User Manual

8 Program TS Matrix Hardware Transcoder

Revision 2019

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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.

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Thor shall have no liability for any error or damage of any kind resulting from the use of this document.

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Table of Contents

Chapter 1 - Introduction

1.1 Product Overview

The Thor Broadcast 8 Program HD/SD Video Transcoder is a professional bidirectional transcoder to convert video between H.264 and MPEG-2 format and also to transcode between HD and SD programs simultaneously. It is equipped with 6 ASI inputs and 8 IP inputs to receive digital channels. After transcoding, it outputs 1 MPTS & 8 SPTS through the DATA port or ASI port.
This transcoder supports advanced re-multiplexing and can effectively provide operators with real-time code rate switch and optimize the video with additional hardware features.
BISS function is now embedded to descramble ASI and IP input programs and CC function as well to transport your closed caption (or teletext).
It can be easily managed through web NMS system, and has become an ideal solution for clients to provide high quality video trans-coding in a single 1RU chassis with easy to use features.

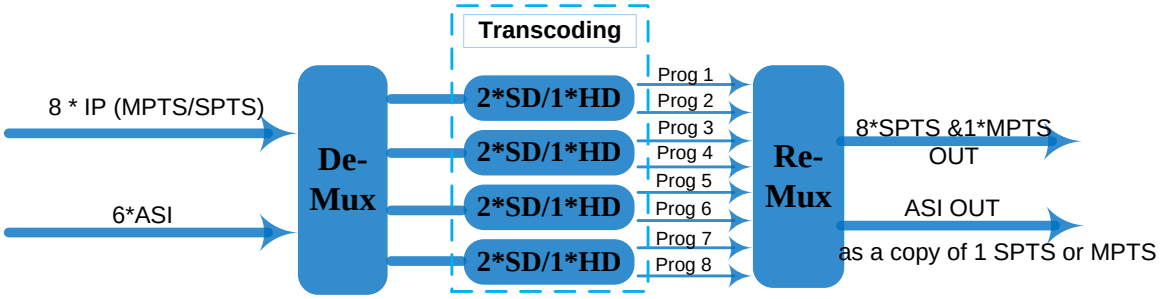
1.2 Key features

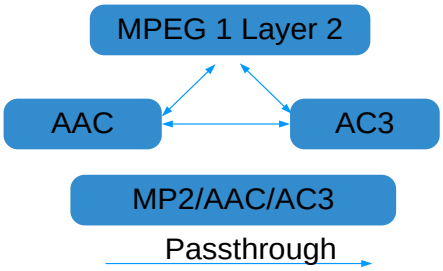
- **8 IP (SPTS/MPTS) inputs plus 6*ASI input**
- **8 SPTS & 1 MPTS (UDP/RTP/RTSP) output; 1 ASI (MPTS) output**
- **Video Trans-coding: MPEG-2 SD/HD and H.264 SD/HD any-to-any**
- **Audio Trans-coding: LC-AAC, MP2 and AC3 any-to-any or pass-through.**
- **Maximum 8 SD or 4 HD programs trans-coding**
- **Maximum 8 channels of audio trans-coding**
- **HD and SD resolutions**
- **CBR and VBR rate control**
- **CC (closed caption)**
- **BISS descrambling**
- **IP out with null packet filtered**
- **Advanced re-multiplexing**
- **LCD & Key board local control; web NMS management**

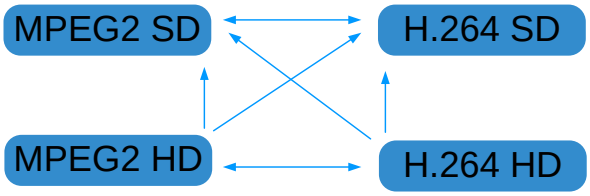
1.3 Specifications

Stream In	MPTS/SPTS over UDP/RTP/RTSP, 1000M Base-T Ethernet Interface/ SFP interface	
	6 * ASI (BNC Type)	
BISS Descramble	Maximum 8 programs	
Video	Resolution	1920x1080I,1280x720P, 720x576i, 720x480i 480x576, 544x576, 640x576, 704x576
	Trans-coding	4*MPEG2 HD → 4*MPEG2/H.264 HD ; 4*MPEG2 HD → 4*MPEG2/H.264 SD ; 8 *MPEG2 SD → 8 *MPEG2/H.264 SD
		4* H.264 HD → 4*MPEG2/H.264 HD ; 4* H.264 HD → 4*MPEG2/H.264 SD ; 8* H.264 SD → 8 *MPEG2/H.264 SD
	Rate Control	CBR/VBR
Audio	Trans-coding	Audio Trans-coding: AAC, MP2 and AC3 any-to-any or pass-through.
	Sampling rate	48KHz
	Bit Rate	32/48/64/96/128/192/224/256/320/384Kbps
Stream Out	8*SPTS & 1*MPTS over UDP/RTP/RTSP, 1000M Base-T Ethernet Interface (UDP/RTP uni-cast / multicast) /SFP interface	
	1 ASI (as a copy of one of the 8 SPTS or the MPTS) output, BNC interface	
System Function	LCD & Key board control; web NMS management	
	Ethernet software upgrade	
General	Dimensions	430mm×405mm×45mm(WxDxH)
	Temperature range	0~45℃(Operation), -20~80℃(Storage)
	Power requirements	AC 110V±10%, 50/60Hz; AC 220V±10%,50/60Hz

1.4 Principle Chart & Transcoding







1.5 Appearance and Description

Front Panel Illustration

1 2 3 4 5 6

① LCD Screen
② NMS Port
③ Data Port
④ Power and Alarm Indicators
⑤ TS Lock Indicators
⑥ Lock Key

Rear Panel Illustration

1 2 3 4 5 1 6

7 8

① 6 ASI Inputs
② 2 ASI Output
③ Data Port for IP Signal Input/Output
④ NMS Port (network management system)
⑤ GE Port (SFP Port); for optical signal in/out
⑥ Power Switch
⑦ Power Connector
⑧ Ground Wire Screw

Chapter 2 - Installation Guide

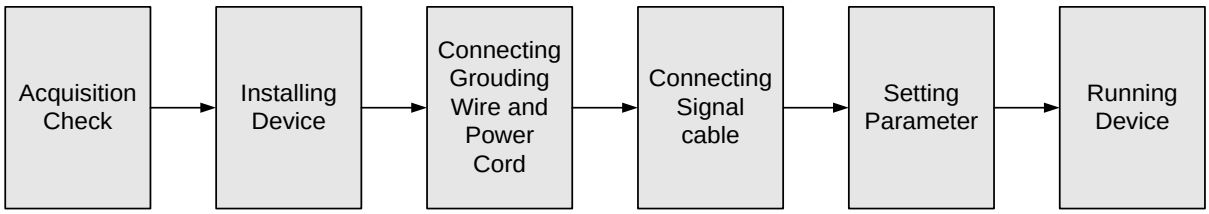
2.1 General Precautions

- ✓ Must be operated and maintained in an area free of dust and debris.
- ✓ The cover should be securely fastened, do not open the cover of the chassis when the power is on. This will also void Thor's manufacturer's warranty.
- ✓ After installation, securely stow away all loose cables, external antenna, and others.

2.2 Power precautions

- ✓ Be careful when connecting a power source to the device.
- ✓ Do not operate in wet or damp areas. Make sure the extension cable is in good condition
- ✓ Make sure the power switch is off before you start to install the device

2.3 Device's Installation Flow Chart Illustrated (as following)



2.4 Environment Requirement

Item	Requirement
Machine Hall Space	When installing unit on rack, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free, HVAC anti-static material:$1X10^{7}$~$1X10^{10}\Omega$, Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/㎡)
Environment Temperature	5~40℃(sustainable)，0~45℃(short time)， installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Fire Protection	Fire alarm system and extinguisher
Power	Device power, HVAC and lighting should be independent to each other. Device power requires AC 110V±10%, 50/60Hz or AC 220V±10%, 50/60Hz. Please carefully check before running.

2.5 Grounding the Unit

- ✓ It is important to keep this device grounded to ensure all of the modules function correctly. Correctly grounding the device will also help prevent any electrical interference, lightening. Etc. Also it helps reject minor interference that may disrupt the devices ability to function smoothly. General rule of them, make sure the device is grounded when installing anywhere.

- ✓ Always use copper wire. When applied correctly the ground must be wrapped well to ensure maximum conduction so it can reduce any high frequencies. The copper ground wire should also be as short and thick as possible

- ✓ Installer must make sure that the two ends of the ground are well conducted and have appropriate anti-rust properties.

- ✓ It is prohibited to use any other device as part of the grounding electric circuit.

- ✓ The area of the conduction between the ground wire and device's frame should be no less than 25 ㎡.

Chapter 3 - Operation

Keyboard Function Description:

MENU: Cancel current entered value, resume previous setting; Return to previous menu.

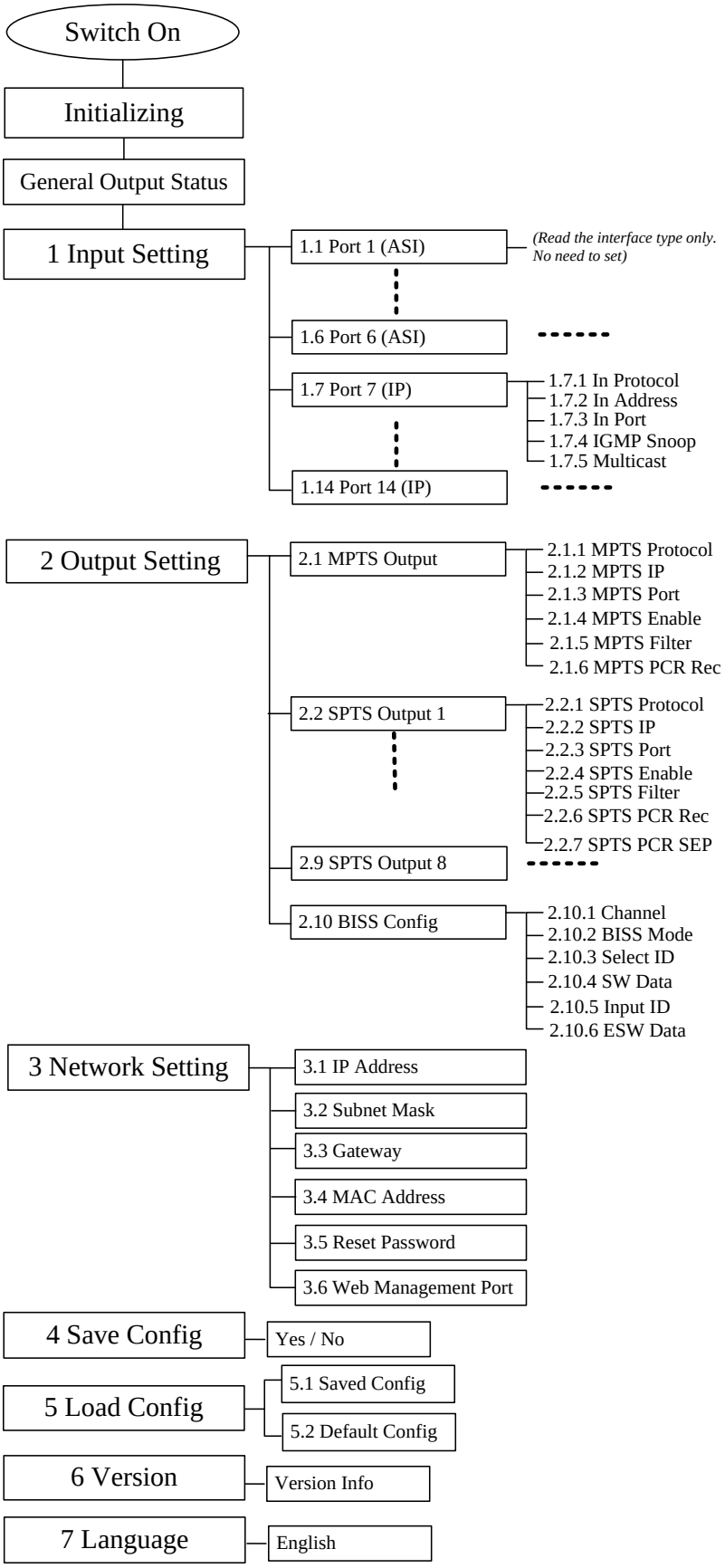
ENTER: Activate the parameters which need modifications, or confirm the change after modification.

LEFT/RIGHT: Choose and set the parameters.

UP/DOWN: Modify activated parameter or paging up/down when parameter is inactivated.

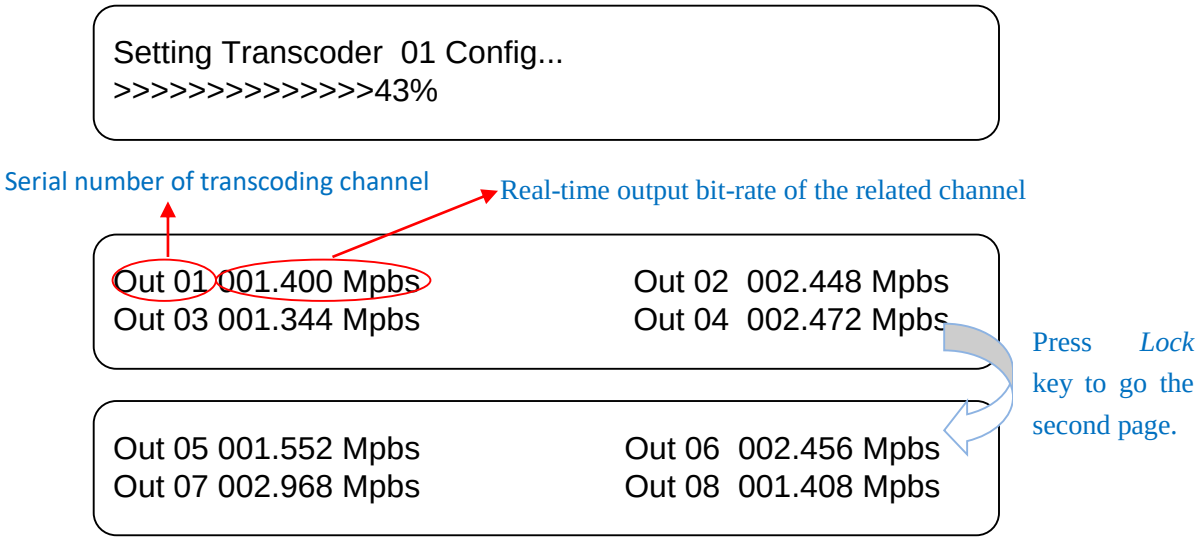
LOCK: Lock the screen/cancel the lock state. After pressing the lock key, the LCD will display the current configuring state.

3.1.1 LCD Menu Structure


Switch On
Initializing
General Output Status
1 Input Setting
1.1 Port 1 (ASI)
(Read the interface type only. No need to set)
1.6 Port 6 (ASI)
1.7 Port 7 (IP)
1.7.1 In Protocol
1.7.2 In Address
1.7.3 In Port
1.7.4 IGMP Snoop
1.7.5 Multicast
1.14 Port 14 (IP)
2 Output Setting
2.1 MPTS Output
2.1.1 MPTS Protocol
2.1.2 MPTS IP
2.1.3 MPTS Port
2.1.4 MPTS Enable
2.1.5 MPTS Filter
2.1.6 MPTS PCR Rec
2.2 SPTS Output 1
2.2.1 SPTS Protocol
2.2.2 SPTS IP
2.2.3 SPTS Port
2.2.4 SPTS Enable
2.2.5 SPTS Filter
2.2.6 SPTS PCR Rec
2.2.7 SPTS PCR SEP
2.9 SPTS Output 8
2.10 BISS Config
2.10.1 Channel
2.10.2 BISS Mode
2.10.3 Select ID
2.10.4 SW Data
2.10.5 Input ID
2.10.6 ESW Data
3 Network Setting
3.1 IP Address
3.2 Subnet Mask
3.3 Gateway
3.4 MAC Address
3.5 Reset Password
3.6 Web Management Port
4 Save Config
Yes / No
5 Load Config
5.1 Saved Config
5.2 Default Config
6 Version
Version Info
7 Language
English

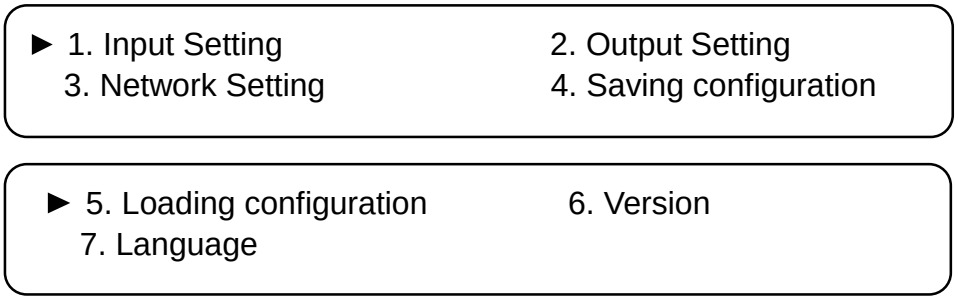
3.1.2 Initial Status

After switching on the device, it will take a few seconds to initialize the system, and then the LCD will display the real-time output bit-rate of the 8 transcoding channels respectively.



3.1.3 General Settings for Main Menu

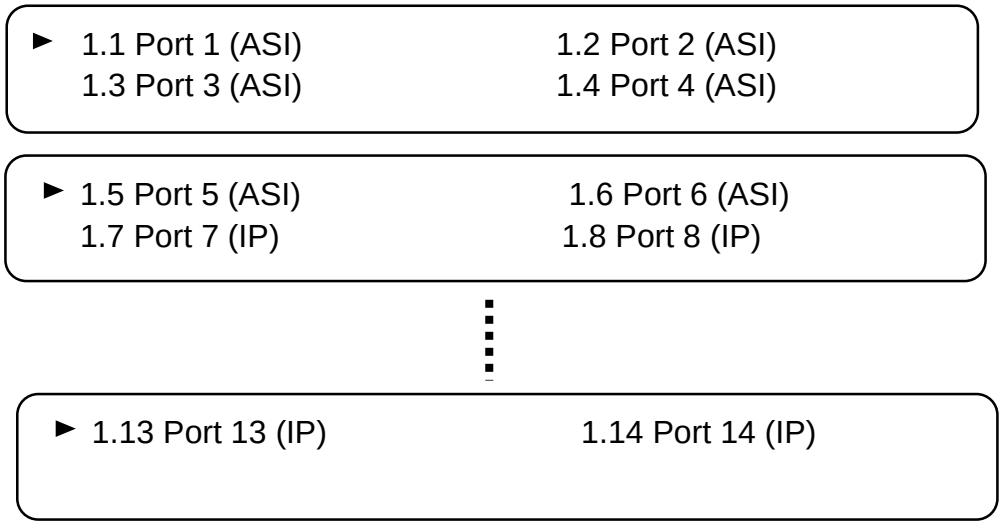
By pressing "LOCK" key again to enter the main menu, press UP/DOWN key to turn LCD page:



The option with "►" is the selected selection, users can press the ENTER key to enter the specified submenu.

3.3.1 Input Setting

Press UP/DOWN/LEFT/RIGHT keys to turn page or specify the target item and press ENTER key to enter into the menu of *Input Setting* when this menu is marked with ►. It shows as bellow:

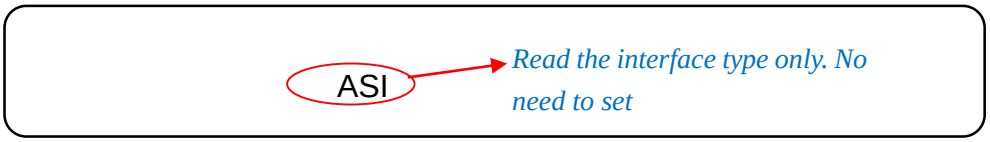


There are 4 pages displaying menus from 1.1 to 1.14 to represent the **6 ASI input channels (1.1-1.6)** and **8 IP channels (1.7-1.14)**. Enter each sub-menu to configure its parameters.

3.3.1.1 Port 1 (ASI 1 Input)

Here we take 1.1 *Port 1 (ASI)* signal input as an example to illustrate ASI inputs:

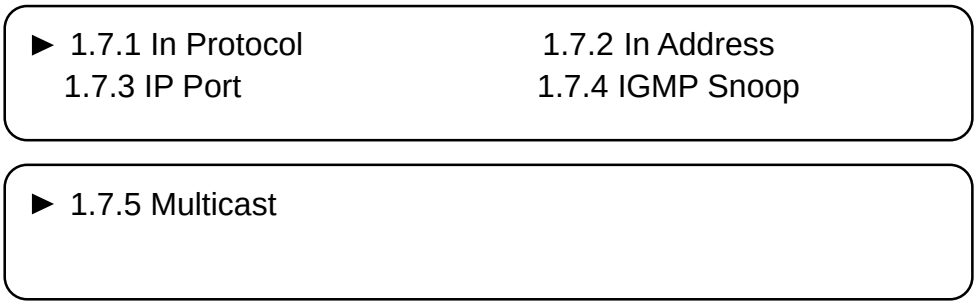
Enter 1.1 and users will find the page as shown:



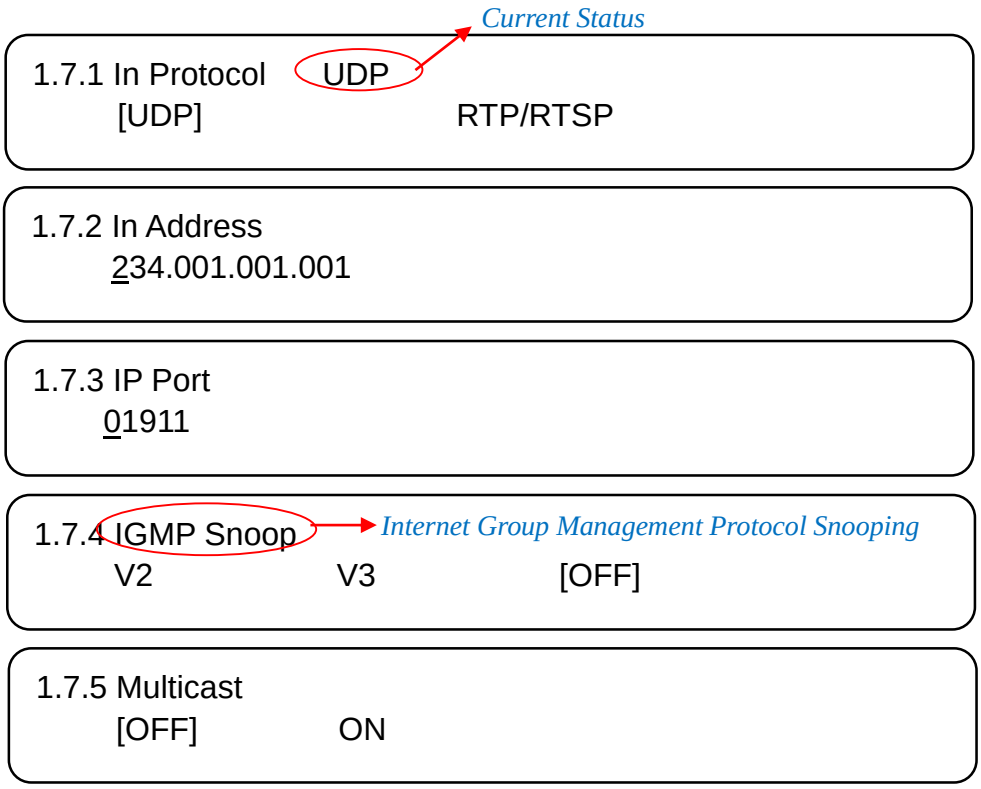
P.S.: The descriptions of 1.2-1.6 Port X (ASI) are the same with 1.1 Port 1 (ASI).

3.3.1.2 Port 7 (IP Input)

Here we take *1.7 Port 7 (IP)* as an example to illustrate IP inputs:



In submenus 1.7.1-1.7.5, you can configure the IP input parameters to receive the IP programs.



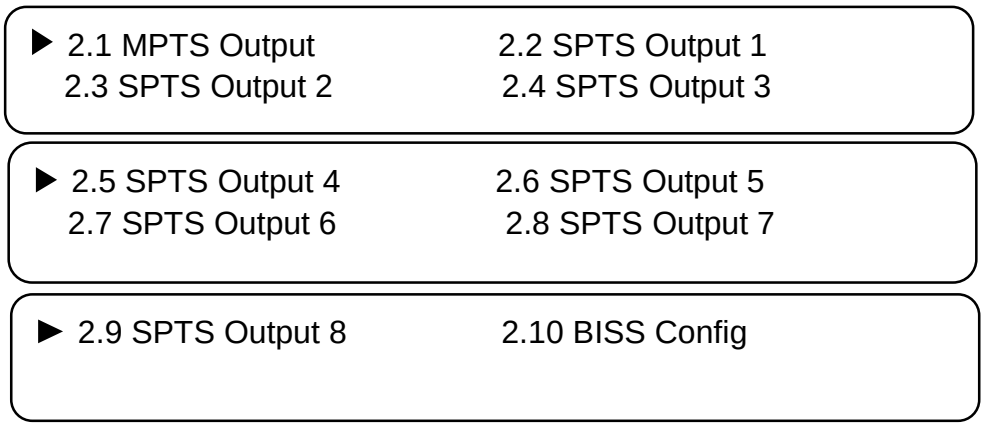
P.S.: The descriptions of 1.8 – 1.14 Port X (IP) are the same.

3.3.2 Output Settings

This transcoder supports IP output in the form of both MPTS (Multiple Programs Transport Stream) and SPTS (Single Program Transport Stream). *Output Settings* containing 2.1- 2.9 is to configure the

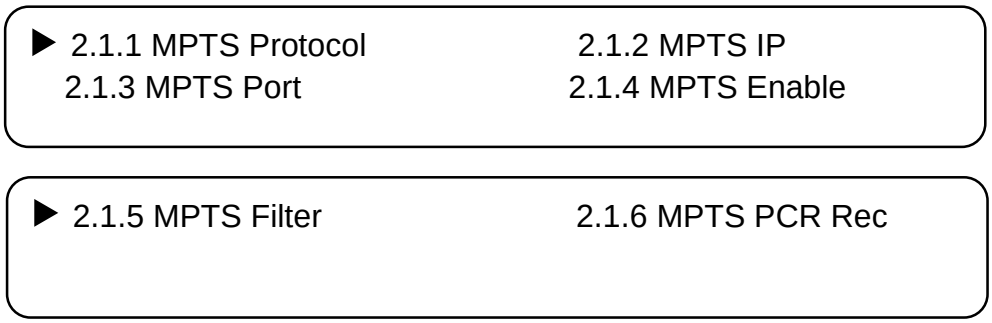
MPTS and SPTS parameters and 2.10 is to configure BISS Config.

Submenus are displayed as shown below:

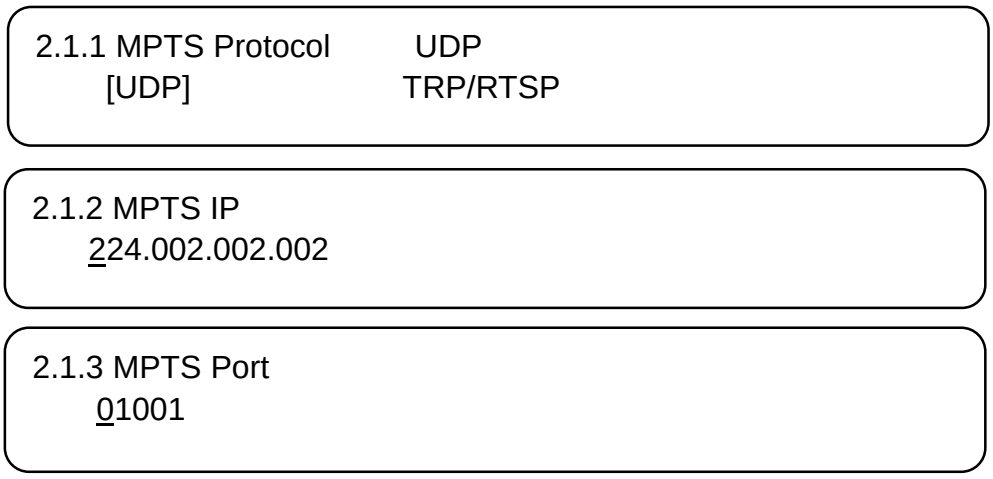


3.3.2.1 MPTS Output

The processed programs can be output through one channel of MPTS (Multiple Programs Transport Stream). User can set the parameters of the MPTS under submenu 2.1.



Under these menus, you can set the IP protocol mode, IP address and port number for the MPTS output, and also choose enable the MPTS output or not.



2.1.4 MPTS Enable
OFF [ON]

This option 'ON', it will filter output null packet.

2.1.5 MPTS Filter ON
OFF [ON]

This option 'ON', it will recovery output PCR.

2.1.6 MPTS PCR REC ON
OFF [ON]

3.3.2.2 SPTS Output (2.2-2.9, taking 2.2 as an example)

The processed programs can also be output in the form of SPTS (Single Program Transport Stream). User can set the parameters of the SPTS under submenu 2.2-2.9. There are all together 8 channels of SPTS as this device can maximally transcode 8 programs simultaneously.

▶ 2.2.1SPTS Protocol 2.2.2 SPTS IP
2.2.3 SPTS Port 2.2.4 SPTS Enable

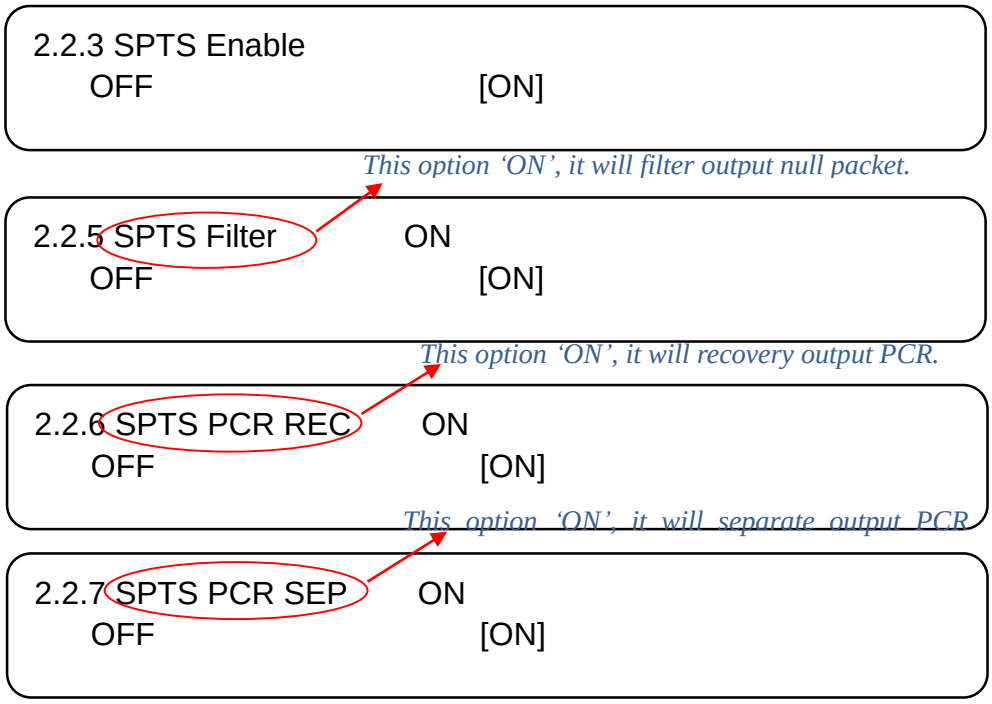
▶ 2.2.5SPTS Filter 2.2.6 SPTS PCR REC
2.2.7 SPTS PCR SEP

Under these menus, you can set the IP protocol mode, IP address and port number for the SPTS output, and also choose enable the corresponding SPTS output or not.

2.2.1 SPTS Protocol UDP
[UDP] TRP/RTSP

2.2.1 SPTS IP
224.002.002.002

2.2.2 SPTS Port
01001

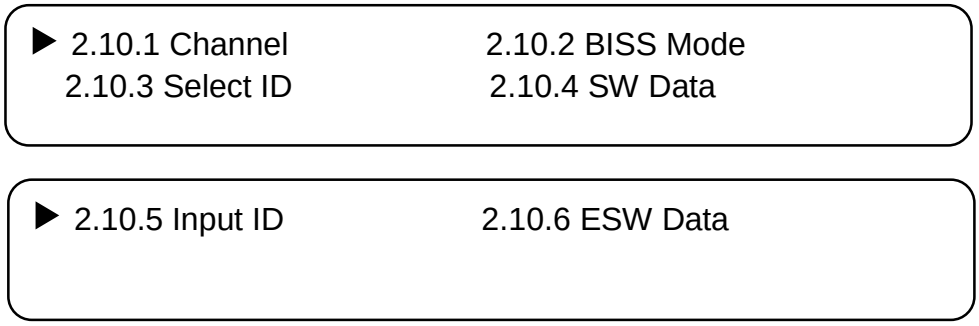


P.S.: The descriptions of 2.3-2.8 are the same with 2.2.

3.3.2.3 BISS Configuration

BISS: Basic Interoperable Scrambling System

This Transcoder also supports BISS to descramble encrypted programs from ASI or IP. Users can set the parameters of BISS under submenu 2.10.



- **BISS Channel**

Select the Channel which needs to be descrambled under this submenu.

BISS Channel CH1
[CH1] CH2 CH3 CH4

BISS Channel CH5
[CH5] CH6 CH7 CH8

- **BISS Mode/Select ID/SW Data/Input ID/ESW Data**

You need to input keys to descramble programs as per the BISS scrambling side which usually is DVB-S/S2 modulator.

The descrambling principle is as following chart:

Modulating Side (BISS SCR)	**Receiving Side (BISS DESCR)**	**Digit (0x----)**
Mode 1+SW Data	Mode 1+ SW Data	12
Mode E+ESW Data + Device	Mode E + ESW Data + Device	16
Mode E+ESW Data + Input ID	Mode E + ESW Data + Input ID	16+14

3.3.3 Network Setting

You can enter *Network Setting* and modify the parameters under its corresponding submenus in the same way explained above.

▶ 3.1 IP Address 3.2 Subnet Mask
3.3 Gateway 3.4 MAC Address

▶ 3.5 Reset Password 3.6 Web Manage Port

3.1 IP Address
192.168.002.136

3.2 Subnet Mask
255.255.255.000

3.3 Gateway
192.168.000.001

3.4 MAC Address
000000000000

NOTE: The MAC address is defaulted by the factory setting, and it's unique.

3.5 Reset Password
No ►Yes

3.6 Web Manage Port
00080

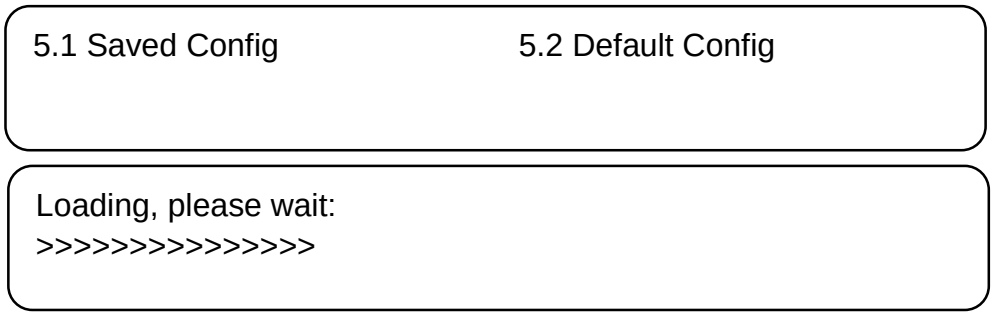
3.3.4 Saving Configuration.

Choose to save the current configuration parameters to the device.

4.1 Saving Configuration
Yes * No

Saving, please wait:
>>>>>>>>>>>>>>>

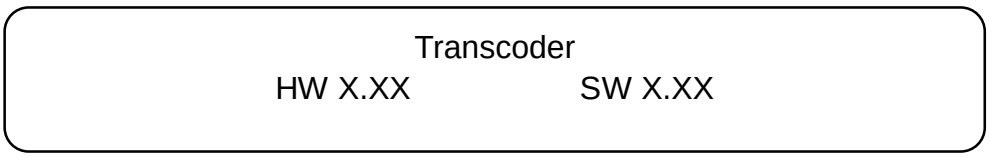
3.3.5 Loading Configuration



You can restore the device into the last saved configuration by choosing the menu 5.1 “Saved Config”, or restore the device into factory configuration by choosing the menu 5.2 “Default Config”.

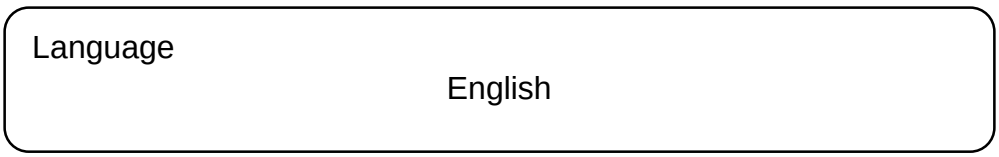
3.3.6 Version

Check the device’s hardware version and software version under this menu:



3.3.7 Language

View system language at this submenu:



Chapter 4 - WEB NMS Operation

For setting configurations you can use the front panel; also you are able to control and set the configurations on any computer by connecting the device to the web NMS Port. You should ensure that the computer's IP address is different from the Thor Transcoder.

4.1 Login

The default IP of this device is 192.168.2.136. We can modify the IP through the front panel.

Connect the pc and the device with net cable, and use ping command to confirm they are on the same network segment.

E.G. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 0 to 255 except 252 to avoid IP conflict).

Use any web browser to connect the device with the PC by inputting the Encoder & Modulator's IP address in the browser's address bar and press Enter.

It will display the Login interface as Figure-1. Input the Username and Password (Both the default Username and Password are "admin".) and then click "LOGIN" to start the device setting.

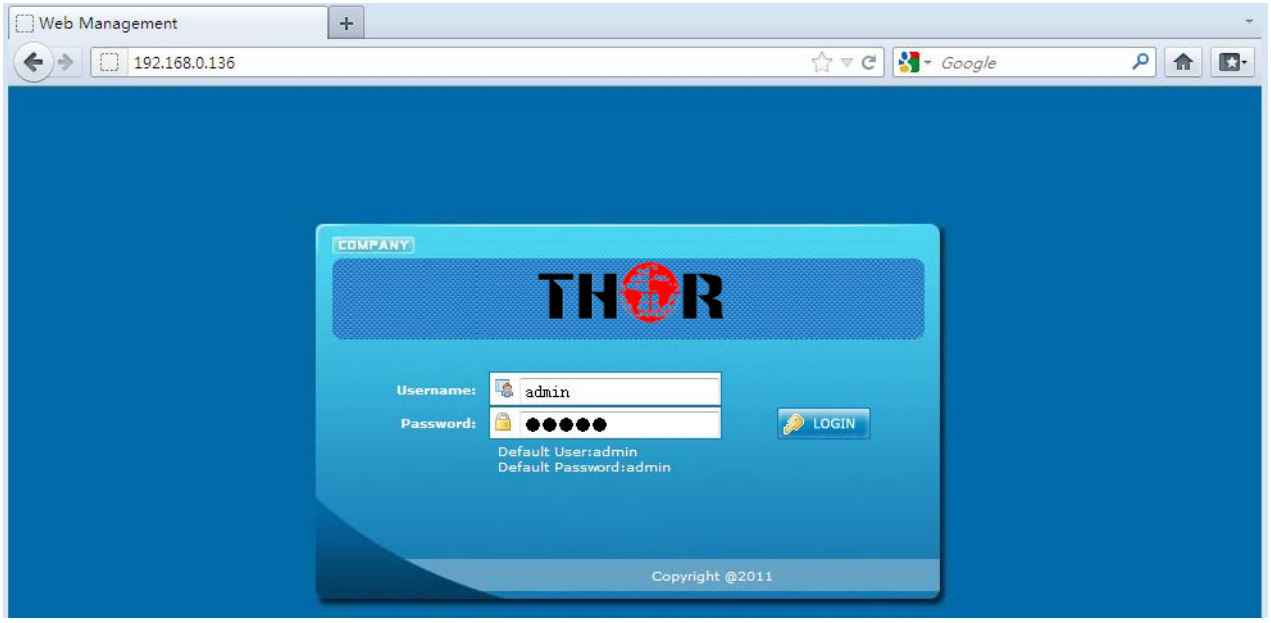
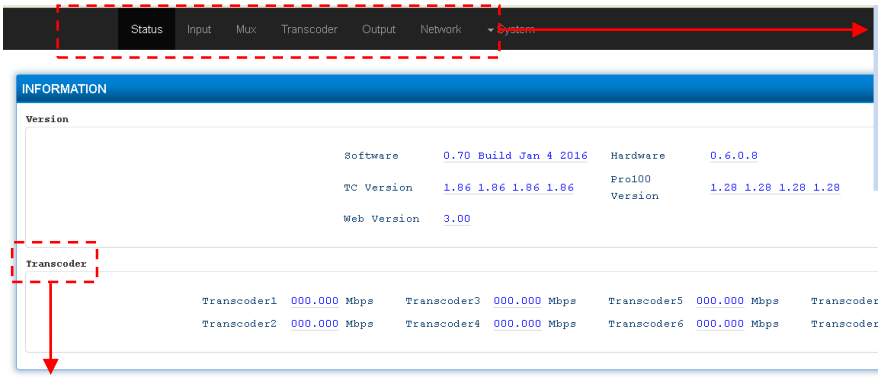


Figure-1

4.2 Operation

When we confirm the login, it displays the WELCOME interface as Figure-2.



Click any item here to enter the corresponding interface to check information or set the parameters.

Transcoding output channel list which indicate the 8 programs respectively

Real-time output bit rate of corresponding output channel.

Figure-2

- **Input**

  Click “Input” and it will display the interface as in Figure-3 where all the input programs can be modified.

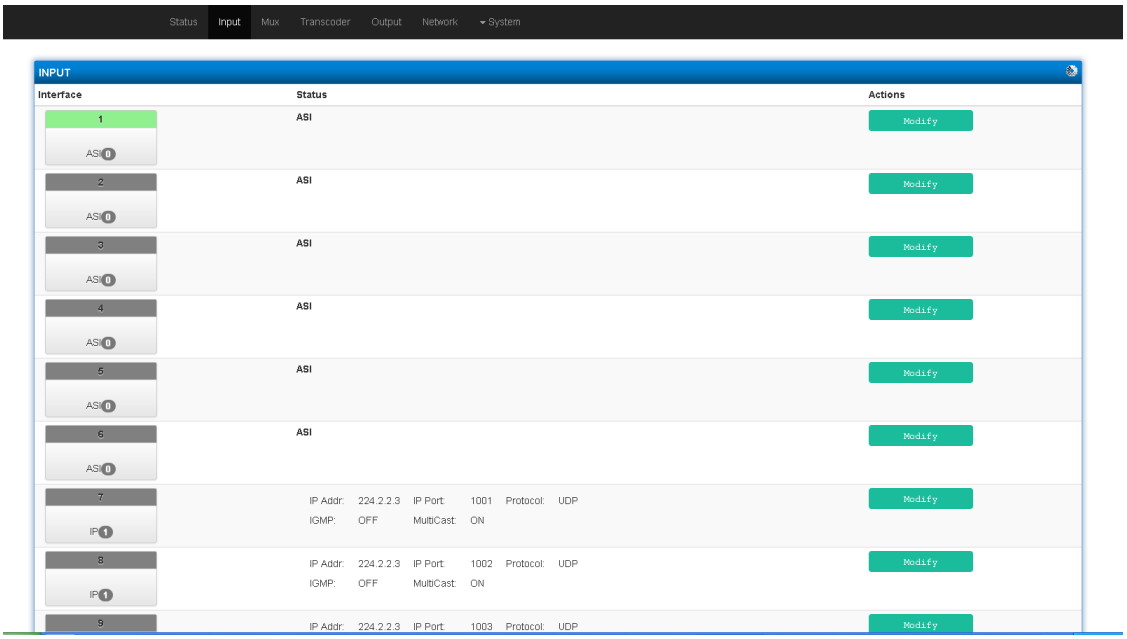
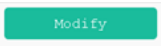
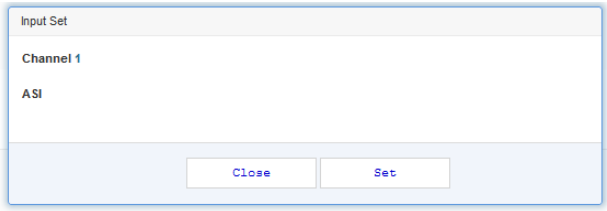


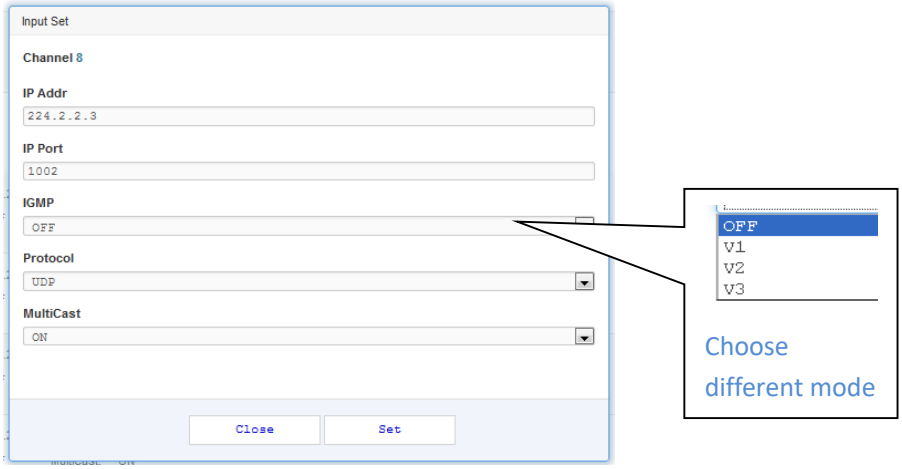
Figure-3

Select one channel to view and setup the parameters of corresponding channel. For example, when we select one channel and click 

, it launches an interface as shown below:



CH01-CH06 ASI Channels (Read only, no need to configure)



CH07-CH14 IP Channels

Set: To make the current parameters shown in the web interface activate. In this way, the configuration can only be saved temporarily and system will restore the last saved configuration if the device reboots.

◆ Mux (Multiplex)

Click "Mux" and it will display the interface as Figure-4 where all the input programs can be listed, setup, and chosen to output.

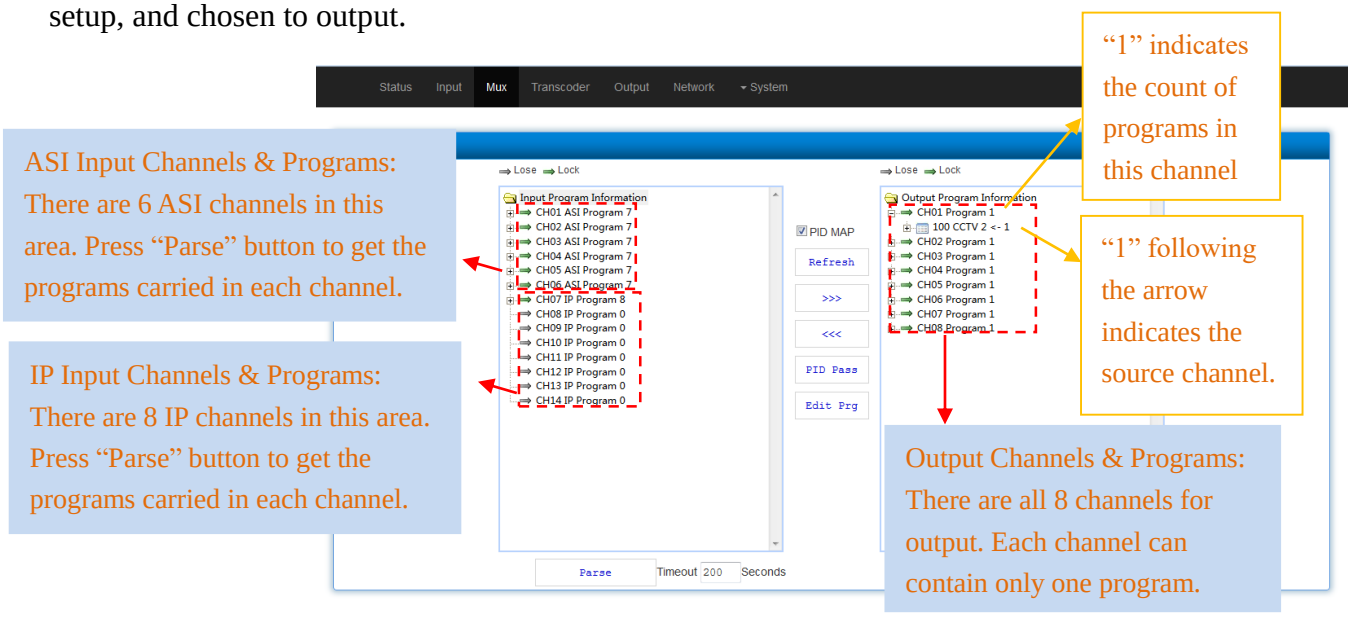
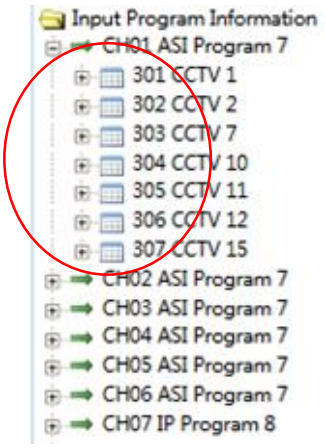


Figure-4

PID MAP : To enable/disable the PID remapping

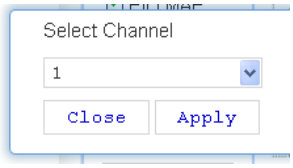
Refresh Click “Refresh” to refresh the input channels especially when new signal source is connected.

Parse Click “Parse” to refresh the program list of the selected channel (ASI/IP). For example:



Parse timeout 200 seconds Time limitation to parse the input programs

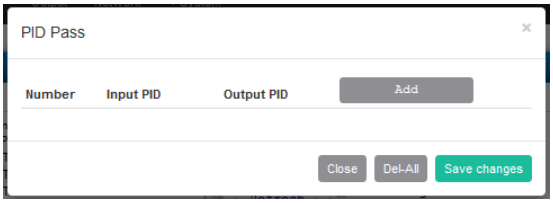
>>> Choose one target program from any input channel and click this button to transfer it to the right box to output. You can transfer maximum 8 programs to output. Click this button to trigger a script which prompts to specify an output channel among 1-8.



Each output channel can only carry one program.

<<< Similarly, you can cancel the multiplexed programs from the right box. Edit Prg Click this button to trigger a dialog box as below, where to add the PIDs which need pass through.

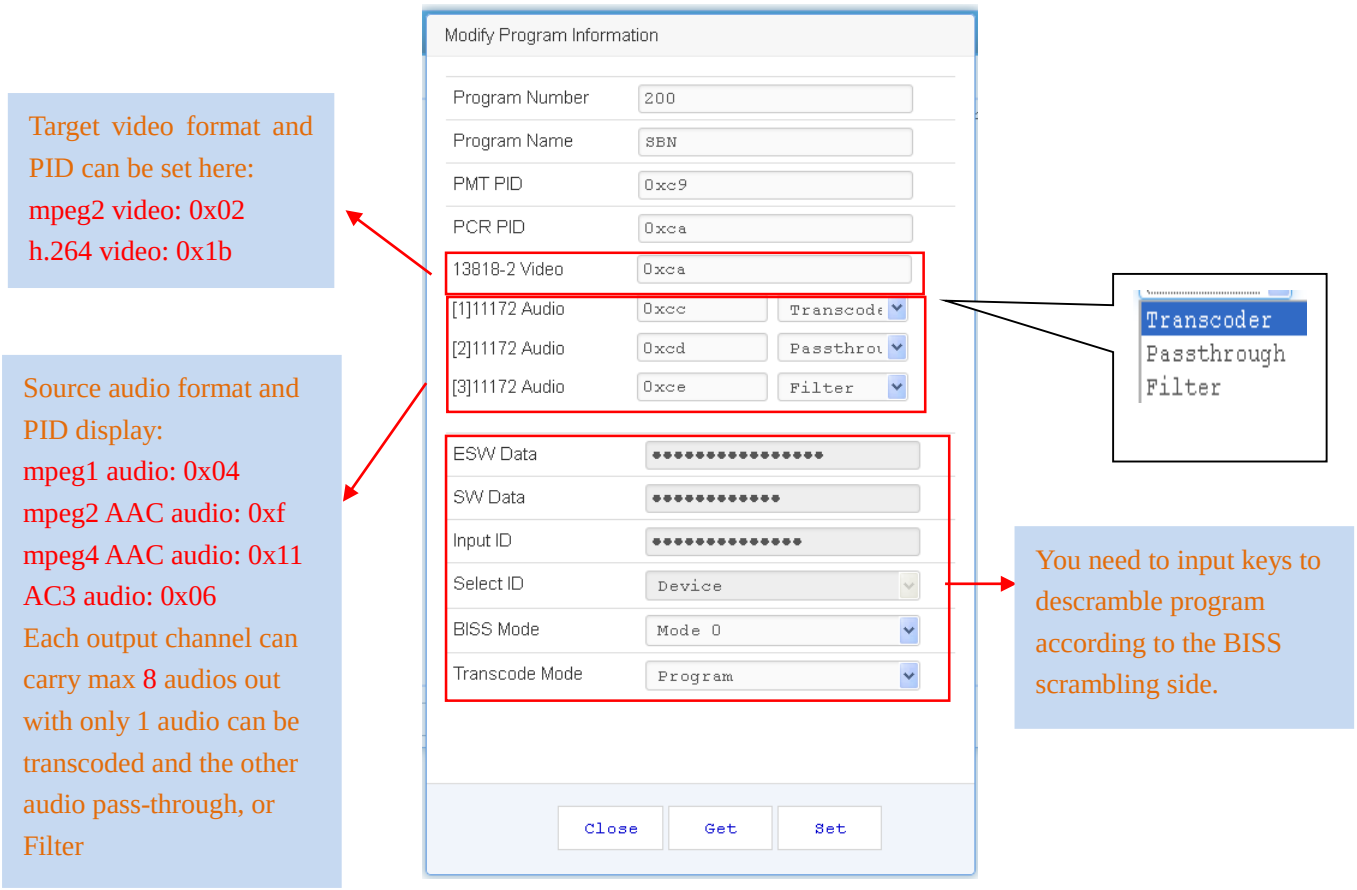
In some occasions, there are some PIDs which won’t belong to any program, such as EPG, NIT tables and so on which user just wants to pass them through the multiplexing module without changing anything. This is the main purpose of this function.



Click "Add" Add to add more boxes for filling the Input & Output PIDs, then click "Save changes" to confirm.

➢ **Program Modify/Transcoding Settings/BISS Descrambling:**

Edit Prg : The information of multiplexed programs can be modified with this button. Click the program to be modified in the output section to trigger a dialog box as below where also to complete the audio/video out mode settings and BISS descrambling settings.



◆ Transcoder

Click "Transcoder" from the menu to trigger the screen as Figure-5. This interface is for setting up the format, bit rate, and PIDs of each program to be transcoded and output. Users can enter each channel (Out 01 – Out 08) to setup for each program.

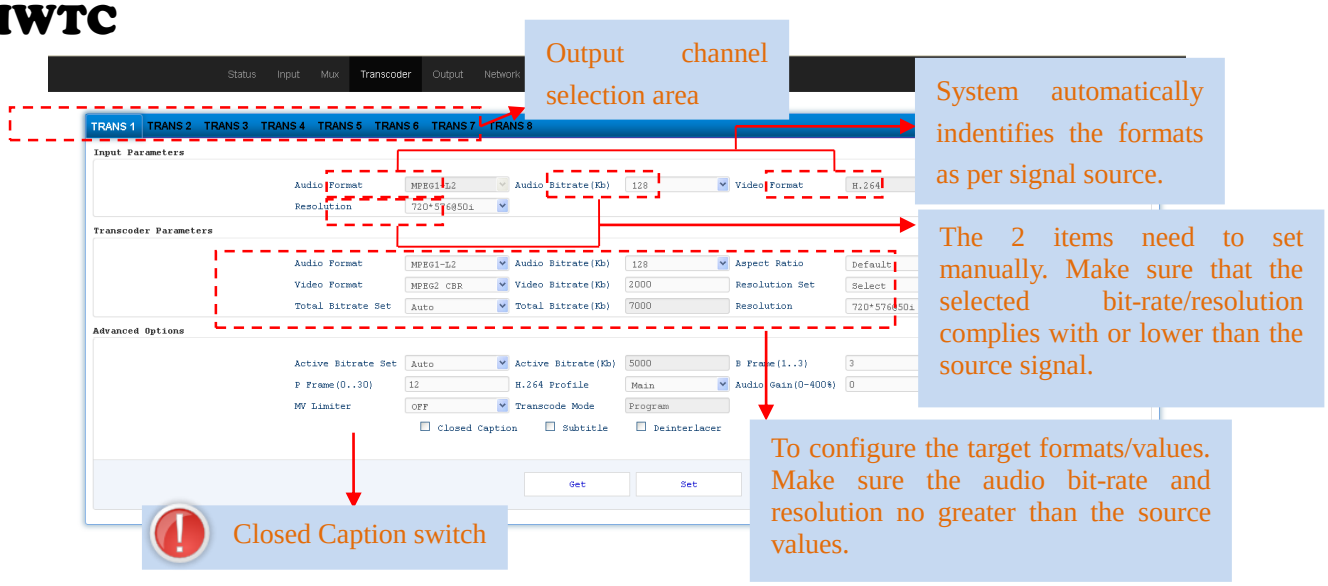


Figure-5

◆ Output

Click “Output” from the menu to trigger the screen as Figure-6. This interface is divided into 3 parts with the first part for configuring ASI output, while the rest 2 part for configuring IP output.

ASI output: This device supports signal output through ASI ports in the form of one MPTS or one SPTS, and the stream is a mirror of the IP output stream.

IP output: This device simultaneously supports IP signal output through DATA port in the form of one MPTS and 8 SPTS. Parameters of MPTS and SPTS can be configured respectively in the second and third part in this interface.

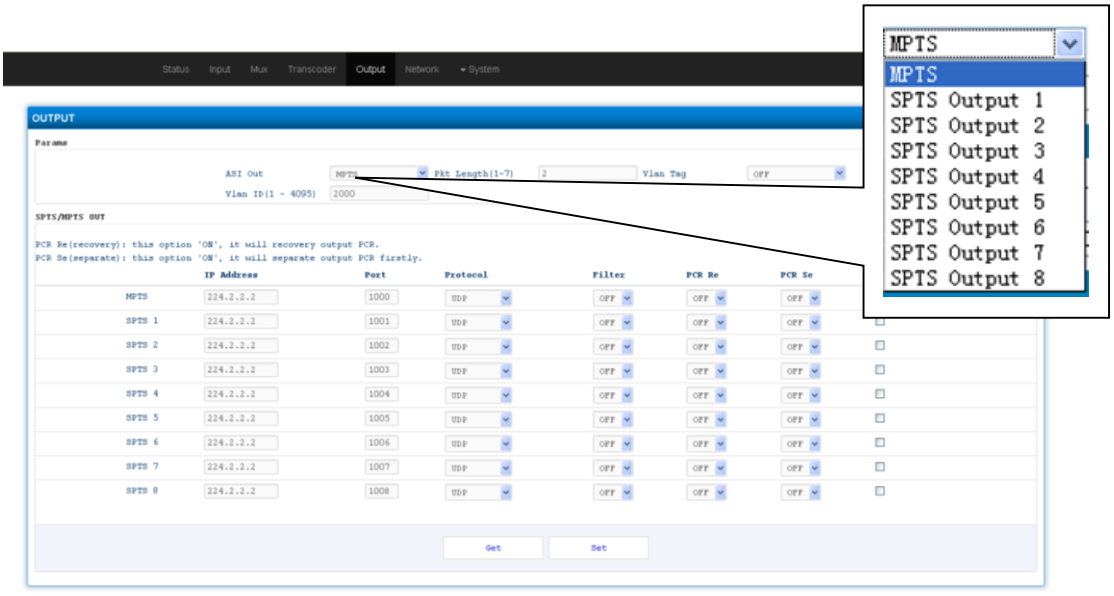


Figure-6

◆ Network

Click “Network”, it will display the screen as Figure-7. Here user can change the device network configuration as needed.

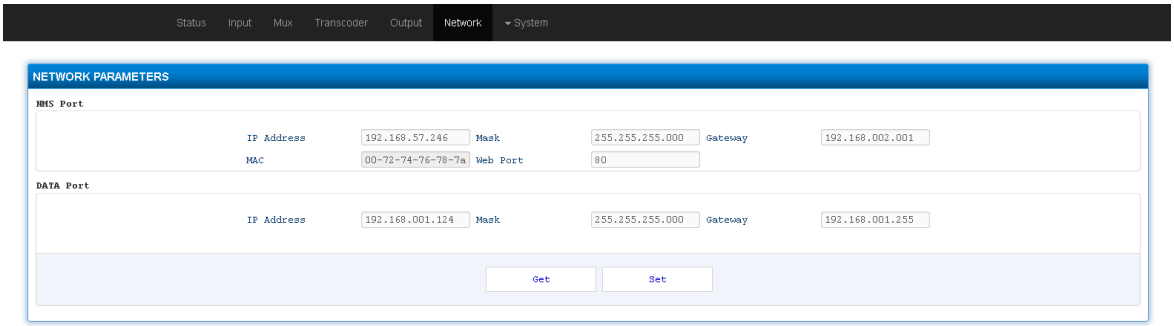


Figure-7

◆ Save Restore

From the menu on left side of the webpage, clicking “Save Restore”, will display the screen as Figure-8 where to save or restore your configurations

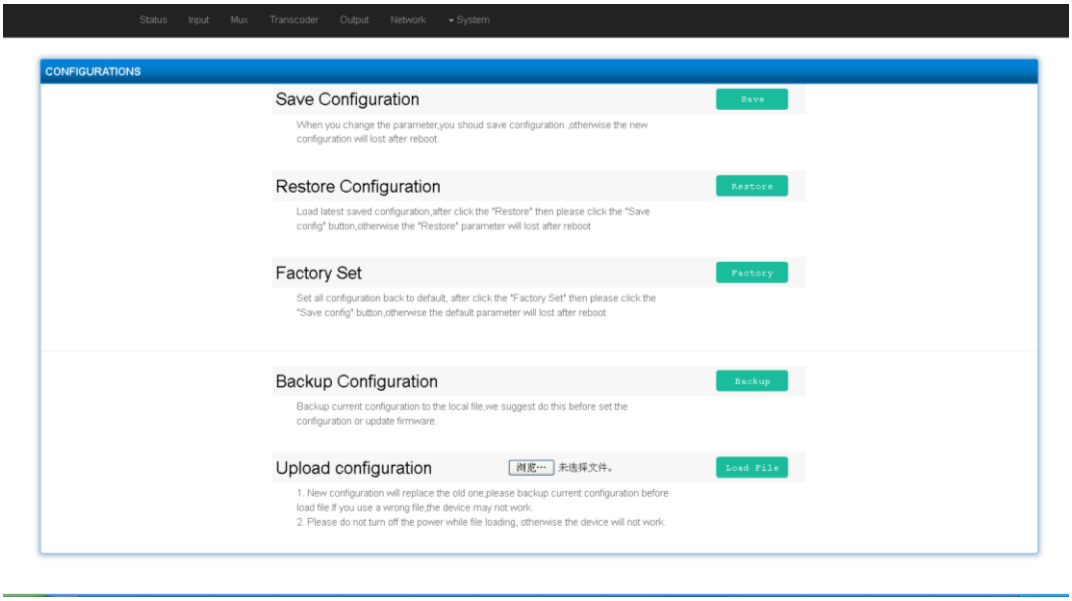


Figure-8

Save Configuration– To save the parameters after you change it.

NOTE: New configuration will replace the old one. Please backup the current configuration before loading a file. Wrong file may cause failure of device.

Factory Set – To resume the device to factory default configuration.

Backup Configuration – To back up the device configuration to the device flash

Upload Configuration – If you need to load the backup file to restore configuration, click “Load file” to restore the latest saved configuration.

◆ Update

From the menu on left side of the webpage, clicking “Update”, it will display the screen as Figure-9 where to update firmware for the device.

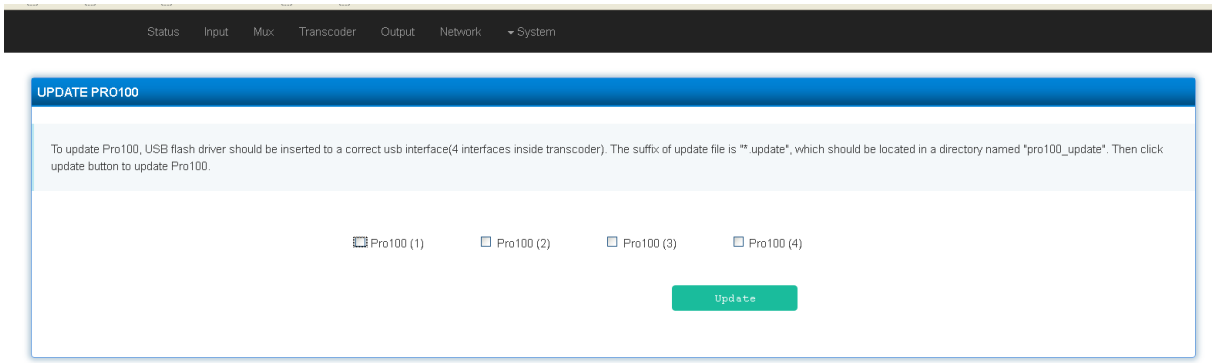


Figure-9

◆ Reboot

Click “Reboot” from the menu, the screen will display as Figure-10. Click “Reboot” box and it will restart the device automatically.

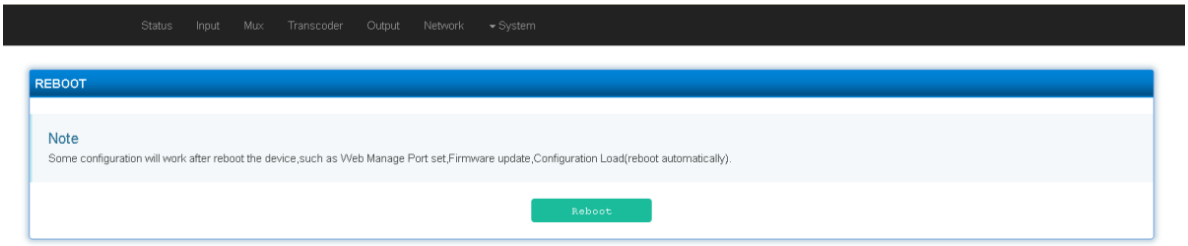


Figure-10

◆ Password

When you click “Password”, it will display the password screen as Figure-11. Here you can change the Username and Password for logging into the device.

After putting the current and new Username and Password, click Apply” to save the configuration.

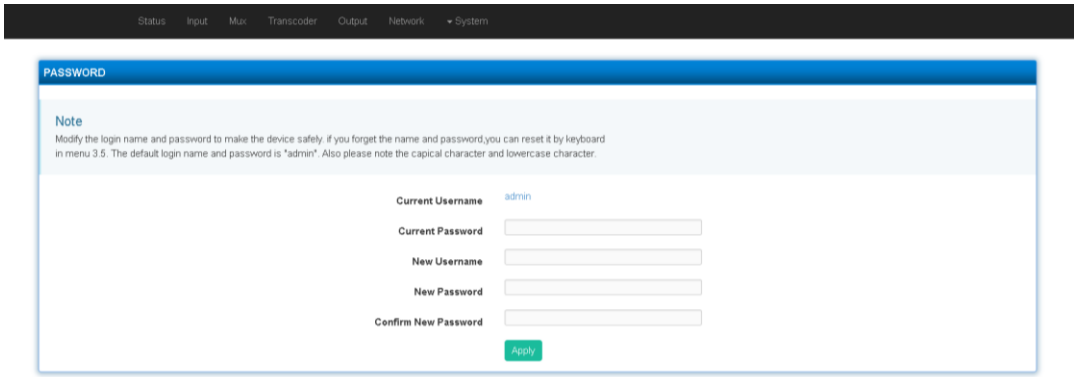

Status
Input
Mux
Transcoder
Output
Network
System
PASSWORD
Note
Modify the login name and password to make the device safely. if you forget the name and password,you can reset it by keyboard in menu 3.5. The default login name and password is "admin". Also please note the capical character and lowercase character.
Current Username
admin
Current Password
New Username
New Password
Confirm New Password
Apply

Figure-11

Chapter 5 - Troubleshooting

THOR's ISO9001 quality assurance system has been approved by the CQC organization. We guarantee the products' quality, reliability and stability. All THOR products haven passed all testing and manual inspections before they are shipped out. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by THOR. To prevent a potential hazard, please strictly follow the operation conditions.

Prevention Measures

- Installing the device in a place where the environmental temperature is between 0 to 45 °C
- Making sure the unit has plenty of ventilation for the heat-sink on the rear panel; and other heat-sink bores if necessary
- Checking the AC input within the power supply and ensure it is working, the connection is correctly installed before switching on device
- Checking the RF output levels to stay within a tolerable range, if it is necessary
- Checking all signal cables have been properly connected
- Frequently switching on/off device is prohibited; the interval between every switching on/off must be greater than 10 seconds.

Conditions needed to unplug power cord

- Power cord or socket damage.
- Any liquid that got into the device.
- Any stuff that could cause a circuit short
- Device in damp environment
- Device has suffered from physical damage; i.e. it fell off a rack.
- Longtime idle.
- After switching on and restoring to factory setting, device still won't work properly.
- Maintenance needed on device

Chapter 6 - Packing List

Thor Transcoder HD SD 8 Programs	1 PC
ASI Cables	6PCS
Ethernet Cable	1PC
Power Cord	1PC

For Further Tech Support

1-800-521-Thor(8467)

support@thorfiber.com