

THOR

BROADCAST

User Manual



One to Four GPS Signals over
One to Four Fibers

[F-GPS-Tx-WE](#)
[F-GPS-Rx-RM](#)

A Note from Thor Broadcast about this Manual

Intended Audience

This user manual has been written to help people who have to use, integrate and to install the product. Some chapters require some prerequisite knowledge in electronics and especially in broadcast technologies and standards.

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Table of Contents

CHAPTER 1 - INTRODUCTION	1
<i>1.1 PRODUCT OVERVIEW</i>	<i>1</i>
<i>1.4 MENU AND DESCRIPTION</i>	<i>3</i>
CHAPTER 2 – GPS TRANSMITTER INSTALLATION	6
2.1 RECEIVING AND INSPECTING.....	6
2.2 PRECAUTIONS	6
2.3 MOUNTING THE EQUIPMENT	6
CHAPTER 3 – GPS RECEIVER PARAMETERS.....	8
3.1 TECHNICAL SPECIFICATIONS	8
3.2 PANEL INTERFACE.....	9
3.3 MENU OPERATION	9
CHAPTER 4 – INSTALLATION.....	12
4.1 RECEIVING AND INSPECTING	12
4.2 PRECAUTIONS.....	12
4.3 MOUNTING THE EQUIPMENT.....	13
CHAPTER 5 - PACKING LIST.....	14

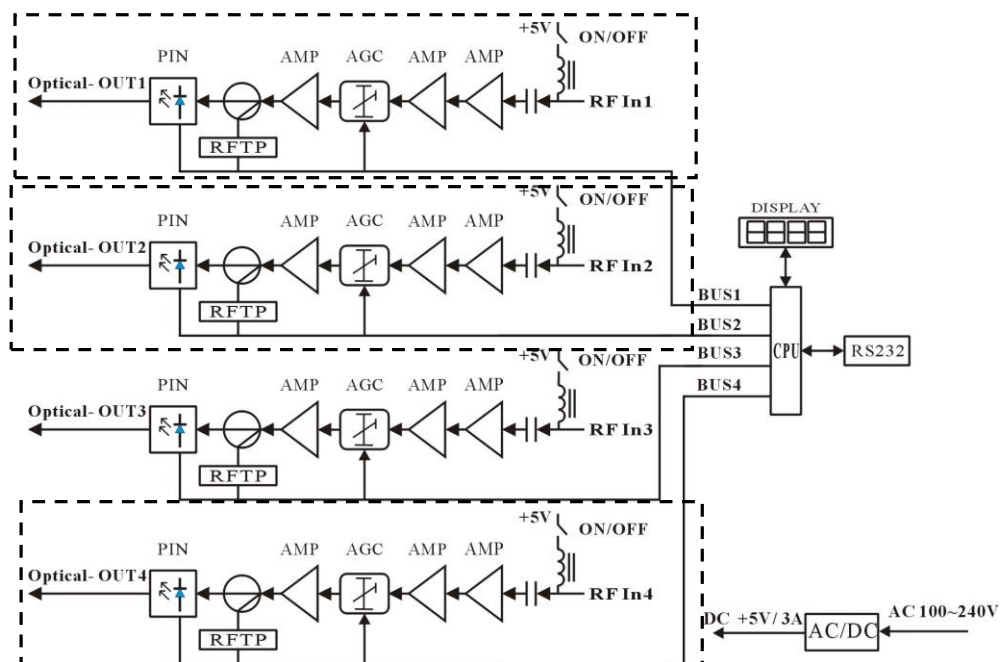
Chapter 1 - Introduction

1.1 Product Overview

The Thor Fiber GPS over Fiber kit features a compact outdoor weatherproof enclosure Transmitter and a rack mount commercial grade Receiver. This satellite optical transmitter come equipped with a high linearity isolated DFB laser, direct modulated. It can transmit GPS signal (45~2400MHz) over glass, single mode fiber only. This allows transmission of the two main signals in the GPS band, L1 and L2, at 1575.42 MHz and 1227.6 MHz. By using built-in LNA, this GPS over Fiber Link is designed to offer a very low noise figure. The transmitter shows incoming RF level and optical output power. The receiver has built in Optical power meter and RF output level meter, which allows for simple troubleshooting.

Both transmitter and receiver have dual redundant power supplies, making them very robust and pragmatic for commercial architectures. These systems are very easy to deploy and can offer various configurations for many applications.

1.2 Diagram



Note: The content in the dashed box is optional.

1.3 Specifications

Item	Unit	Indexes	Remark
Optical Characteristics			
Laser Type		Isolated DFB	
Optical Wavelength	nm	1510, 1530, 1550, 1570 or specified by the user	Specified by the user
Optical Output Power	mW	1, 2, 3	Specified by the user
Optical Return Loss	dB	50	
Optical Connector Type		SC/APC	Specified by the user
RF Characteristics			
Input Impedance	Ω	50	
RF Connector		TNC type	Specified by the user
Working Bandwidth	MHz	85~2000	
Input Range	dBuV	47~67	Input level (AGC attenuation=0)
Flatness	dB	± 2	50~600MHz
	dB	± 1.5	600~2000MHz
Input Return Loss	dB	12	50~2400MHz
C/IM3		≥ 55	Note 1
AGC attenuation	dB	-7~+7	Note 2

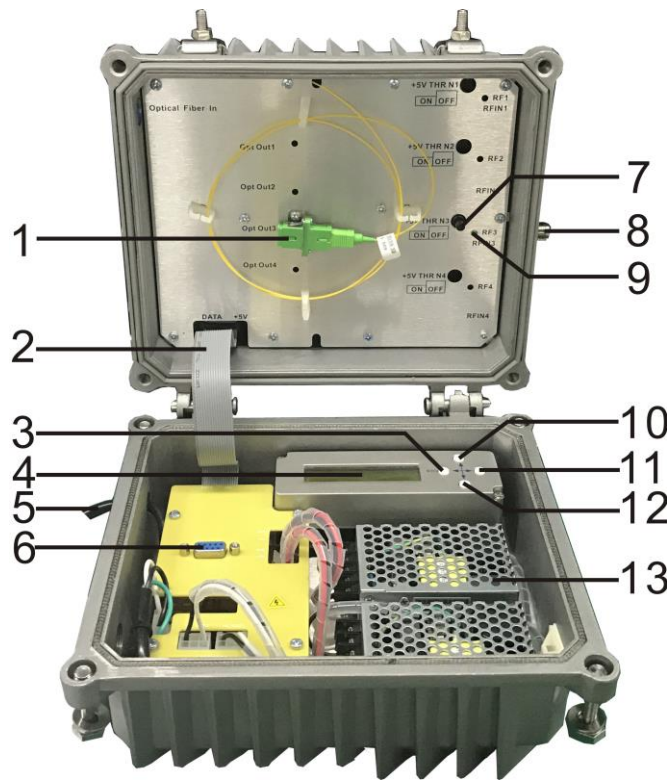
General Characteristics			
Serial Interface		RS232	
Power Supply (AC)	V	100~240	Optional dual power
Consumption	W	10	
Relative Humidity	%	5~95	
Working Temperature	$^{\circ}\text{C}$	-20~60	
Storage Temperature	$^{\circ}\text{C}$	-40~70	
Dimension (W)*(D)*(H)	mm	1U 19 inch 483*395*44	

Note 1: C/IM3 is defined as the ratio between the peak of carrier signal and triple beat (IM3) by using a two-tone test (1.0GHz and 1.1GHz).

Note 2: The input level range is 47~67dBμV when AGC attenuation=0; the input level range is 48~68dBμV when AGC attenuation=1. That is to say, AGC attenuation increase 1dB, the input level will corresponding increase 1dB and the optical receiver output level will also increase 1dB (the same optical power received). The reduce rule is just the same.

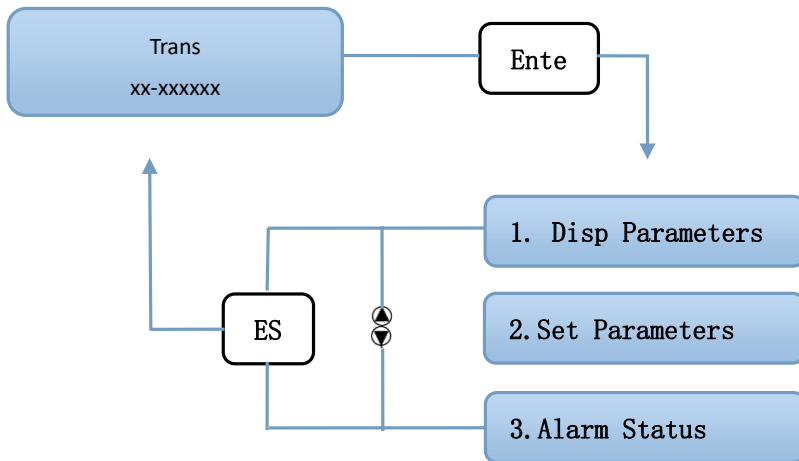
1.4 Menu and Description

RF indicator	Have RF signal input	LED green
	No RF signal input	LED off



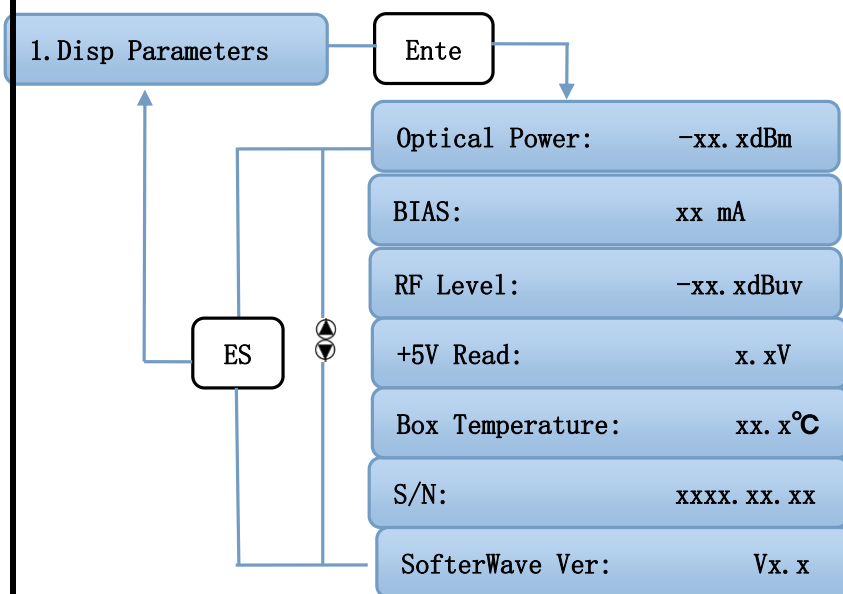
1	Optical transmit port	2	Data and power cables	3	ESC
4	Display screen	5	Power line in	6	RS232 interface
7	+5V feeder switch	8	RF input port	9	RF indicator
10	Up	11	Enter	12	Down
13	Switching power supply				

1.5 Menu Operation



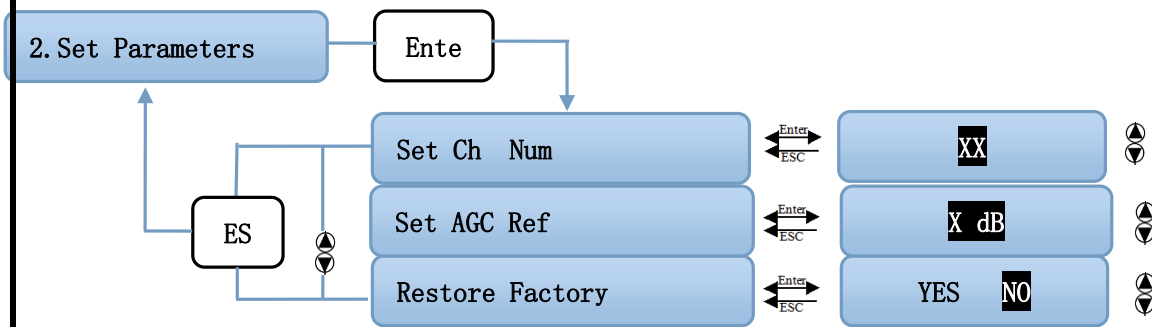
Display parameters	Description
Trans xx-xxxxx	Boot displayed xx-xxxxx is the device model
1.Disp Parameters	Menu 1: Display parameters
2.Set Parameters	Menu 2: Set parameters
3.Alarm Status	Menu 3: Alarm status

1.5.1 Display Menu



Display parameters	Description
Optical Power	Optical output power
BIAS	Laser bias current
RF Level	Laser input level
+5V Read	+5V monitor voltage
Box Temperature	Box temperature
S/N	Serial number
SofterWave Ver	Software version number

1.5.2 Setup Menu



Display parameters	Description	Remark
Set Ch Num	Set the channel number	Range 1~200
Set AGC Ref	Set the AGC attenuation	Range +7~-7
Restore Factory	Restore factory settings	

1.5.3 Alarm Menu

Display alarm content	Description
Optical Alarm	optical output power alarm
RF Alarm	RF input alarm
BIAS Alarm	Laser current alarm
+5V Alarm	+5V voltage alarm
Device Temper Alarm	Device internal temperature alarm
Invalid Power	Power failure alarm

Chapter 2 – GPS Transmitter Installation


2.1 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 Thor Fiber.

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.

2.2 Precautions

Heed the following precautions when working with the equipment.

	Warning	Read the installation instructions before connecting the system to the power source.
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	Warning	The plug-socket combination must be accessible at all times, because it serves as the main disconnecting point.
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2.3 Mounting the Equipment

2.3.1 Mount the Equipment

It must be grounded reliably. Then you can unscrew the four sealing screws.

2.3.2 Connecting the RF Cables

Verify the type of RF input F connector according to the ordering information, and then connect with the matching RF cable type.

2.3.3 Connecting the Optical Fiber Cables

It has 1 to 4 output optical connectors (depending on custom order).

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 optical fiber connector type is matched with the equipment according to the ordering information. Thor Fiber always uses SC/APC with RF over Fiber gear.
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 optical connector has not been exposed to any contamination.

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

4. Note the key characteristics of the mating connectors and align them accordingly.

2.3.4 Connecting Power

The equipment uses AC220V power supply. Follow the power connection procedure below.

It can equip two 220V power supplies that require input voltage from 110 to 265 VAC, at 50 to 60Hz single phase.

Connect the power; it takes about 60 seconds for all systems to operate. Then close it and screw on the four sealing screws.

Chapter 3 – GPS Receiver Parameters

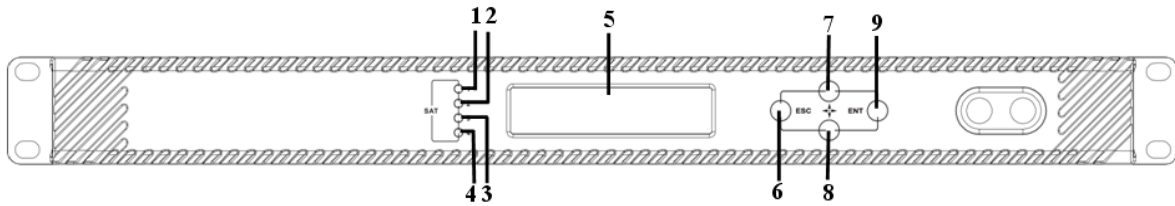
3.1 Technical Specifications

Item	Unit	Indexes	Remark
Optical Characteristics			
Operating Wavelength	nm	1260~1620	
Responsivity	A/W	≥ 0.9	
Optical Return Loss	dB	≥ 50	
Optical Connector Type		SC/APC	Specified by the user
Optical Receiving Power	dBm	-15 ~0	
RF Characteristics			
Operating Bandwidth	MHz	50 ~2400MHz	
Total Output Power	dBm	-20	
Flatness	dB	± 2	50~600MHz
		± 1.5	600~2400MHz
Output Return Loss	dB	≥ 12	50~2400MHz
C/IM3	dB	≥ 55	Note 1
Output Impedance	Ω	50	
RF connector	Ω	TNC	
Link Performance	dB μ V	≥ 70	Note 2
General Characteristics			
Operating Voltage (AC)	V	100-240	
Consumption	W	≤ 8	
Operating Temperature	$^{\circ}$ C	-20 ~+50	
Storage Temperature	$^{\circ}$ C	-40 ~+85	
Dimension (W) \times (D) \times (H)	(mm)	1U 19 inch 483*395*44	

Note 1: C/IM3 is defined as the ratio between the peak of carrier signal and triple beat (IM3) by using a two-tone test (1.0GHz and 1.1GHz).

Note 2: The test condition adopts the specified optical transmitter, AGC attenuation= 0 and optical receiving power= -5dBm.

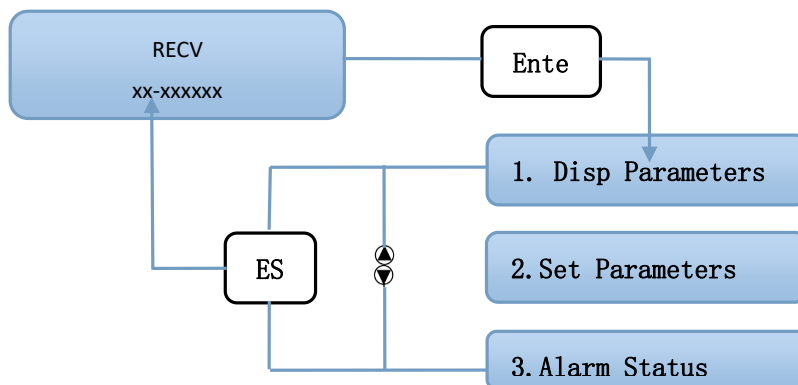
3.2 Panel Interface



1	Module 1 indicator	2	Module 2 indicator	3	Module 3 indicator
4	Module 4 indicator	5	LCD	6	ESC
7	Up	8	Down	9	Enter

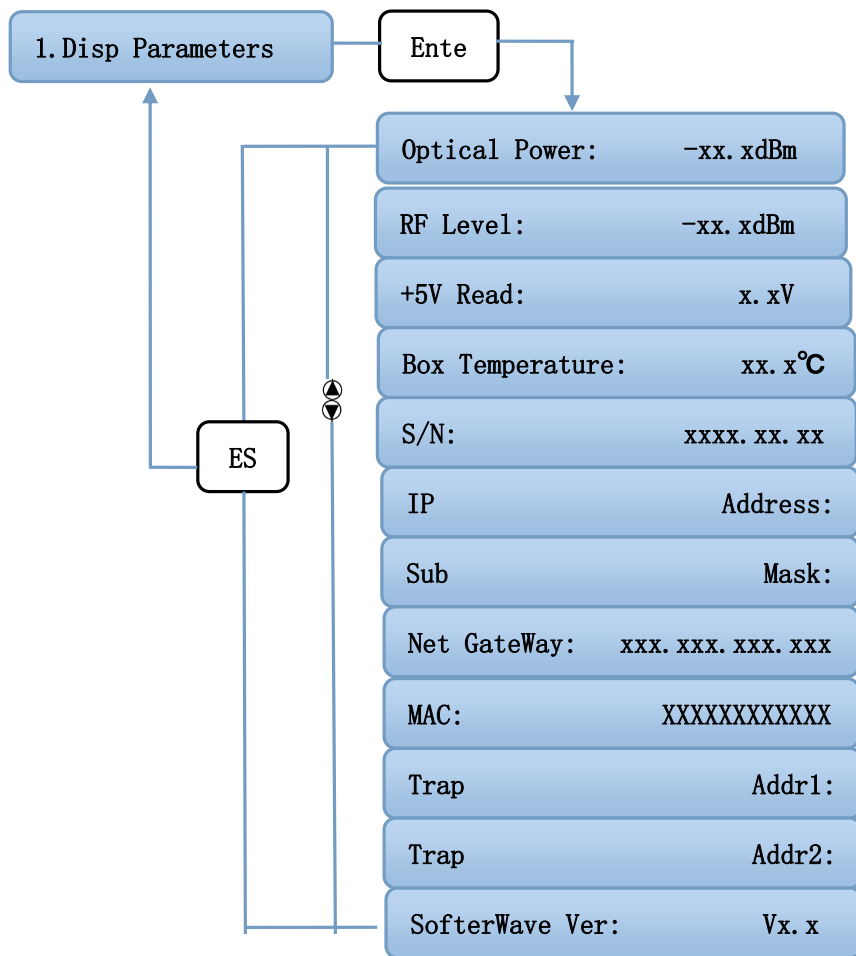
3.3 Menu Operation

3.3.1. Main Menu



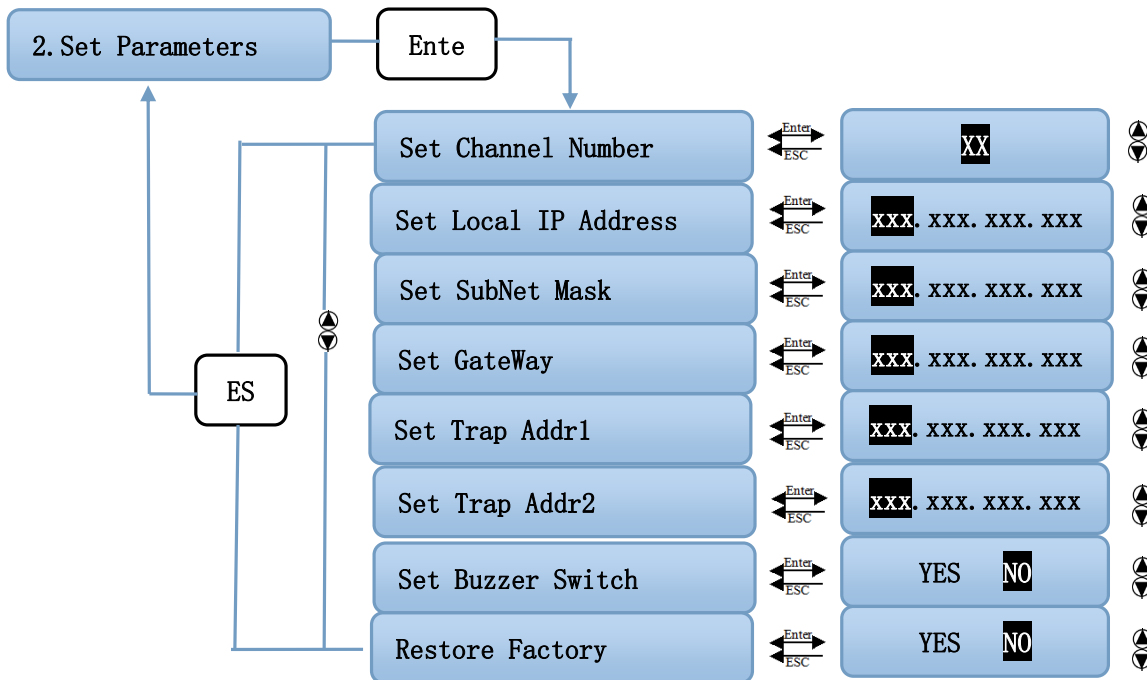
Display parameters	Description
RECV xx-xxxxx	Boot displayed xx-xxxxx is the device model
1.Disp Parameters	Menu 1: Display parameters
2.Set Parameters	Menu 2: Set parameters
3.Alarm Status	Menu 3: Alarm status

3.3.2 Display Menu



Display parameters	Description
Optical Power	optical input power
RF Level1	output level
+5V Read	+5V monitor voltage
Box Temperature	Box temperature
S/N	Serial number
IP Address	IP address
Sub Mask	Subnet mask
Net GateWay	Gateway
MAC	MAC address
Trap Addr1	Trap1 address
Trap Addr2	Trap2 address
SofterWave Ver	Software version number

3.3.3. Setup Menu



Display parameters	Description	Remark
Set Channel Number	Set the channel number	Range 1~200
Set Local IP Address	Set IP address	
Set SubNet Mask	Set subnet mask	
Set GateWay	Set gateway	
Set Trap Addr1	Set trap1 address	
Set Trap Addr2	Set trap2 address	
Set Buzzer Switch	Set the buzzer switch	YES is on, NO is off
Restore Factory	Restore factory settings	

3.3.4 Alarm Menu

Display alarm content	Description
Optical Alarm	optical input power alarm
RF Alarm	RF output alarm
+5V Alarm	+5V voltage alarm
Device Temper Alarm	Device internal temperature alarm
Invalid Power	Power failure alarm

Chapter 4 – Installation


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.

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.

4.2 Precautions

Heed the following precautions when working with the equipment.

	Warning	Read the installation instructions before connecting the system to the power source.
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	Warning	The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.
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4.3 Mounting the equipment

4.3.1 Mount the equipment in the cabinet

To mount the equipment in a standard 19-inch equipment cabinet/Rack:

1. Place the unit in the cabinet/Rack.
2. Use four mounting screws to attach the mounting ears on the front panel to the cabinet.
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 type of RF input F connector according to the ordering information, and then connect with the matching RF cable.

4.3.3 Connecting the Optical Fiber Cables

The equipment has 1 to 4 input optical connectors based on Model Selection

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 optical fiber connector type is matched with equipment 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 section "Cleaning Patch Cord or Pigtail Fiber Optical Connectors".
3. Verify that the optical connector has not been exposed to any contamination.

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

4. Note the key characteristics of the mating connectors and align them accordingly.

4.3.4 Connecting the Ethernet Cable

You can connect the equipment to your TCP/IP network in order to monitor and control the optical receiver remotely. After you complete the installation procedures described in this chapter, you can use a network management system (NMS) to monitor and control the equipment.

To connect the equipment, you must use a shielded and grounded Category 5 Ethernet cable.

To connect the Ethernet cable:

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

4.3.5 Power On

The equipment uses AC220V power supply. Follow the power connection procedure below.

It can equip two 220V power supplies that require input voltage from 150 to 265 VAC, at 50 to 60Hz single phase. The AC power sockets are on the rear panel.

Connect the power; it takes about 60 seconds for all systems to operate.

Chapter 5 - Packing List

Thor Fiber Weatherproof Outdoor Transmitter	1 PC
Rackmount Receiver	1 PC
Power Cord	2 PC
Instruction Manual	1 PC

For Further Tech Support

1-800-521-Thor(8467)

support@thorfiber.com