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.

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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Contents

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) 1920*1080_60i, 1920*1080_50i, 1280*720_60p, 1280*720_50P 720*480_60i, 720*576_50i
Bit Rate	0.5~19.5Mbps for H.264 encoding 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

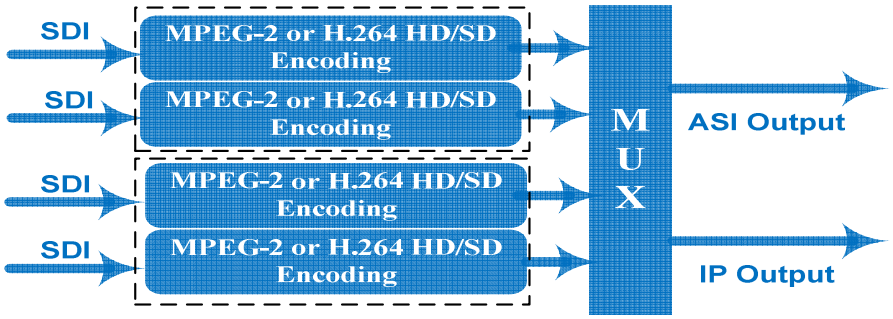
System

Local interface	LCD + control buttons
Remote management	Web NMS
Low Latency Mode	Normal, mode 1, mode 2
output	2*ASI out (BNC type); 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

8 1 2 3 4 5 6 7 8

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 2 3 4 56

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.

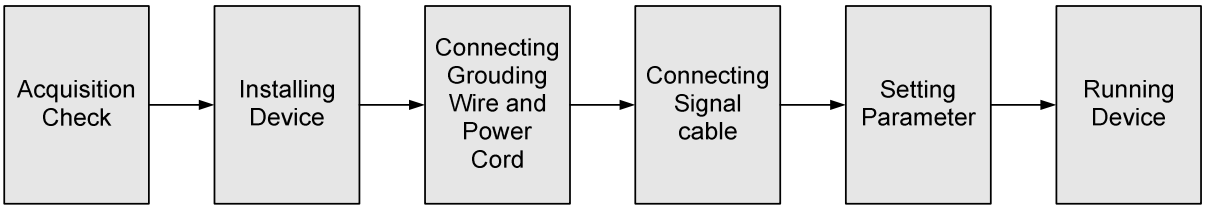
2.1 General Precautions

- ✓ 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 Volume resistivity of ground 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
Wall	It can be covered with wallpaper, or brightness less paint.

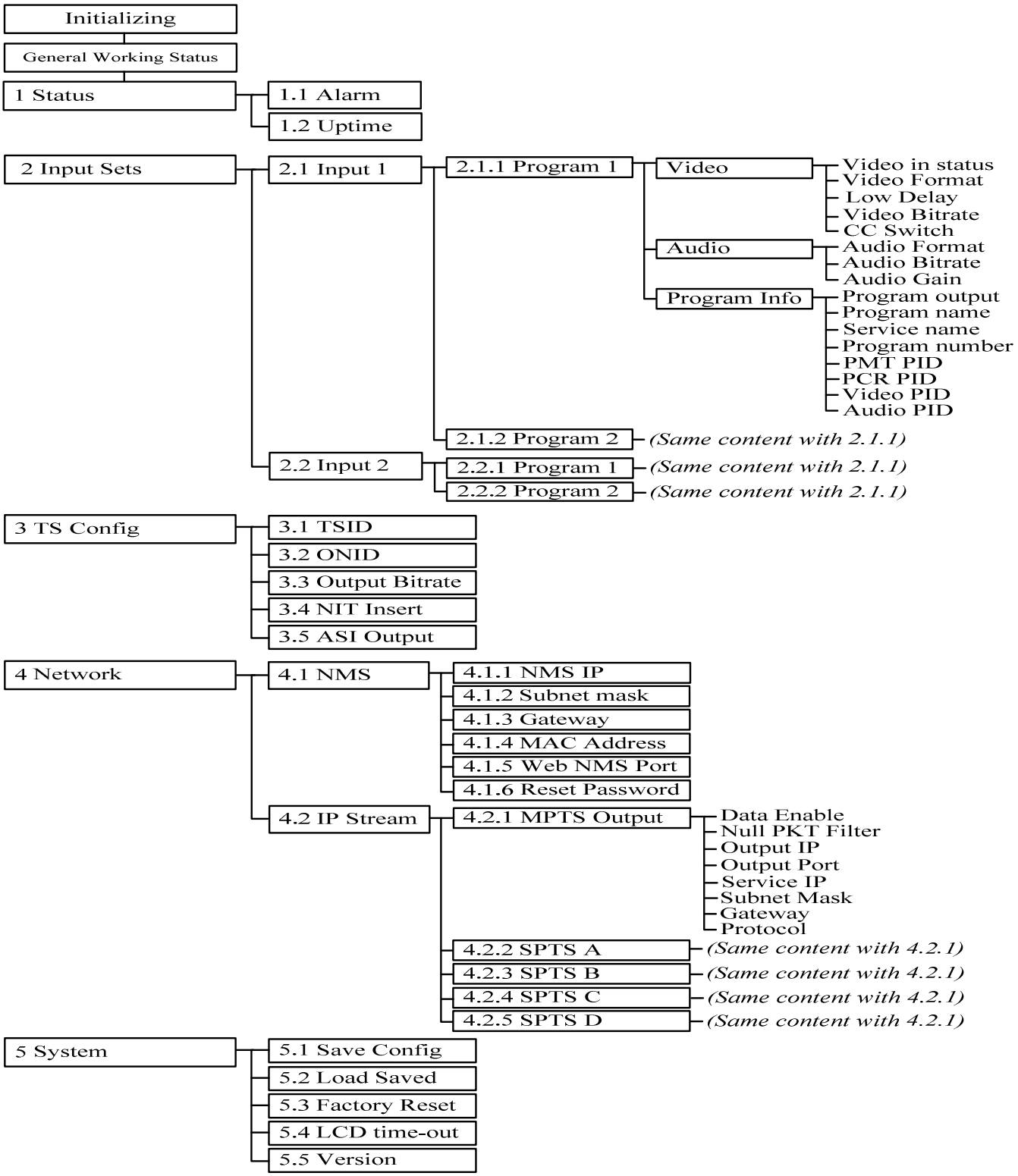
Fire Protection	Fire alarm system and extinguisher
Power	Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC 110V±10%, 50/60Hz or AC 220V±10%, 50/60Hz. Please carefully check before running.

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 ㎡.

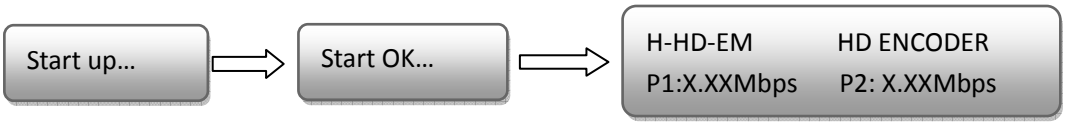
Chapter 3 Operation

3.1 LCD Tree Breakdown



3.2 Initial Status

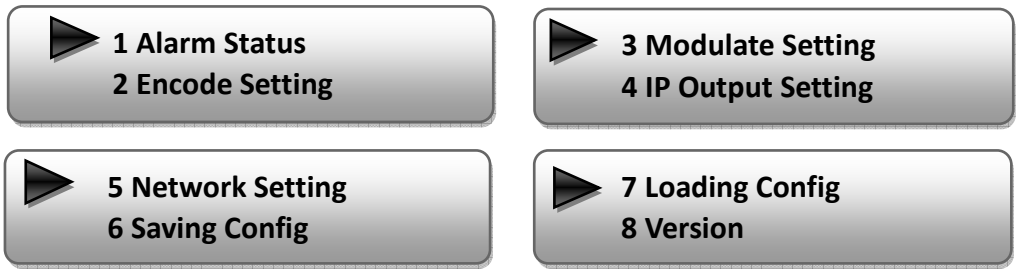
Switch on the device and after a few seconds' initialization, it presents start-up pictures as shown below:



- **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:

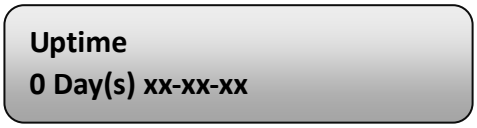


User can press UP/DOWN buttons to specify menu item, and then press ENTER to enter the submenus as below:

1) Status

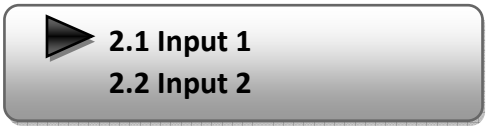
Alarm

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.



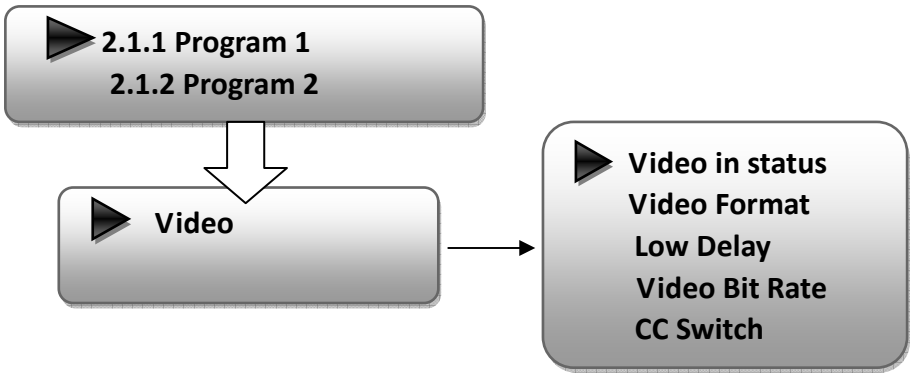
Uptime

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

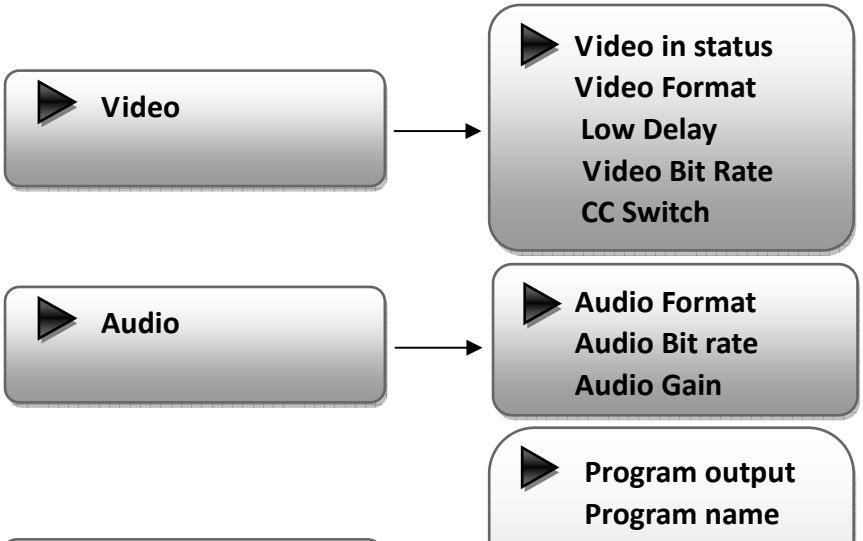


2) Input Settings

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 connecters. 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

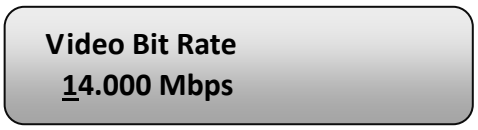
The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode**, **the Resolution** of signal source and **Decoding solution** adopted on terminal side will have an impact on the latency.

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



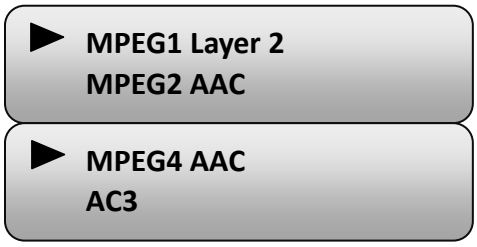
CC Switch

CC refers to Closed Caption.

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

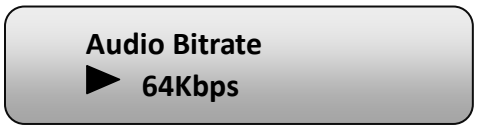
Audio Format

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



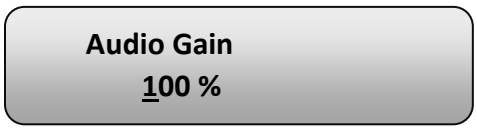
Audio Bit Rate

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



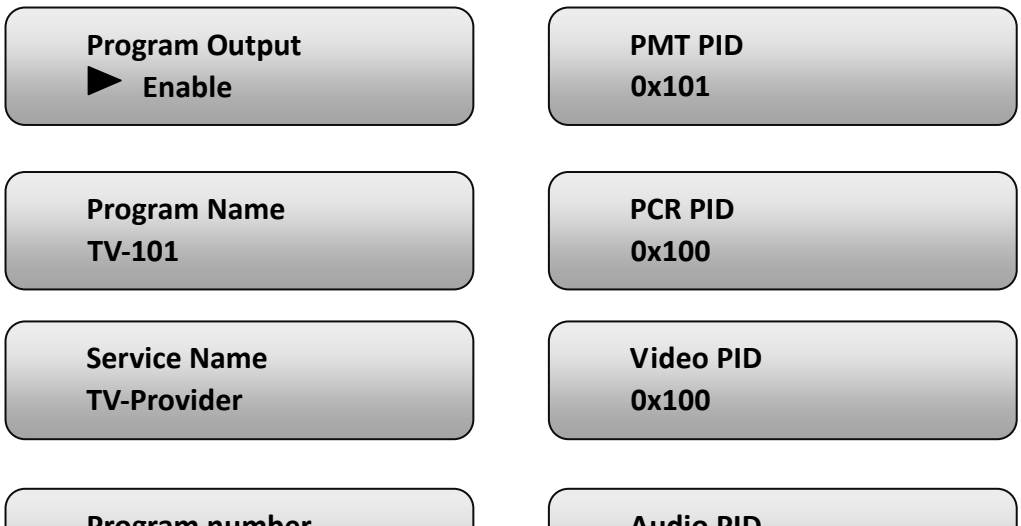
Audio Gain

Users can adjust the audio gain in this menu.



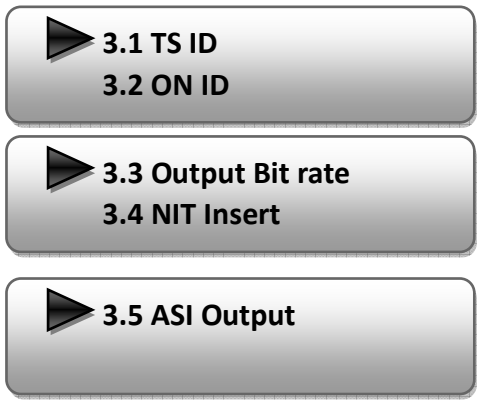
Program Info

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



3) TS Configuration

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

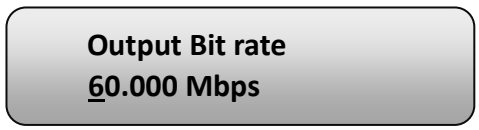


TS ID/ ON ID

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)

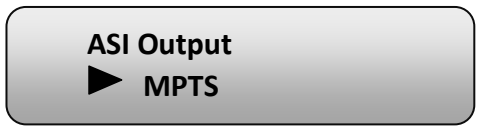


NIT Insert

Users can insert your NIT with operations in the menu.

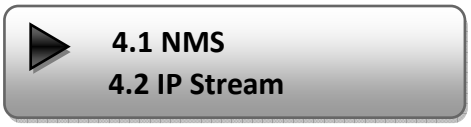
ASI Output

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



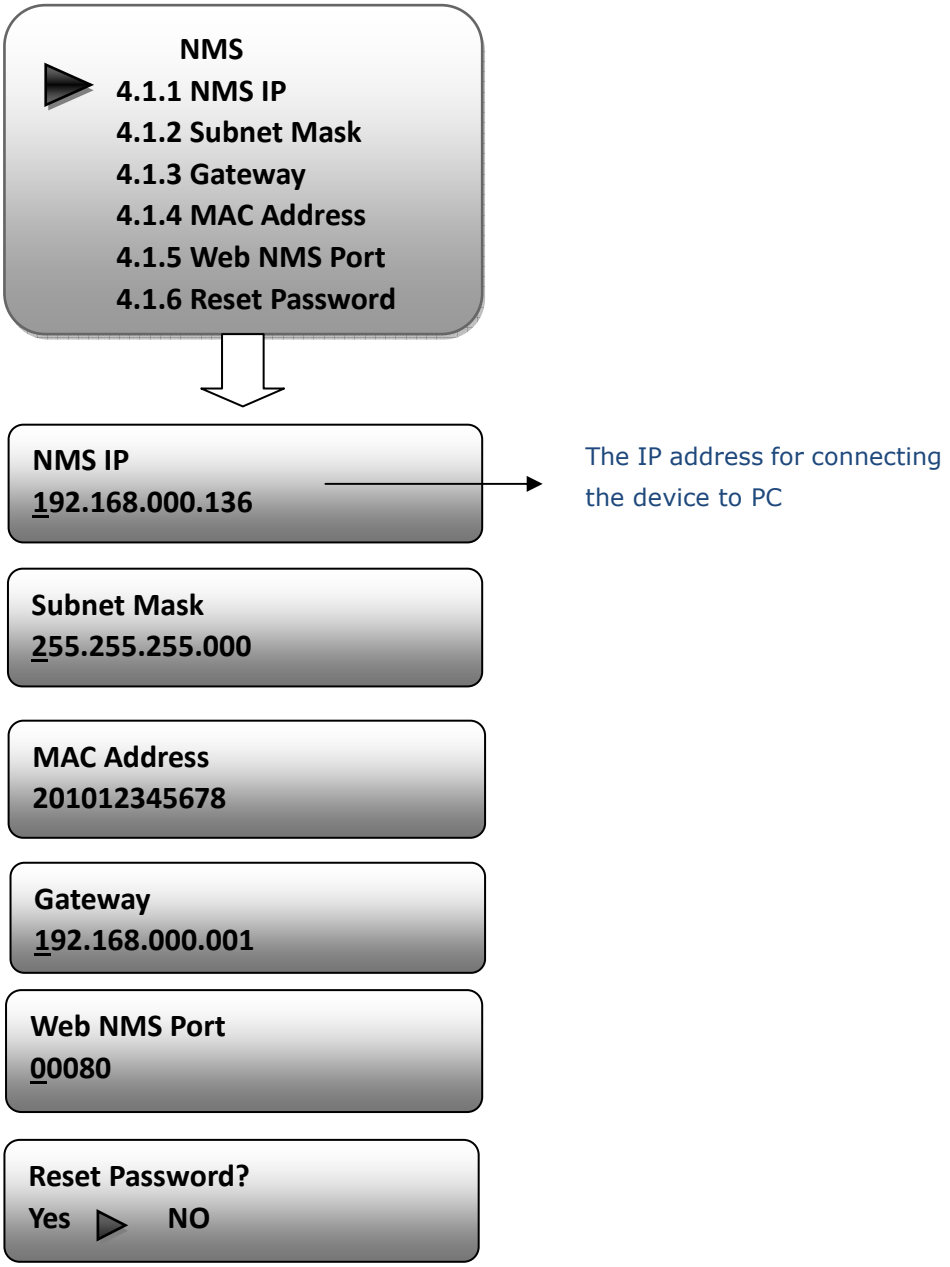
4) Net Work

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



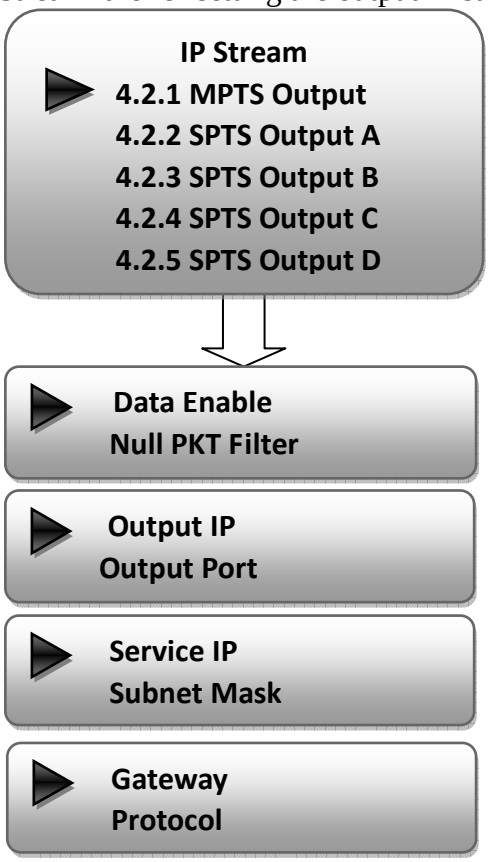
NMS

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



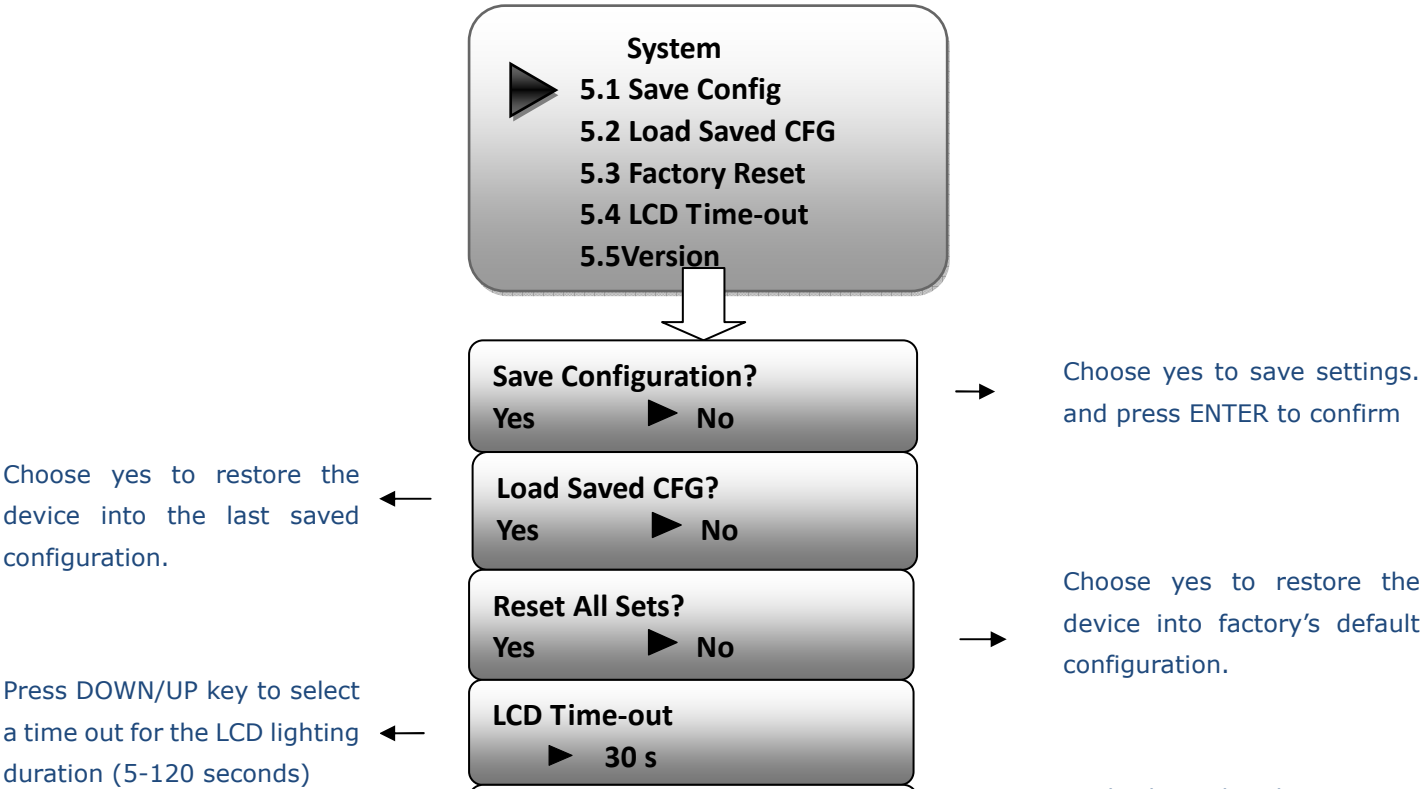
IP Stream

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.



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.

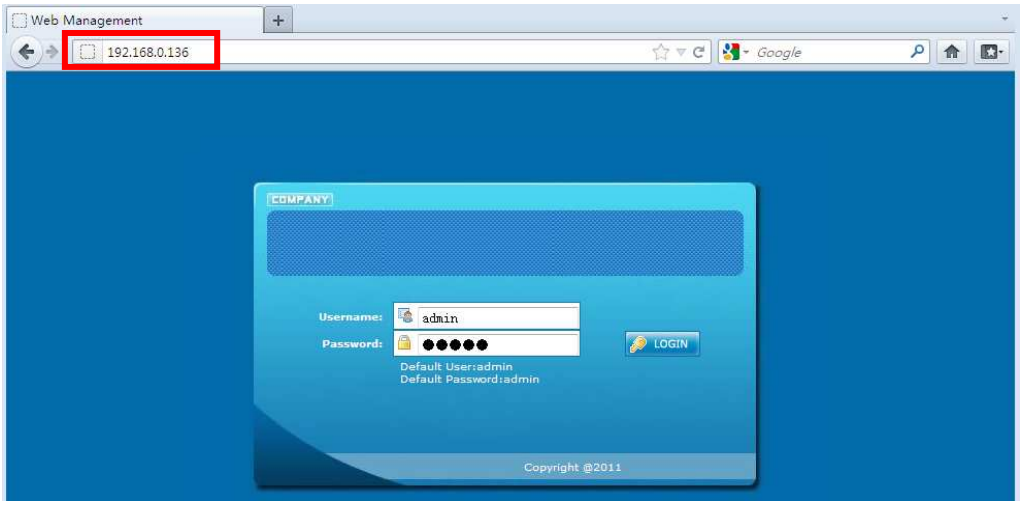


Figure-1

4.2 Operation

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

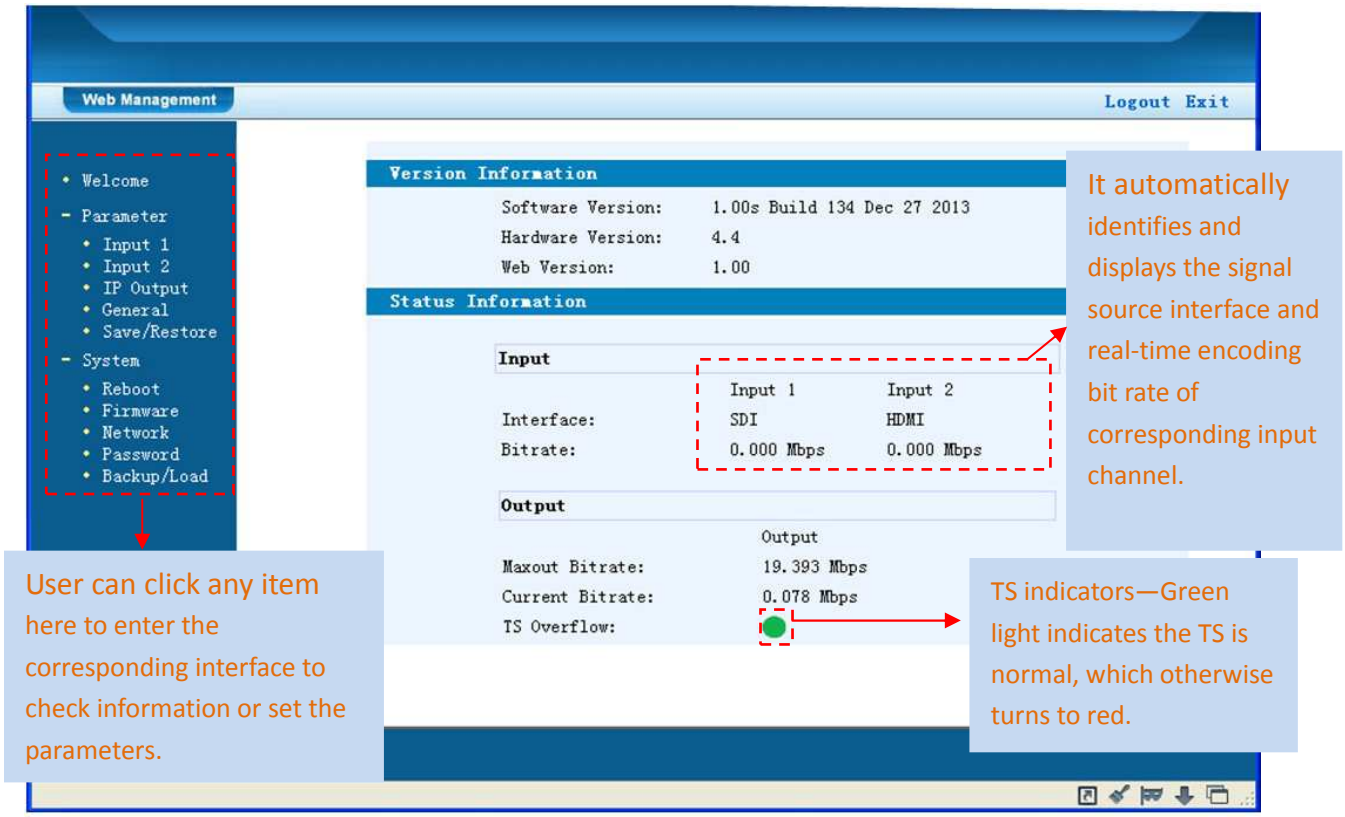


Figure-2

Input 1

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

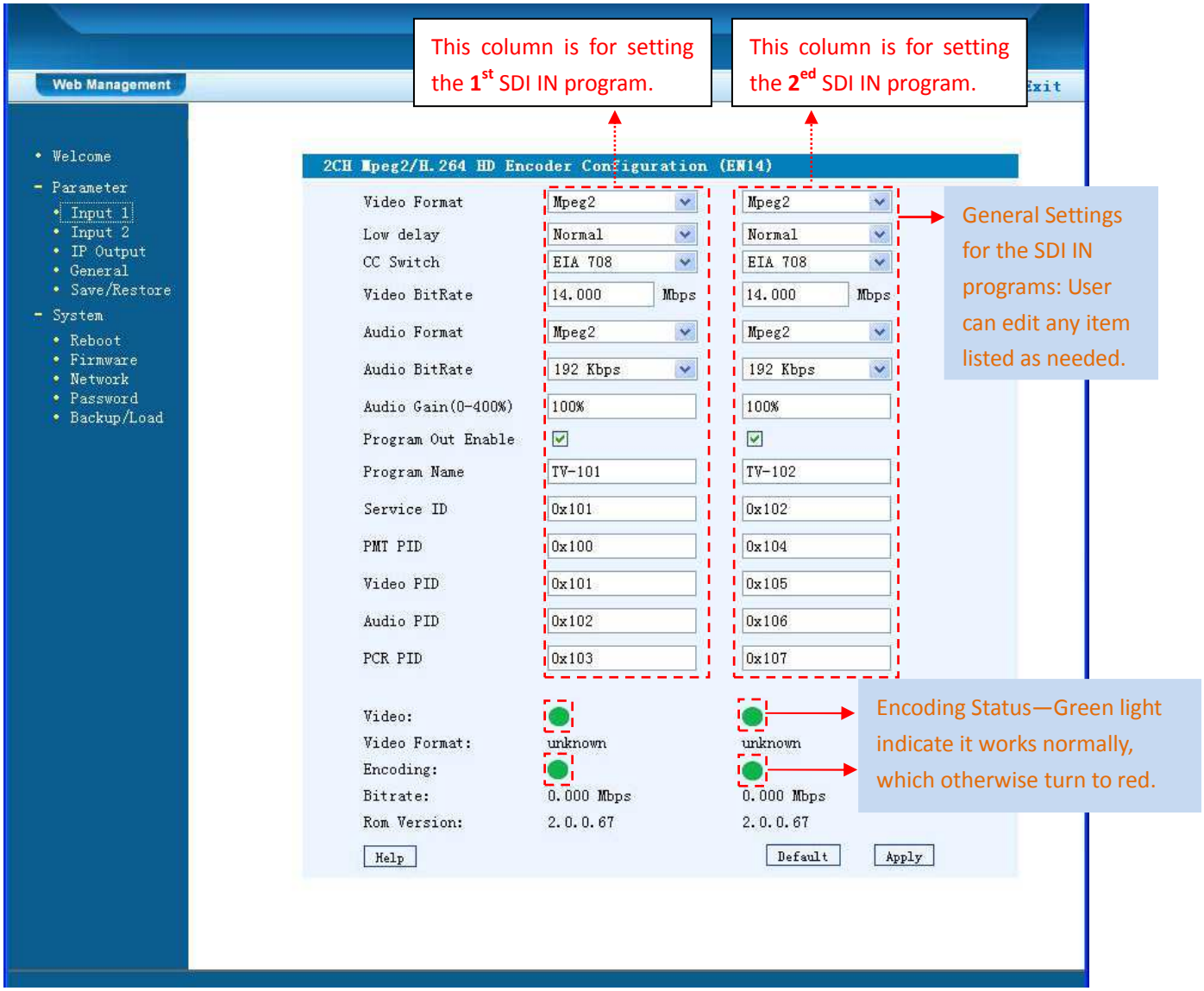


Figure-3

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 (3rd & 4th ones) from the 2ed 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.

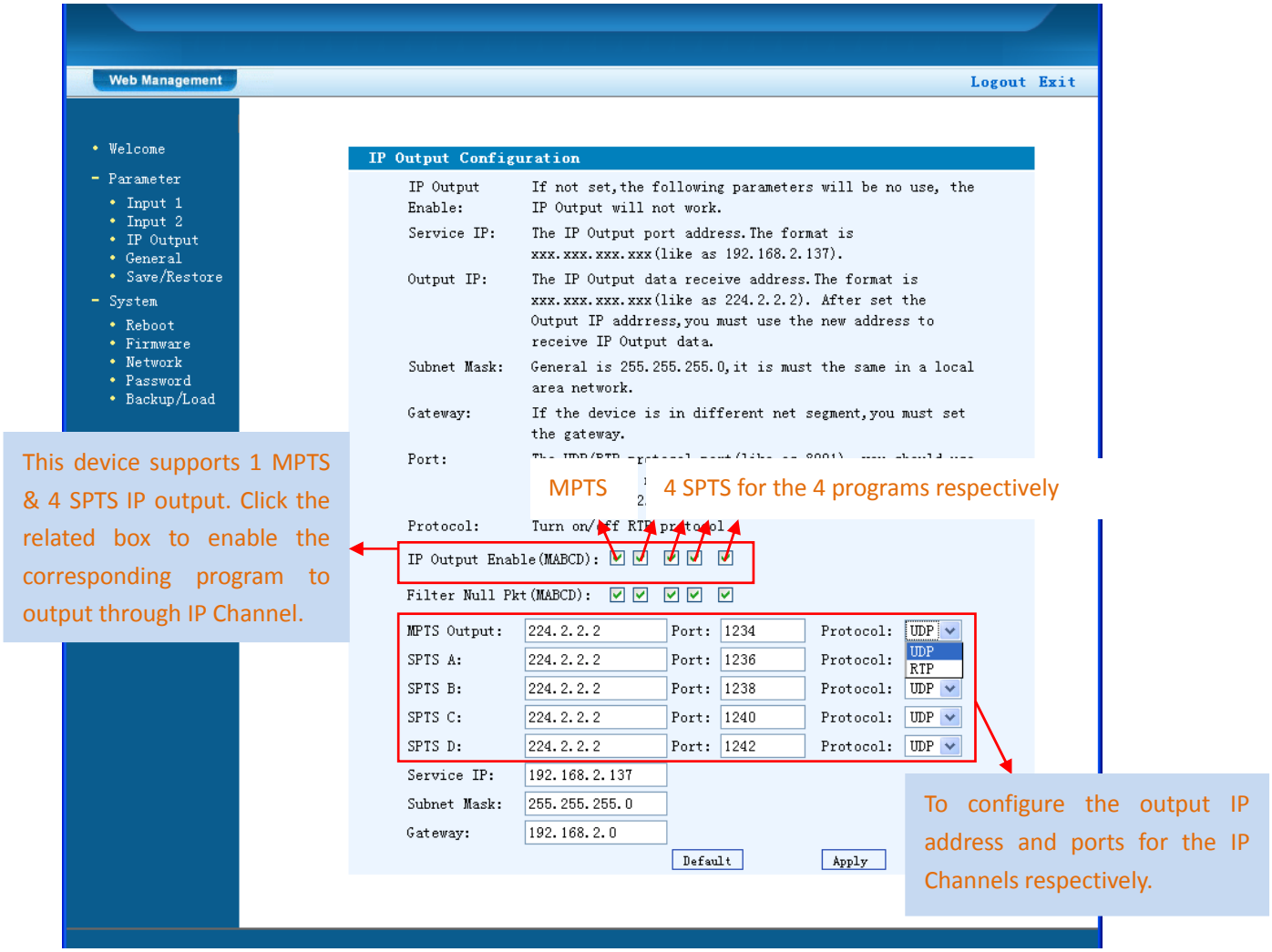


Figure-4

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.

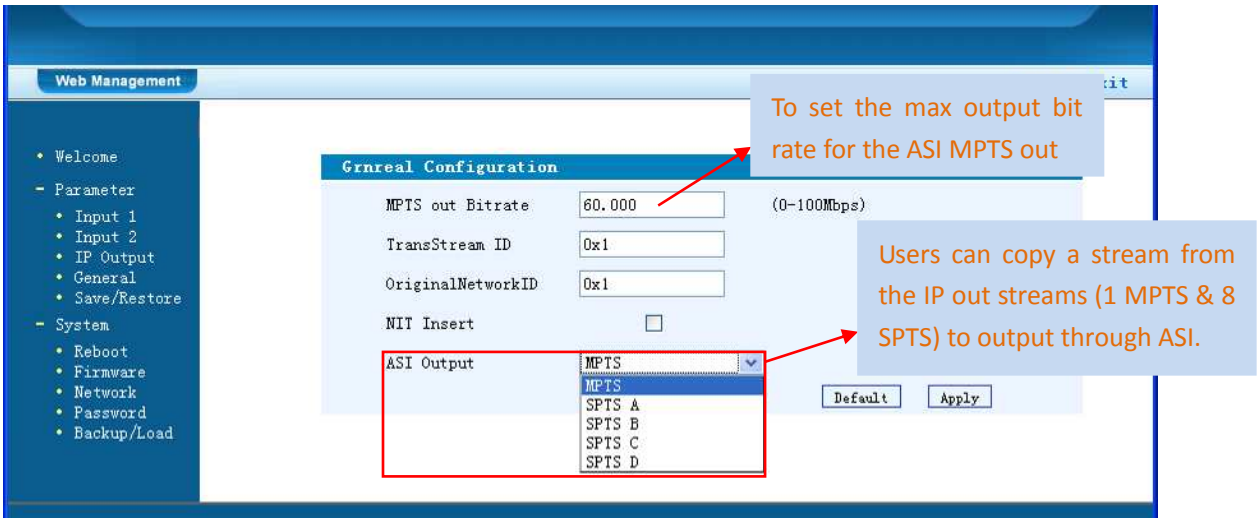


Figure-5

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.

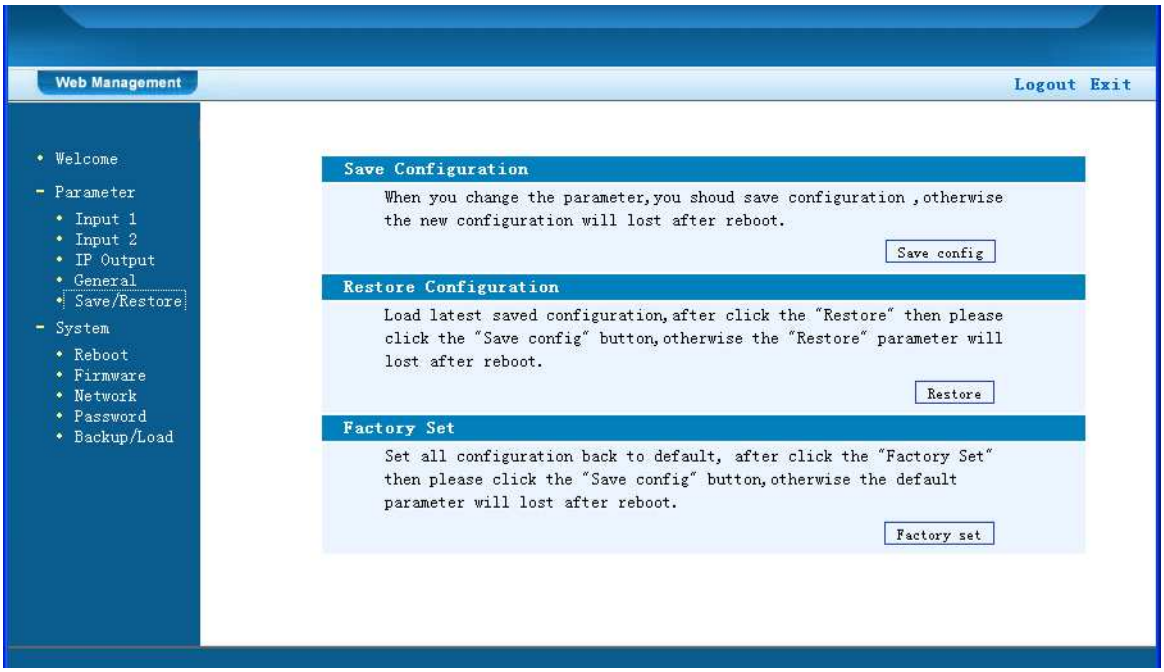


Figure-6

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.

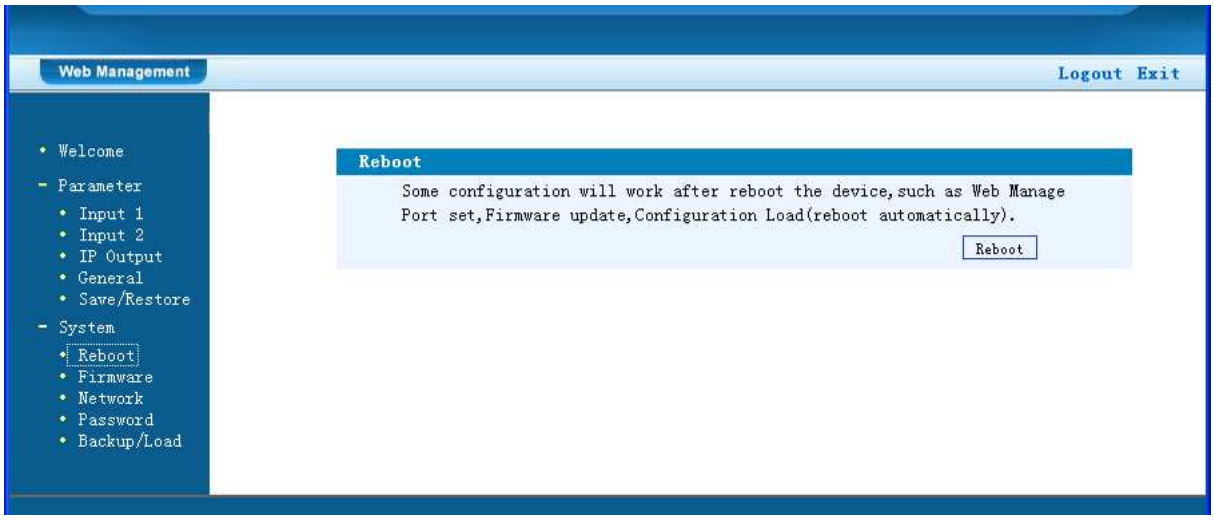


Figure-7

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.

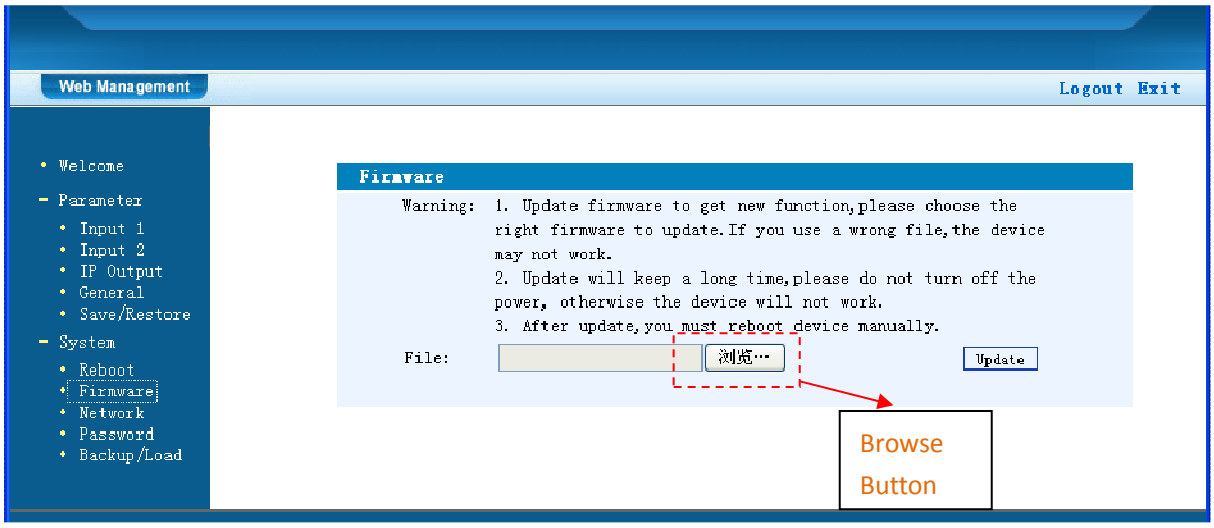


Figure-8

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.

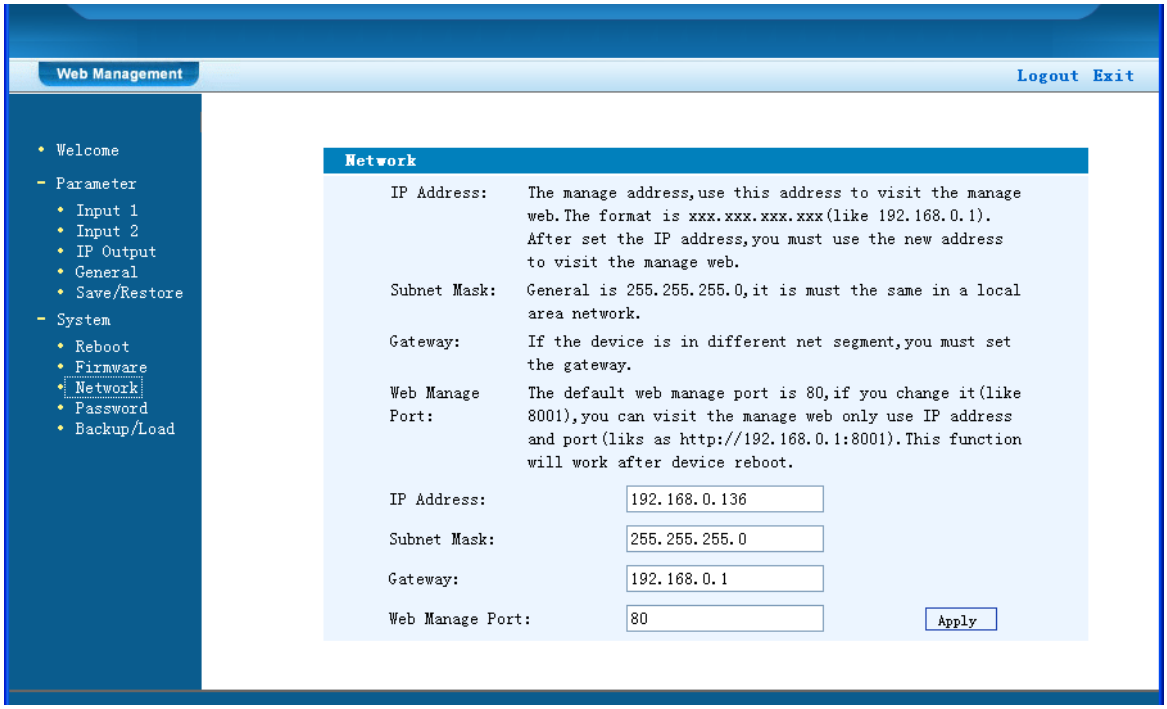


Figure-9

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.

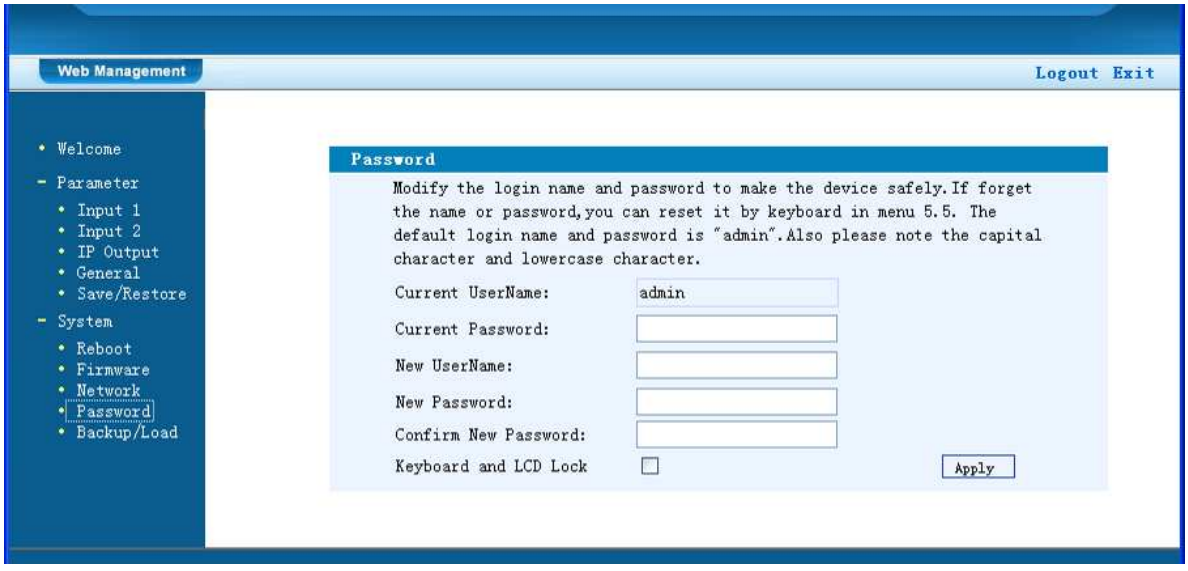
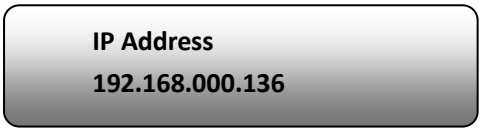


Figure-10

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.



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.

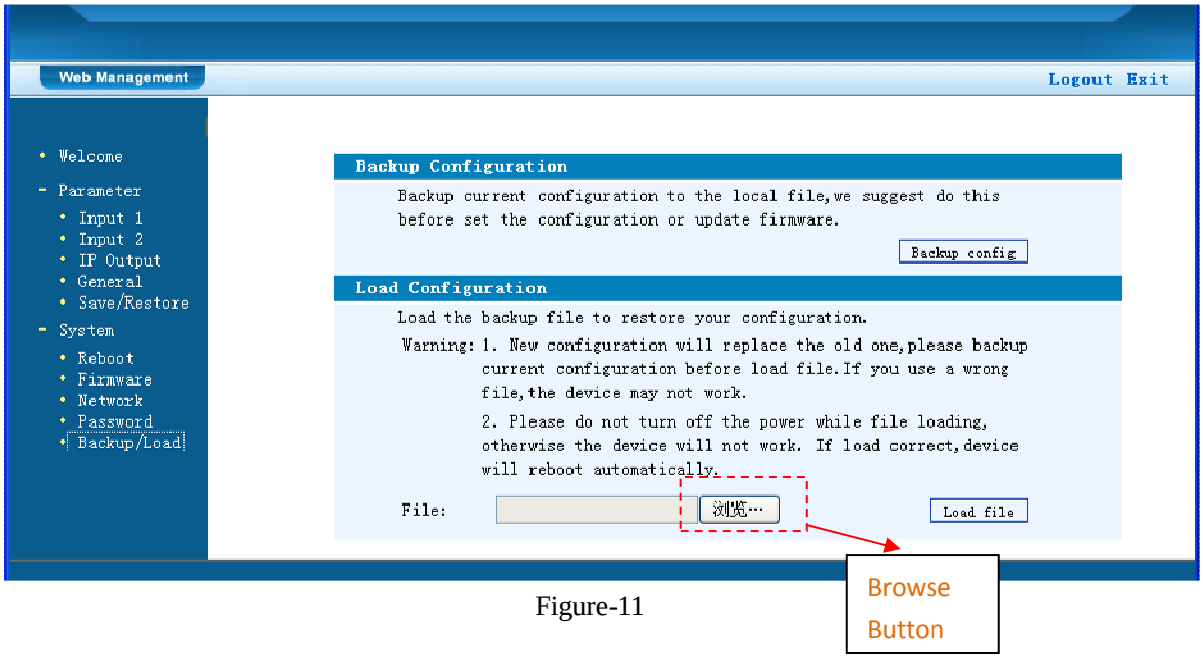


Figure-11

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