



H-8HD-EMS HD-SDI Program Encoder
H-8HD-EMH HDMI Program Encoder



User's Manual

2016

Version: 2.1

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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Chapter 1 Product Introduction

1.1 Outline

The Thor Broadcast 8 HDMI H.264 Encoder is our 1RU solution for the best HD audio & video encoding/multiplexing up to 8 individual HDMI sources. This high density HDMI encoder outputs 8 channels MPEG-4 AVC/H.264 in perfect clarity and format. It allows for a single ASI input and an ASI output that lets you output MPTS and SPTS. It can multiplex the ASI input TS's and the 8 encoded SPTS to generate an MPTS output with the inserted PSI/SI information. This advanced encoder helps encapsulate everything you need to launch a high density output for IPTV headends, multiplexing, and ASI contribution feeds.

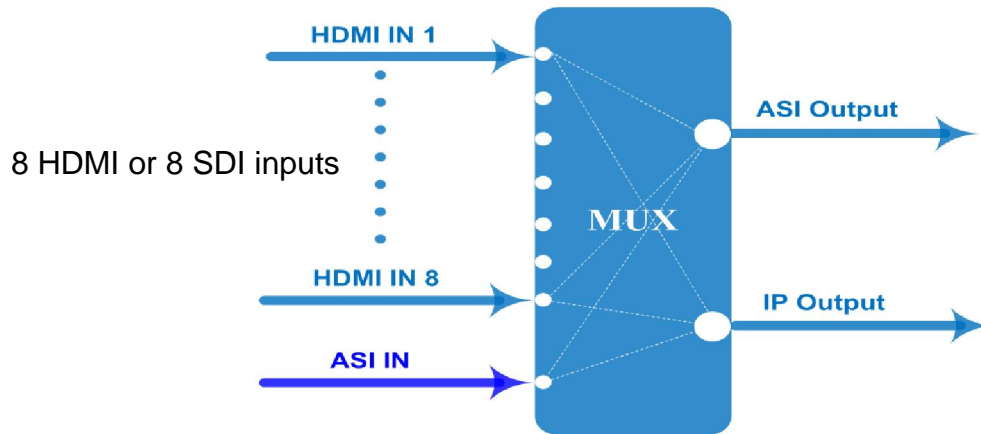
1.2 Main Features

- 8 HDMI or 8 sDi channels input & 1 ASI Input
- H.264/AVC high profile level 4.0 video encoding
- MPEG1 Layer 2 (HE-AAC (V2) or LC-AAC optional) audio encoding
- PSI/SI editing and inserting
- VBR or CBR video bitrate mode
- 720P, 1080I, 1080P HD video format
- ASI output MPTS or 8 SPTS
- IP Output MPTS and 8 SPTS
- IP null packet filter
- PID filter and transparent transport
- Real-time output bit-rate monitoring
- Update device through NMS port
- LCD / keyboard, and network management (NMS)

1.3 Specifications

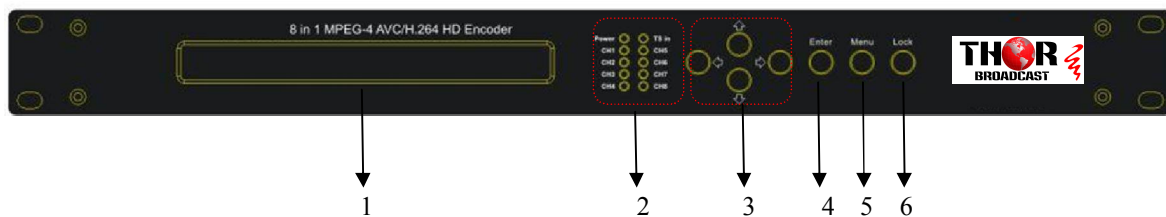
Input	8 HDMI or 8 SDI inputs	
	1 ASI input, BNC interface	
Video	Resolution	1920×1080_60P, 1920×1080_50P
		1920×1080_60i, 1920×1080_50i
		1280×720_60P, 1280×720_50P
		720x576_50i, 720x480_59.95i
	Encoding	MPEG-4 AVC/H.264 high profile level 4.0
	Bit-rate	0.8Mbps~19Mbps (each channel)
	Rate Control	CBR/VBR
GOP Structure	IBBP	
	Advanced Pretreatment	De-interlacing, Noise Reduction, Sharpening
Audio	Encoding	MPEG-1 Layer II, HE-AAC (V2), LC-AAC
	Sampling rate	48KHz
	Resolution	24 bit
	Bit-rate	64Kbps~384Kbps each channel
Multiplexing		1 ASI input multiplexed with local 8 channels of TS
Stream output		2*ASI output, BNC interface
		MPTS and 8 SPTS over UDP, 1000 Base-T Ethernet interface (UDP unicast / multicast)
System function		LCD/keyboard operating, NMS supporting
		Chinese-English control interface
		Ethernet software & hardware upgrade
Miscellaneous	Dimension (W× L× H)	440mm×410mm×44.5mm
	Approx weight	4kg
	Temperature	0~45℃(work), -20~80℃ (Storage)
	Power	AC 100V-220V±10%, 50/60Hz
	Consumption	25W

1.4 Principle Chart



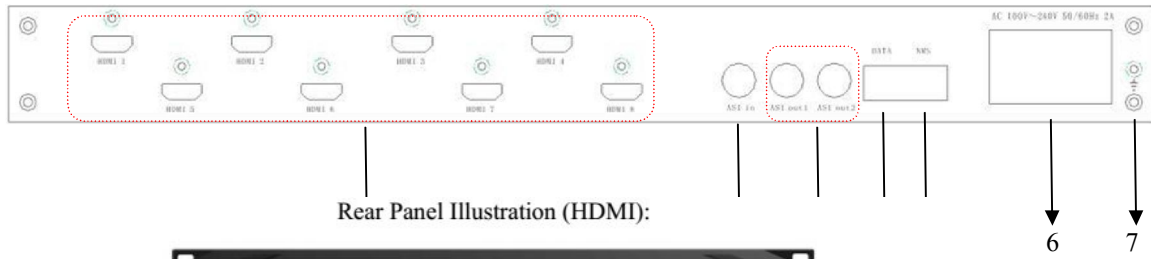
1.5 Appearance and Illustration

Front Panel Illustration:



1	LCD Screen	
2	Indicators	Power Indicator
		TS In: Input Lock Indicator
		CH1-CH8: When the program has been multiplexed, the indicator will be on.
3	UP/ DOWN, LEFT/RIGHT Keys	
4	Enter Key	
5	Menu Key	
6	Lock Key	

Rear Panel Illustration:



Rear Panel Illustration (HDMI):



Rear Panel Illustration (SDI):



1	8 * HDMI Input Ports
2	ASI Input Port
3	2 * ASI Output Ports
4	Data Port (for IP Signal Output)
5	NMS (Network Management Port)
6	Power Switch and socket
7	Grounding Pole

Chapter 2 Installation Guide

2.1 Acquisition

When you first open the package of the encoder, please check items according to packing list.

Normally it should include the following items:

- H-8HD-EMH MPEG-4 AVC/H.264 HD Encoder
- User's Manual
- HDMI Cable
- ASI Cable
- Power Cord

If any item is missing please contact Thor Broadcast 1-800-521-8467

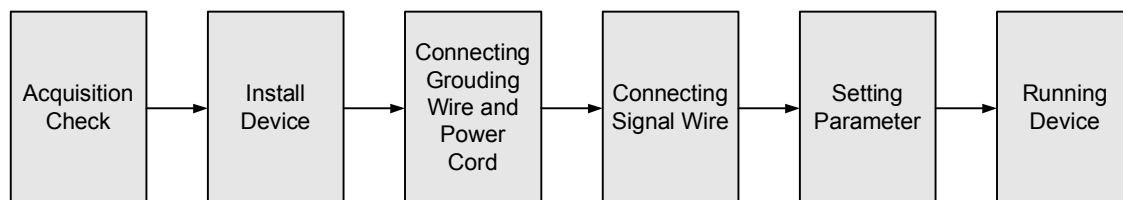
2.2 Installation Preparation

When you install the device, please follow these steps. The details of installation will be described at the rest part of this chapter. You can also refer to the rear panel chart during the installation.

The main content of this chapter includes:

- Checking the possible device for missing or damage during transportation
- Preparing relevant environment for installation
- Installing Encoder
- Connecting signal cables
- Connecting communication port (if it is 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 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, Rack Room with Ventilation
Environment Temperature	5~40°C(sustainable), 0~45°C(short time), installing air-conditioning is recommended
Relative Temperature	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Power	Device power requires AC power 220V 50Hz. Please carefully check before running.

2.2.3 Grounding Requirement

- ✓ 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, lightning. 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 m².

2.2.4 Frame Grounding

All the machine frames should be connected with 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

Connect 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 ,whose order goes like this, power switch is on the left, power supply socket is on the right and the fuse is just between them.

- Connecting Power Cord

Insert one end into power supply socket, while insert the other end to AC power.

- Connect the ground wire carefully

⚠ **Caution:**

Before connecting power cord to Encoder, set the power switch to "OFF".

2.4 Signal Cable Connection

2.4.1 HDMI input cable illustration:



2.4.2 ASI output cable illustration:



2.4.3 Network Cable illustration (CAT5):



2.4.4 HDMI input interface connection

Find the HDMI interface on the device according to the connector mark described on the rear panel illustration, and then connect the HDMI cable (in the accessories). One end is connected to the head-end equipment while the other end to the encoder's HDMI input port. The encoder's HDMI input port (HDMI1...HDMI8) and its connection are illustrated as follows:



2.4.5 ASI output interface connection

Find the ASI output interface on the device according to the connector mark described on the rear panel illustration, and then connect the ASI cable (in the accessories). One end is connected to the encoder's ASI out connector (ASI1, ASI2) while the other end to the TS stream multiplexer or modulator's ASI input port. The encoder's ASI output interface and its connection are illustrated as follow:



2.4.6 IP Output Interface connection

Find the DATA interface on the device according to the connector mark described on the rear panel illustration, and then connect the network (CAT5). One end of the network cable is connected to the encoder's DATA output connector, while the other end to the TS stream multiplexer IP input port or other device which can input IP signal. The encoder's DATA connection is illustrated as follows:



2.4.7 NMS Connection

Find the NMS interface on the device according to the connector mark described on the rear panel illustration, and then connect the network (CAT5). One end of the network cable is connected to the encoder's NMS connector, while the other end to the computer or the PC. The encoder's NMS connection is illustrated as follows:



Chapter 3 Operation

The H-8HD-EMH front panel is the user operating interface. Before operating, you can decide whether to use the default settings or customize the input and output parameters.

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.

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

3.1 Initializing

After powering on the device it will take a few seconds to initialize the system, and then the LCD will show the device name and output real-time bit-rate in the first row, while the 8 channels’ respective input video resolution, frame rate and real-time encoding bit-rate in the second row in turn.

8 in 1 Encoder	65.958 Mbps
1 480I 60 08.235M	2 480I 60 08.241M

3.2 General Settings

By pressing LOCK key, enter in the main menu and set the input and output parameters in the following editing interfaces, the LCD will display the following pages:

▶ 1 Input Setting	2 ASI Setting
3 Output Setting	4 Network Setting

▶ 5 Saving Config 7 Version (SNMP)	6 Loading Config 8 Language
---------------------------------------	--------------------------------

The option with “▶” is the current selection, press the ENTER key to enter the specified submenu to modify the device parameter.

3.2.1 Input Setting

Under this menu, enter the corresponding encoding channel to set the relevant audio and video input parameters, and select programs to multiplex. The LCD will display 8 submenus which range from Encoding Channel 1 to Encoding Channel 8. The settings are the same for Encoding Channels 1-8, so we will show you one channel as an example to further explain. After pressing the enter key, the LCD will display the following pages:

▶ 1.1 Encoder 1 1.3 Encoder 3	1.2 Encoder 2 1.4 Encoder 4
----------------------------------	--------------------------------

▶ 1.5 Encoder 5 1.7 Encoder 7	1.6 Encoder 6 1.8 Encoder 8
----------------------------------	--------------------------------

Enter the submenu, the interface will turn into the following pages, and then you can enter the corresponding interface to modify the parameters.

▶ 1.1.1 Video 1.1.3 System	1.1.2 Audio 1.1.4 PG Muxer
-------------------------------	-------------------------------

3.2.1.1 Video Setting

▶ 1.1.1.1 Bitrate 1.1.1.3 Profile	1.1.1.2 BitrateMod 1.1.1.4 Level
--------------------------------------	-------------------------------------

➤ Bitrate

Press “Enter” key, modify relevant parameters of encoding rate (adjustable range: 0.8M~19M), the specific steps are displayed as follows:

1.1.1.1 Bitrate
8.000Mbps

➤ **Bitrate Mode**

Choose CBR & VBR at this menu. CBR (Constant Bit-rate) means that the bit-rate will be a constant value. VBR (Variable Bit-rate) means that the bit-rate will always change along with the video scene changing.

1.1.1.2 BitrateMod 01/01
[CBR] VBR

➤ **Profile**

Select the configuration of H.264 profile at this menu. There are H.264 High Profile code format and main Profile code format.

1.1.1.3 Profile 01/01
[HIGH] MAIN

➤ **Level**

Select the H.264 level at this menu. The option with bracket is the current choice.

1.1.1.4 Level 01/03
[1.2] 1.3 2.0 2.1

1.1.1.4 Level 02/03
[2.2] 3.0 3.1 3.2

1.1.1.4 Level 03/03
[4.0] 4.1 4.2

3.2.1.2 Audio Setting

1.1.2.1 Bit Rate 1.1.2.2 Format

3.2.1.3 System Settings

▶ 1.1.3.1 Prog Number	1.1.3.2 Video PID
1.1.3.3 Audio PID	1.1.3.4 PMT PID
▶ 1.1.3.5 PCR PID	1.1.3.6 IP Enable
1.1.3.7 Out Address	1.1.3.8 Out Port
▶ 1.1.3.9 Null PKT	

Under this interface, set the corresponding system parameters, after the modification, press enter key to take the modification into effect.

➤ Program Number Setting

Set the program number by pressing ENTER to enter this submenu. The LCD will display as shown below:

1.1.3.1 Program Number 0x0101

➤ Video/Audio/PMT/PCR PID Settings

Set these parameters by pressing ENTER to enter these submenus. The LCD will display the following pages, and the maximum PID number cannot exceed 0x1fff.

1.1.3.2 Video PID 0x0101
1.1.3.3 Audio PID 0x0102
1.1.3.4 PMT PID 0x0100

1.1.3.5 PCR PID
0x0101

➤ **IP Enable**

1.1.3.6 IP Enable 01/01
YES [NO]

➤ **Out Address/Out Port Setting**

Modify the out address and out port in interfaces below.

1.1.3.7 Out Address
224.002.002.002

1.1.3.8 Out Port
1002

➤ **Null Packet**

1.1.3.9 Null Packet 01/01
YES [NO]

Choose YES (filter the null packet) or NO (don't filter null packet) to decide whether to filter the null packet or not.

3.2.1.4 Program Mux Setting

Decide whether to open the multiplexing function of the device.

➤ **Channel Mux**

Under this interface, decide whether to multiplex the channel encoding stream. **YES** means that the device multiplexes the encoding stream into the MPTS, while **NO** means that the output program is SPTS. The LCD will display the following pages after pressing enter key.

1.1.4.1 Channel Mux 01/01
[YES] NO

3.2.3.2 IP Out Address

Enabling the IP output function, you can set the device IP output address in this interface. After pressing the ENTER key, the operating interface will display the following page:

▶ 3.2 IP Out Address
224.002.002.002

3.2.3.3 IP Out Port

In this menu, set the encoder IP output port number by pressing the ENTER key to enter the main editing interface.

▶ 3.3 IP Out Port
01001

3.2.3.4 Trans Stream ID

Set the device TS ID in this interface after pressing the ENTER key to enter the main editing page.

▶ 3.4 Trans Stream ID
00000

3.2.3.5 Output Stream

Modify the bit rate of output streams in this interface after pressing the ENTER key to enter the main editing page.

3.5 Output Stream
040.000 Mbps

3.2.3.6 ASI Output

Set the ASI output in this interface under this menu, and there are 9 options: MPTS, and Channels 1-8.

3.6 ASI Output 01/03
[MPTS] Channel 1 Channel 2 Channel 3

3.2.3.7 UTC Time

UTC refers to Universal Time Coordinated. Enter this menu to set the time as needed and it will then generate the TDT table and show in the user's STB.

3.7 UTC Time Configuration
2012-01-29 15:45:03

3.2.3.8 Null Packet

3.8 Null Packet YES [NO] 01/01

3.2.3.9 TS Package Num

Set the amount of TS packages by entering into interface below.

3.9 TS Package Num 01/02
1 2 3 [4]

3.9 TS Package Num 02/02
[5] 6 7

3.2.4 Network Setting

Set the network parameters by pressing the enter key, and the LCD will display the following interfaces.

4.1 IP Address
192.168.005.018

4.2 Subnet Mask
255.255.255.000

4.3 Gateway
192.168.002.001

4.4 Console Address
192.168.002.211

The MAC address is read-only in the keyboard operation interface, so users can just check the physical address under this interface, and the modification must be done in the network updating tools.

4.5 MAC Address
201012345679

NOTE: The MAC address is unique, and cannot be modified.

3.2.5 Saving Configuration

Save the modification by pressing the enter key, and it will display the following interface when pressing the enter key.

5 Saving Config 01/01
YES [NO]

3.2.6 Loading Configuration

In this interface, select the modified configuration and the factory defaulted configuration. Enter the corresponding menu to select the configuration. The LCD will display the following interfaces:

▶ 6.1 Load Saved 6.2 Load Default

3.2.7 Version

Check the device software version and hardware version, and the LCD will display the following interface when users press the ENTER key.

8 in 1 Encoder
SW 0.17F HW 08

3.2.8 Language

Select the language under this submenu:

8 Language
[ENGLISH]

Chapter 5 WEB NMS Operation

User not only can use front buttons to set configuration, but also can control and set the configuration in computer by connecting the device to web NMS Port. User should ensure that the computer's IP address is different from the encoder's IP address; otherwise, it would cause IP conflict.

5.1 login

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

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

I.G. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 1 to 254 except 252 to avoid IP conflict).

Use web browser to connect the device with 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.

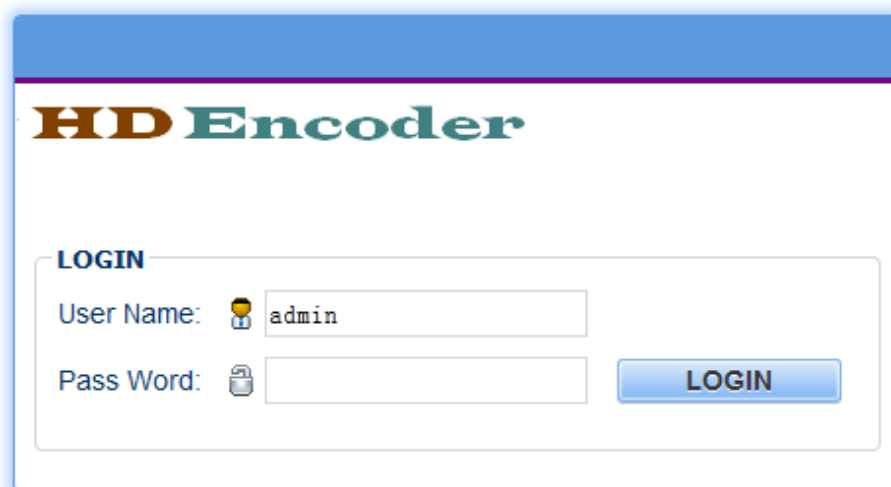


Figure-1

5.2 Operation

Encode Setting

From the menu on top of the webpage, clicking “Encode Setting”, it displays the information of the program from the 1st HDMI/SDI encoding channel as Figure-2.

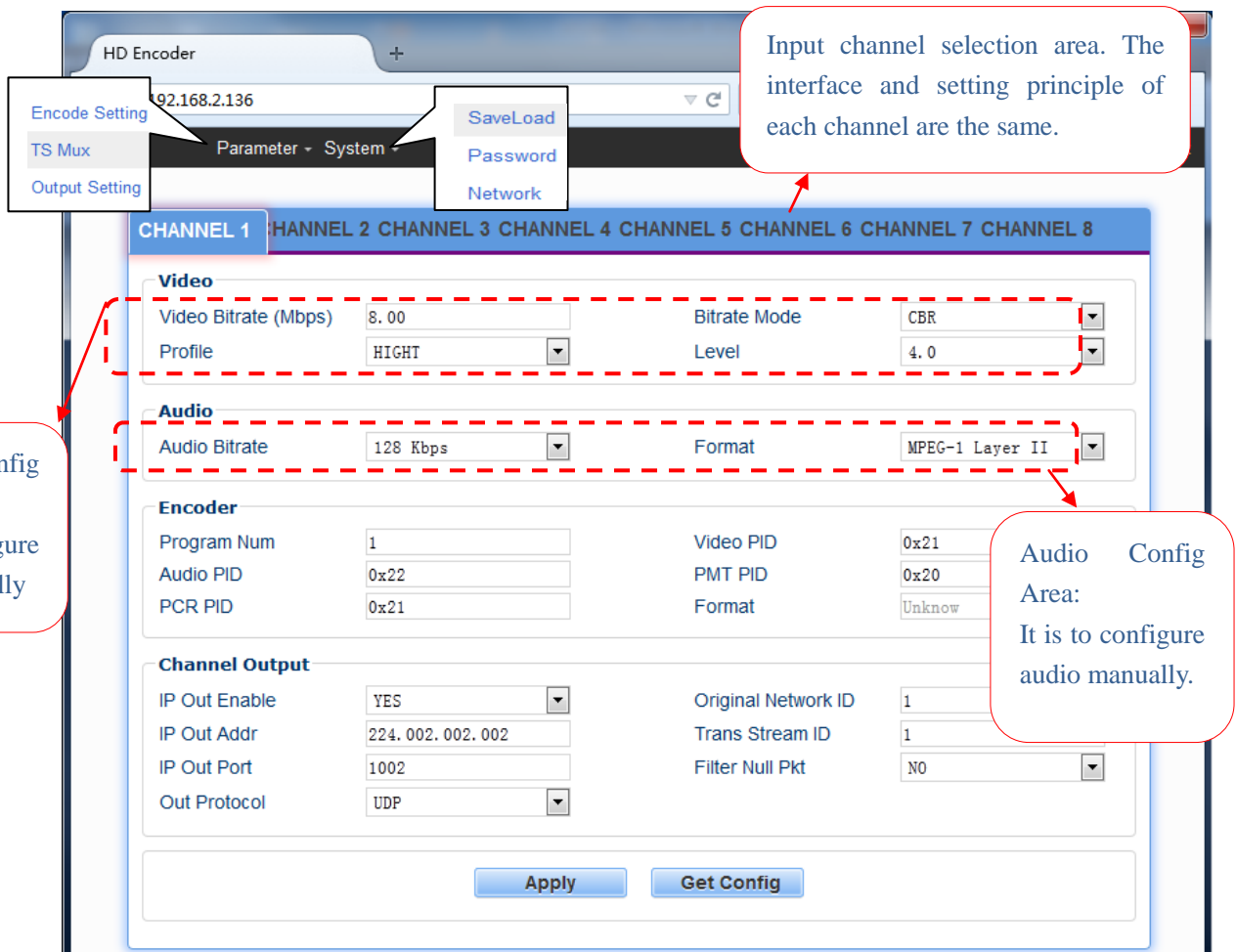


Figure-2

TS Mux

From the menu on top of the webpage, clicking “TS MUX”, it displays as Figure-2.

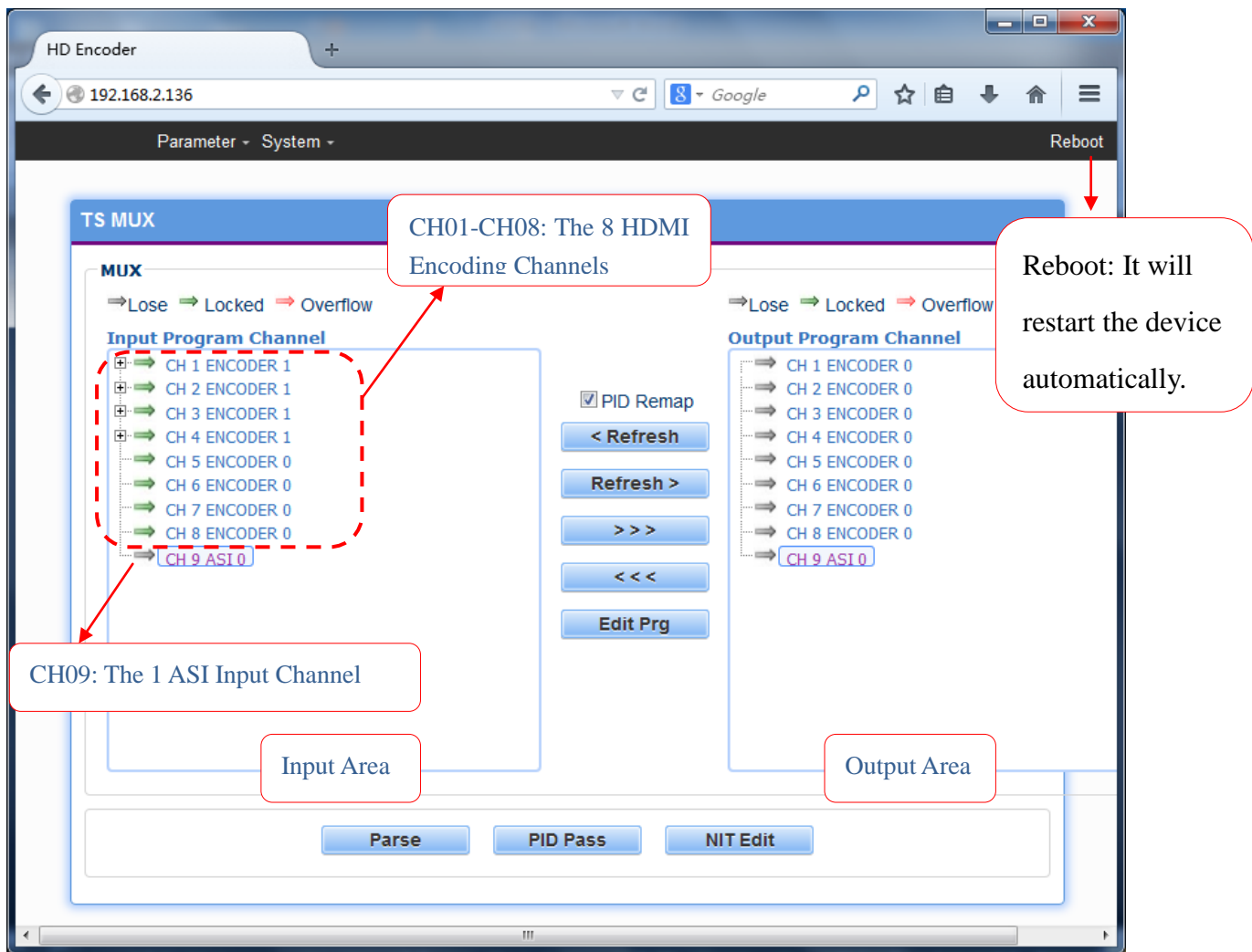


Figure-2

PID Remap : Check this box the set the PID Mapping

: To refresh the inputting terminal and get the inputting information

: To refresh the outputting terminal and get the outputting information

: Multiplex the input programs to the output channels after selecting the target program. The system will automatically allot the program to the relevant output channel.

: Cancel the multiplexed programs.

: To modify the output programs' Program Name, PMT, PCR, video, or audio PID as needed. To modify program information, user can select the target program in output part first and click this button to pop up a dialog box Figure-3 as below:

Figure-3

PID Pass : User can decide to bypass the inputting PID as needed.

In some occasions, there are some PIDs which won't belong to any program, such as EPG, NIT tables, and so on, but user just wants to pass them through the multiplexing module without changing anything. This is the main purpose of this function. Click this button to pop up a dialog box Figure-4:

Index	Channel	Input PID	Output PID
NEXT	9	0x1	0x1

Figure-4

NIT Edit NIT: Network Information Table.

NIT table is a very important table for describing the network and TS. Users can set the parameters of the output NIT table under below interface (Figure-5).

Figure-5

Network ID: The parameter describes the output TS's network ID

Network Name: The parameter describes the output TS's network name.

Insertion private description

Inster Private: This checkbox will allow user to insert the private descriptor into the output TS. The private descriptor includes two parts. One is descriptor tag, and the other is descriptor information.

The Descriptor Tag is an 8-bit field which identifies each descriptor.

The Descriptor Data is the detailed information of the private description.

Output Setting

Click "Output Setting", it will display the interface where to configure the output parameter. as Figure-6.

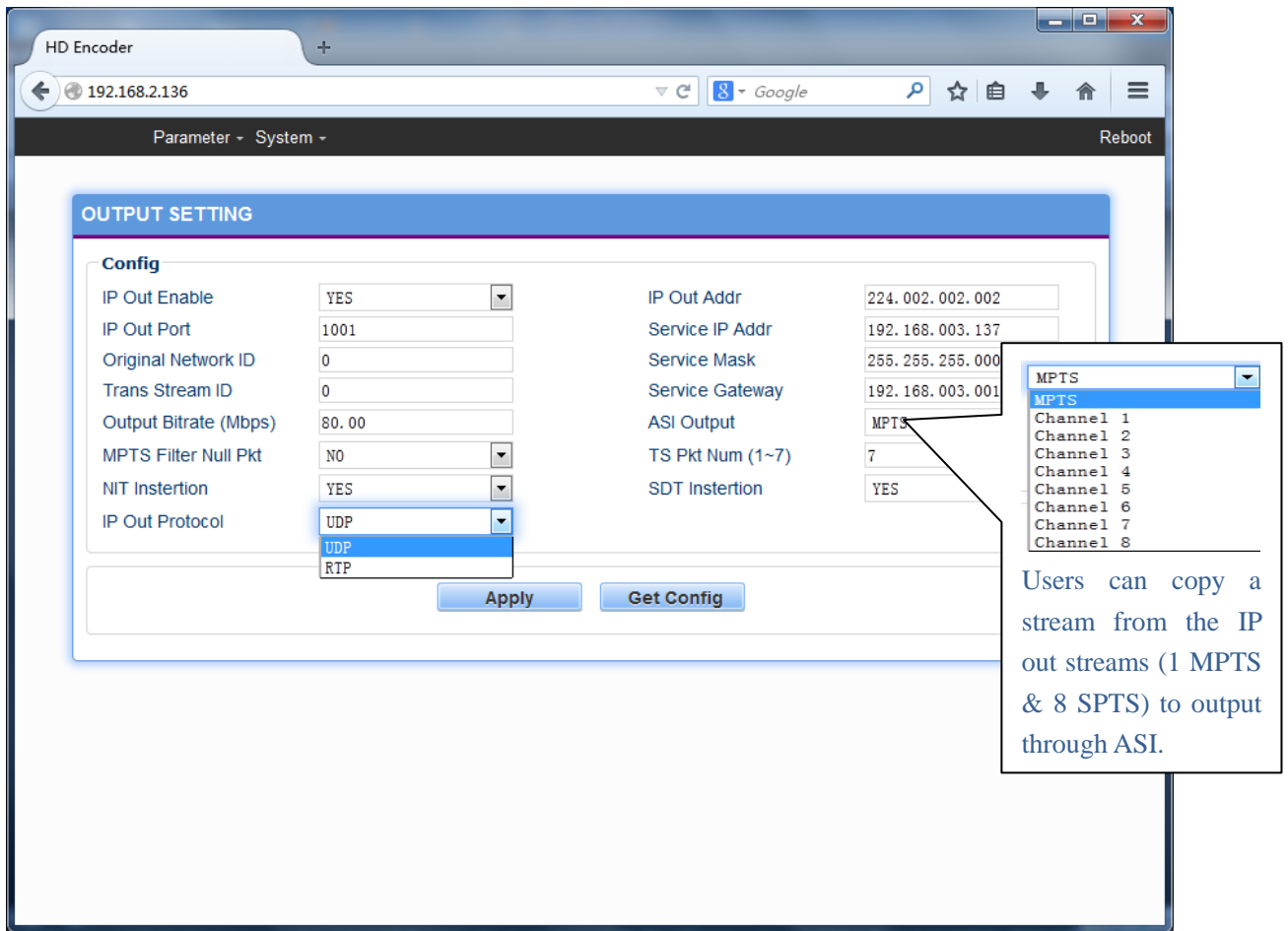


Figure-6

After setting the parameters, click “Apply” to save the setting.

Save Load

From the menu on left side of the webpage, clicking “Save Load”, it will display the screen as Figure-7 where to save or restore your configurations.

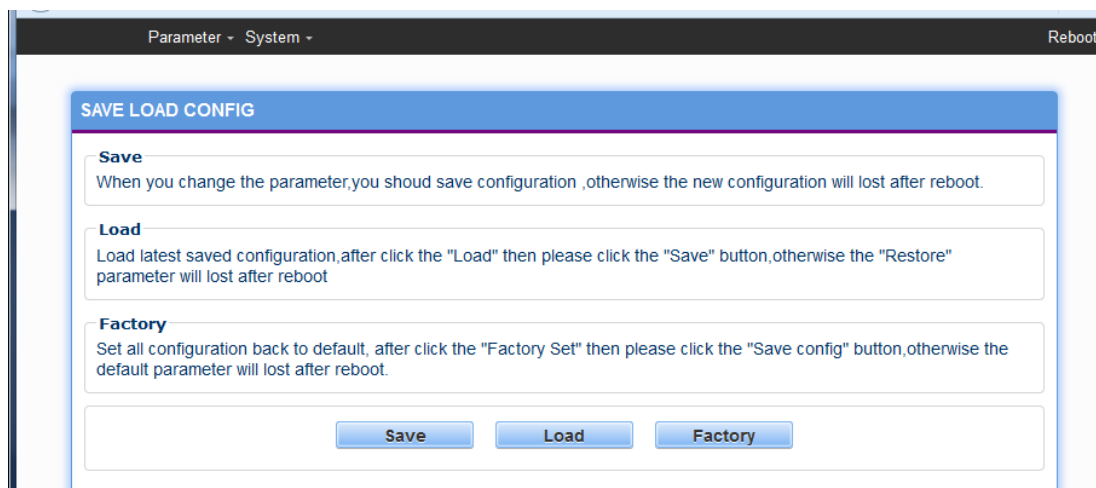
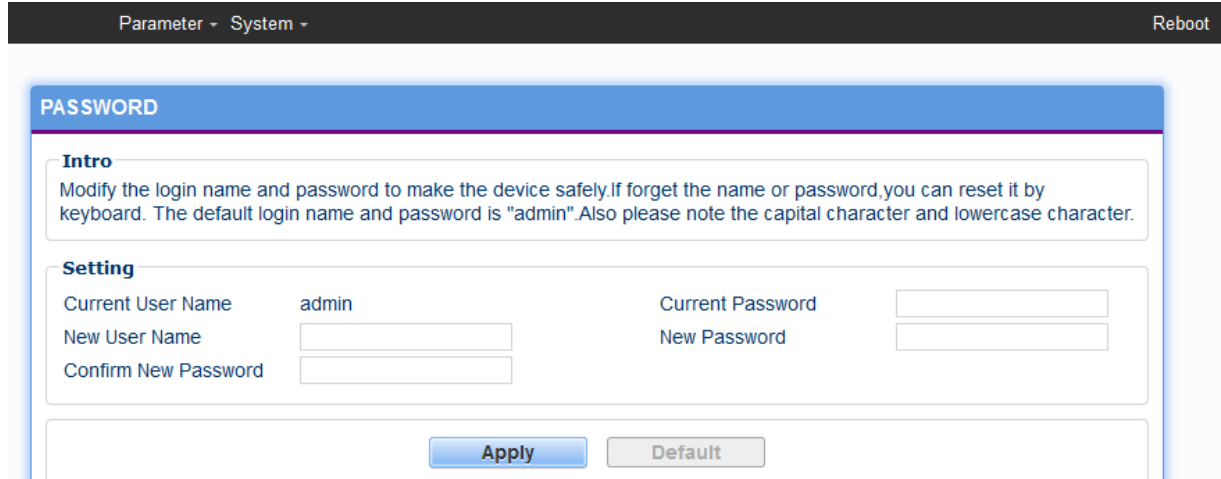


Figure-7

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.

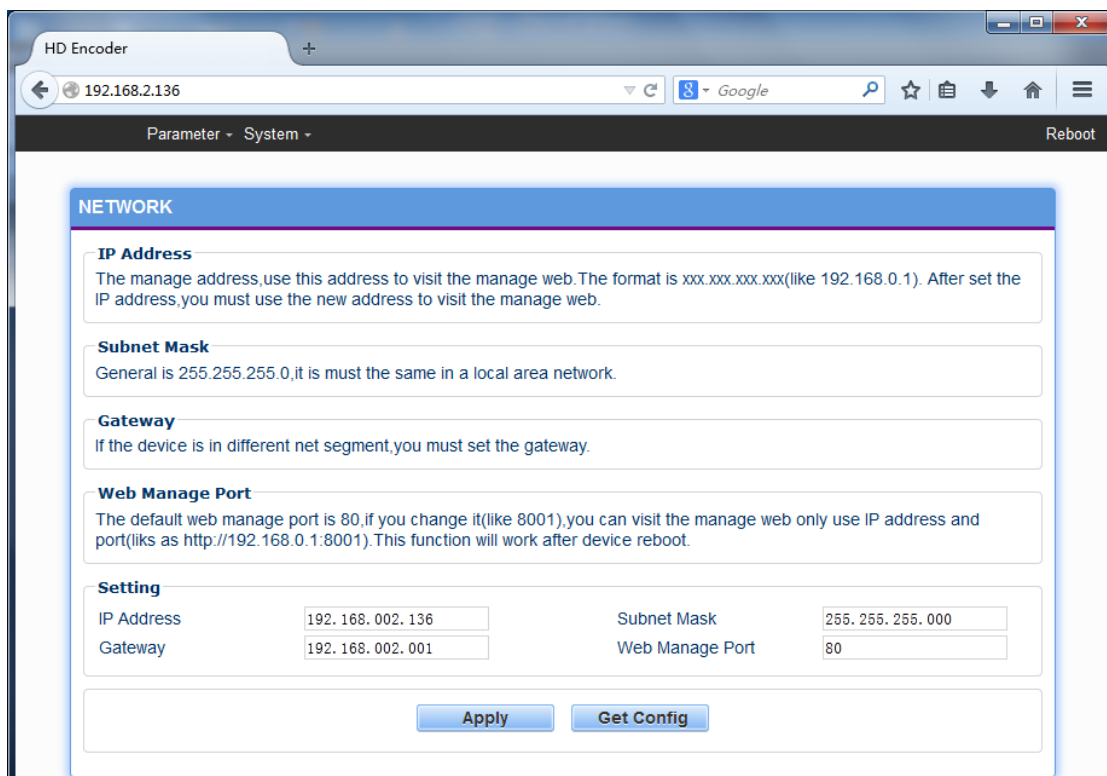


The screenshot shows a web interface for configuring the password. At the top, there is a navigation bar with "Parameter - System -" on the left and "Reboot" on the right. The main content area is titled "PASSWORD" and contains an "Intro" section with instructions: "Modify the login name and password to make the device safely. If forget the name or password, you can reset it by keyboard. The default login name and password is 'admin'. Also please note the capital character and lowercase character." Below this is a "Setting" section with four input fields: "Current User Name" (pre-filled with "admin"), "Current Password", "New User Name", and "New Password". There is also a "Confirm New Password" field. At the bottom of the settings section are two buttons: "Apply" and "Default".

Figure-8

Network

When user clicks “Network”, it will display the screen as Figure-9. It displays the network information of the device. Here user can change the device network configuration as needed.



The screenshot shows a web browser window displaying the "NETWORK" configuration page. The browser's address bar shows "192.168.2.136". The page has a navigation bar with "Parameter - System -" and "Reboot". The main content area is titled "NETWORK" and contains several sections: "IP Address" (instructions: "The manage address, use this address to visit the manage web. The format is xxx.xxx.xxx.xxx (like 192.168.0.1). After set the IP address, you must use the new address to visit the manage web."), "Subnet Mask" (instructions: "General is 255.255.255.0, it must be the same in a local area network."), "Gateway" (instructions: "If the device is in different net segment, you must set the gateway."), and "Web Manage Port" (instructions: "The default web manage port is 80, if you change it (like 8001), you can visit the manage web only use IP address and port (like as http://192.168.0.1:8001). This function will work after device reboot."). Below these sections is a "Setting" section with four input fields: "IP Address" (192.168.002.136), "Subnet Mask" (255.255.255.000), "Gateway" (192.168.002.001), and "Web Manage Port" (80). At the bottom are two buttons: "Apply" and "Get Config".

Figure-9

Chapter 7 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 have 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

- H-8HD-EMH 1pcs
- User's manual 1pcs
- HDMI cable 8pcs
- ASI cable 1pcs
- Power cord 1pcs

THOR BROADCAST

LOS ANGELES CA

1-800-521-8467