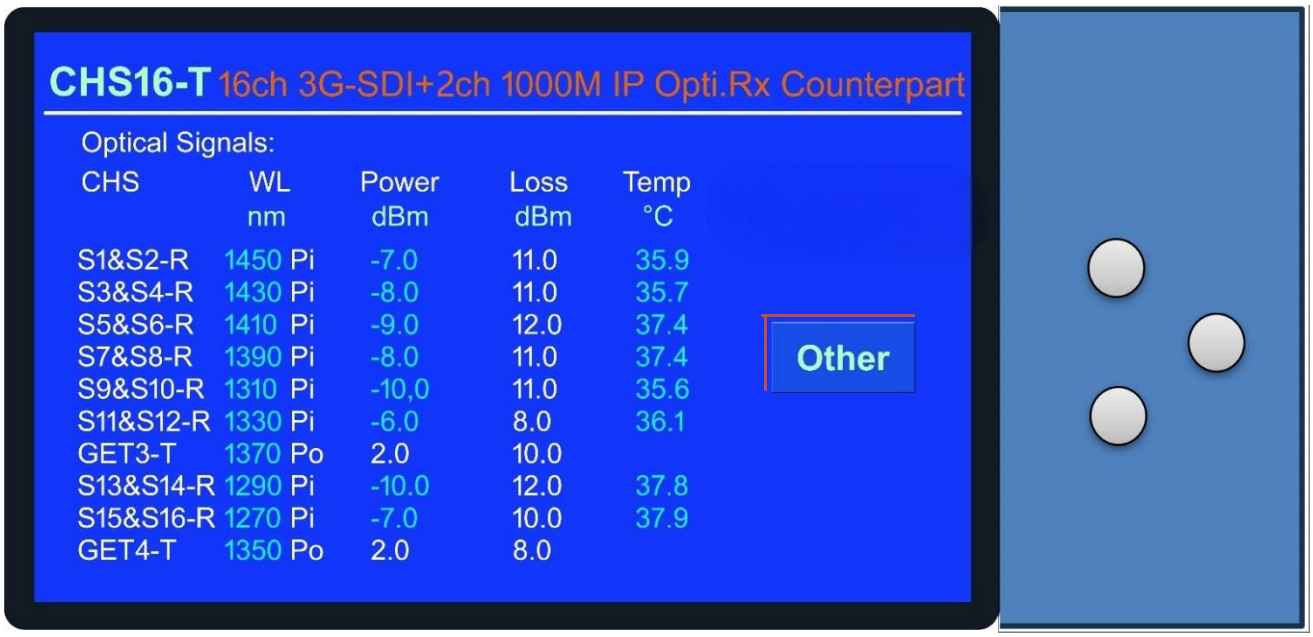

Optical Page of Receiver

On the Top of the page, it shows equipment's Model and name.

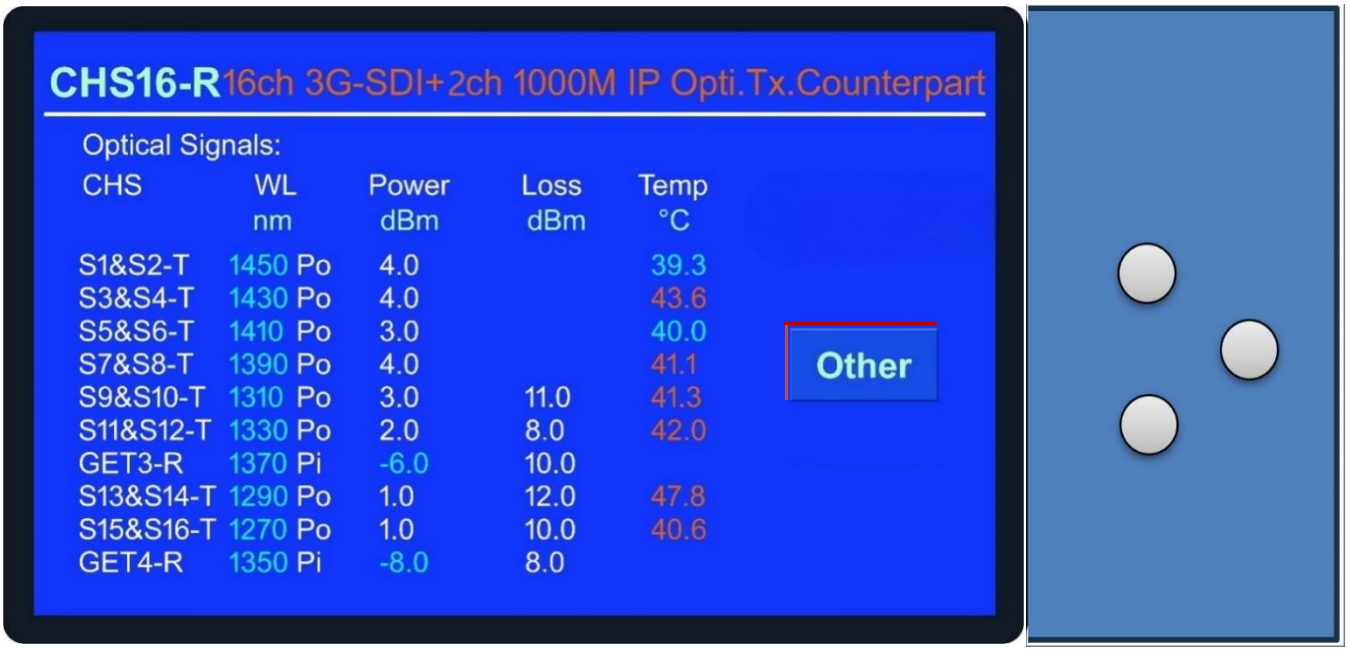
On the left, it shows Optical Signal's information including Channels, Optical module wavelength, Optical Power, link loss, Temperature of Optical Module.

On the right, there are logo and Other button, when press Return key, it will go to Menu page. Press Enter key, it will enter into Counterpart's Optical signal page (for the receiver, it has all Optical Transmission channels, so, all transmitter's information can be showed on the LCD of receiver; for transmitter, due to S1~S8 has no transmitting back Optical channel, so S1~S8's information of Receiver can't be showed on the LCD of Transmitter). Press Return key, it will go to Menu page. Press Enter key again, it will go to Optical page.

Press Enter key will enter into Counterpart page as follow:

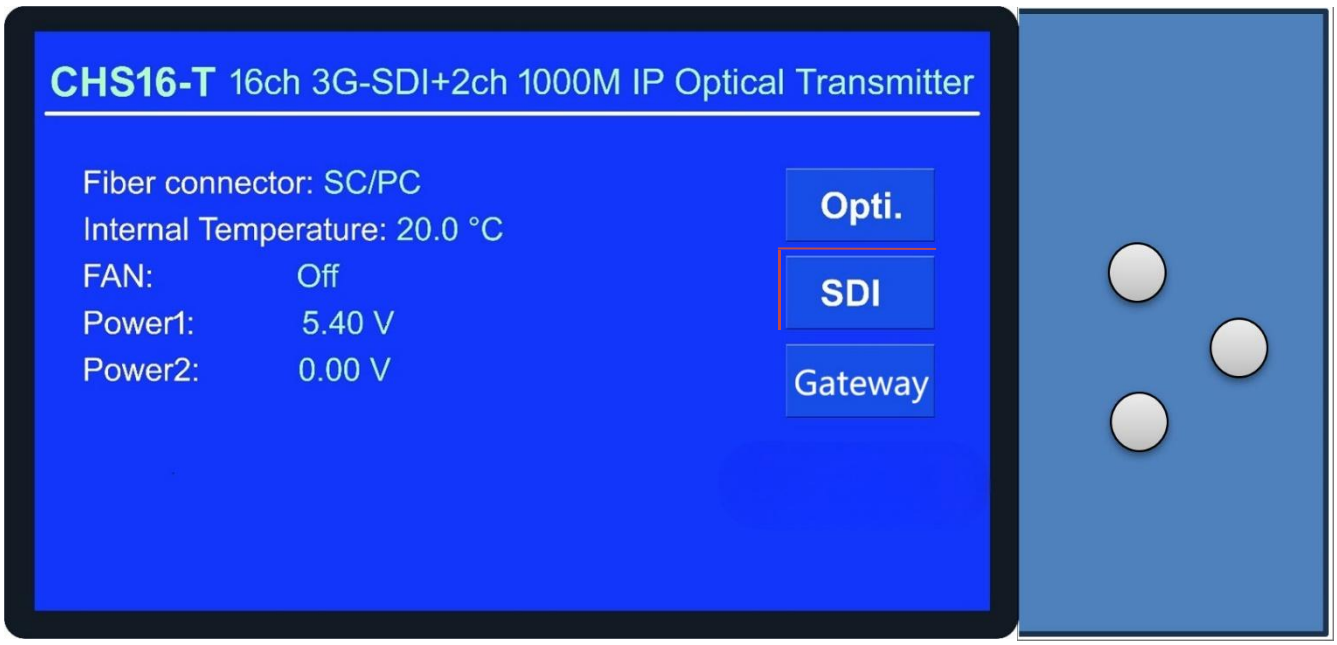



Counterpart's Optical page of Transmitter

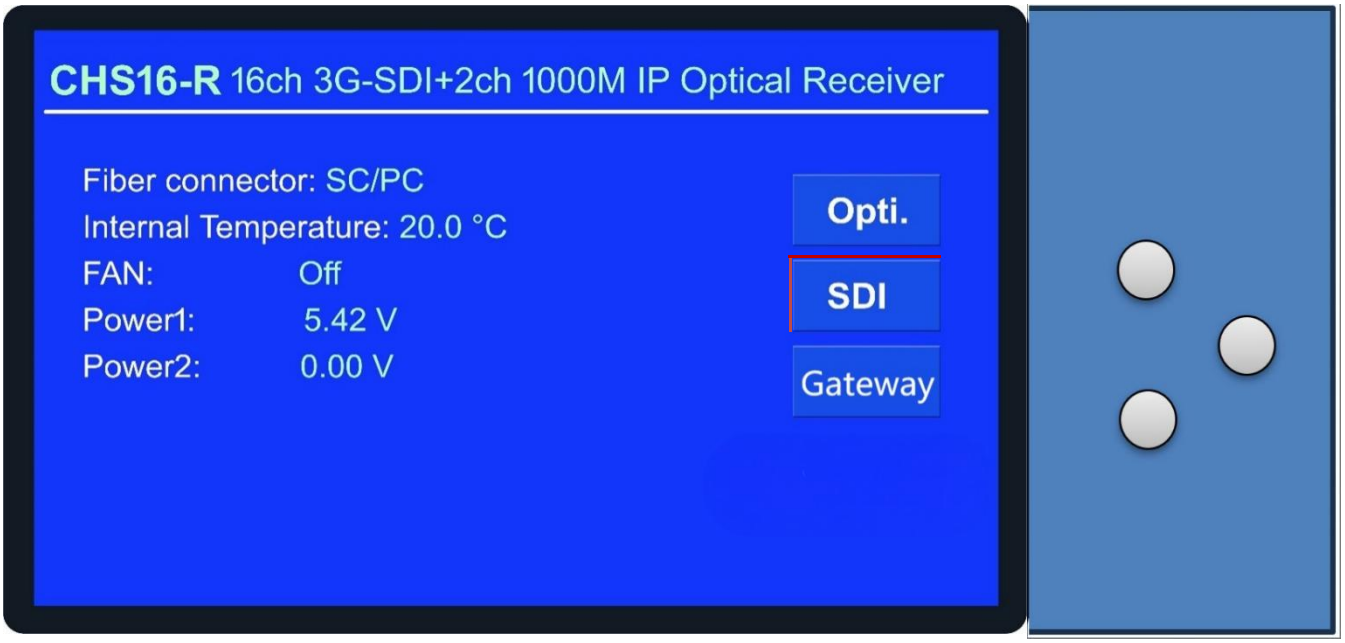



Counterpart's Optical page of Receiver

Press **Return** key on **Optical page** will return to the **Menu page** as follow:

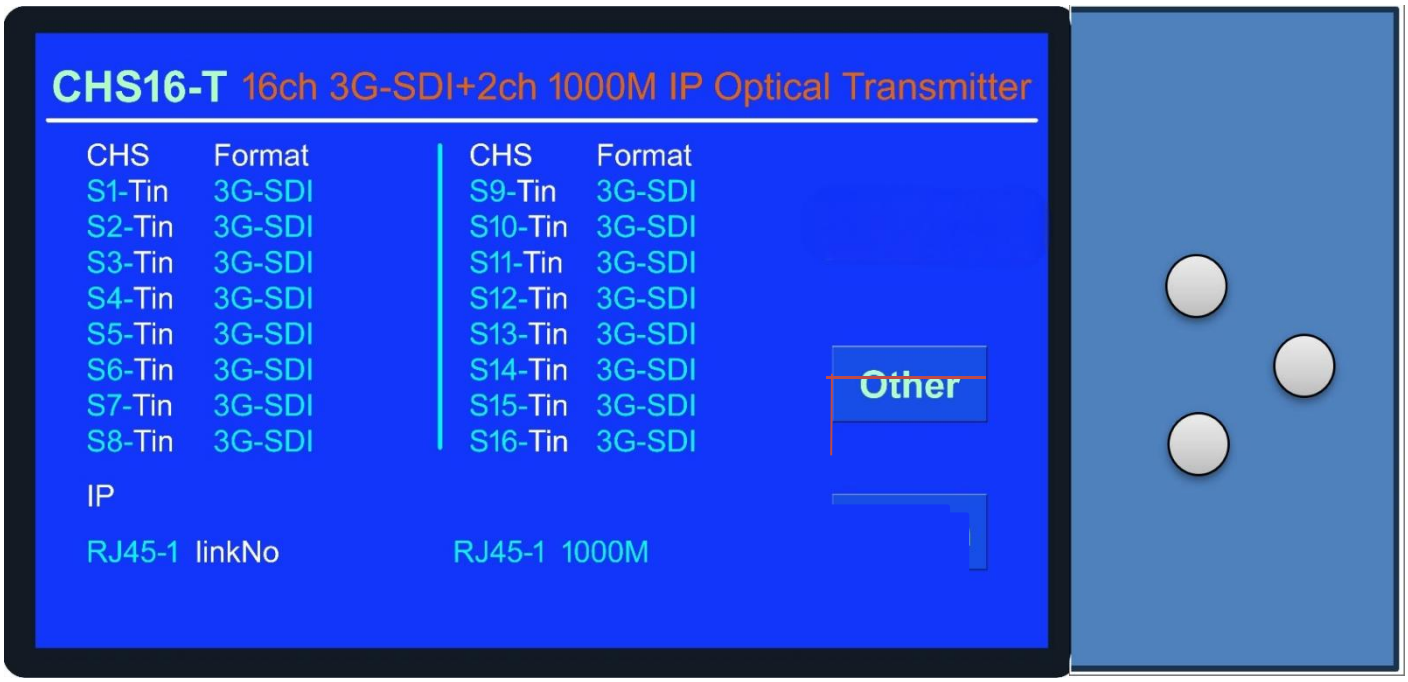



Menu page of Transmitter

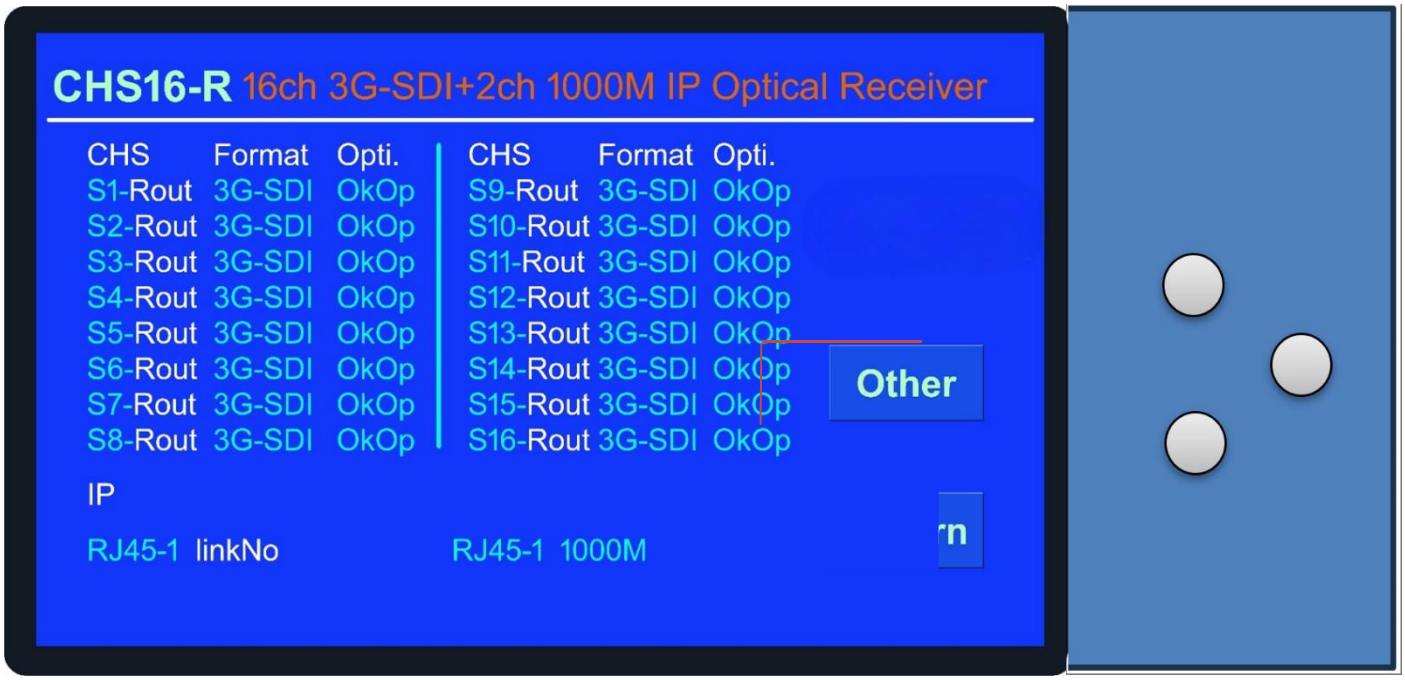



Menu page of Receiver

On Menu page, press Choose key and switch the cursor to SDI button. Then press Enter key, it will enter to the SDI Signal page as follow:




SDI Signal page of Transmitter




SDI Signal page of Receiver

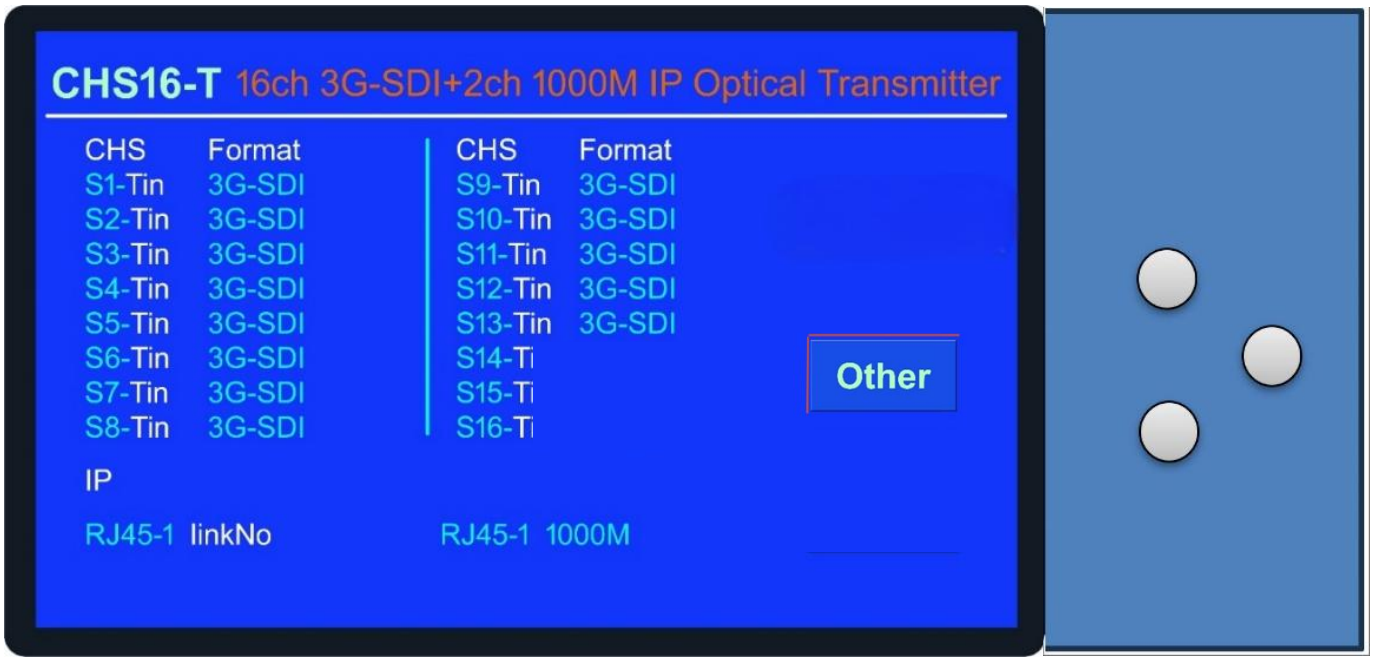
On top of the page, it shows equipment's Model, name.

On the left, it shows the channels (in or out), Signal's format (3G-SDI, HD-SDI or SD-SDI), Optic's status.

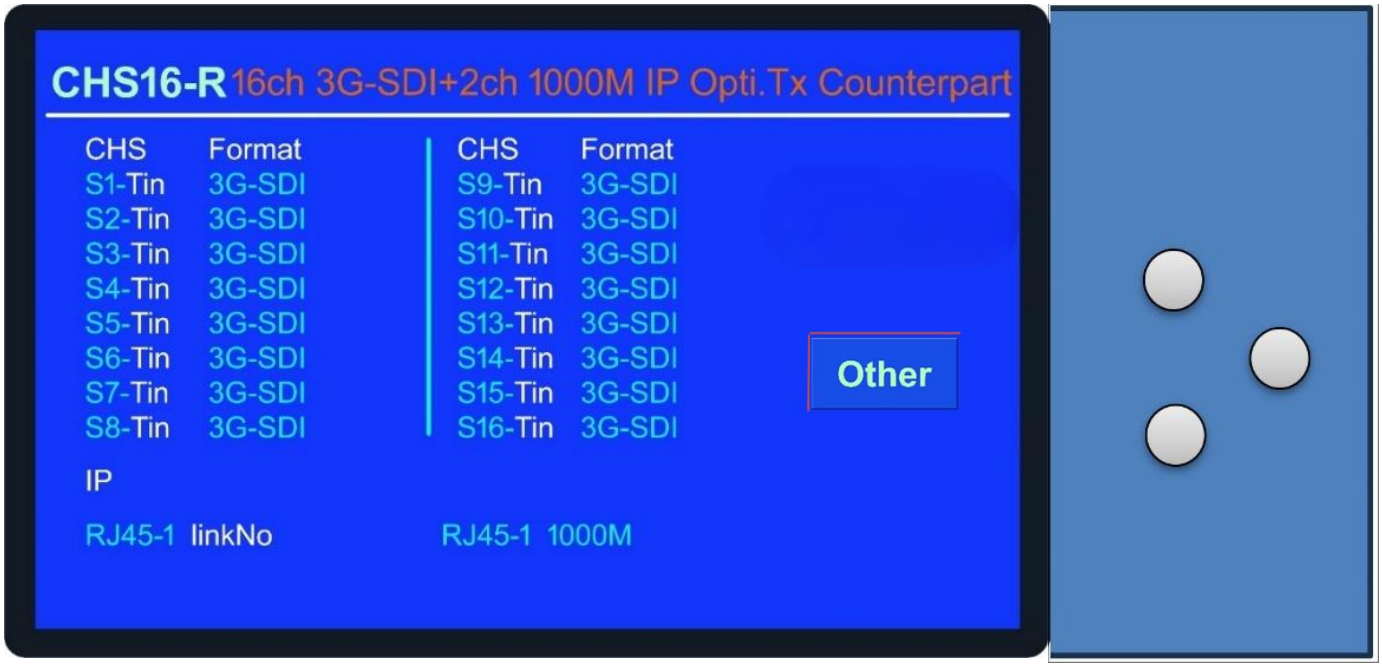
On the blow, it shows IP's status.

On the right, there are logo and Other button. when press Return key, it will go to Menu page, press Enter key, it will enter into counterpart's SDI signal page (for the receiver, it has all Optical Transmission channels, so, all transmitter's SDI information can be showed on the LCD of receiver; for transmitter, due to there is no transmitting back Optical channel, SDI information of Receiver can't be showed on the LCD of Transmitter). Press Return key, it will go to Menu page. Press Enter key, it will go to SDI signal page.

Press Enter key and it will enter into Counterpart's SDI Signal Page as follow:

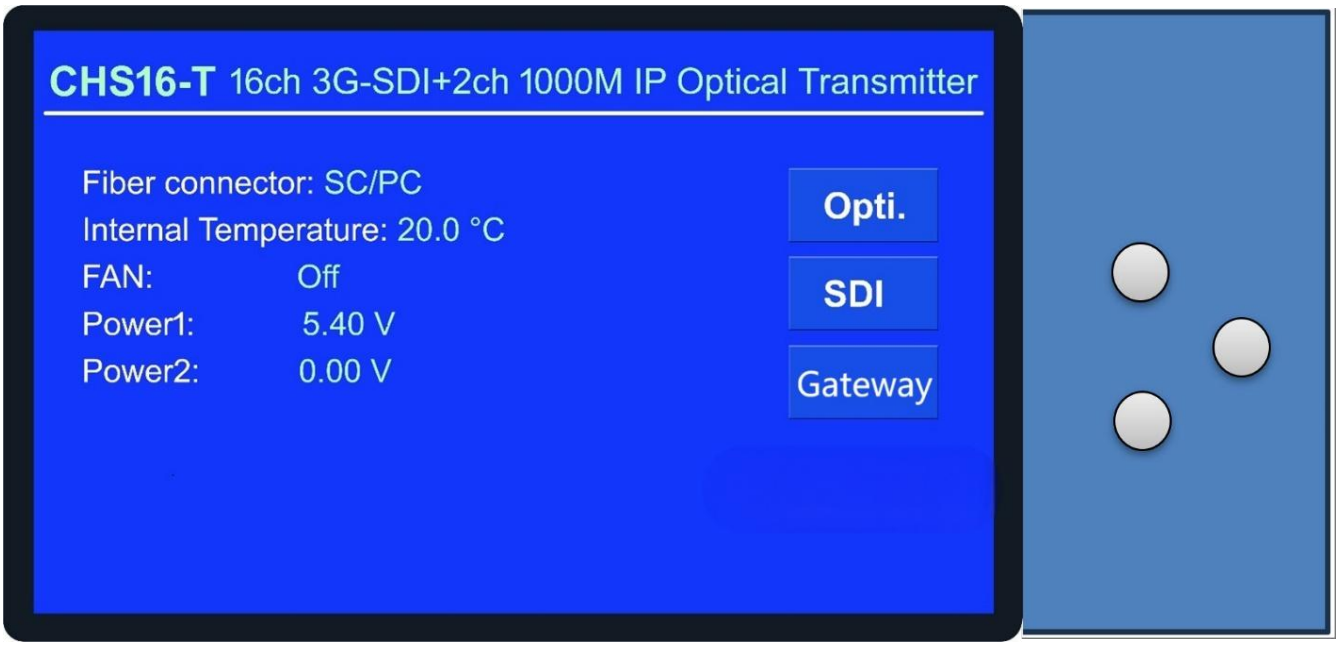



Counterpart's SDI Signal page of Optical Transmitter

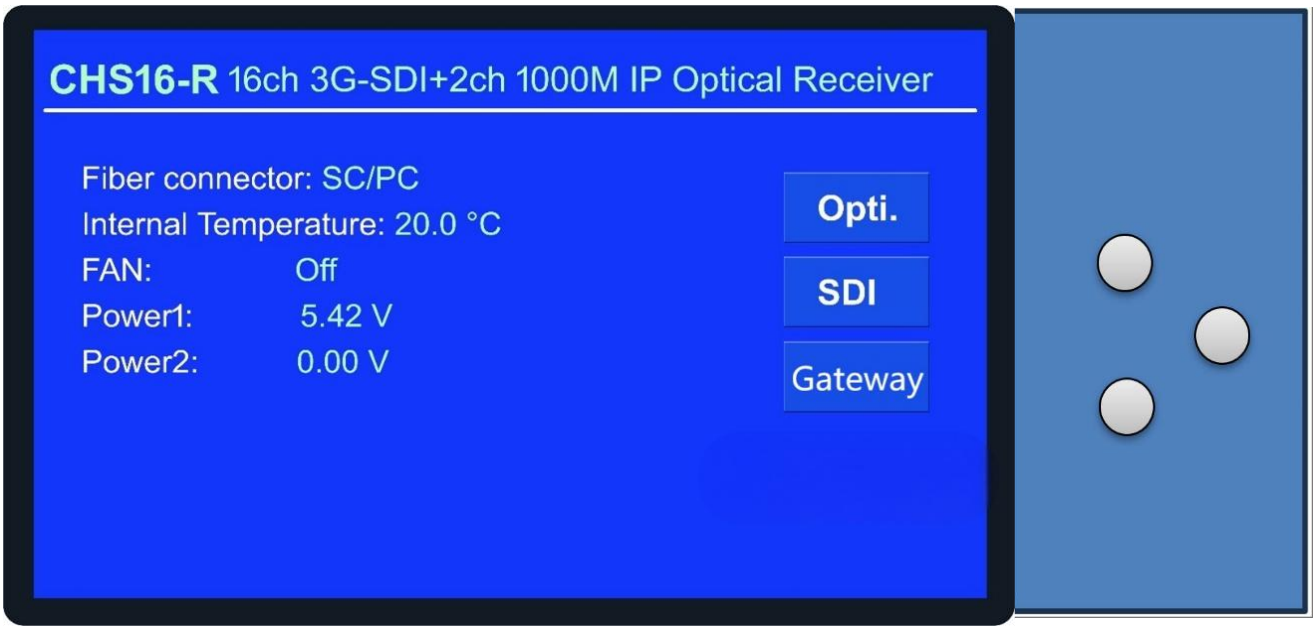



Counterpart's SDI Signal page of Optical Receiver

Press Return key on SDI signal page will Return to the Menu page as follow:




Menu page of Transmitter




Menu page of Receiver

On Menu page, press Choose key and switch the cursor to Gateway button. Then press Enter key, it will enter to the Gateway setting page as follow:


Gateway setting page of Transmitter (Display mode)


Gateway setting page of Receiver (Display mode)

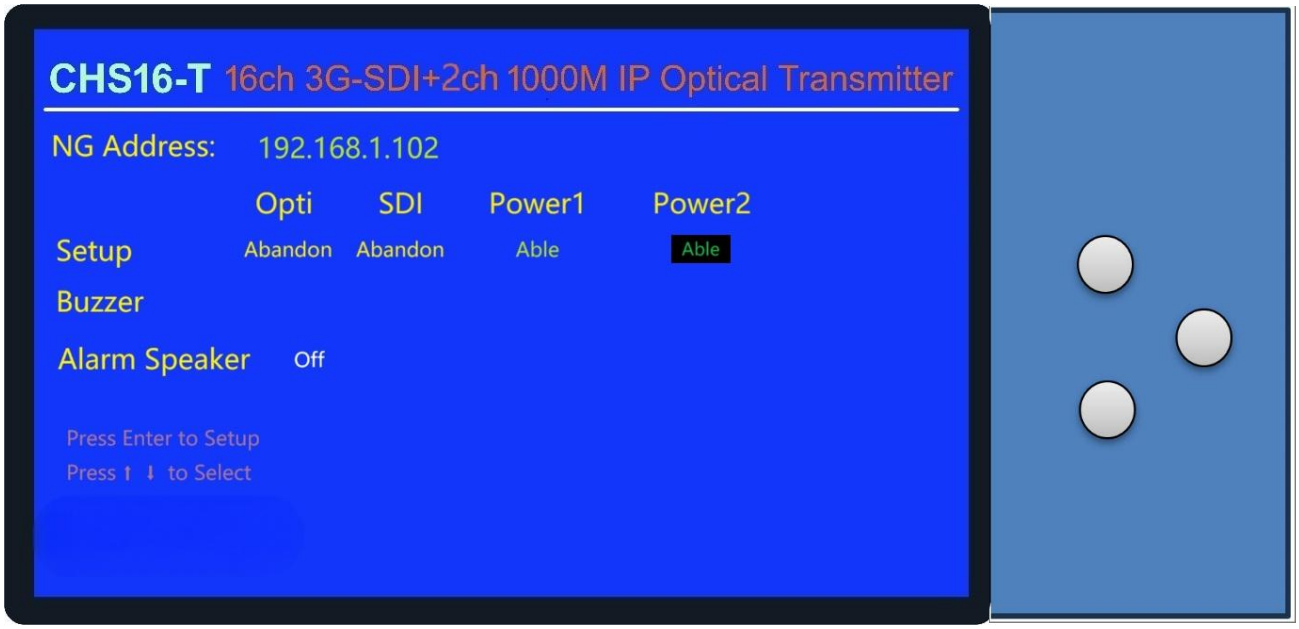
On the Top of the page, it shows equipment's Model and name.

On the left, it shows Gateway setting information including Network Gateway address(NG), Setup status,

Buzzer status and Alarm speaker status.

On the bottom, there are logo, Other button, when press Return key, it will go to Menu page. Press Enter key, it will enter into Network setup mode. Press Return key, it will go to Menu page. Press Enter key again, it will go to Network display mode.

Press Enter key, it will enter into Network setup mode. The highlight area is green font with black background. Press Choose key, it will switch the setting item from Power2 -> Power1 -> SDI -> Opti. Press Return key, it will switch setting from Able to Abandon and vice versa. Press Enter key again, the setting is finished and will return to Network display mode.




Gateway setting page of Transmitter (Setting mode)

Gateway setting page of Receiver (Setting mode)

# Ⅳ. Technical Parameter

## 4.1 Performance Parameter

| | | | |
|---|---|---|---|
| **3G-SDI Input** | | | |
| Input channels | 16(one loop output for each channel) | | |
| Input automatical cable balance | ＞80m （2970Mbps）（BELDEN8281 cable）<br>＞250m （270Mbps） （BELDEN8281 cable） | | |
| Input reflection loss | ＞16dB （270MHz） | | ＞12dB （2970MHz） |
| Impedance | 75Ω | connector | BNC |
| **3G-SDI Output** | | | |
| Output channels | 16 (dual output ports for each channel) | | |
| Output level | 800mV$_{P-P}$ ±10% | | |
| Ascent/ descent | ＜0.8ns | | |
| Max. Jitter | ＜0.1UI（2970Mbps）（100% color bar） | | |
| | ＜0.2UI（2970Mbps）（SDI pathology signal） | | |
| Impedance | 75Ω | connector | BNC |
| **IP** | | | |
| Channels | 2 | | |
| Standard | 1000BASE-T，100BASE-TX ，IEEE802.3Z/AB | | |
| Bit rate | 10M/100M/1000M self-adapt | | |
| Connector | RJ45 | | |
| **Optical parameter** | | | |
| wavelength | 1450nm, 11430nm, 1410nm, 1390nm, 1310nm, 1330nm, 1370nm, 1290nm, 1350nm, 1270nm | | |
| Optical transmission power | -5±3dBm | | 0±3dBm |
| Optical receiving power | -22～-3 dBm | | -16～-3 dBm |
| Optical transmission distance | 0~10km | | |
| Connector | SC/UPC | | |
| Power supply | AC100～245V ＜15W | | |
| Size | 19” 2U chasis, 430mm x 230mm x 86mm | | |

## Ⅴ. Notice

5.1 Fiber connector：this equipment's finer connector is SC/UPC，if misused, the output optical power will be reduced，maybe can affect the signal quality。

**5.2** the fiber connector should be kept clean, to avoid dust block the fiber channel, and affect normal transmission。

**5.3** receiver optical power should be within the distance scale, could not be too large of too small, do not more than 500μW eg. -3dBm，to avoid to burned the fiber receiving tube。

**5.4** The input and output of optical transceiver are BNC, 75Ω。

## Ⅵ：Other notices

1、open the package, and keep all the material , in case of using for returning to prepare in the future。

2、check the package see if there is damage, if the package has been damaged, please check and confirm according to clause on shipment, then open the package and take out the packing list from the side, open the package and check each item according the packing list see if it is the whole goods, if anyone has been damaged, or lost, please contact with us.。

3、During connect the cable of lightning and power supply surge protection , the protection method should be taken consideration，we will not be responsible for the damage by lightning or high power surge。

4、the chassis temperature of installed equipment could not be more than 65℃，in order to ensure the transmission index, the temperature in chassis should maintain at 25℃±25℃。

5、Install the front panel off frame

The electro-coating panel which factor have made holes, 19" chassis can be installed in 19" standard frame。

6、how to connect fiber and connector

Check fiber connector， when insert connector into the flange plate, Ceramic core of connector should insert into the flange and feel the activity spiral of spring is tight, and locked the connector fully, don't know insert the connector violently； when feel the is block in flange plate, then exit connector, and check the ceramic core and spring, insert the connector into the flange plate violently will lead to break the optical window。

We will be not responsible for repairing any broken of optical window.

All fiber connector should be capped by protection cap to avoid the dust and other dirt contaminated it when it will not be used。

## Ⅶ:Maintain Service

### 7.1 Regarding of the equipment with trouble

For the equipment with trouble, it can be sent back to our company, we will repair or replace the equipment according the damaged situation。 If the equipment is not under the guarantee, we will charge according to the material and labor cost。

Before repairing the equipment, it must be confirmed by us

### 7.2 The package of the equipment for repairing

When you ship the equipment, it is necessary to re-pack it, please according to the follow method, please put a label on it and write down your company's name, address and telephone, as well as the equipment's model, SN number, the description of the trouble

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