THOR BROADCAST

H-4HD-EMH

H-4HD-EMS

H-4HD-EMHS

4 Channel SDI & HDMI

Pro-DVB Contribution Encoder

For ASI and IPTV

User Manual 2017

A Note from Thor Broadcast about this Manual

Intended Audience

This user manual has been written to help people who have to use, integrate and to install the product. Some chapters require some prerequisite knowledge in electronics and especially in broadcast technologies and standards.

Disclaimer

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

Copy Warning

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Chapter 1 Introduction

1.1 Product Overview

The Thor Broadcast series SDI and HDMI Pro-DVB 4 channel input encoders are designed for modern state of the art broadcasts for ASI and IP solutions. Managed through any modern web browser, each encoder can be independently adjusted for bitrate, codecs, and video image qualities. Encoding support for the MPEG-2, or H.264, codec along with Dolby AC/3 audio ensure that the programs generated by this encoder can be used around the world on a global scale. All four program streams are multiplexed into an ASI MPTS output on mirrored BNC terminals. The 4 encoded HDMI (HD-SDI) programs will output through ASI and IP ports in MPTS or SPTS. This powerful design allows you to distribute up to 1080p program streams in crystal clear High Definition. This design is topped off with a dual power supply to ensure that your Thor Broadcast encoder has the redundancy needed for any application.

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*HDMI or 4*SDI inputs (model dependent)**
- **Supports CC(close caption) only for SDI interface EIA 708**
- **VBR/CBR rate control mode**
- **Low Latency, best in class of any modern encoder**
- **PSI/SI editing and inserting**
- **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	HDMI*4/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

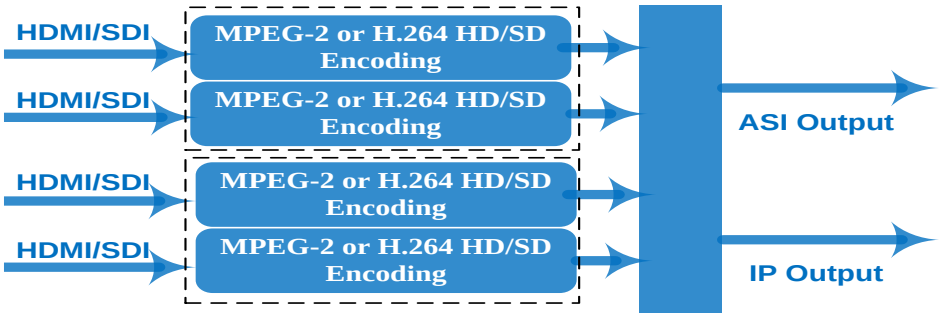
System

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

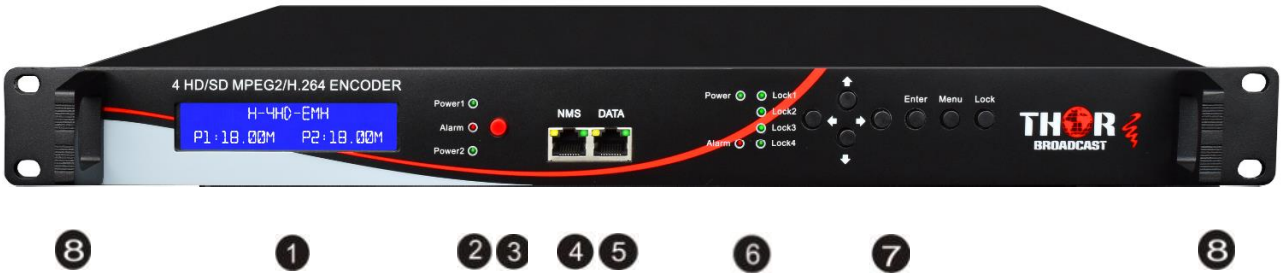
Power supply	AC 100V~240V
Power Consumption	45W
Dimensions	482*400*44mm
Weight	4.5 kgs
Operation temperature	0~45℃

1.4 Principle Chart



1.5 Appearance and Description

Front Panel Illustration



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**

Rear Panel -- H-4HD-EMH

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

Rear Panel -- H-4HD-EMS

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

Chapter 2 Installation Guide

Please use caution when operating this device in order to abstain 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.

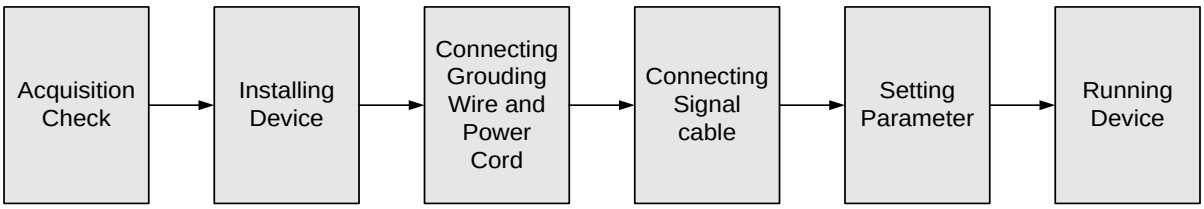
2.1 General Precautions

- Must be operated and maintained free of dust or debris.
- The cover should be securely fastened, do not open the cover of the products when the power is on.
- After installation, securely stow away all loose cables, external antenna, and others.

2.2 Power Precautions

- When you connect the power source, make sure it is grounded correctly so it doesn't cause an overload.
- Avoid operating on a wet floor in the open. 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

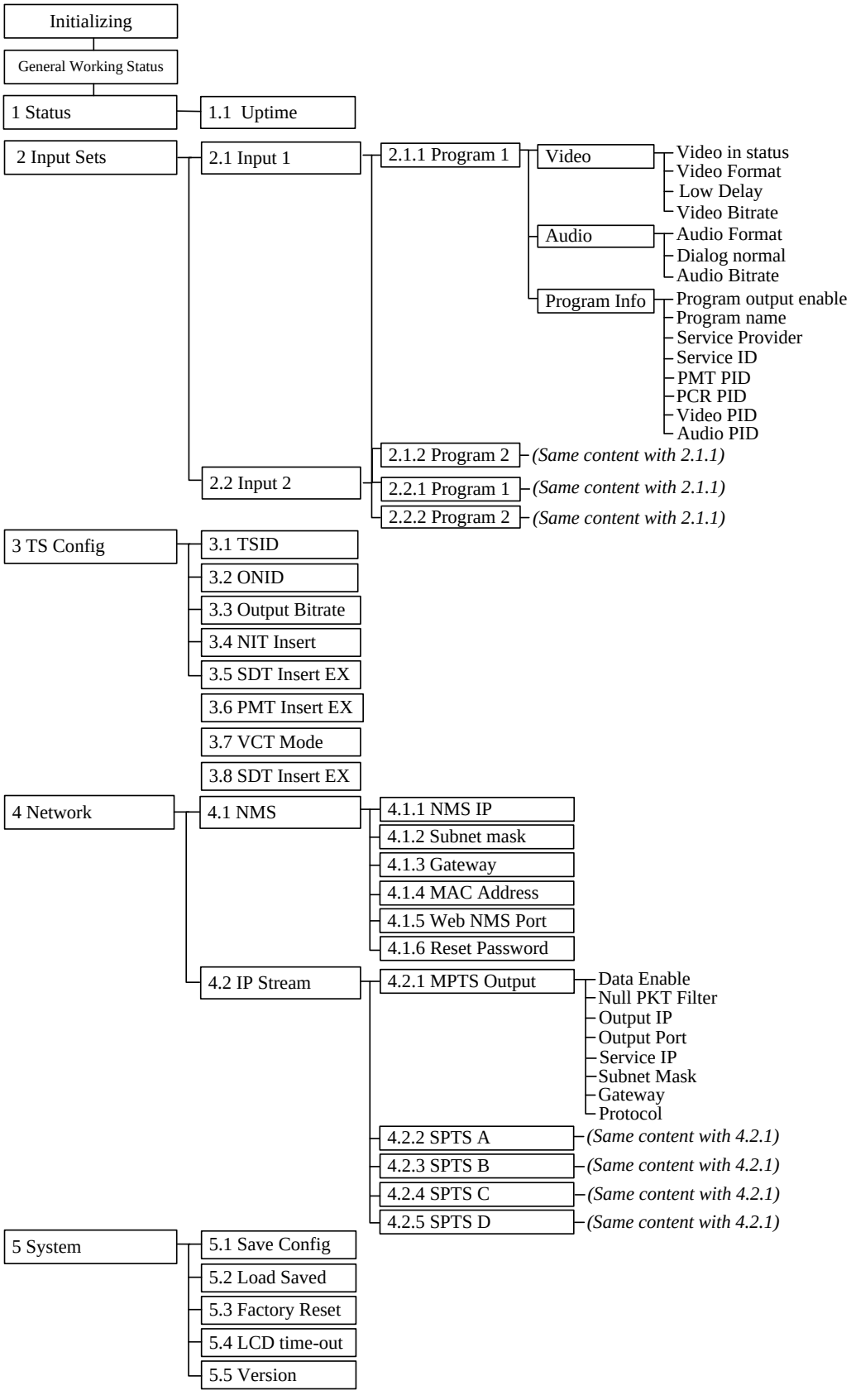
Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static 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 ㎡.

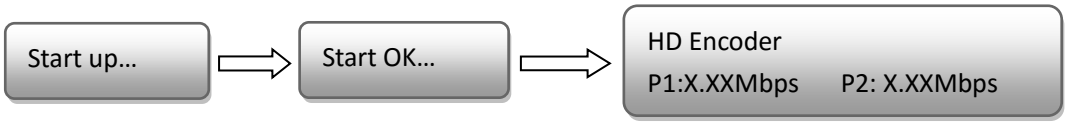
Chapter 3 Operation

3.1 LCD Menu Class Tree



3.2 Initial Status

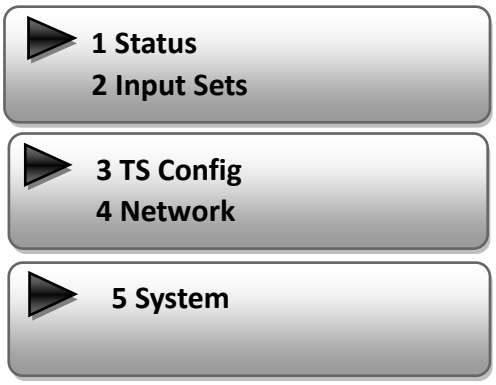
Switch on the device and after a few seconds' initialization, it presents start-up pictures as below:



- **HD Encoder**: H-4HD-EMH or H-4HD-EMS
- **P1**: Program 1; **P2**: Program 2; **P3**: Program 3; **P4**: Program 4
- **X.XX Mbps**: indicates 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 you can configure the parameters for the Thor Encoder.

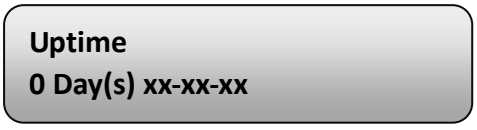


Press UP/DOWN buttons to specify one item and then press ENTER to go inside its submenus. Press MENU to step back to upper level menu.

1) Status

➢ **Uptime**

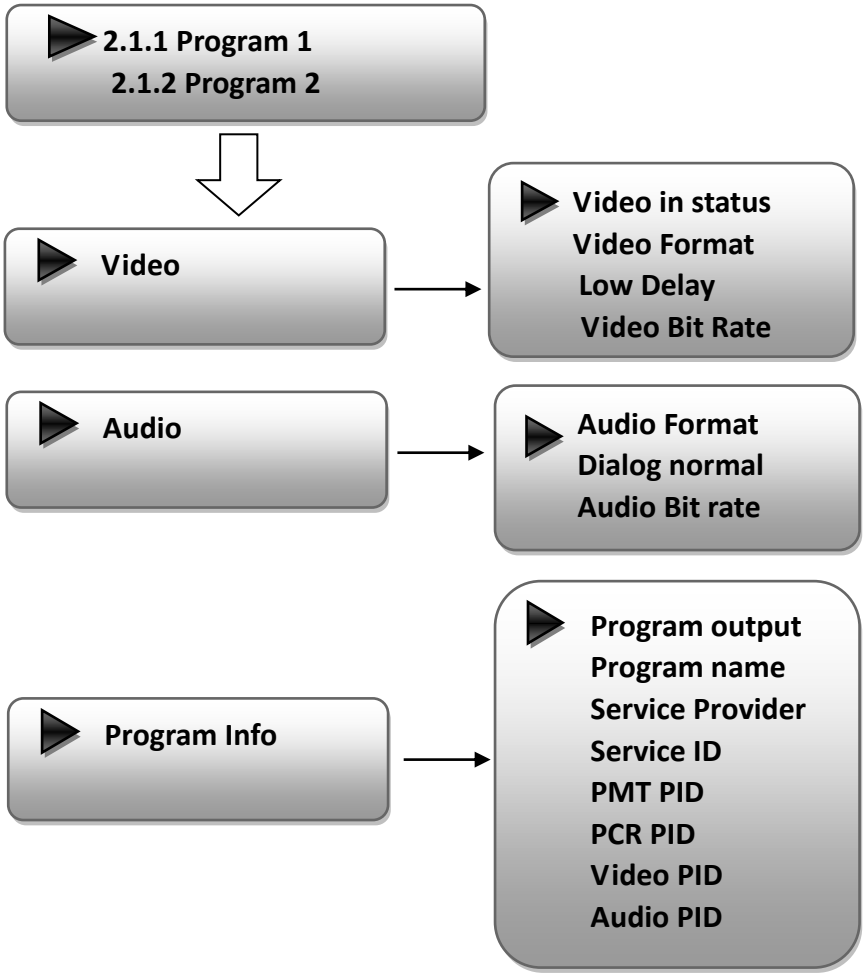
Displays the working time duration of the device. It times upon power on.



2) Input Sets

Under this submenu, the LCD will show "2.1 Input 1" and "2.2 Input 2" to represent the two HDMI/SDI input modules respectively.

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



- **Video in Status**

Enter this menu to check the video input status.

- **Video Format**

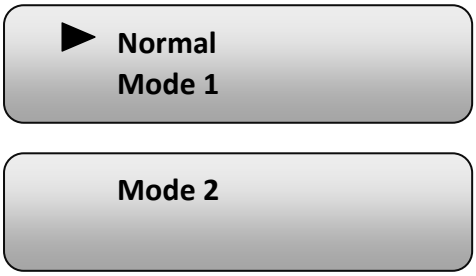
The HDMI & SDI encoders support both "MPEG2" and "H.264" video encoding

formats. 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 this entire manual.)

- **Low Delay**

  Thor Broadcast Encoders offer Low Latency options (MODE 1 is the Fastest)



NOTE

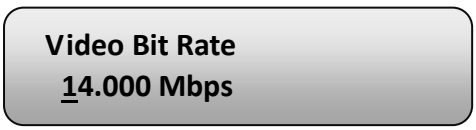
The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode**, **the Resolution** of signal source and **Decoding** options all have an effect on Latency.

- **Video Bit Rate**

  Set the video encoding bit rate manually in this menu.

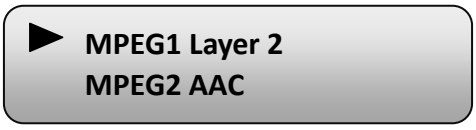
  0.5~19.5Mbps for H.264 encoding

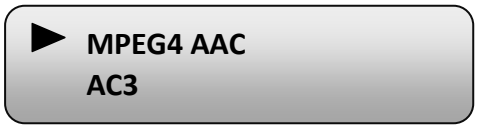
  1~19.5Mbps for MPEG-2 encoding



- **Audio Format**

  The HDMI encoder supports 4 encoding formats. Enter this menu to select one format from the 4 options.



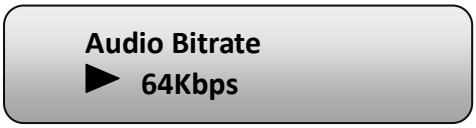


- **Dialog Normal**

  Enter this menu to set the dialog normal (Range -31~-1dB)

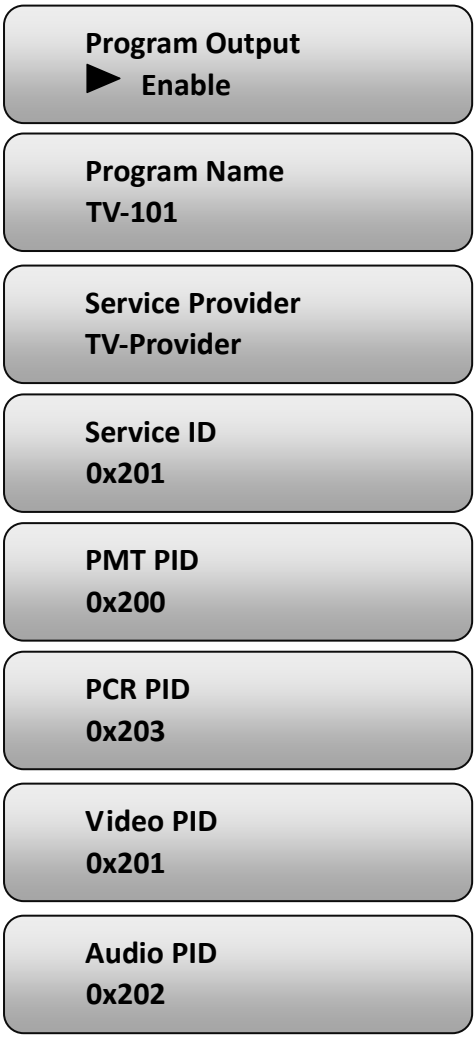
- **Audio Bit Rate**

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



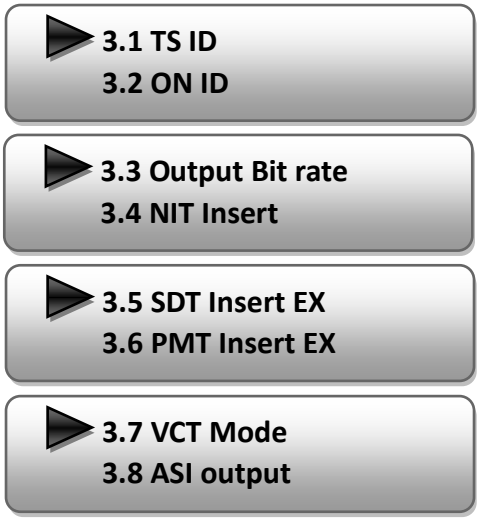
- **Program Info**

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



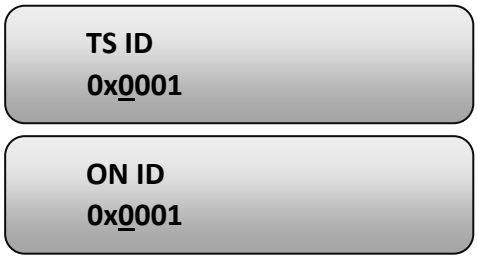
3) TS Config

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



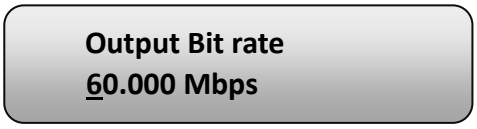
- **TS ID/ON ID**

Set the TS ID and Original Network ID in the 2 submenus. The IDs are in hexadecimal form.



- **Output Bit rate**

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



- **NIT Insert**

Insert your NIT with operations in the menu.

- **SDT Insert External**

  Enable SDT with operations in the menu.

- **PMT Insert External**

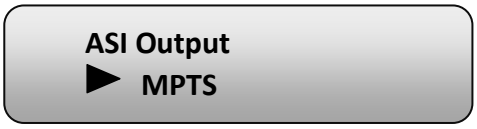
  Enable PMT with operations in the menu.

- **VCT Mode**

  Set VCT Mode with operations in the menu, there are three options: TVCT, CVCT, close VCT.

- **ASI Output**

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

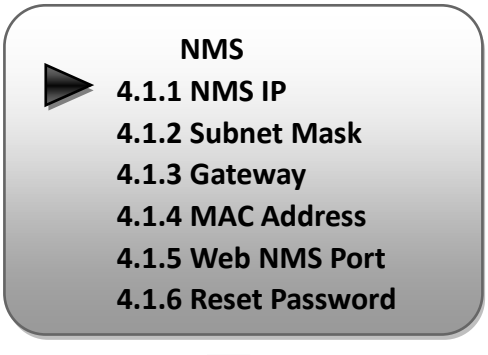


4) Network

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

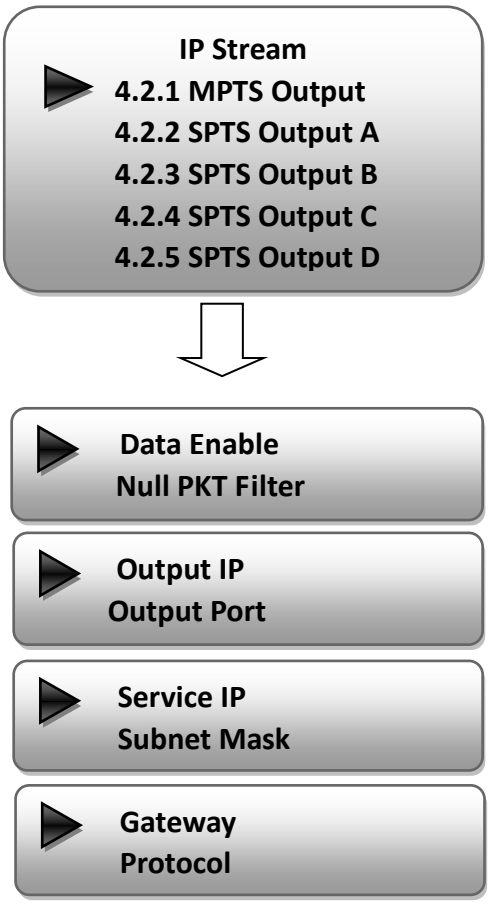
- **NMS**

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



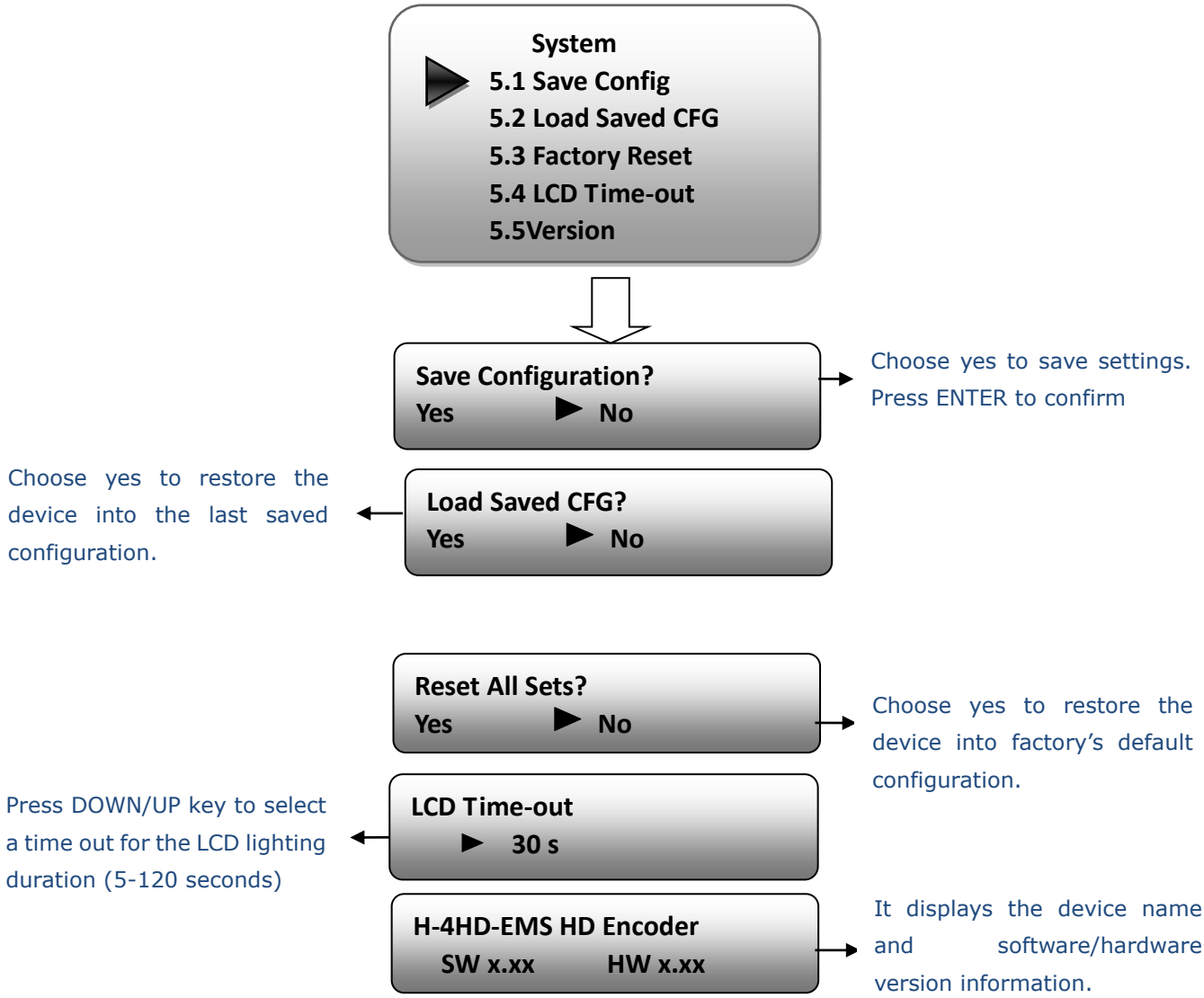
- **IP Stream**

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



5) System

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



Chapter 4 WEB NMS Operation

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

4.1 login

The default IP of this device is 192.168.0.136. We can modify the IP through the front panel. Connect the pc and the device with net cable, and use ping command to confirm they are on the same network segment. E.G. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 0 to 255 except 252 to avoid IP conflict). Use any web browser to connect the device with the PC by inputting the Encoder & Modulator's IP address in the browser's address bar and press Enter. It will display the Login interface as Figure-1. Input the Username and Password **(Both the default Username and Password are "admin".)** and then click "LOGIN"

Figure-1

4.2 Operation

When we confirm the login, it displays the WELCOME interface.

In the following sections we are using a 4-channel unit with 2 SDI inputs and 2 HDMI inputs to demonstrate its GUI menus.

Figure-2

Input 1

From the menu on left side of the webpage, clicking “Input 1”, displays the information of the programs (1st & 2nd) from the SDI inputs.

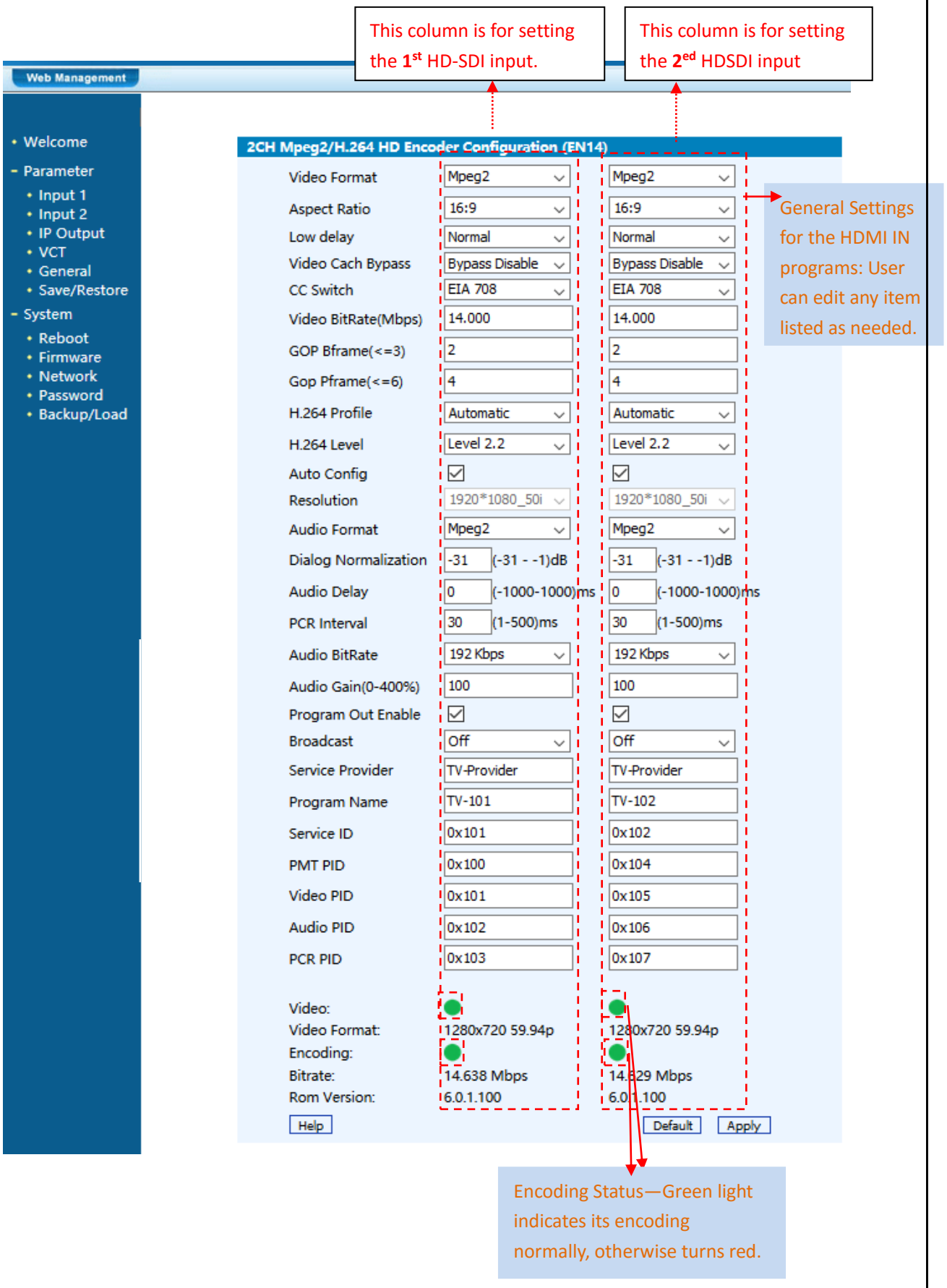

This column is for setting the 1st HD-SDI input.
This column is for setting the 2ed HDSDI input
Web Management
Welcome
Parameter
Input 1
Input 2
IP Output
VCT
General
Save/Restore
System
Reboot
Firmware
Network
Password
Backup/Load
2CH Mpeg2/H.264 HD Encoder Configuration (EN14)
Video Format
Aspect Ratio
Low delay
Video Cach Bypass
CC Switch
Video BitRate(Mbps)
GOP Bframe(<=3)
Gop Pframe(<=6)
H.264 Profile
H.264 Level
Auto Config
Resolution
Audio Format
Dialog Normalization
Audio Delay
PCR Interval
Audio BitRate
Audio Gain(0-400%)
Program Out Enable
Broadcast
Service Provider
Program Name
Service ID
PMT PID
Video PID
Audio PID
PCR PID
Video:
Video Format:
Encoding:
Bitrate:
Rom Version:
1280x720 59.94p
14.638 Mbps
6.0.1.100
Help
Default
Apply
General Settings for the HDMI IN programs: User can edit any item listed as needed.
Encoding Status—Green light indicates its encoding normally, otherwise turns red.

Figure-3

NOTE

The different combination of **Video Format, Video Bit-rate, Low Delay Mode** and the **Resolution** of signal source will have an impact on the latency. Please refer to the **Appendix** attached for detailed information.

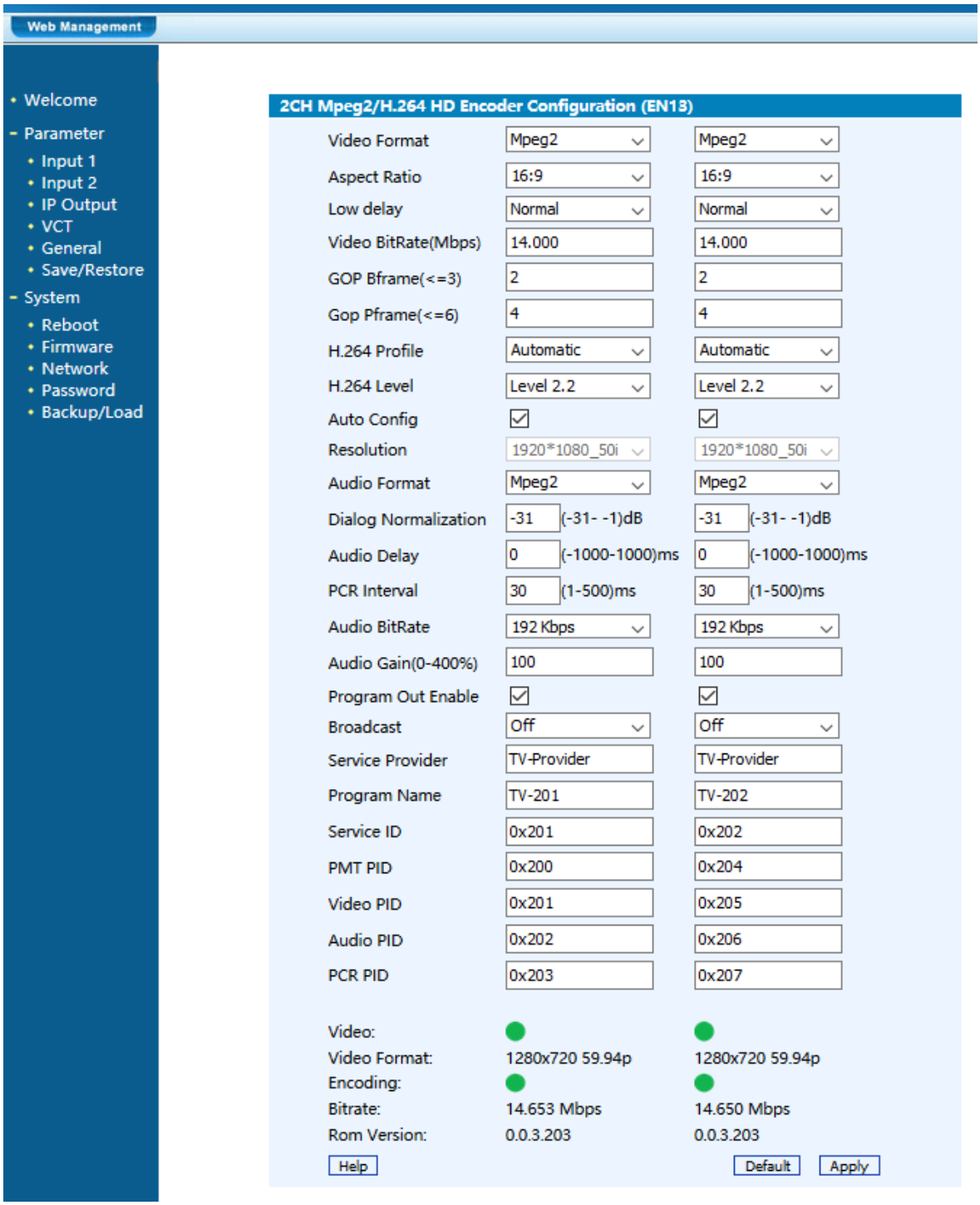
Help For user to turn to refer detailed explanation of terms on this interface

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", displays the information of the programs (3rd & 4th inputs) from the HDMI encoding module.



IP Output

Click “IP Output”, it will display the interface where to configure the output IP stream in MPTS or SPTS that will output on a single RJ45 port.

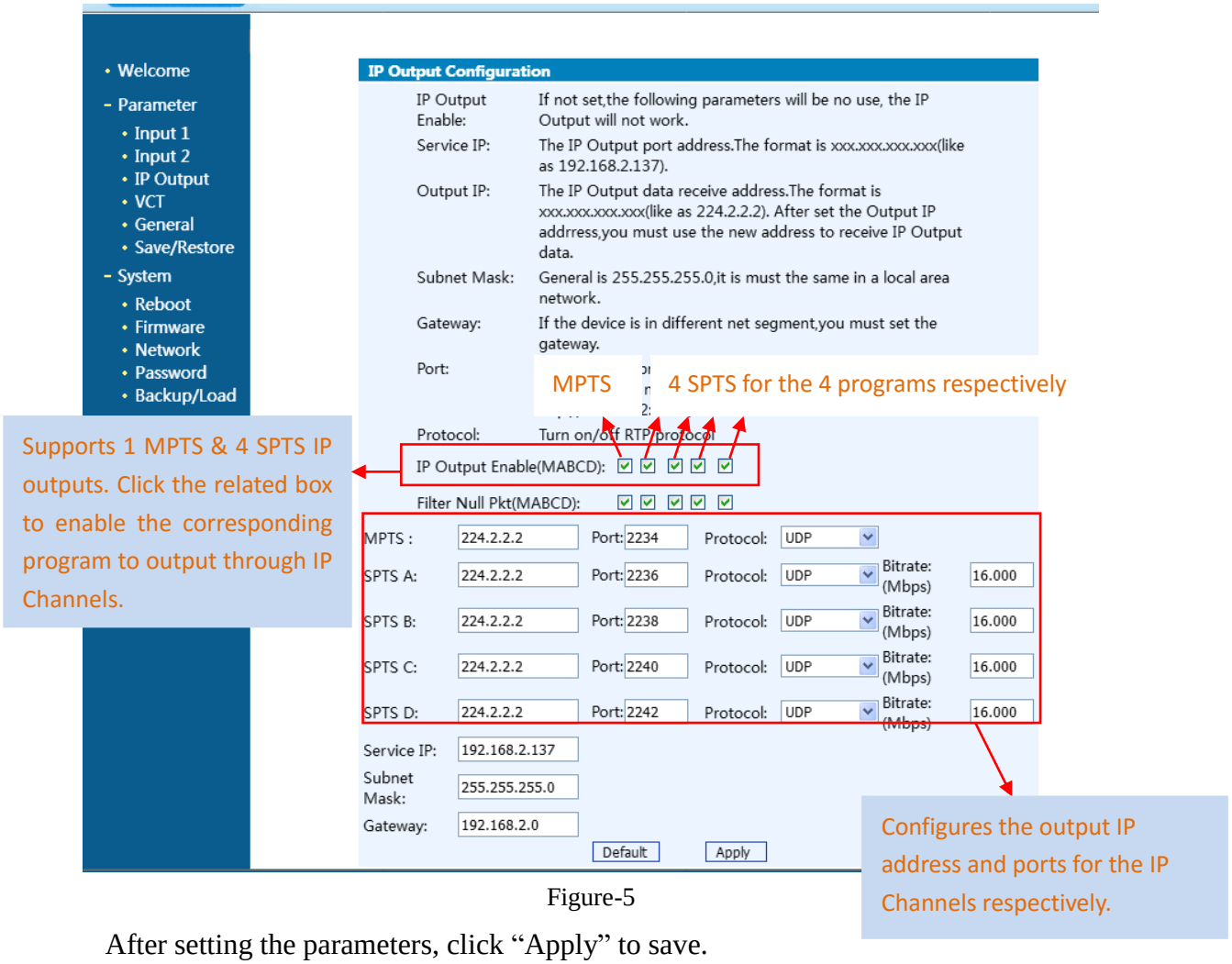


Figure-5

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

VCT

Click “VCT” from the menu, it will display the interface as Figure-6 where to set the VCT configuration.

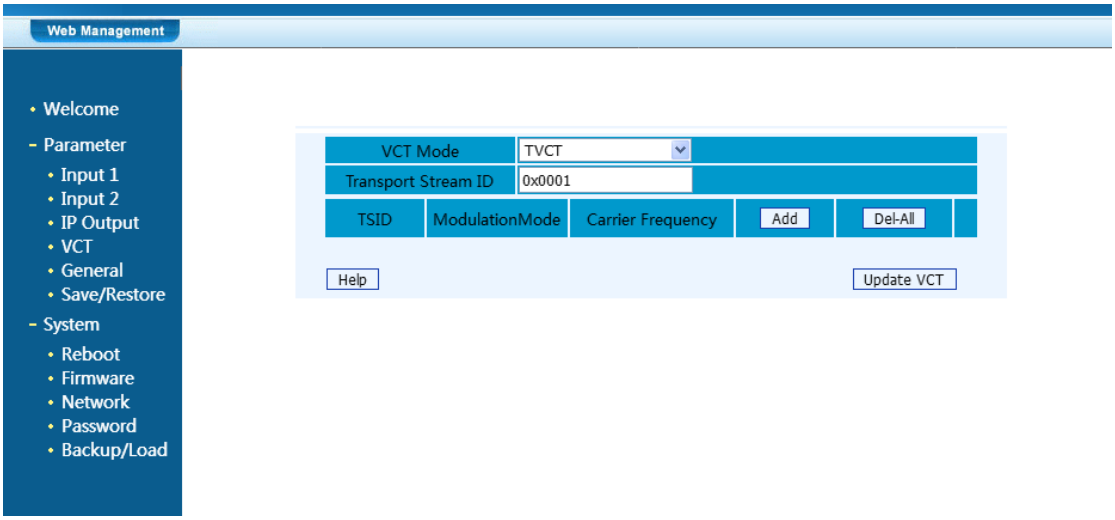


Figure-6

General

Clicking “General” from the menu, it will display the interface as Figure-7 where to set the network info for the output TS.

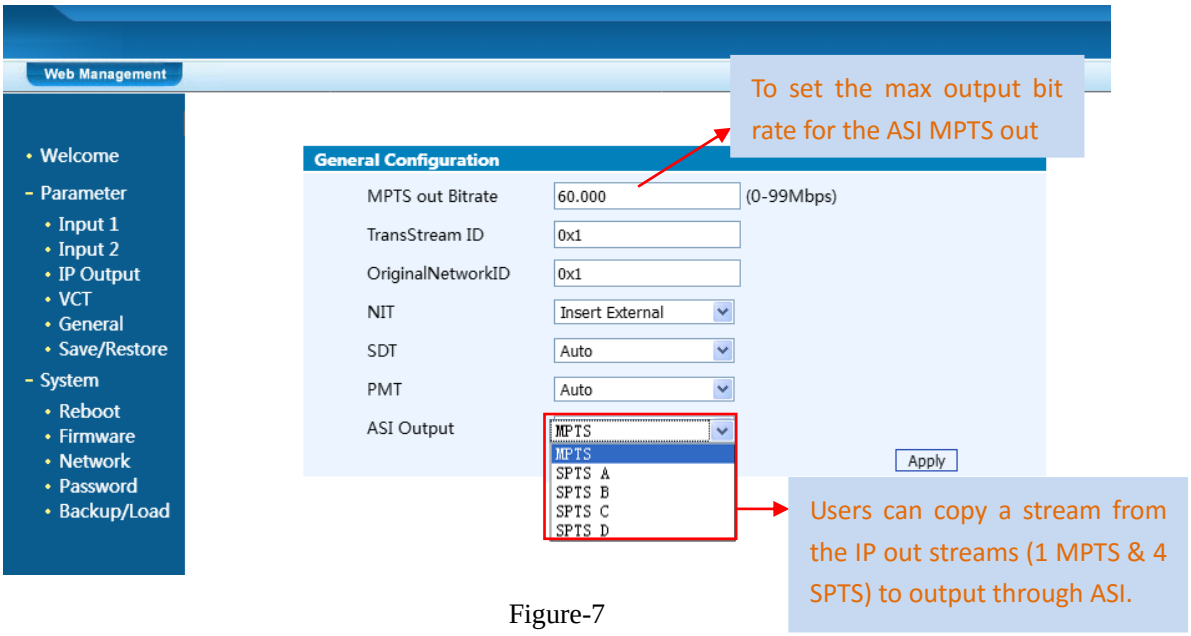


Figure-7

Save/Restore

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

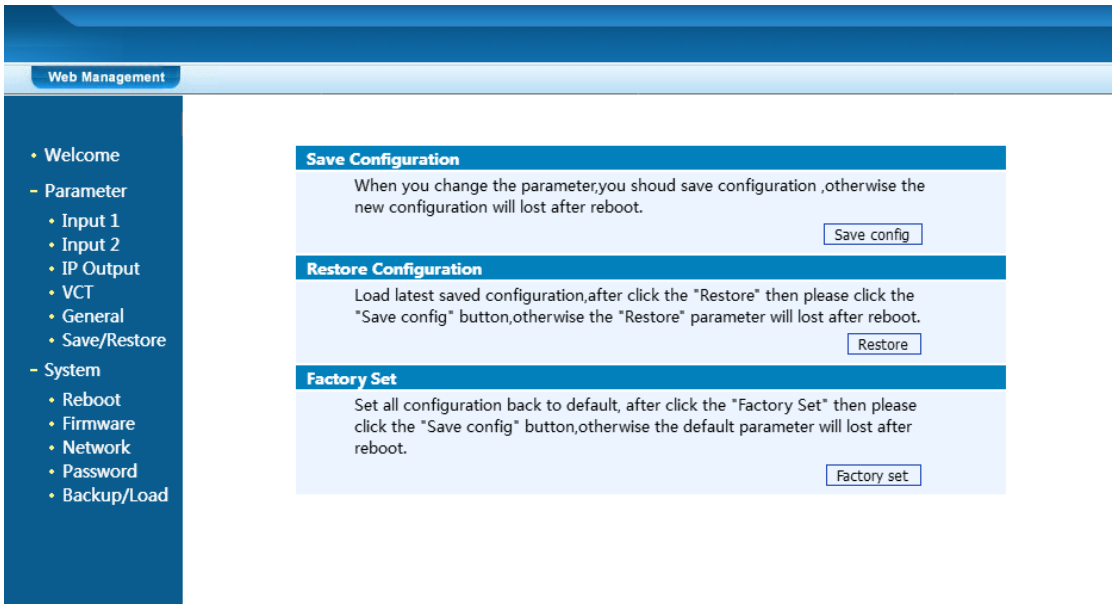


Figure-8

Restart the Device

Click “Reboot” from the menu, the screen will display as Figure-9. Here when clicking “Reboot” box, it will restart the device automatically.

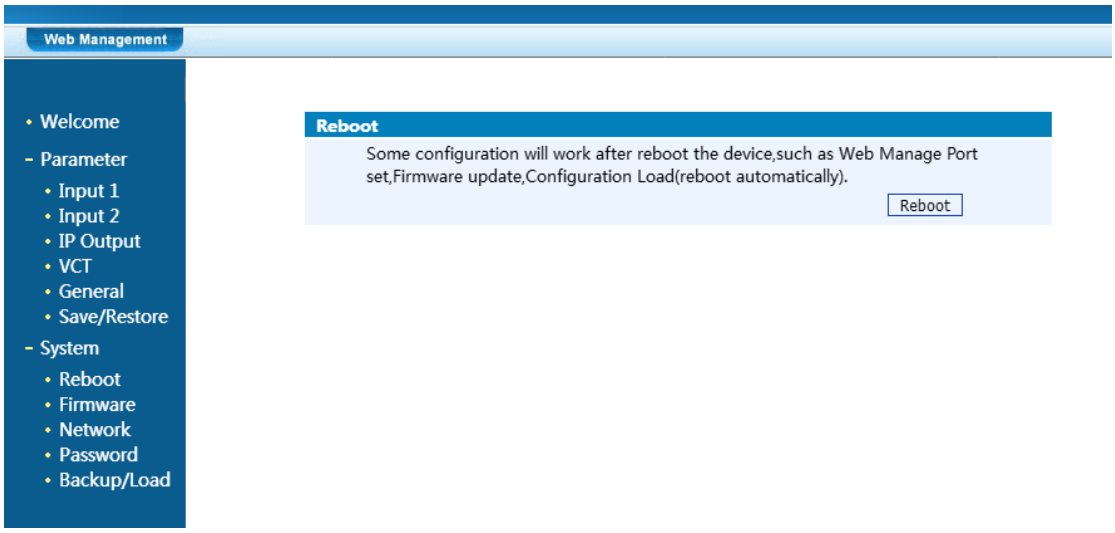


Figure-9

Update the Device

Click “Firmware” from the menu it will display the screen as Figure-10. 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 option.

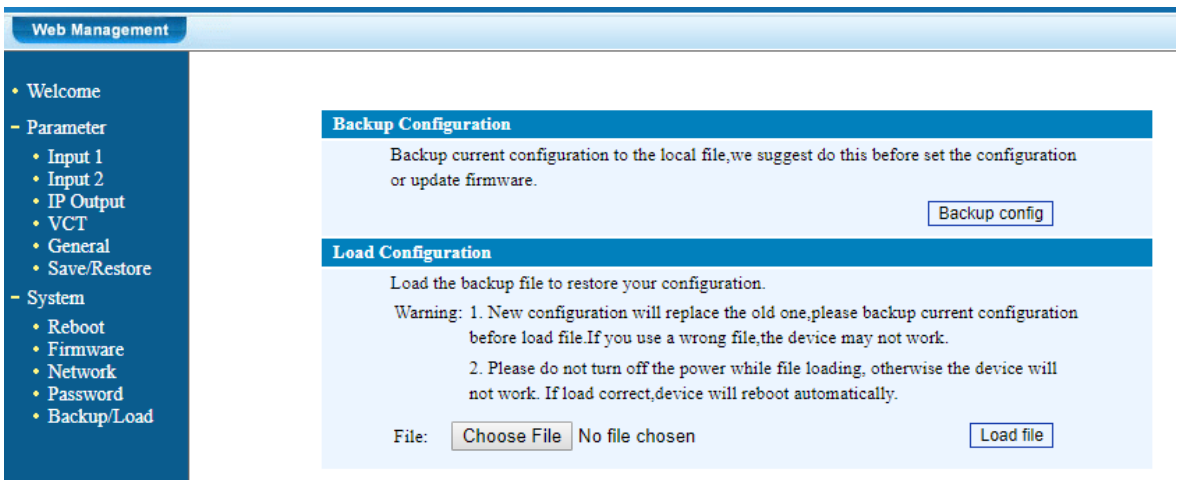


Figure-10

Network

When user clicks “Network”, it will display the screen as Figure-11. It displays the network information of the device. Here user can change the device network configuration as needed.

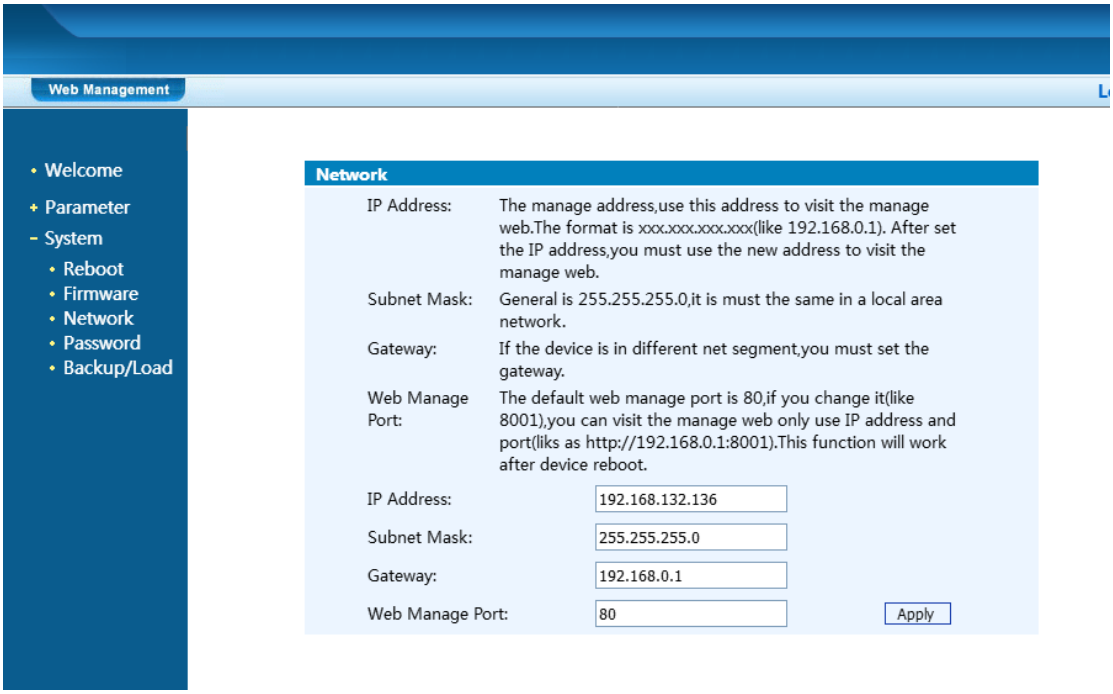


Figure-11

Change Password

When user clicks “Password”, it will display the password screen as Figure-12. Here user can change the Username and Password for login to the device.

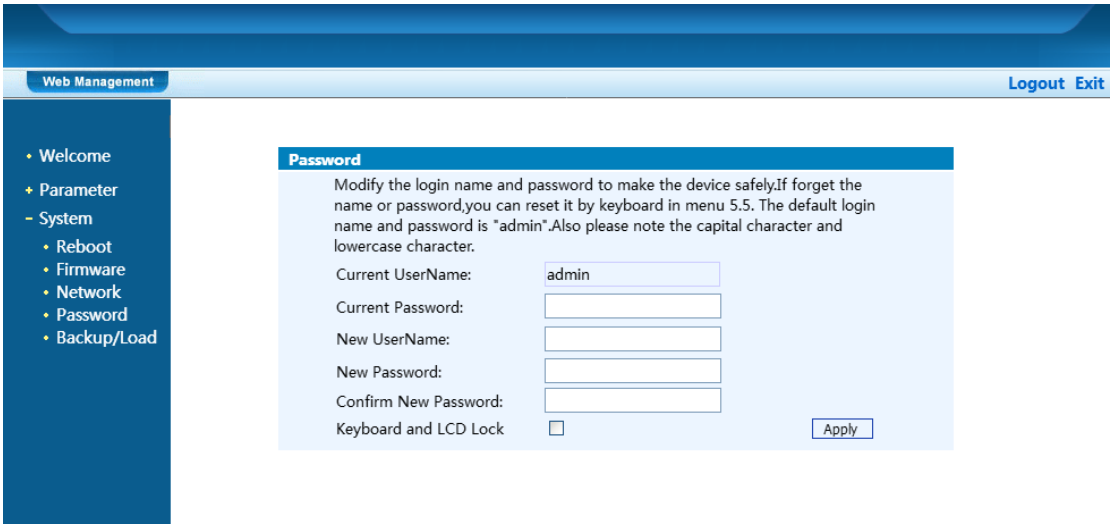


Figure-12

➢ 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 view the device information and configurations. User can't operate the keyboard & LCD while only the device IP address can be noted in the LCD window.

Backup/Load

Click "Backup/Load" from the menu

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

Restore Configuration – Loads the most recently saved configuration

Load Configuration – If you 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.

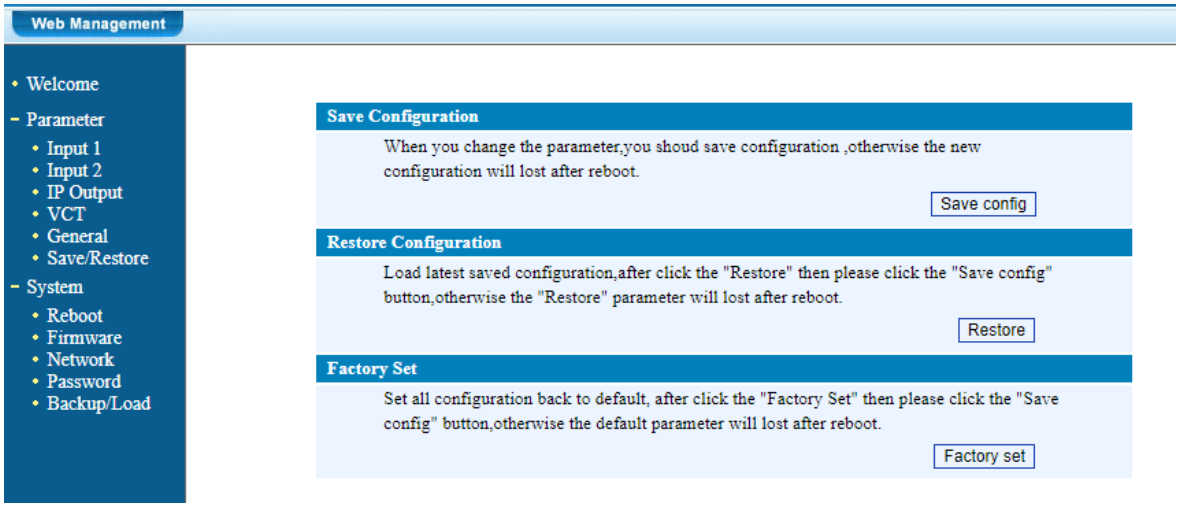
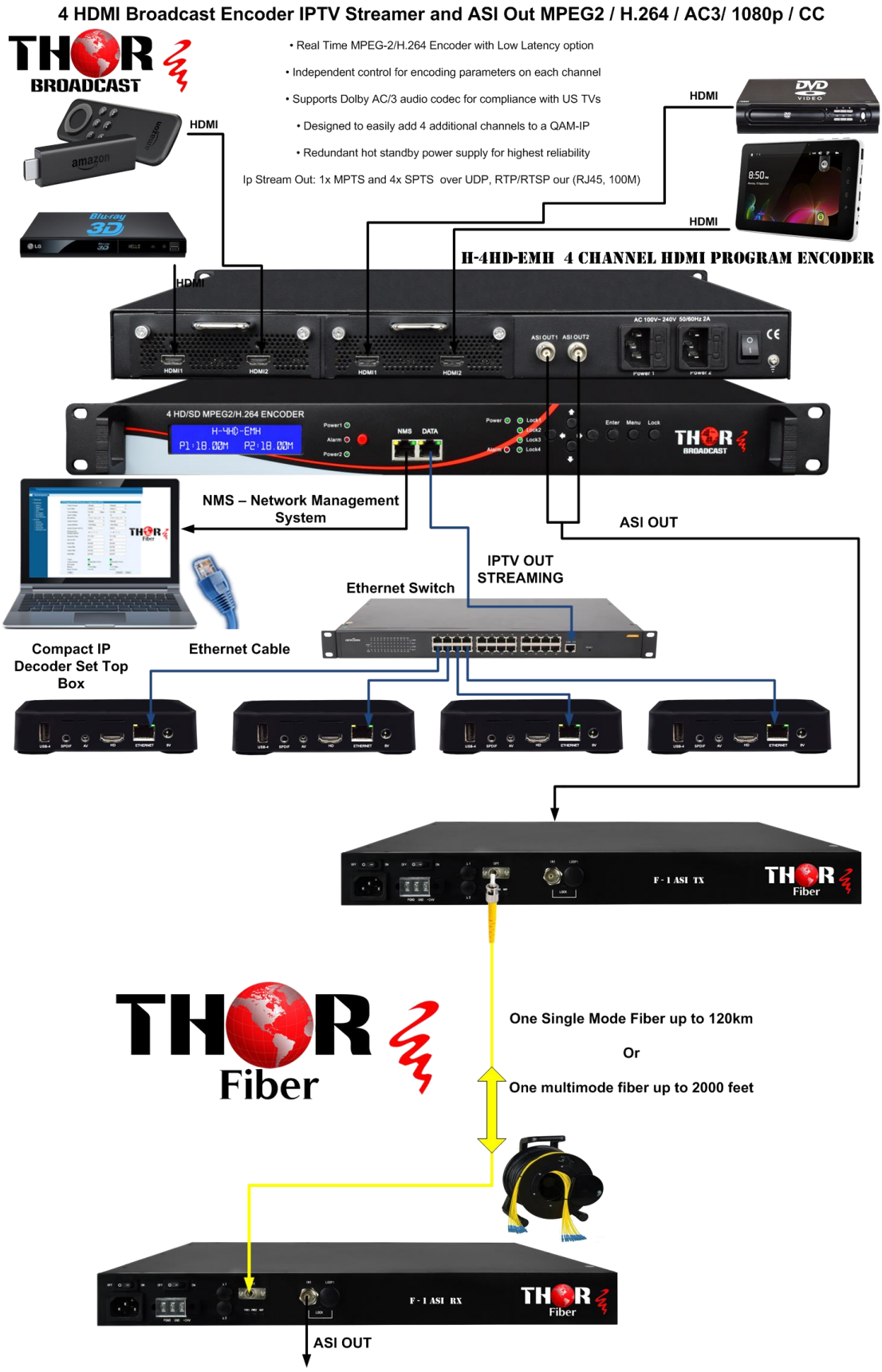


Figure-13

Application Drawing:

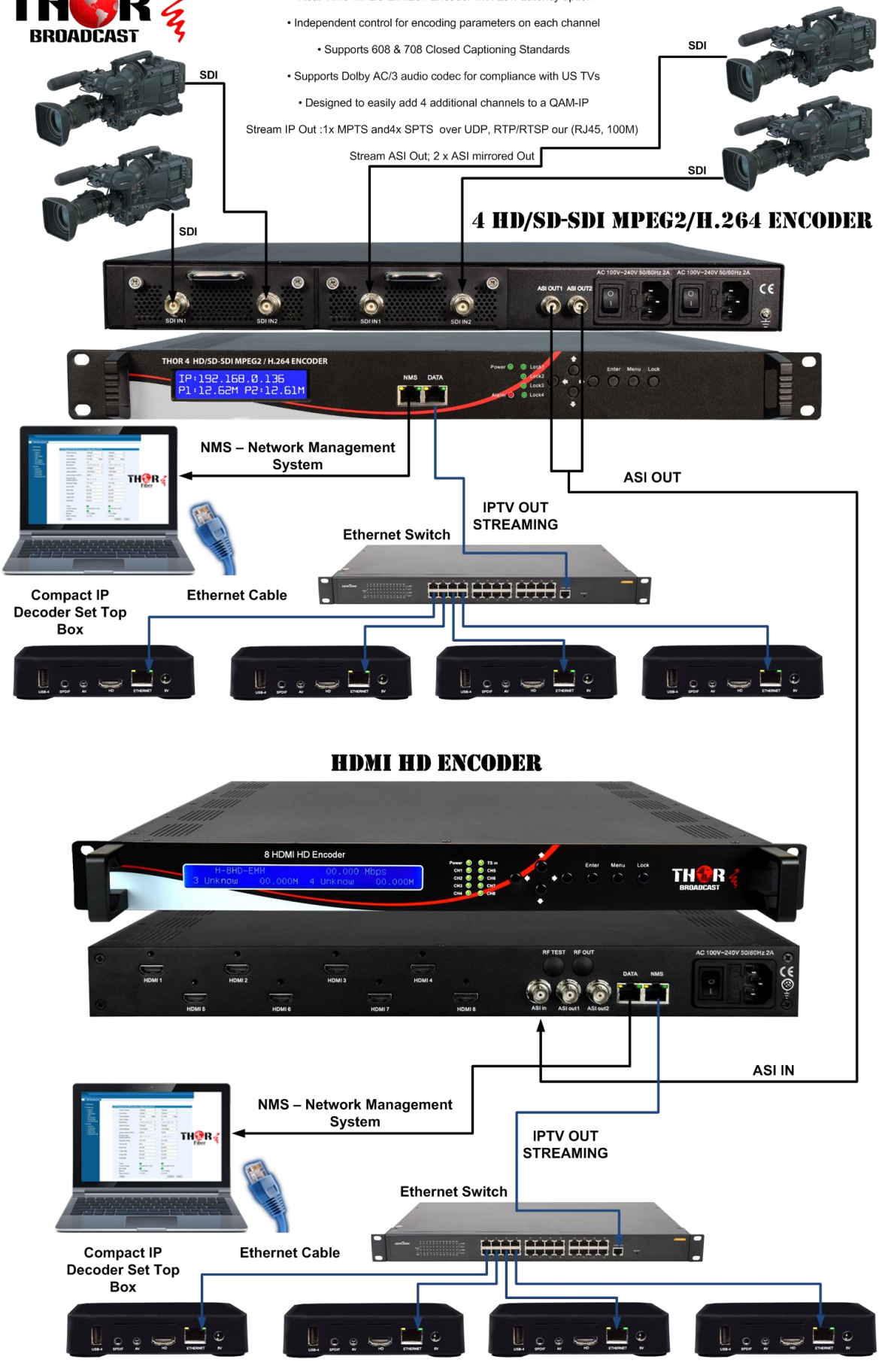


4 HD-SDI Broadcast Encoder IPTV and ASI Out MPEG2 / H.264 / AC3/ 1080p / CC

- Real Time MPEG-2/H.264 Encoder with Low Latency option
- Independent control for encoding parameters on each channel
- Supports 608 & 708 Closed Captioning Standards
- Supports Dolby AC/3 audio codec for compliance with US TVs
- Designed to easily add 4 additional channels to a QAM-IP

Stream IP Out :1x MPTS and4x SPTS over UDP, RTP/RTSP our (RJ45, 100M)

Stream ASI Out; 2 x ASI mirrored Out



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

H-4HD-EMS or EMH Encoder	1PC
User Manual	1PC
HDMI/SDI Cables	4PCs
Power Cord	1PC

For Further Tech Support

1-800-521-Thor(8467)

support@thorfiber.com