



User Manual



8 Program Matrix Hardware Transcoder

H-8TS-ATSC

About This Manual

Intended Audience

This user manual has been written to assist the user who has to operate, integrate and to install this device. Some chapters require some prerequisite knowledge in electronics and especially in broadcast technologies and standards.

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Chapter 1 Introduction

1.1 Product Overview

The *H-8TS-ATSC* is a professional bidirectional transcoder that converts video between H.264 and MPEG-2 format and also transcodes between HD and SD programs simultaneously. It is equipped with six tuner inputs and an IP output for multicasting. After transcoding, it outputs MPTS & 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 high performance. BISS function is now embedded to descramble tuner and IP input programs and CC function as well to transport your closed caption (or teletext).

It can be easily managed through the Network Management System (NMS), and has become an ideal solution for operators to provide high quality video trans-coding.

1.2 Key Features

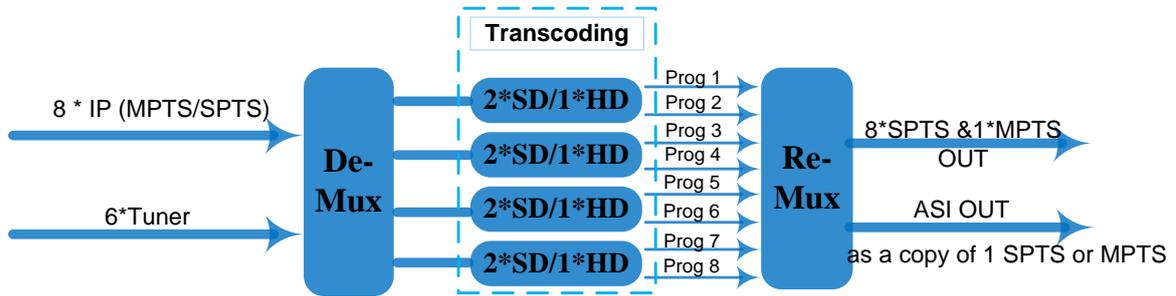
- Supports 8 x IP (SPTS/MPTS) input & 6*Tuner input
- Supports 8 x SPTS & 1 x MPTS (UDP/RTP/RTSP) output; 1 ASI (MPTS) output
- Video Trans-coding: MPEG-2 SD/HD and H.264 SD/HD any-to-any
- Audio Trans-coding: AAC, MP2 and AC3 any-to-any or pass-through
- Supports maximum 8 SD or 4 HD programs trans-coding
- Supports maximum 8 channel audio trans-coding
- Supports 1920x1080I, 1280x720P, 720x576i, 720x480i, 480x576, 544x576, 640x576 and 704x576 resolutions
- Supports CBR and VBR rate control
- Supports CC (closed caption)
- Supports BISS descrambling
- Supports 8 audio pass-through per channel

- **Advanced re-multiplexing**
- **LCD & Key board local control; Network Management System (NMS)**

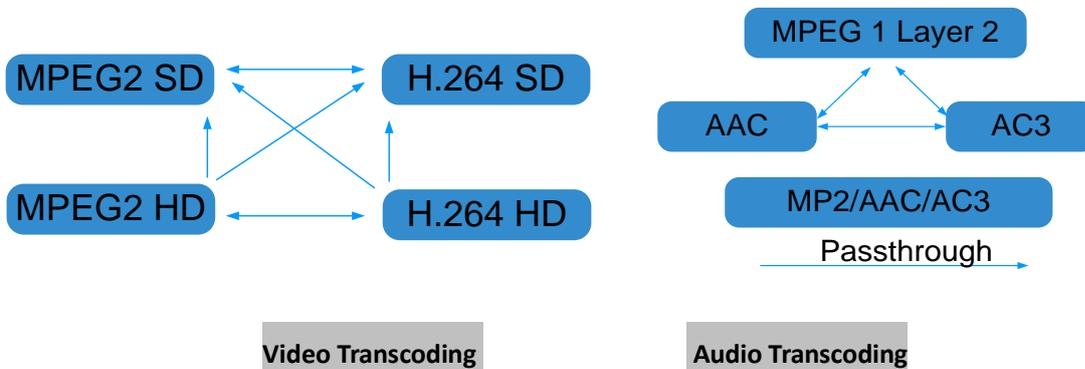
1.3 Technical Specifications

Stream In	MPTS/SPTS over UDP/RTP/RTSP, 1000M Base-T Ethernet Interface/ SFP interface	
	6 * ATSC Tuners (DVB-C/T/S/S2/ISDB-T Optional)	
BISS Descramble	Maximum 8 programs	
Video	Resolutions	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	64Kbps-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; Network Management System (NMS)	
	Ethernet software upgrade	
General	Dimensions	430mm×405mm×45mm(WxDxH)
	Approx weight	4.8 Kg
	Temperature range	0~45℃ (Operation), -20~80℃ (Storage)
	Power requirements	AC 110V±10%, 50/60Hz; AC 220V±10%, 50/60Hz
	Power consumption	20W

1.4 Inner Principle Chart

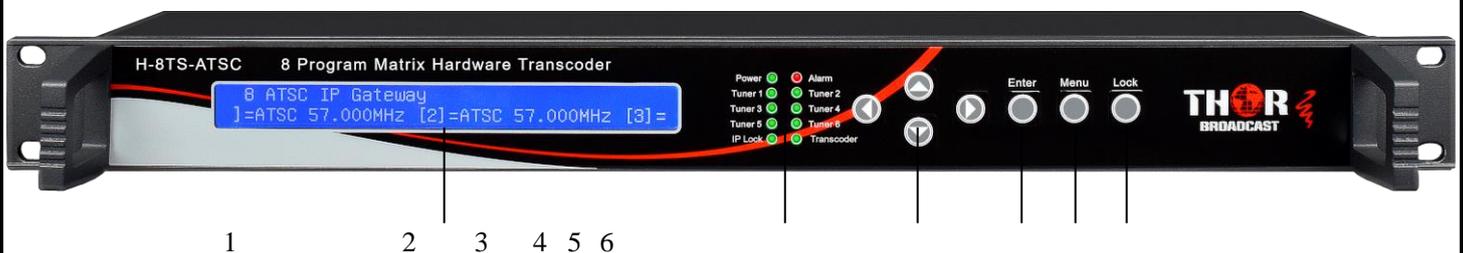


1.5 Transcoding Mode Example



1.6 Appearance and Description

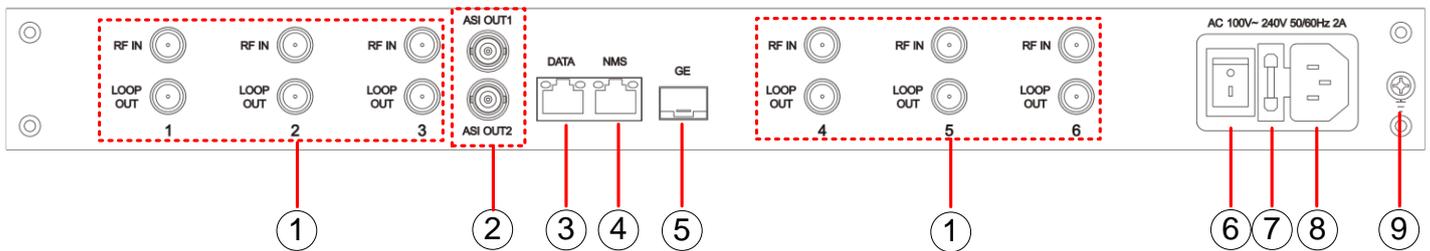
Front Panel Illustration



1	LCD screen	
2	LED Indicators	Power Indicator
		Alarm Indicator: to indicate system or connection errors

		Tuner 1 -- Tuner 6: to indicate the 6 RF IN statuses, the corresponding LED will turn on when source tuner is properly connected from the back panel.
3	Navigation area: UP/ DOWN, LEFT/RIGHT keys	
4	Enter key	
5	Menu key	
6	Lock key	

Rear Panel Illustration



1	6 * RF input & loop out interfaces
2	2 * ASI output ports
3	Data port: for IP signal input & output
4	NMS port (Network Management System)
5	GE port (SFP port), for optical signal input & output
6	Power Switch
7	Fuse
8	Power socket
9	Grounding Pole

Chapter 2 Installation Guide

This section is to explain the precautions which shall be taken into consideration because of the possible injury that may be brought to users when this device is operated or installed. For this reason, please read all details here and be aware before installing or using this device.

2.1 Acquisition Check

When users open the package of the device, it is necessary to check items according to the packing list. It should include the following items:

- H-8TS-ATSC 8-in-1 Transcoder
- User Manual
- RF Cables
- ASI Cable
- Power Cord

If any item is missing or mismatching with the list above, please contact local dealer.

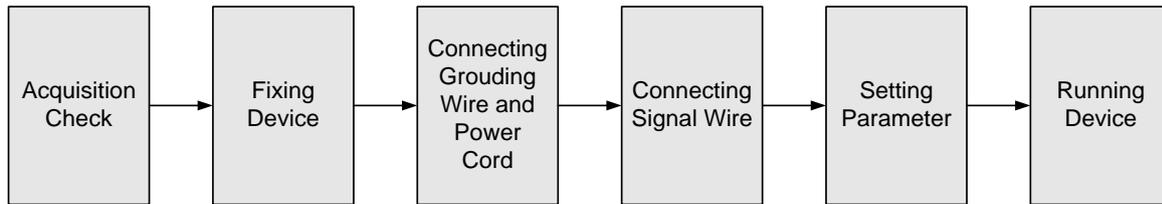
2.2 Installation Preparation

When users install device, please follow the below steps. The details of installation will be described in the following chapters. Users can also refer to the rear panel chart during the installation.

The main content of this chapter includes:

- Checking device is not missing or damaged during the transportation
- Preparing the relevant environment for installation
- Installing Transcoder
- Connecting signal cables
- Connecting to communication port (if necessary)

2.2.1 Device's Installation Flow Chart is Illustrated as following:



2.2.2 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine in a frame array, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against the wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1 \times 10^7 \sim 1 \times 10^{10} \Omega$, Grounding current limiting resistance: 1M (Floor bearing should be greater than 450Kg/m^2)
Environment Temperature	$5 \sim 40^\circ\text{C}$ (sustainable), $0 \sim 45^\circ\text{C}$ (short time), installing air-conditioning is recommended
Relative Temperature	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
Wall	It can be covered with wallpaper, or brightness less paint.
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power should be independent of each other. Device power requires AC power 220V 50Hz. Please carefully check before running.

2.2.3 Grounding Requirements

- All function modules' have good grounding designs which are the basis of the reliability and stability of devices. This will guarantee lightning arresting and interference rejection. Therefore, the system must follow these rules.
- Coaxial cables outer conductor and isolation layer should keep proper electric

conducting with the metal housing of device.

- Grounding conductor must adopt copper conductor in order to reduce high frequency impedance, and the grounding wire must be as thick and short as possible.
- Users should make sure the 2 ends of grounding wire are properly terminated and be anti-rust.
- It is prohibited to use any other device as part of grounding electric circuit
- The area of the conduction between grounding wire and device's frame should be no less than 25mm².

2.2.4 Frame Grounding

All the machine frames should be connected with a protective copper strip. The grounding wire should be as short as possible and avoid circling. The area of the conduction between grounding wire and grounding strip should be no less than 25mm².

2.2.5 Device Grounding

Connecting the device's grounding rod to frame's grounding pole with copper wire.

2.3 Wire's Connection

The grounding wire conductive screw is located at the right end of rear panel, and the power switch, fuse; power supply socket is just beside it. The power switch is on the left, the power supply socket is on the right and the fuse is just between them.

- **Connecting The Power Cord**
User can insert one end into power supply socket, while insert the other end to AC power.
- **Connecting The Grounding Wire:**
When the device is solely connected to the protective ground, it should adopt in an independent way, and share the same ground with other devices. When the device adopts in a united way, the grounding resistance should be smaller than 1Ω.

 **Caution:**

Before connecting power cord to the *H-8TS-ATSC*, the user should set the power switch to “OFF”.

2.4 Signal Cable Connections

2.4.1 RF input and loop out cable illustration:



2.4.2 ASI output cable illustration:

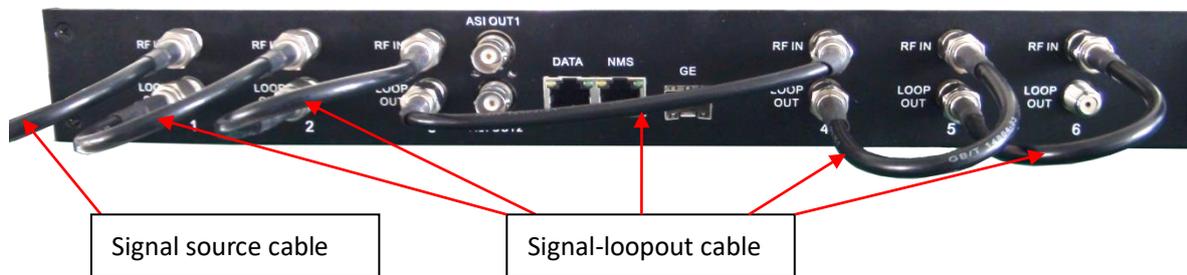


2.4.3 IP & NMS Cable illustration (CAT5):



2.4.4 RF input and loop out cable connection. Here is a typical example:

Users can find the RF input (signal source) connectors on the rear panel labeled RF In and then connect the source signal with the RF cables (in the accessories). One end is connected to the signal source equipment while the other end goes to the transponder's RF IN port. Picture below presents a typical way of connection:



2.4.5 ASI output interface connection

The 2 ASI output interfaces are located in the middle of the rear panel. Insert one end of the ASI cable to the transcoder's ASI out connector (ASI OUT 1/ASI OUT 2) while the other end to the TS multiplexer or modulator's ASI input port. The transcoder's ASI output interface and its connection are illustrated as follow:



2.4.6 DATA Giga Ethernet (GE) Input/Output Interface Connection

The DATA (GE) port, located in the middle of the rear panel, is used to input/output IP (optical) signal at the same time. Plug one end of the network cable to the transcoder's DATA (GE) connector and the other end to the TS stream multiplexer DATA input port or other device which can input IP signal.



2.4.7 NMS Connection

NMS (Network Management System) port is where the user can connect the device to with a PC for management. Connect one end of the network cable (CAT5) to the transcoder's NMS port and the other end to the computer. The transcoder's NMS connection is illustrated as follows:



Chapter 3 Operation

The *H-8TS-ATSC* front panel is a user friendly, operating interface that is convenient to set up system parameters quickly. The LCD is a 2-line * 40-character back-lit dot-matrix user interface with buttons for **UP**, **DOWN**, **LEFT**, **RIGHT**, **ENTER**, **MENU**, and **LOCK** on the front panel control.

Before operating, the user can decide whether to use the default settings or customize the input and output parameters settings. The detail operations go as follows:

Keyboard Function Description:

ENTER: To activate the parameters which need modifications, or confirming the change after modification.

MENU: To cancel presently entered value, resume previous setting and return to previous menu.

LEFT/RIGHT: To move the “▶” to choose or set the parameters.

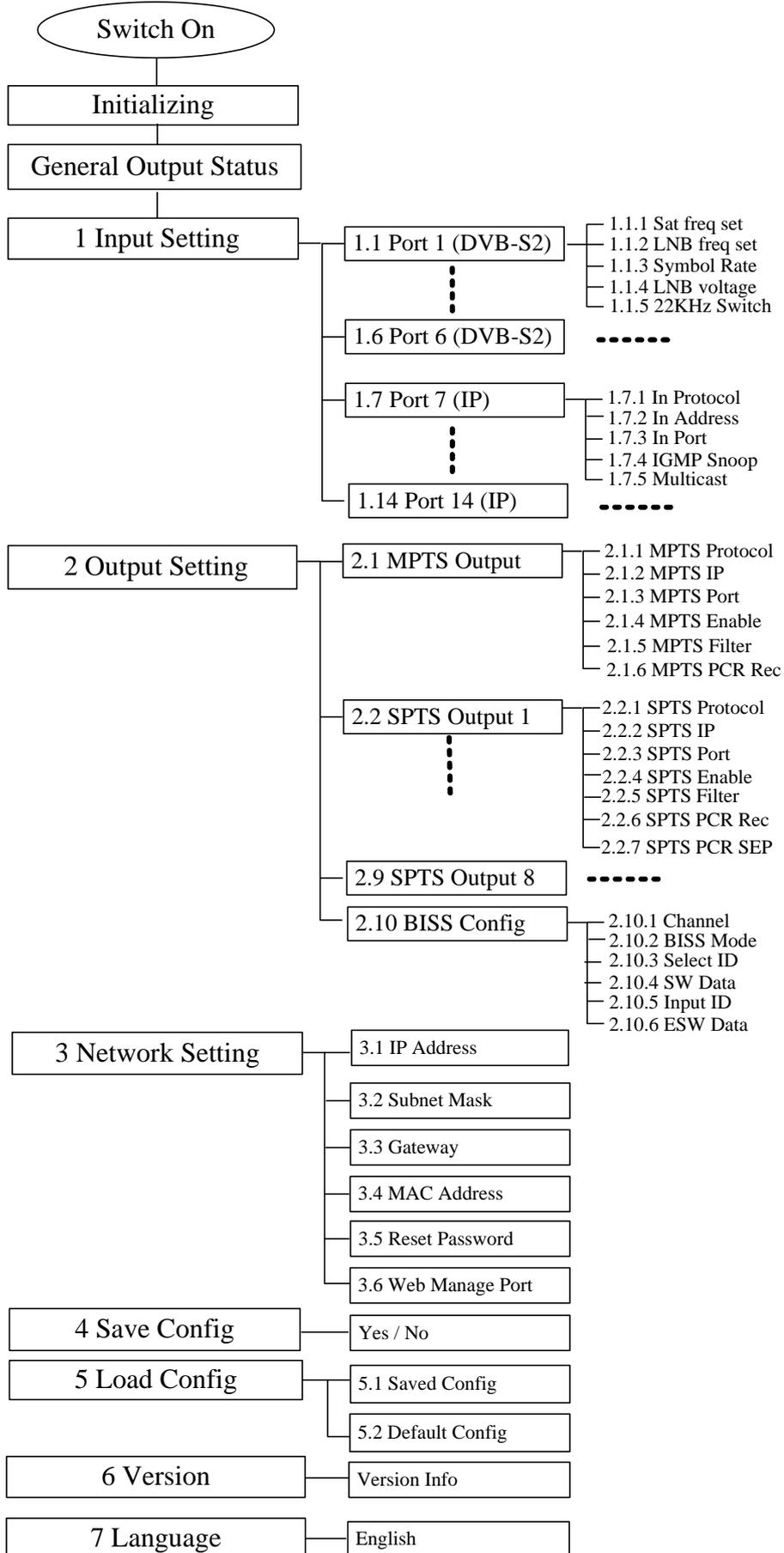
UP/DOWN: To modify activated parameter or page up/down when parameter is inactivated.

LOCK: To Lock the screen / cancel the lock state. After pressing lock key, the system will question the user to save present setting or not. If not, the LCD will display the current configuration state.

At the “Factory Configuration” page, user can press “**ENTER**” key to restore the factory default configuration.

3.1 LCD Menus

LCD Menu Tree



3.2 Initial Status

After turning 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.

Setting Transcoder 01 Config...
>>>>>>>>>>>>>>>43%

Serial number of transcoding channel

Real-time output bit-rate of the related channel

Out 01 001.400 Mbps	Out 02 002.448 Mbps
Out 03 001.344 Mbps	Out 04 002.472 Mbps
Out 05 001.552 Mbps	Out 06 002.456 Mbps
Out 07 002.968 Mbps	Out 08 001.408 Mbps

Press *Lock* key to go the second page.

3.3 General Settings for Main Menu

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

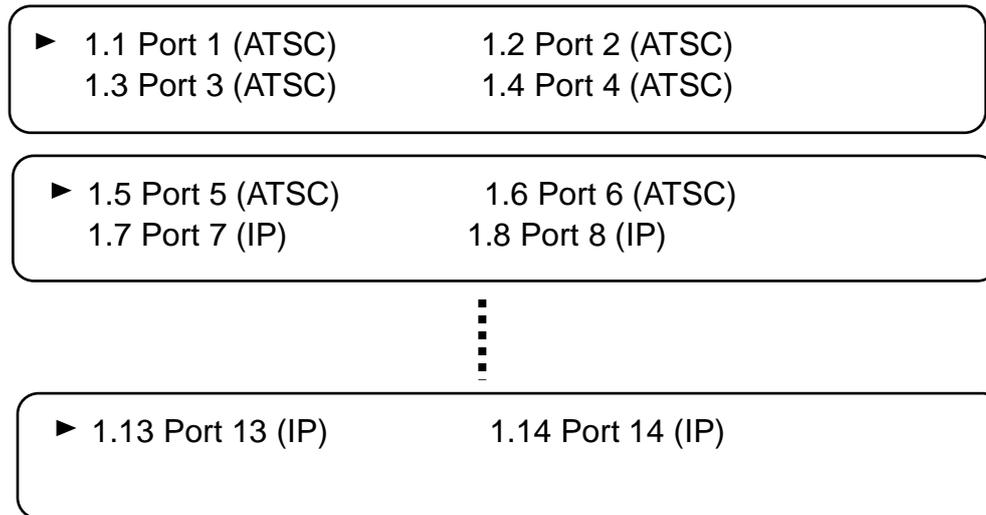
▶ 1. Input Setting	2. Output Setting
3. Network Setting	4. Saving configuration
▶ 5. Loading configuration	6. Version
7. Language	

The option with “▶” is the selected selection, users can press the ENTER key to enter the specified submenu to modify its parameters.

3.3.1 Input Setting

User can press UP/DOWN/LEFT/RIGHT key 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:

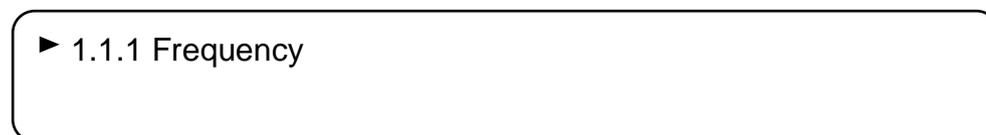


There are 6 pages displaying menus from 1.1 to 1.16 to represent the **6 tuner inputs (1.1-1.6)** and **8 IP channels (1.7-1.14)**. User can enter each sub-menu to configure its parameters.

3.3.1.1 Port 1 (ATSC Tuner Input)

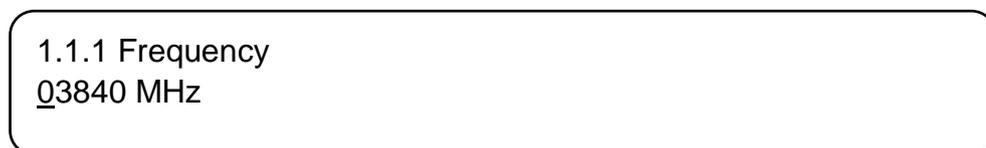
Here we take 1.1 *Port 1 (ATSC)* signal input as an example to illustrate tuner inputs:

Enter 1.1 and users will find submenus as below:



User can check and set the tuner frequency in steps as below:

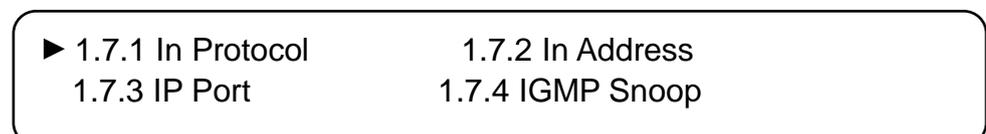
- 1) To move the underline through LEFT/RIGHT keys.
- 2) To modify the value of underlined character through UP/DOWN keys



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

3.3.1.2 Port 7 (IP Input)

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



▶ 1.7.5 Multicast

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

1.7.1 In Protocol **UDP** *Current Status*
 [UDP] RTP/RTSP

1.7.2 In Address
 234.001.001.001

1.7.3 IP Port
 01911

1.7.4 **IGMP Snoop** *Internet Group Management Protocol Snooping*
 V2 V3 [OFF]

1.7.5 Multicast
 [OFF] ON

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

3.3.2 Output Setting

The *H-8TS-ATSC* transcoder supports IP output in the form of both MPTS (Multiple Programs Transport Stream) and SPTS (Single Program Transport Stream). *Output Setting* containing 2.1- 2.9 are to configure the MPTS and SPTS parameters and 2.10 are to configure BISS Config.

Submenus are displayed as shown below:

▶ 2.1 MPTS Output 2.2 SPTS Output 1
 2.3 SPTS Output 2 2.4 SPTS Output 3

▶ 2.5 SPTS Output 4 2.6 SPTS Output 5
 2.7 SPTS Output 6 2.8 SPTS Output 7

▶ 2.9 SPTS Output 8 2.10 BISS Config

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.

▶ 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

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

2.1.1 MPTS Protocol UDP
 [UDP] TRP/RTSP

2.1.2 MPTS IP
224.002.002.002

2.1.3 MPTS Port
01001

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 recoverv 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 an 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 the *H-8TS-ATSC* can maximally transcode 8 programs simultaneously.

▶ 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	

Under these menus, user 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
<u>224</u> .002.002.002

2.2.2 SPTS Port
<u>0</u> 1001

2.2.3 SPTS Enable
OFF [ON]

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

2.2.5 SPTS Filter	ON
OFF [ON]	

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

2.2.6 SPTS PCR REC	ON
OFF [ON]	

This option 'ON', it will separate output PCR

2.2.7 SPTS PCR SEP ON
 OFF [ON]

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

The *H-8TS-ATSC* also supports BISS to descramble encrypted programs from ASI or IP.

Users can set the parameters of BISS under submenu 2.10.

▶ 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

➤ **BISS Channel**

User can 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**

Users need to input keys to descramble programs as per the BISS scrambling side.

The descrambling principle is as following chart:

Modulating Side (BISS SCR)	Receiving Side (BISS DESCR)	Digit (0x----)
Mode I+SW Data	Mode I+ 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

User 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 <u>1</u> 92.168.002.136

3.2 Subnet Mask <u>2</u> 55.255.255.000
--

3.3 Gateway <u>1</u> 92.168.000.001
--

3.4 MAC Address 000000000000

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

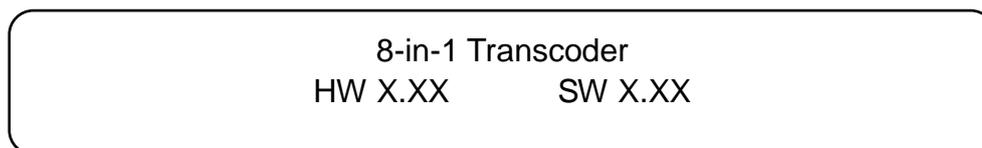
User can restore the device into the last saved configuration by choosing the menu **5.1**

“**Saved Config**”, or restore the device into factory configuration by choosing the menu **5.2**

“**Default Config**”.

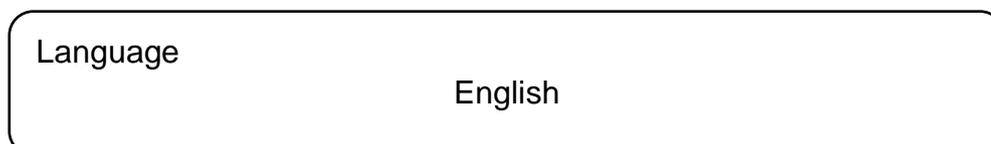
3.3.6 Version

User can check the device’s hardware version and software version under this menu:



3.3.7 Language

User can view system language at this submenu:



Chapter 4 Network Management System(NMS)

Besides using the LCD panel and navigation buttons to configure system parameters, the user can also control and set the device with a computer by connecting the device to computer through the NMS Port—Web Management Page, where users can parse programs input from different channels, operate multiplexing, and modify program information.

4.1 Login

The default IP address of this device is **192.168.2.136**. (You can verify and modify the IP through the front panel. See **3.3.3 Network Setting**)

Connect the PC (Personal Computer) and the device with an Ethernet cable, and use the **ping** command to confirm they are on the same network segment. For instance, 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).

Launch the web browser, an input the device 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 access NMS.

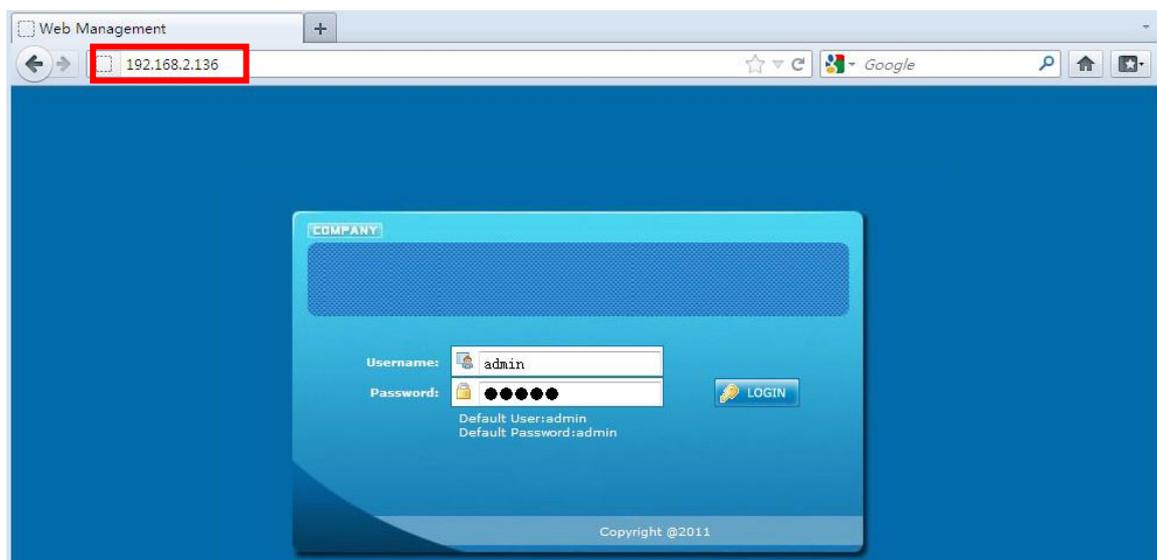


Figure-1

4.2 Operation

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

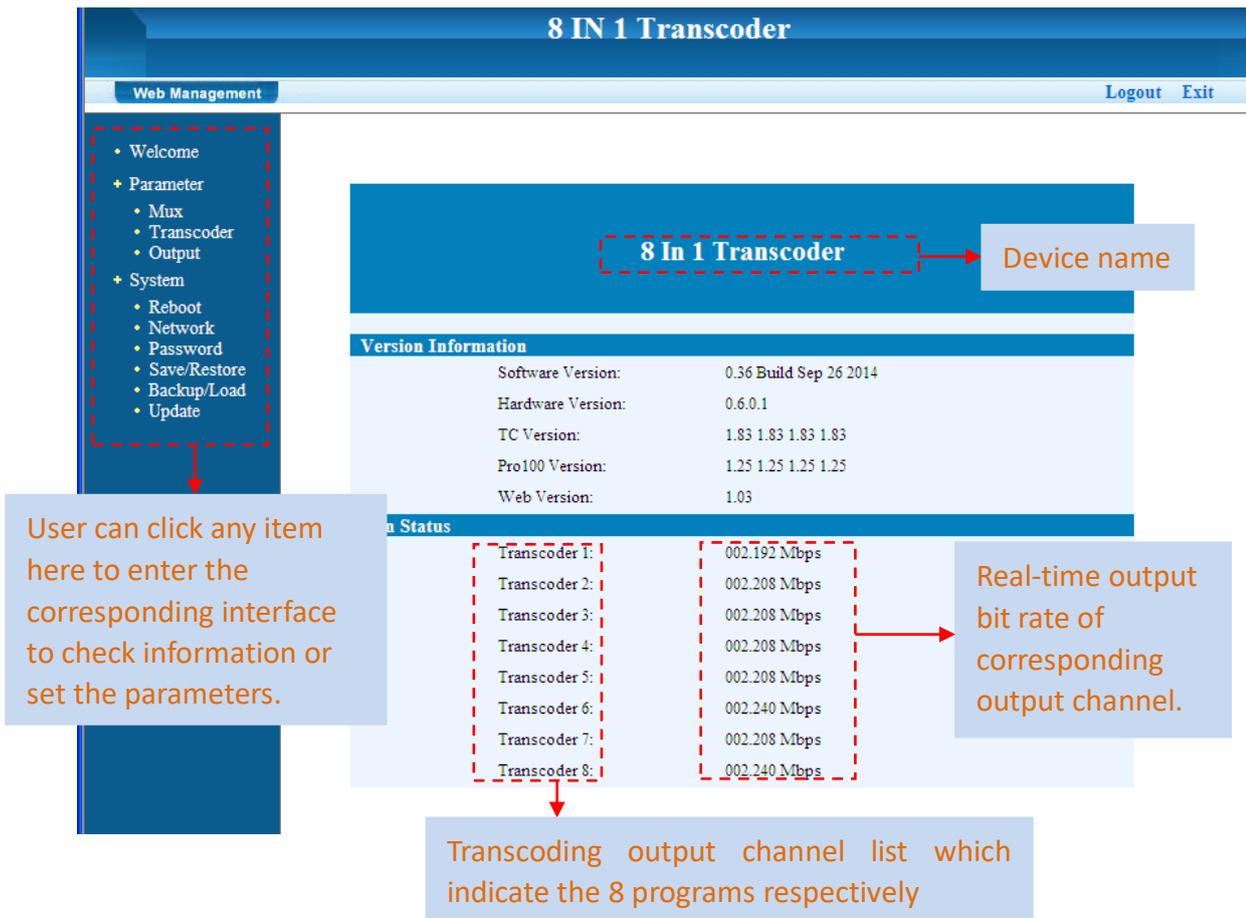


Figure-2

◆ Mux (Multiplex)

Click “Mux” and it will display interface as Figure-3 where all the input programs can be listed, setup, and chosen to output.

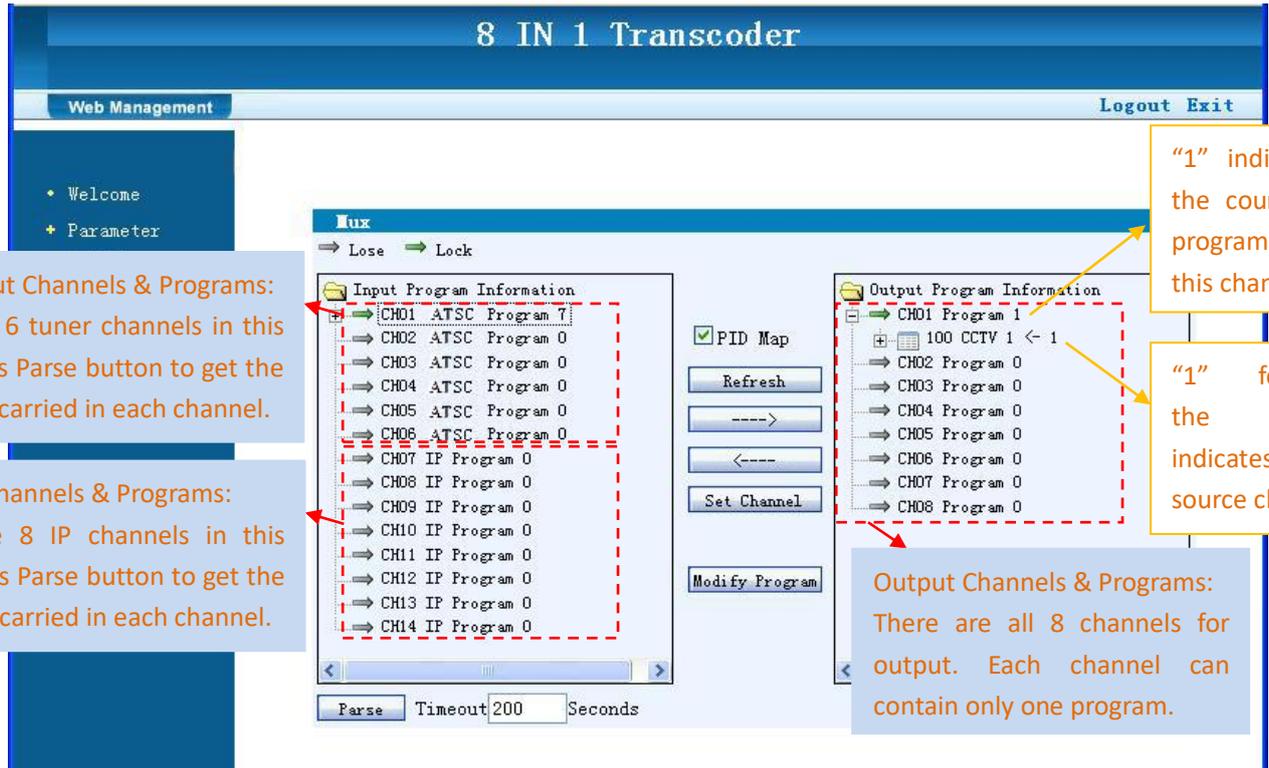
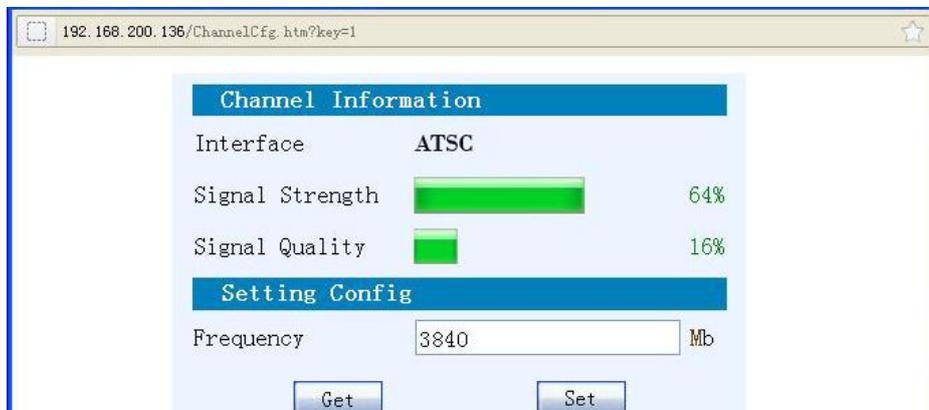


Figure-3

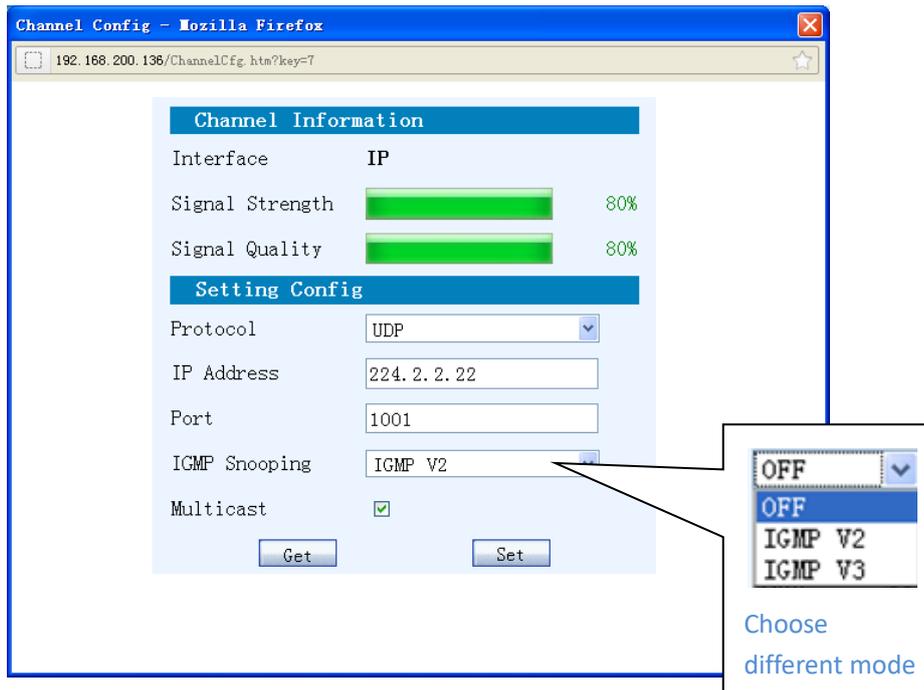
PID Remap: To enable/disable the PID remapping

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

Set Channel Select one channel first and then click this button to view and setup the parameters of corresponding channel. For example, when we select one channel and click *Set Channel*, it launches an interface as below:



CH01-CH06 ATSC Program

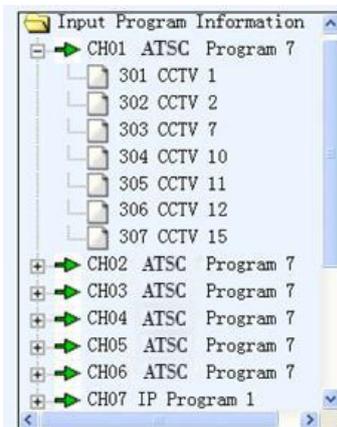


CH07-CH14 IP Channels

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.

Get : To read the current device’s activated parameters and display them on the web management interface

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



Parse timeout 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. User can transfer maximum 8 programs to output. Click this button to trigger a script which prompts to specify an output channel among 1-8.

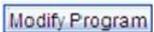


Each output channel can only carry one program.

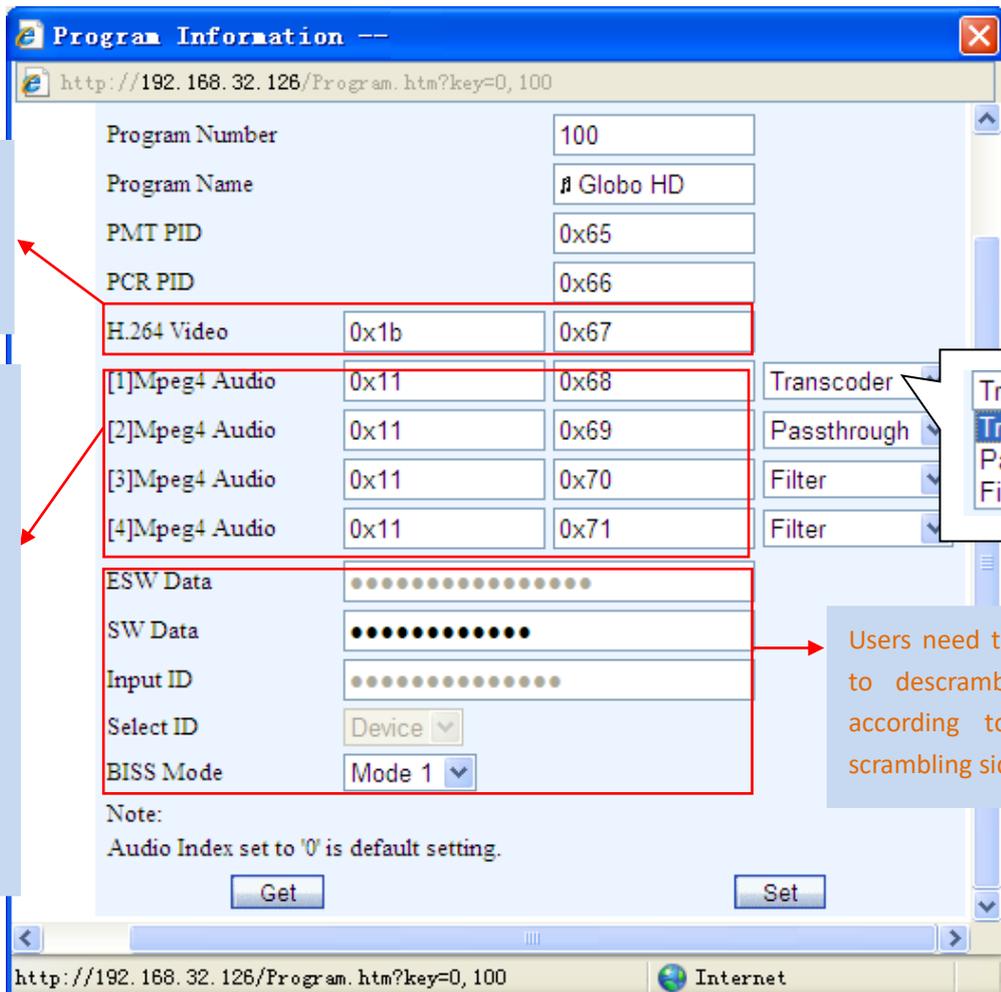


Similarly, user can cancel the multiplexed programs from the right box.

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



The information of multiplexed program 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.



Target video format and PID can be set here:
Mpeg2 video: 0x02
H.264 video: 0x1b

Source audio format and PID display:
Mpeg1 audio: 0x04
Mpeg2 AAC audio: 0xf
Mpeg4 AAC audio: 0x11
AC3 audio: 0x06

Each output channel can carry max 8 audios out with only 1 audio can be transcoded and the other audio pass-through, or filter

Users need to input keys to descramble program according to the BISS scrambling side.

◆ Transcoder

Click “Transcoder” from the menu to trigger the screen as Figure-4. 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.

System automatically identifies the formats as per signal source.

Output channel selection area

The 2 items need set manually. Make sure that the selected bit-rate/resolution complies with or lower than the source signal.

Closed Caption switch

To configure the target formats/values. Make sure the audio bit-rate and resolution no greater than the source values.

Figure-4

◆ Output

Click “Output” from the menu to trigger the screen as Figure-5. 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 transcoder 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 transcoder 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.

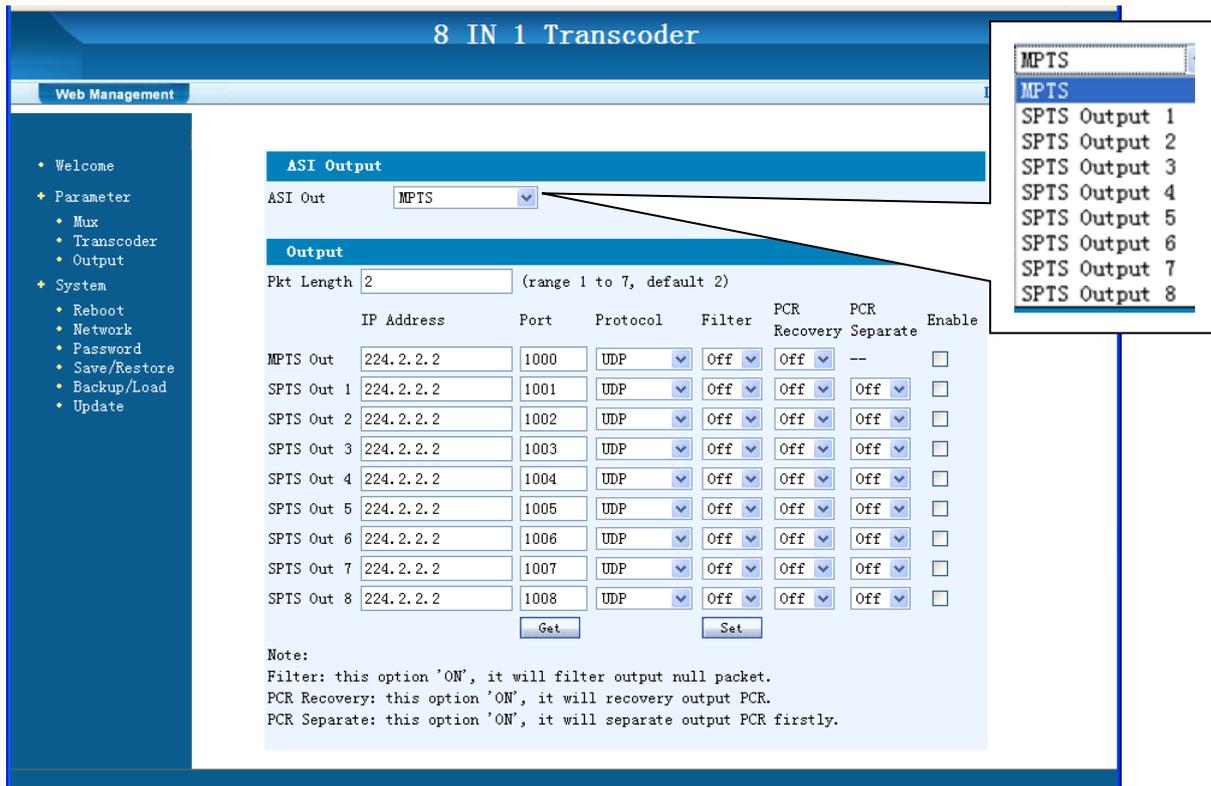


Figure-5

◆ Reboot

Click “Reboot” from the menu, the screen will display as Figure-6. Click “Reboot” box and it will restart the device automatically.



Figure-6

◆ Network

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

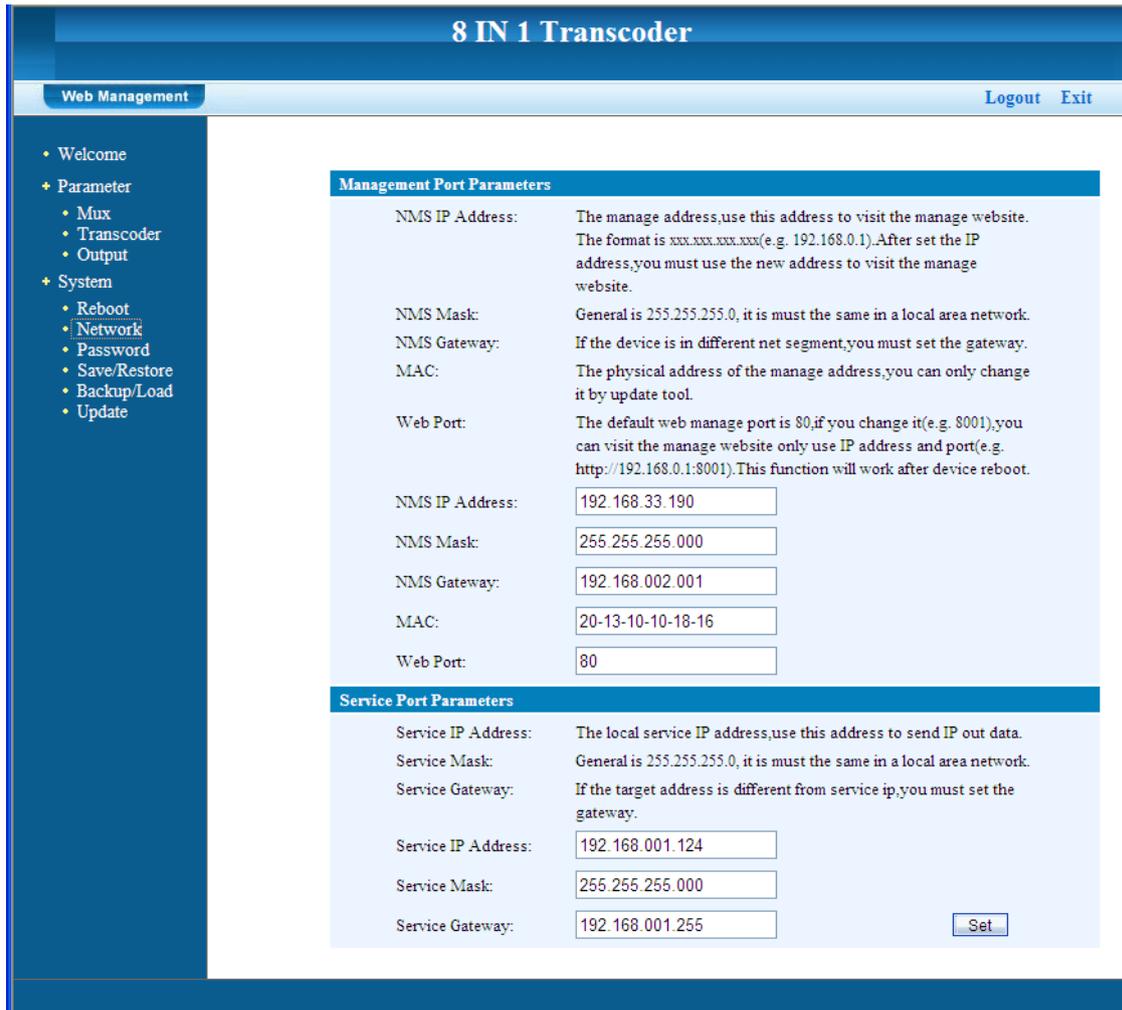


Figure-7

◆ Password

When user clicks “Password”, it will display the password screen as Figure-8. Here user can change the Username and Password for login to the device.

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



Figure-8

◆ **Save/Restore**

From the menu on left side of the webpage, clicking “Save/Restore”, it will display the screen as Figure-9. Where to save or restore your configurations

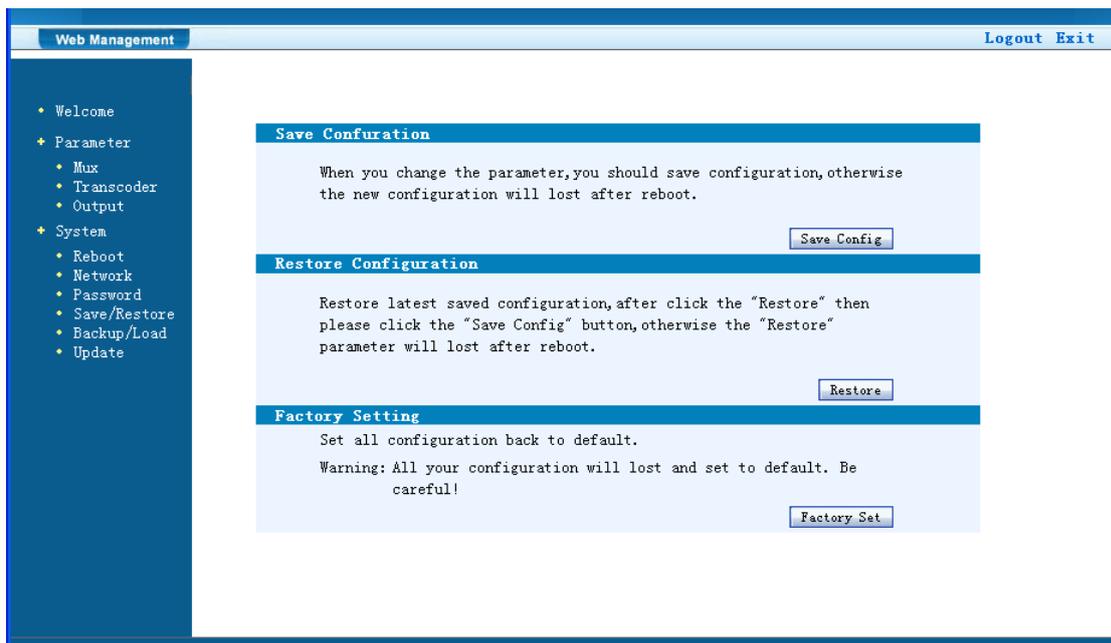


Figure-9

◆ **Backup/Load**

Click “Backup/Load” from the menu, it will display the screen as Figure-10.

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

Load Configuration – If user needs to load the backup file to restore configuration, click “Load” to restore the latest saved configuration.

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

Resume Setting – To resume the device to factory default configuration.

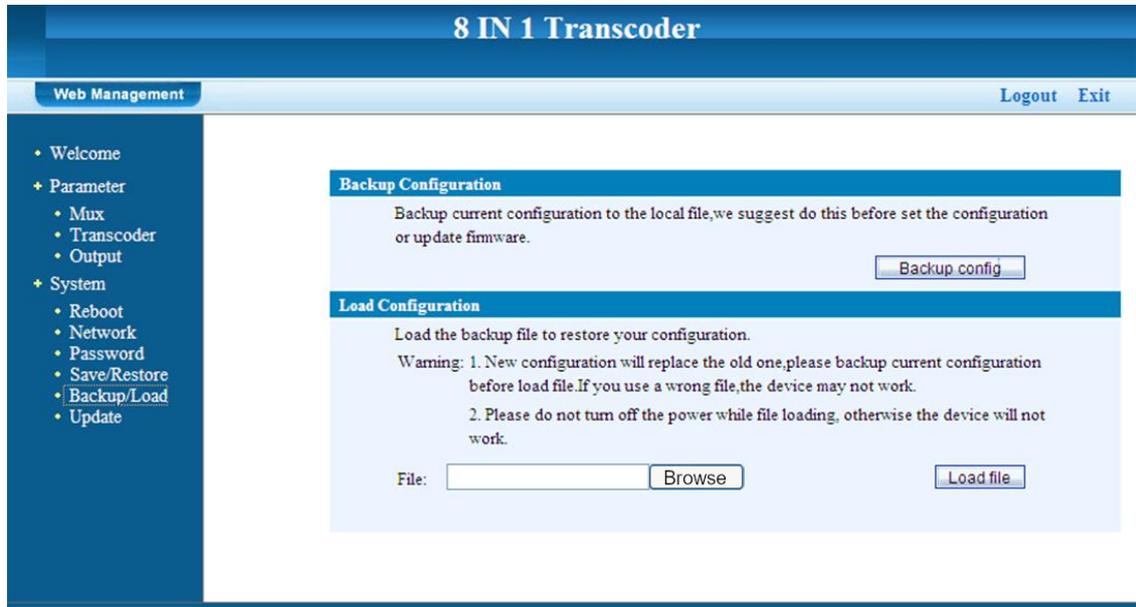


Figure-10

◆ Update

From the menu on left side of the webpage, clicking “Update”, it will display the screen as Figure-11 where to update firmware for the device.

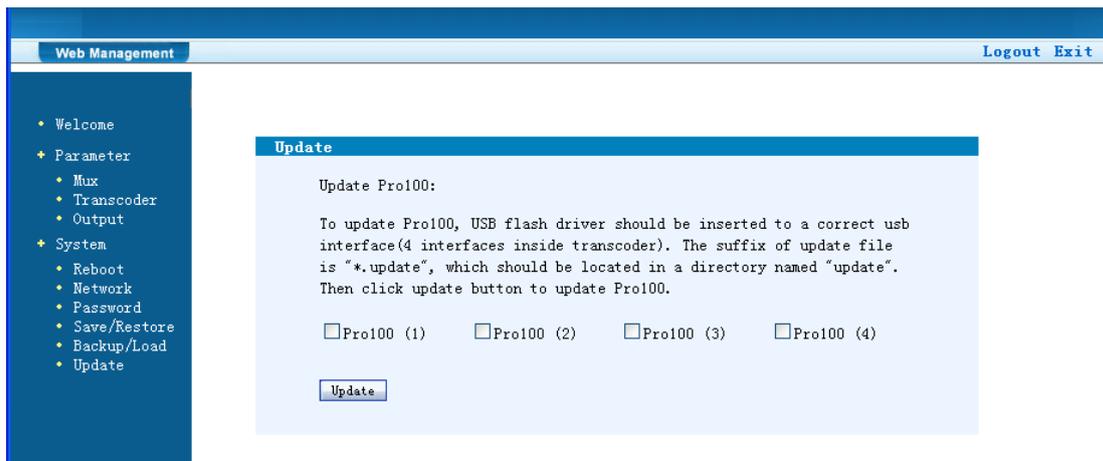


Figure-11

Chapter 5 Troubleshooting

Thor Broadcast ISO9001 quality assurance system has been approved by CQC organization. For guarantee the products' quality, reliability and stability. All *Thor* products have passed testing and inspection before shipping out of our lab. The testing and inspection scheme covers all the Optical, Electronic and Mechanical criteria which have been published by *Thor Broadcast*. To prevent potential hazards or electrical shock, please strictly follow the operating conditions.

Preventive Measures:

- Installing the device in an environment, which the temperature should be between 0 to 45 °C.
- Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary.
- Check the input AC is within the power supply working range and the connection is correct before switching on device.
- Checking the RF output level varies within tolerant range if necessary.
- Checking all signal cables has been properly connected.
- Frequently switching on/off device is prohibited; the interval between every switching on/off must greater than 10 seconds.

Conditions needed to unplug power cord:

- Power cord or socket damaged.
- Any liquid spilled into device.
- A circuit short.
- Device in damp environment.
- Device has suffered from physical damage.
- Longtime idle.
- After switching on and restoring to factory setting, device still cannot work properly.
- Maintenance needed.

Chapter 6 Packing List

H-8TS-ATSC	1PC
User Manual	1PC
ASI Cables	6 PCs
Power Cord	1PC