

# THOR

## FIBER

**PRO-DVB H-2/4HD-EM(S/H)**

**2ch or 4ch HD-SDI**

**AC3 & CC 608/708**



**Revision 1.3**  
**Revised 2014**

## **A Note From Thor 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 Introduction**

## **1.1 Product Overview**

The Thor H-2/4HD-EM is our new pro broadcast featured encoder that features high end performance with powerful functionality. It comes equipped with 2/4 HD-SDI channel inputs that support: MPEG-2 & H.264 video encoding with MPEG-1 layer 2, LC-AAC, HE-AAC, and AC3 audio encoding. The 2/4 SDI inputs will be output via either ASI or IP in MPTS or SPTS.

This encoder will be an ideal chassis to support any DVB-ASI programming as it adopts the necessities to output AC3 audio and Closed Caption 608 & 708. Also comes' stock with dual power supply, as a back-up units is on standby to ensure your unit won't fail. Structured to facilitate to the demanding needs of any broadcast, this encoder series is the newest addition to Thor's Broadcast Encoders.

## **1.2 Key Features**

- **Dual power supply**
- **MPEG2 HD/SD & MPEG4 AVC/H.264 HD/SD video encoding**
- **MPEG1 Audio Layer 2, LC-AAC, HE-AAC and AC3 audio encoding**
- **4\*HD-SDI input**
- **Support VBR/CBR rate control mode**
- **Support CC (closed caption) EIA 608 & EIA 708**
- **Low Latency function**
- **Supports PSI/SI editing and inserting**
- **Supports IP null packet filter**
- **ASI output, IP (MPTS & 4 SPTS) output over UDP, RTP**
- **LCD display, Remote control and firmware**
- **Web-based NMS management; Updates via web**

## 1.3 Specifications

### Encoding Section

#### Video

|                   |                                                                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Encoding          | MPEG2 & MPEG4 AVC/H.264                                                                                                                              |
| Input             | HD-SDI*4                                                                                                                                             |
| Resolution        | 1920*1080_60P, 1920*1080_50P, (-for MPEG4 AVC/H.264 only)<br>1920*1080_60i, 1920*1080_50i,<br>1280*720_60p, 1280*720_50P<br>720*480_60i, 720*576_50i |
| Bit Rate          | 0.5~19.5Mbps for H.264 encoding<br>1~19.5Mbps for MPEG-2 encoding                                                                                    |
| Rate Control Mode | CBR/VBR                                                                                                                                              |

#### Audio

|             |                                                         |
|-------------|---------------------------------------------------------|
| encoding    | MPEG1 Layer II, MPEG2-AAC, MPEG4-AAC, Dolby Digital AC3 |
| Sample rate | 48KHz                                                   |
| Bit rate    | 64kbps, 96kbps, 128kbps, 192kbps, 256kbps, 320kbps      |

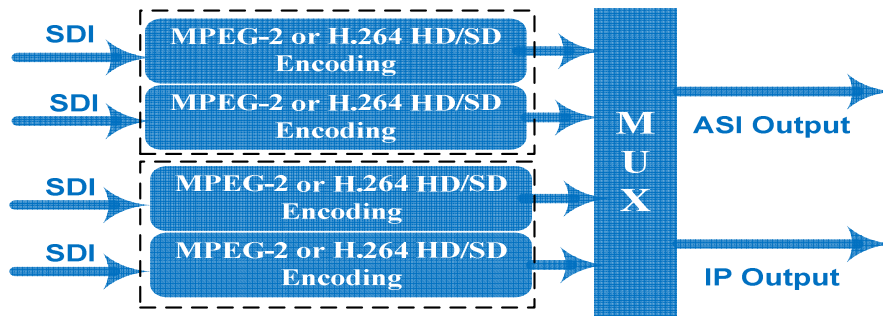
### System

|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| Local interface   | LCD + control buttons                                                    |
| Remote management | Web NMS                                                                  |
| Low Latency Mode  | Normal, mode 1, mode 2                                                   |
| output            | 2*ASI out (BNC type);<br>IP (1 MPTS & 4 SPTS) over UDP, RTP (RJ45, 100M) |
| NMS interface     | RJ45, 100M                                                               |
| Language          | English                                                                  |

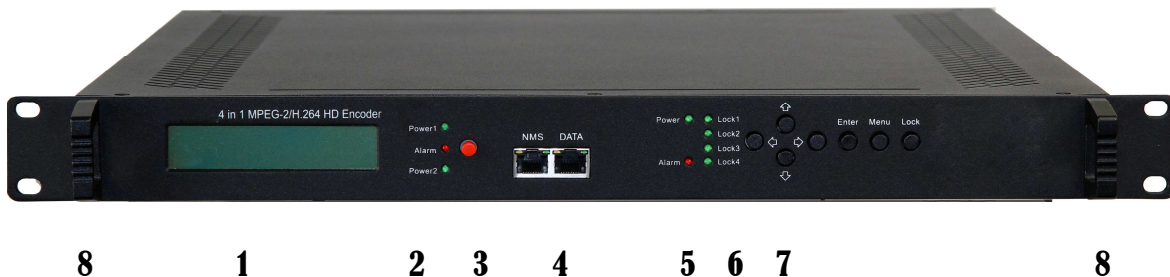
### General

|                       |              |
|-----------------------|--------------|
| Power supply          | AC 100V~240V |
| Power Consumption     | 45W          |
| Dimensions            | 482*400*44mm |
| Weight                | 4.5 kgs      |
| Operation temperature | 0~45℃        |

## 1.4 Schematic Overview



## 1.5 Image and Button Configuration Layout



- ① LCD window
- ② Power supply indicators
- ③ Power Alarm Switch: When only one power supply is connected or one of the power supplies fails, the device will give alarm sound, and then press the alarm switch to turn off the alarm sound.
- ④ NMS port for the connection between the device and PC
- ⑤ DATA port for IP signal out
- ⑥ Indicators for whole unit power supply, working alarm and input signal lock status
- ⑦ Control Buttons
- ⑧ Handles



- ① SDI Input Module 1: Program input port 1&2
- ② SDI Input Module 2: Program input port 3&4
- ③ ASI output ports
- ④ Power Supply Slot
- ⑤ Power Switch
- ⑥ Grounding

## **Chapter 2 Installation Guide**

Please use caution when operating this device in order to abstain from any possible injury during installation. For this reason, please read all details listed below and make and use caution before proceeding to operate and use this electronic equipment.

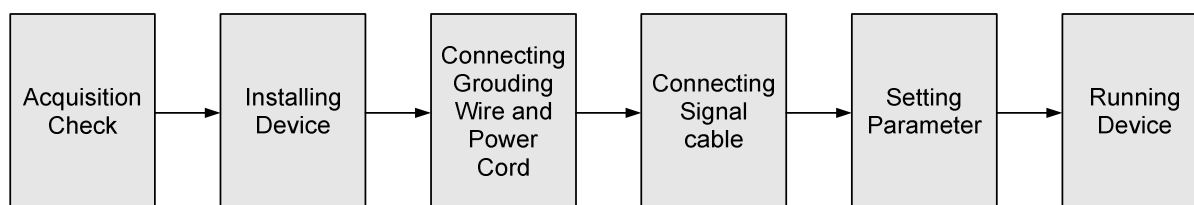
### **2.1 General Precautions**

- ✓ 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 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<br>Volume resistivity of ground anti-static material: $1 \times 10^7 \sim 1 \times 10^{10} \Omega$ , Grounding current limiting resistance: $1 \text{M}\Omega$<br>(Floor bearing should be greater than $450 \text{Kg/m}^2$ ) |
| Environment Temperature | $5 \sim 40^\circ \text{C}$ (sustainable ), $0 \sim 45^\circ \text{C}$ (short time),<br>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                                                                                                                                                                             |
| Wall                    | It can be covered with wallpaper, or brightness less paint.                                                                                                                                                                                                 |

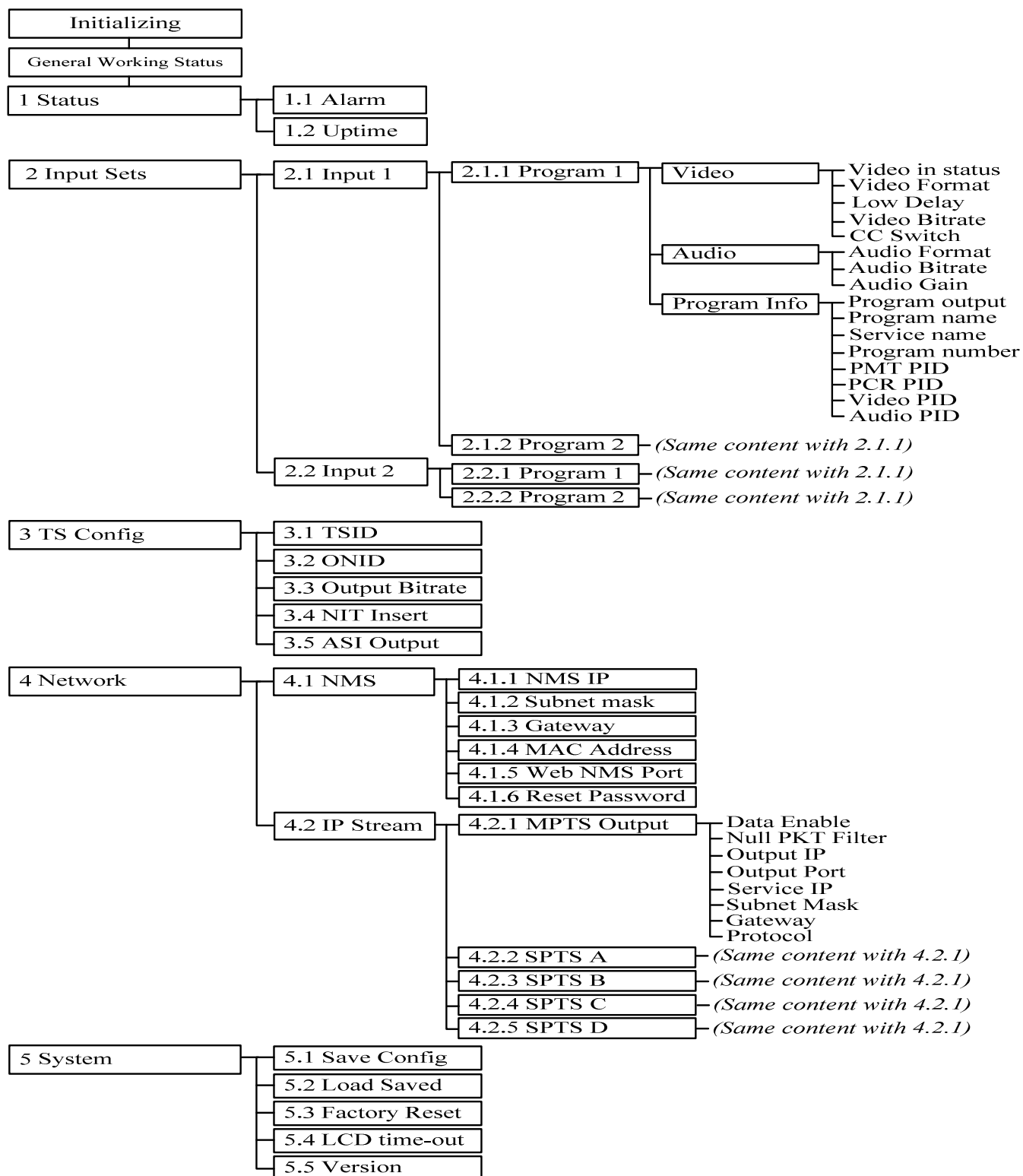
|                 |                                                                                                                                                                                                                         |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fire Protection | Fire alarm system and extinguisher                                                                                                                                                                                      |
| Power           | Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC 110V $\pm$ 10%, 50/60Hz or AC 220V $\pm$ 10%, 50/60Hz. Please carefully check before running. |

## 2.5 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, 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 m<sup>2</sup>.

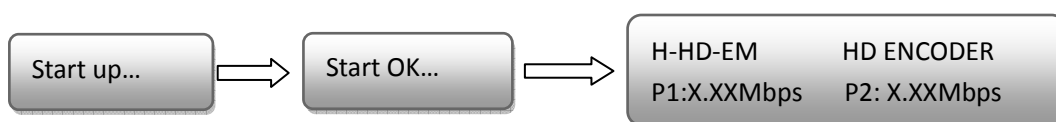
## Chapter 3 Operation

### 3.1 LCD Tree Breakdown



### 3.2 Initial Status

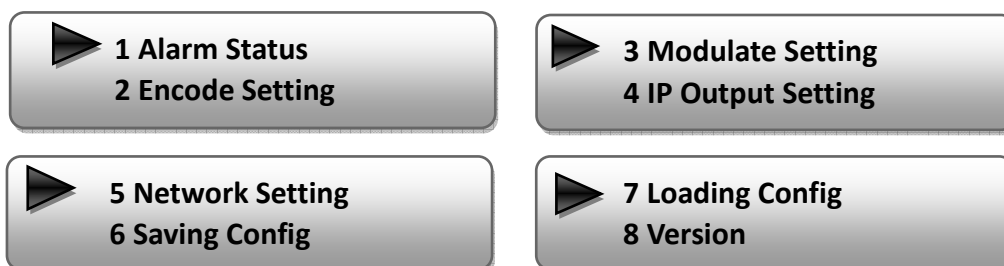
Switch on the device and after a few seconds' initialization, it presents start-up pictures as shown below:



- **H-HD-EM:** Module name and number
- **P1:** Program 1; **P2:** Program 2; **P3:** Program 3; **P4:** Program 4
- **X.XX Mbps:** indicate the current encoding bit rate of the corresponding channel.

### 3.3 General Settings for Main Menu

Press “Lock” key on the front panel to enter the main menu. The LCD will display the following pages where user can configure the parameters for the device:



User can press UP/DOWN buttons to specify menu item, and then press ENTER to enter the submenus as below:

#### 1) Status



### Alarm

The alarm indicator will turn on if there is no A/V signals inputting or outputting bit rate overflows. User then can enter this menu to check the error type.

**Uptime**  
0 Day(s) xx-xx-xx

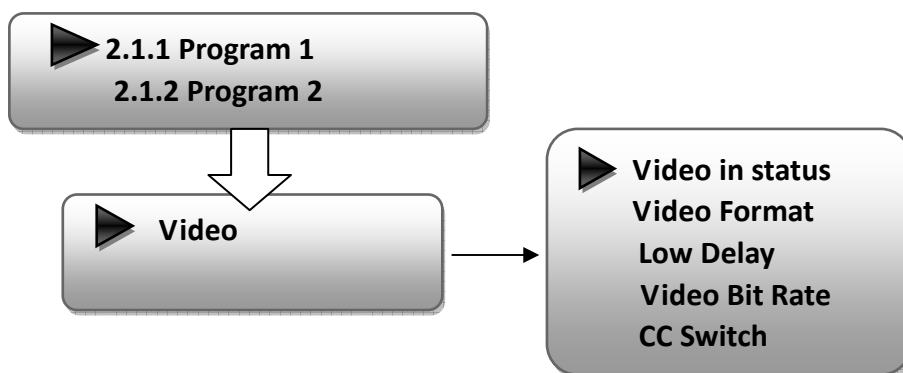
### Uptime

It displays the working time duration of the device. It times upon power on.

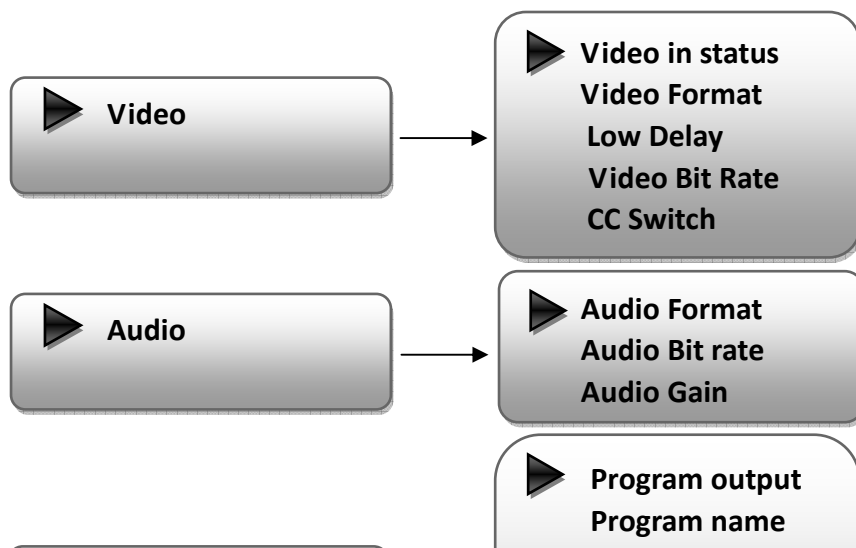
▶ **2.1 Input 1**  
2.2 Input 2

### 2) Input Settings

Under this submenu, the LCD will show “2.1 Input 1” and “2.2 Input 2” to represent the two SDI-input modules respectively.



Each SDI input module support two program input connectors. Under submenus 2.1 (or 2.2), user could set the video/audio parameters for the 2 SDI programs respectively.

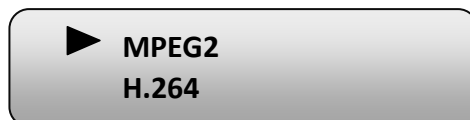


### Video in Status

Users can enter this menu to check the video input status.

### Video Format

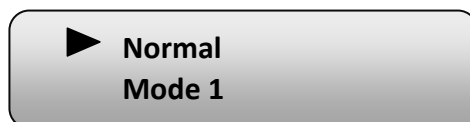
The SDI encoding module supports both “MPEG2” and “H.264” video encoding formats. Users can enter this menu to select one format from the 2 options.



*Press ENTER to shift ‘\*’ to ‘▶’, and then press UP/DOWN buttons to specify one item and then press ENTER to confirm. Press MENU to step back to upper level menu. (The operation method is applicable for rest part.)*

### Low Delay

This unit can achieve a low time delay from encoding to decoding terminal end-to-end.



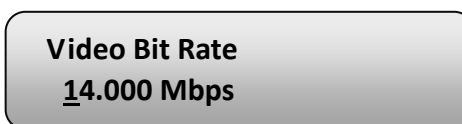
### NOTE

The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode**, the **Resolution** of signal source and **Decoding solution** adopted on terminal side will have an impact on the latency.

### Video Bit Rate

Users can set the video encoding bit rate manually in this menu.

0.5~19.5Mbps for H.264 encoding  
1~19.5Mbps for MPEG-2 encoding



### CC Switch

CC refers to Closed Caption.

Users can select a standard for the CC from the 2 options in this menu.



## Audio Format

The SDI encoding module supports 4 encoding formats. Users can enter this menu to select one format's from the 4 options available.

▶ **MPEG1 Layer 2**  
MPEG2 AAC

▶ **MPEG4 AAC**  
AC3

## Audio Bit Rate

The audio bit rate ranges from 64Kbps to 320Kbps. Users can select one bit-rate from the options provided.

**Audio Bitrate**  
▶ **64Kbps**

## Audio Gain

Users can adjust the audio gain in this menu.

**Audio Gain**  
100 %

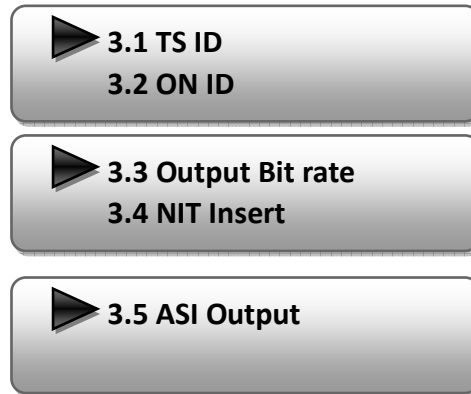
## Program Info

Users can enable or disable the program output in the first sub-menu and configure the other parameters in the rest sub-menus.

|                                           |                                  |
|-------------------------------------------|----------------------------------|
| <b>Program Output</b><br>▶ <b>Enable</b>  | <b>PMT PID</b><br><b>0x101</b>   |
| <b>Program Name</b><br><b>TV-101</b>      | <b>PCR PID</b><br><b>0x100</b>   |
| <b>Service Name</b><br><b>TV-Provider</b> | <b>Video PID</b><br><b>0x100</b> |
| <b>Program number</b>                     | <b>Audio PID</b>                 |

### 3) TS Configuration

This encoder support TS output via ASI ports. ‘TS Config’ is for the configuration of ASI output. Its submenus contain:



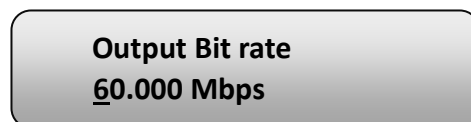
#### TS ID/ ON ID

Users can set the TS ID and Original Network ID in the 2 submenus. The IDs are in hexadecimal form.



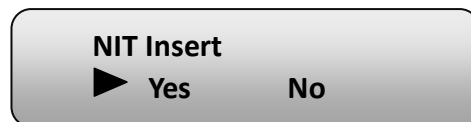
#### Output Bit rate

Users can set the max output bit rate for the ASI MPTS out. (Range 0-100 Mbps)



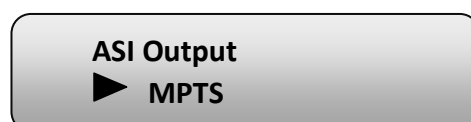
#### NIT Insert

Users can insert your NIT with operations in the menu.



#### ASI Output

Users can copy a stream from the IP out streams (1 MPTS & 8 SPTS) to output through ASI.



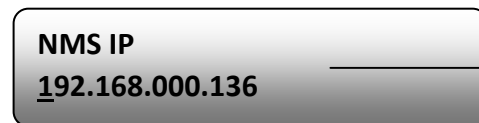
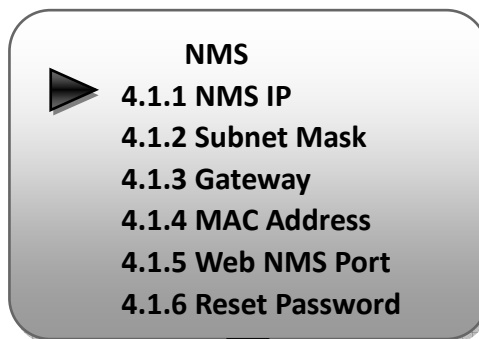
#### 4) Net Work

‘Net work’ is divided into 2 parts: NMS and IP Stream.

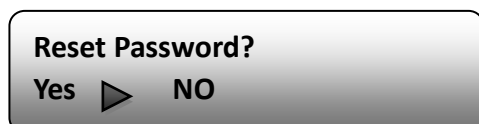
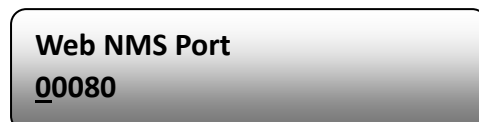
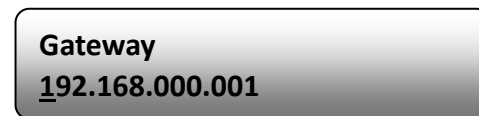
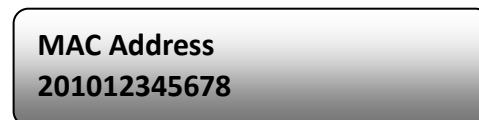
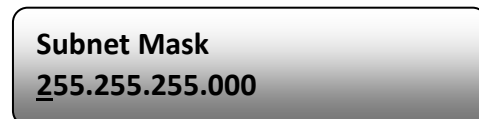


#### NMS

Submenus under ‘NMS’ are for setting the parameters related to the device connection in the network.

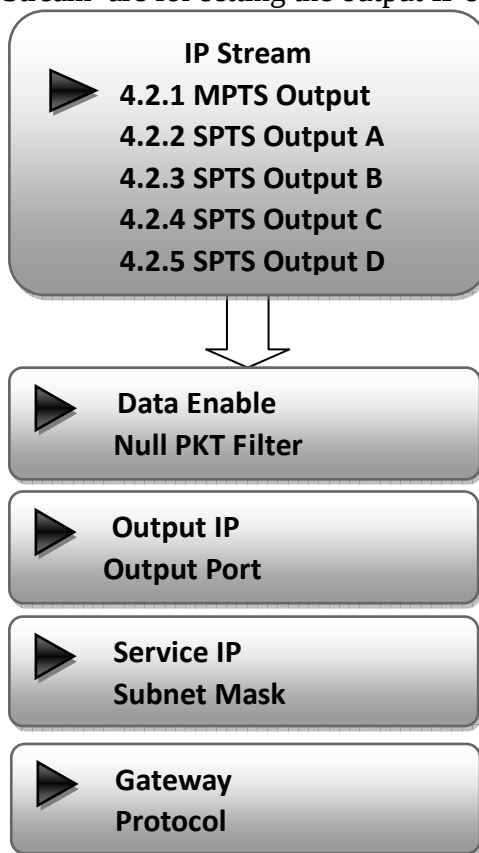


The IP address for connecting the device to PC



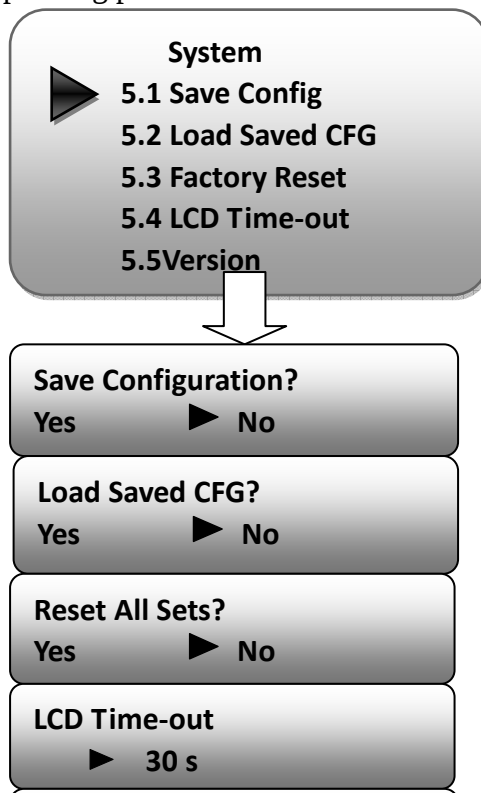
### IP Stream

Submenus under 'IP Stream' are for setting the output IP stream in MPTS or SPTS.



### 5) System

Users can set the system parameters in this menu. Enter 'System' submenus to separately set corresponding parameters.



Choose yes to restore the device into the last saved configuration.

Press DOWN/UP key to select a time out for the LCD lighting duration (5-120 seconds)

Choose yes to save settings. and press ENTER to confirm

Choose yes to restore the device into factory's default configuration.

## Chapter 4 WEB NMS Operation

Using the LCD digital display and front buttons for setting configuration is always an option if you are close by, conveniently you can alter the same settings through a computer by connecting the device to the web NMS Port. Always make sure that the computer's IP address is different from the Units IP address; otherwise, it will cause an IP conflict. Below is an explanation of how you can adjust settings through a web portal

### 4.1 login

The default IP address of this device is 192.168.0.136. (We can modify the IP through the front panel.)

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

NOTE\* if 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 a PC by inputting the encoders 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.

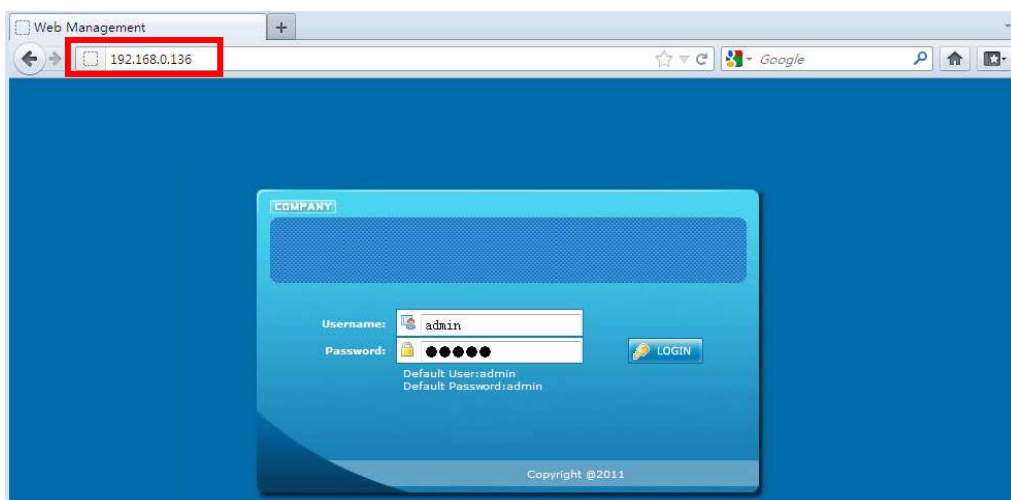
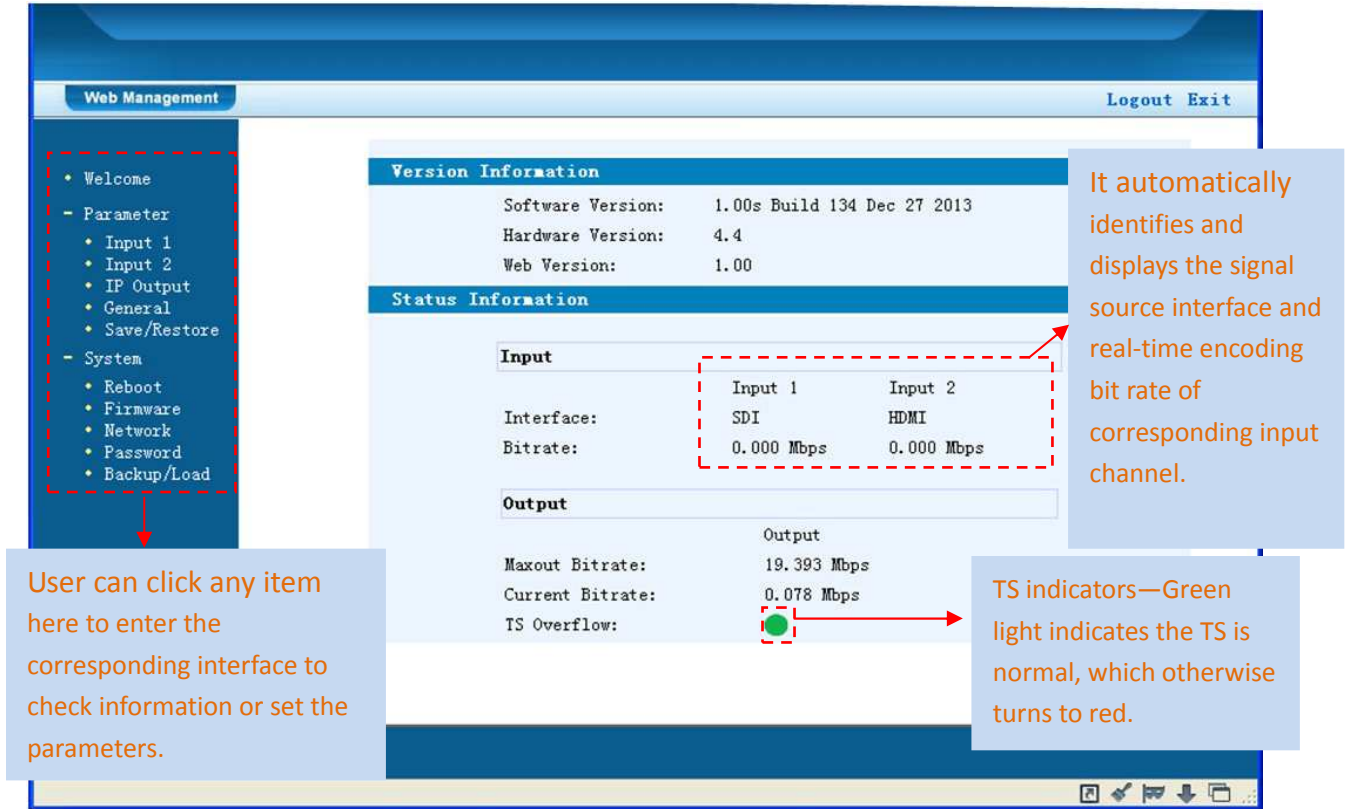


Figure-1

## 4.2 Operation

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



The screenshot displays the 'Web Management' interface. On the left is a sidebar menu with options: Welcome, Parameter (Input 1, Input 2, IP Output, General, Save/Restore), and System (Reboot, Firmware, Network, Password, Backup/Load). The main content area shows 'Version Information' (Software Version: 1.00s Build 134 Dec 27 2013, Hardware Version: 4.4, Web Version: 1.00) and 'Status Information'. The 'Status Information' section includes 'Input' (Interface: SDI, Bitrate: 0.000 Mbps) and 'Output' (Maxout Bitrate: 19.393 Mbps, Current Bitrate: 0.078 Mbps, TS Overflow: 0.078 Mbps). A green circle next to 'TS Overflow' indicates a normal status. Annotations highlight the sidebar menu, the input/output status table, and the green TS Overflow indicator.

It automatically identifies and displays the signal source interface and real-time encoding bit rate of corresponding input channel.

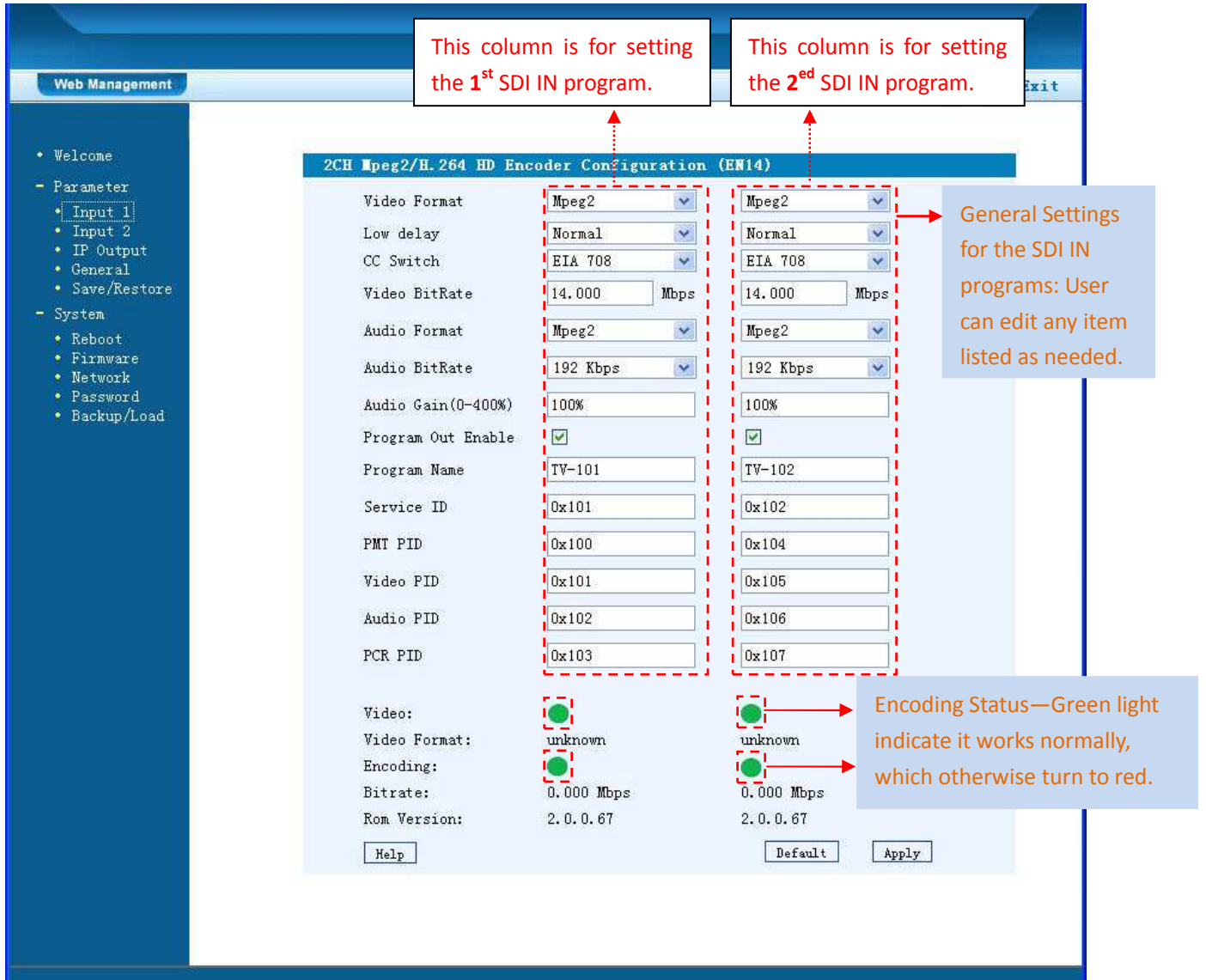
User can click any item here to enter the corresponding interface to check information or set the parameters.

TS indicators—Green light indicates the TS is normal, which otherwise turns to red.

Figure-2

### Input 1

From the menu on left side of the webpage, click “Input 1”, it displays the information of the programs (1<sup>st</sup> & 2<sup>ed</sup> ones) from the 1<sup>st</sup> SDI encoding module as Figure-3.



This column is for setting the 1<sup>st</sup> SDI IN program.

This column is for setting the 2<sup>nd</sup> SDI IN program.

General Settings for the SDI IN programs: User can edit any item listed as needed.

Encoding Status—Green light indicate it works normally, which otherwise turn to red.

Figure-3

### NOTE

The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode**, the **Resolution** of signal source and **Decoding solution** adopted on terminal side will have an impact on the latency.

Help

For user to turn to refer detailed explanation of terms on this interface

Default

Click this button to apply the default setting of Input 1

Apply

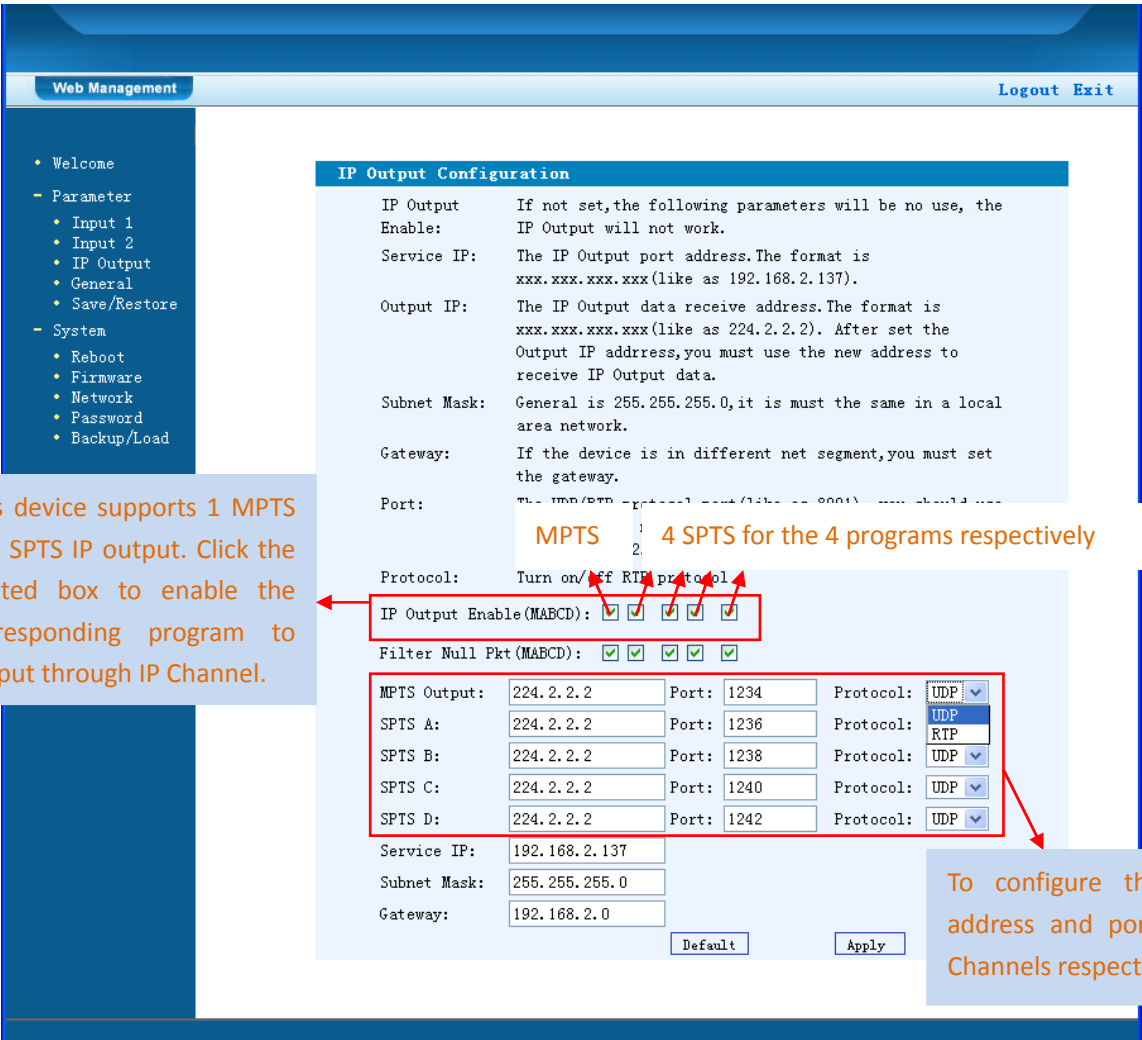
Click this button to apply the modified parameters.

## Input 2

Similarly, from the menu on left side of the webpage, clicking “Input 2”, it displays the information of the programs (3<sup>rd</sup> & 4<sup>th</sup> ones) from the 2<sup>ed</sup> SDI encoding module.

## IP Output

Click “IP Output”, it will display the interface where to configure the output IP stream in MPTS or SPTS the as Figure-4.



The screenshot shows the "IP Output Configuration" web interface. The left sidebar contains a menu with "Parameter" > "IP Output" selected. The main content area displays configuration options for IP Output. Annotations include:

- A callout box on the left states: "This device supports 1 MPTS & 4 SPTS IP output. Click the related box to enable the corresponding program to output through IP Channel." with an arrow pointing to the "IP Output Enable (MABCD)" checkboxes.
- An annotation above the checkboxes states: "MPTS 1 4 SPTS for the 4 programs respectively" with arrows pointing to the checkboxes for MPTS and SPTS A, B, C, and D.
- A callout box on the right states: "To configure the output IP address and ports for the IP Channels respectively." with an arrow pointing to the input fields for MPTS Output, SPTS A, SPTS B, SPTS C, and SPTS D.

The configuration fields shown are:

- IP Output Enable (MABCD): ☒ ☒ ☒ ☒ ☒
- Filter Null Pkt (MABCD): ☒ ☒ ☒ ☒ ☒
- MPTS Output: 224.2.2.2 Port: 1234 Protocol: UDP
- SPTS A: 224.2.2.2 Port: 1236 Protocol: RTP
- SPTS B: 224.2.2.2 Port: 1238 Protocol: UDP
- SPTS C: 224.2.2.2 Port: 1240 Protocol: UDP
- SPTS D: 224.2.2.2 Port: 1242 Protocol: UDP
- Service IP: 192.168.2.137
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.2.0

Figure-4

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

## General

Clicking “General” from the menu, it will display the interface as shown in Figure-5 where to set the network info for the output TS.

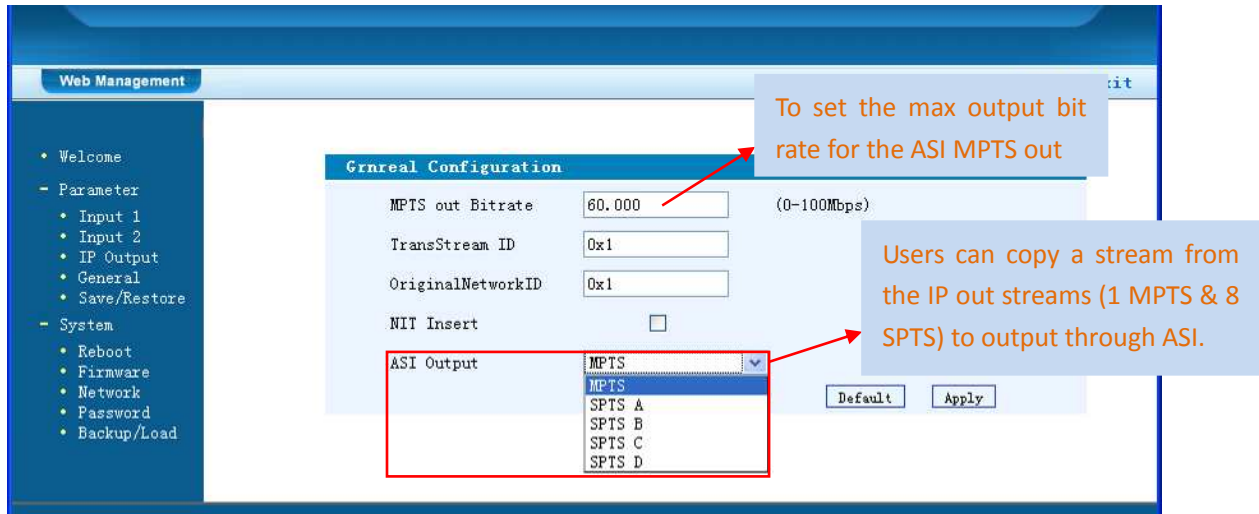


Figure-5

## Save/Restore

From the menu on left side of the webpage, click “Save/Restore”, it will display the screen as Figure-6 where to save or restore your configurations.

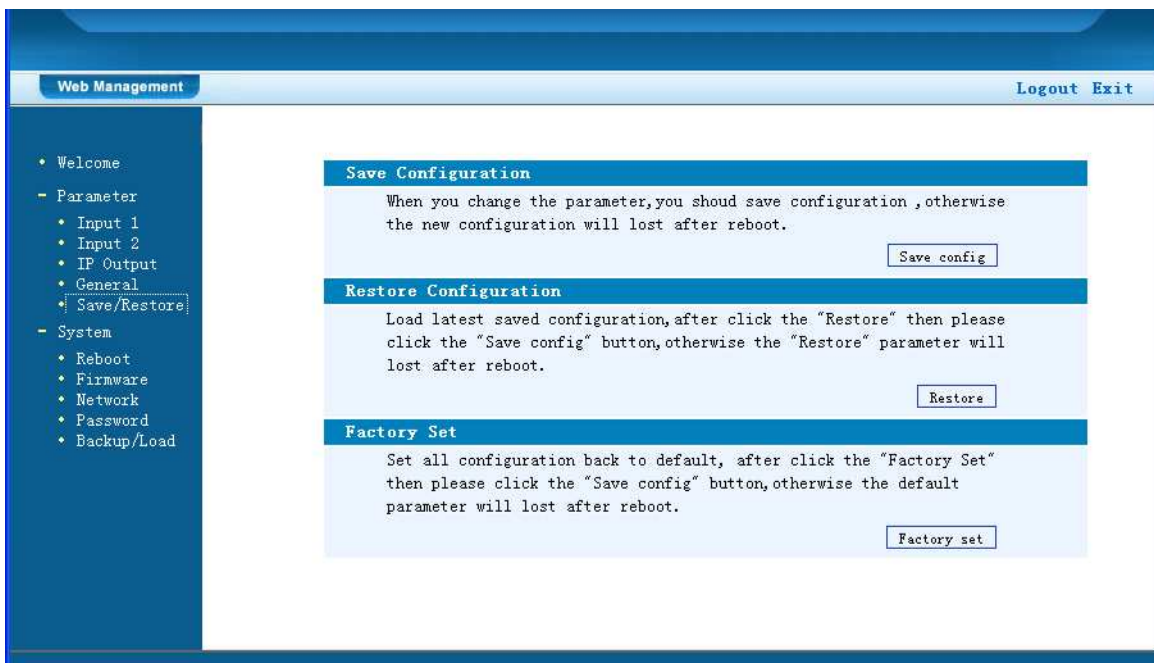


Figure-6

## Restart the Device

Click “Reboot” from the menu, the screen will display as shown in Figure-7. Here, when clicking “Reboot” box, it will restart the device automatically.

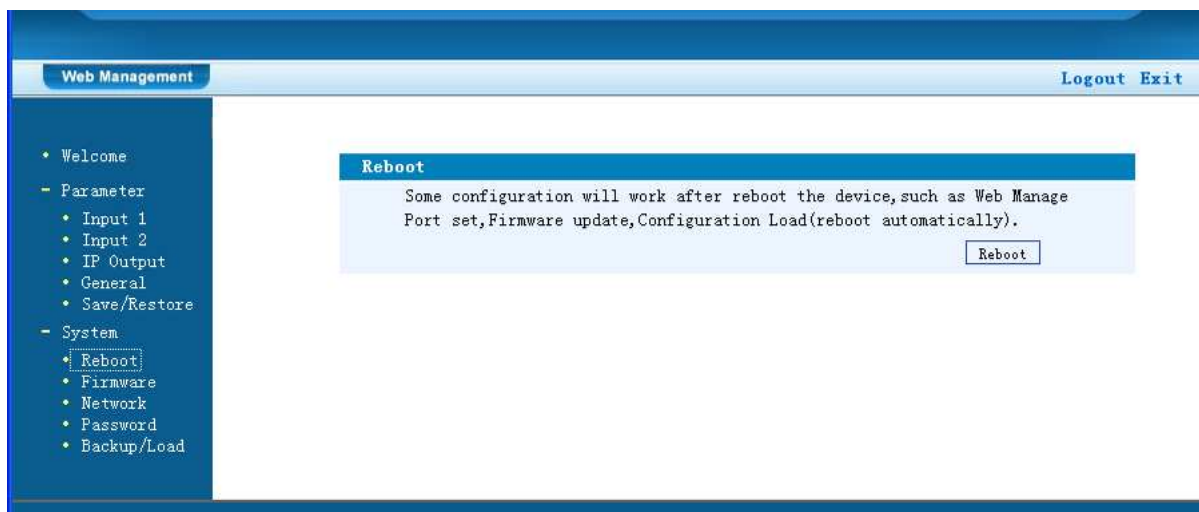


Figure-7

## Update the Device

Click “Firmware” from the menu it will display the screen as Figure-8. Here user can update the device by using the update file.

Click “Browse” to find the path of the device update file for this device then click “Update” to update the device.

After updating the device, user needs to restart the device by using Reboot options.

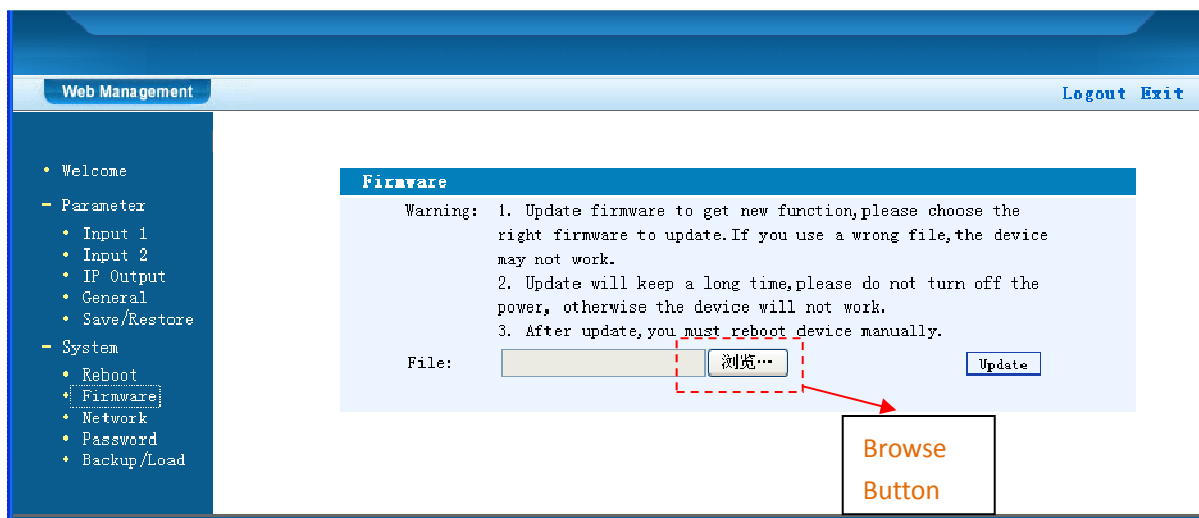
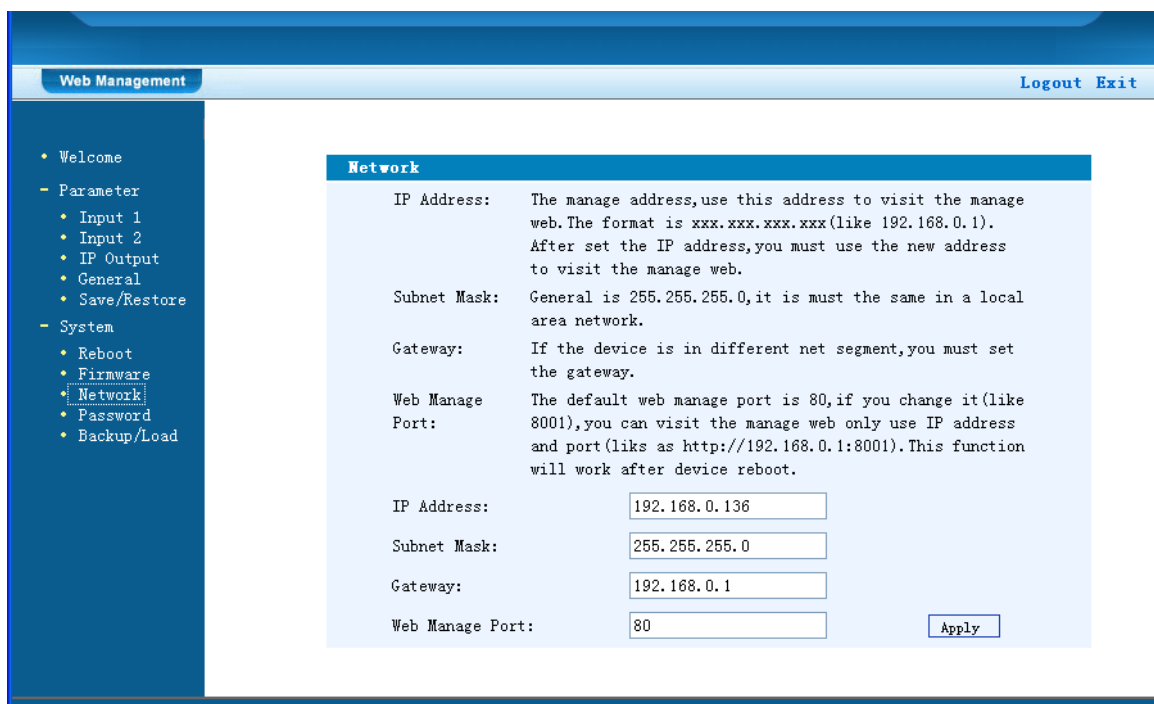


Figure-8

## Network

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



The screenshot shows the 'Web Management' interface with a sidebar menu on the left and a main content area. The sidebar menu includes 'Welcome', 'Parameter' (with sub-items: Input 1, Input 2, IP Output, General, Save/Restore), and 'System' (with sub-items: Reboot, Firmware, Network, Password, Backup/Load). The 'Network' option is selected. The main content area has a 'Network' title bar and contains the following information:

- IP Address:** 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:** General is 255.255.255.0, it is must the same in a local area network.
- Gateway:** If the device is in different net segment, you must set the gateway.
- Web Manage Port:** 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 the text, there are input fields for the following values:

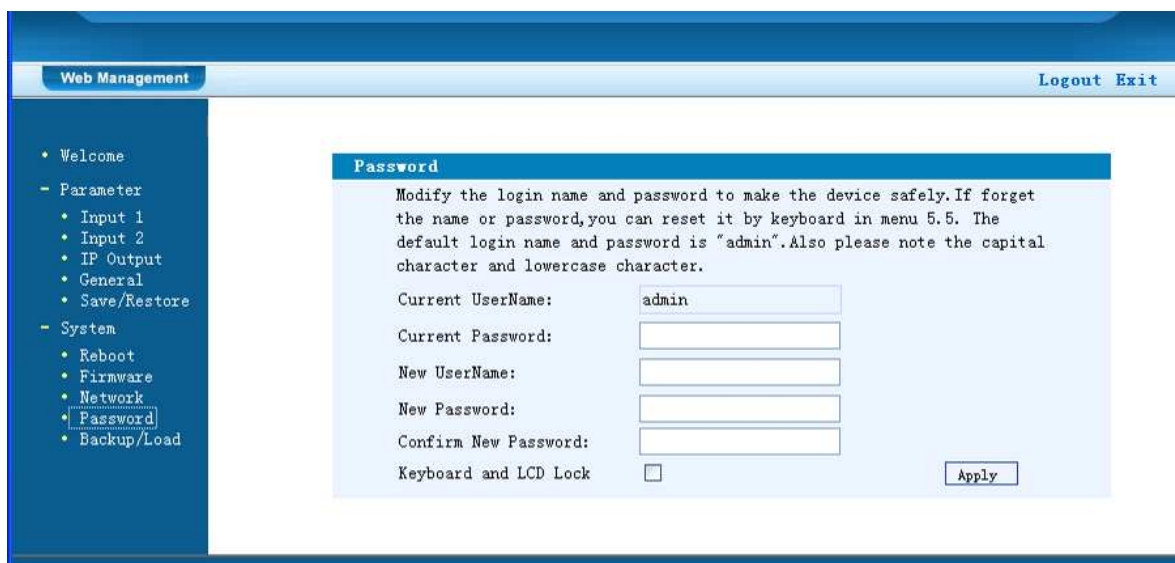
- IP Address: 192.168.0.136
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.0.1
- Web Manage Port: 80

An 'Apply' button is located at the bottom right of the form.

Figure-9

## Change Password

When you click “Password”, it will display the password screen as shown in Figure-10. Here you can change the Username and Password for logging into the device.



The screenshot shows the 'Web Management' interface with a sidebar menu on the left and a main content area. The sidebar menu includes 'Welcome', 'Parameter' (with sub-items: Input 1, Input 2, IP Output, General, Save/Restore), and 'System' (with sub-items: Reboot, Firmware, Network, Password, Backup/Load). The 'Password' option is selected. The main content area has a 'Password' title bar and contains the following information:

- Modify the login name and password to make the device safely. If forget the name or password, you can reset it by keyboard in menu 5.5. The default login name and password is “admin”. Also please note the capital character and lowercase character.

Below the text, there are input fields for the following values:

- Current UserName: admin
- Current Password: (empty)
- New UserName: (empty)
- New Password: (empty)
- Confirm New Password: (empty)
- Keyboard and LCD Lock: ☐

An 'Apply' button is located at the bottom right of the form.

Figure-10

Keyboard and LCD Lock ☐

Keyboard and LCD Lock: If it is marked with “√”, the LCD and keyboard will be locked to avoid unrelated users’ modifying or viewing the device information and configurations. You can’t operate the keyboard & LCD, only the device IP address can be noted in the LCD window.

IP Address  
192.168.000.136

## Backup/Load

Click “Backup/Load” from the menu, it will display the screen as in Figure-11.

**Backup Configuration** – To back up the device configuration file to a folder

**Load Configuration** – If user needs to load the old configuration to the device, click “Browse” and find the backup configuration file path. After selecting the file, click “Load File” to load the backup file to the device.

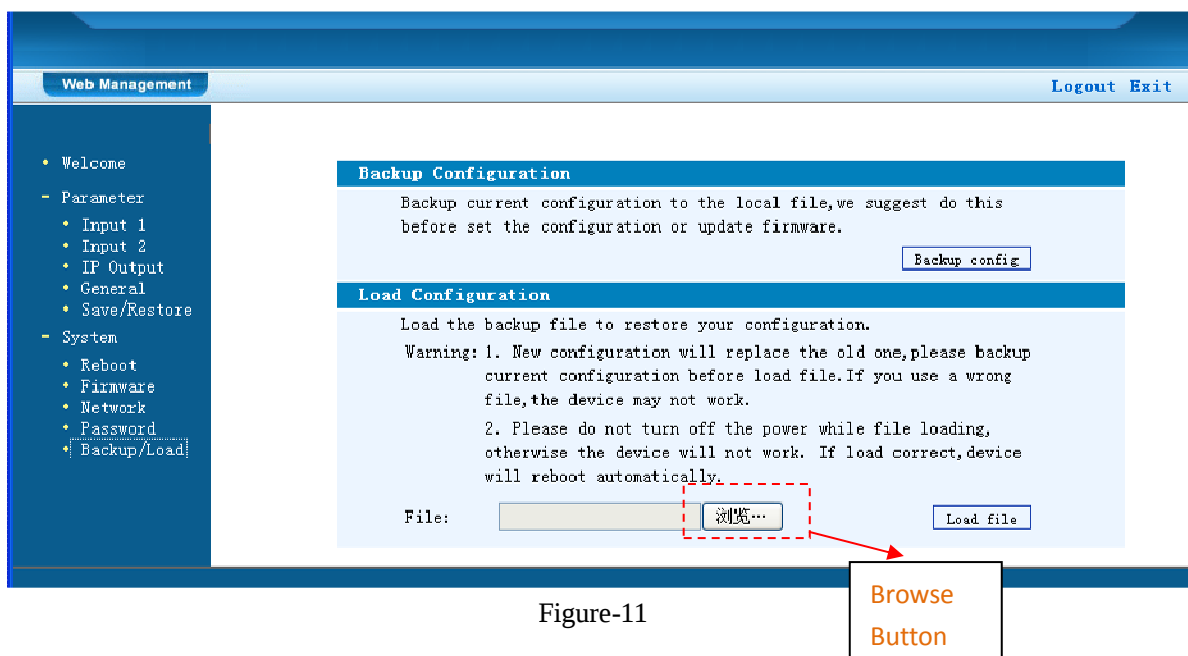


Figure-11

## **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 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



H-2/4HD-EM(S/H)

## Chapter 6 Packing List

|                      |     |
|----------------------|-----|
| Thor H-HD-ME Encoder | x 1 |
| User Manual          | x 1 |
| SDI Cables           | x 1 |
| Power Cord           | x1  |