QUESTTEL
Broadcast Systems

2CH SDI to ASI and IP MPEG2/ MPEG4(H.264) Encoder

User Manual

B-SDI-ASI-IP-2CH

About This Manual

Intended Audience

This user manual has been written to help people who have to use, to 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

This encoder is our professional HD audio & video encoding device which has 2 channels of SDI (HDMI/YPbPr+HDMI+CVBS/YPbPr+S-Video+CVBS Optional) input for MPEG-2 and MPEG-4 AVC/H.264 video encoding and MPEG-1 Audio layer 2, LC-AAC, HE-AAC and AC3 audio encoding. It is also equipped with 1 channel ASI input for re-mux. The 2 encoded programs will output through 2 ASI or IP ports in MPTS or 4 SPTS.

It adopts pluggable design makes it convenient to change encoding module as needed

1.2 Key Features

- MPEG2 & MPEG4 AVC/H.264 HD video encoding
- MPEG1 Audio Layer 2, MPEG2-AAC, MPEG4-AAC and Dolby Digital AC3 audio encoding
- 2*SDI signals input, pluggable and changeable encoding modules
- Support CBR/VBR rate control mode
- Support CC(Closed Caption)
- Support Low Latency function
- Support 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	SDI *2
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	1~19.5Mbps
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

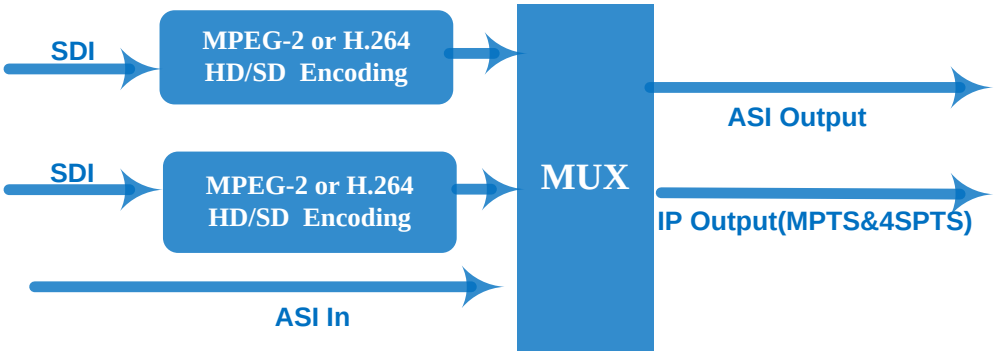
System

Local interface	LCD + control buttons
Remote management	Web NMS
output	2ASI out (BNC type) IP (1 MPTS & 4 SPTS) over UDP, RTP (RJ45, 100M)
NMS interface	RJ45, 100M
Language	English

General

Power	AC 100V~240V
Dimensions	482*300*44mm
Weight	3.5 kgs
Operation temperature	0~45℃

1.4 Principle Chart



1.5 Appearance and Description

Front Panel Illustration

① LCD window
② NMS port for the connection between the device and PC
③ DATA port for IP signal out
④ Indicators for whole unit power supply, working alarm and input signal lock status
⑤ Control Buttons
⑥ Handles

Rear Panel Illustration

①SDI Input
②SDI Input
③ASI input ports
④ASI output ports
⑤Power Switch
⑥Power Supply Slot
⑦Grounding

Chapter 2 Installation Guide

This section is to explain the cautions the users must know in some case that possible injure may bring to users when it's used or installed. For this reason, please read all details here and make in mind before installing or using the product.

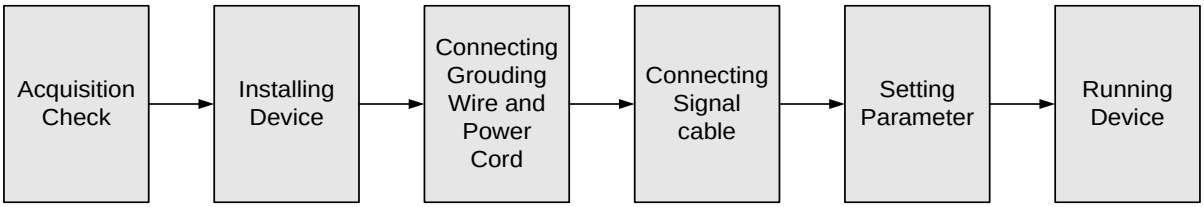
2.1 General Precautions

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

2.2 Power precautions

- ✓ When you connect the power source, make sure if it may cause 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

- ✓ All function modules' good grounding is the basis of reliability and stability of devices. Also, they are the most important guarantee of lightning arresting and interference rejection. Therefore, the system must follow this rule.
- ✓ Grounding conductor must adopt copper conductor in order to reduce high frequency impedance, and the grounding wire must be as thick and short as possible.
- ✓ Users should make sure the 2 ends of grounding wire well electric conducted and be antirust.
- ✓ It is prohibited to use any other device as part of grounding electric circuit
- ✓ The area of the conduction between grounding wire and device's frame should be no less than 25 mm^2.

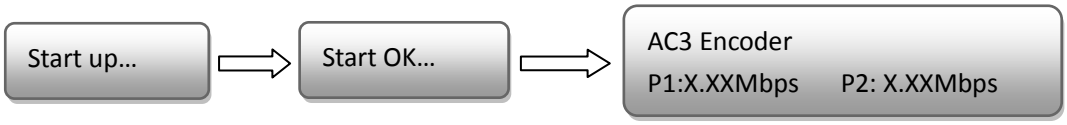
Chapter 3 Operation

3.1 LCD Menu Class Tree

- Initializing
  - General Working Status
    - 1 Status
      - 1.1 Alarm
      - 1.2 Uptime
    - 2 Input Sets
      - 2.1 Input 1
        - 2.1.1 Video
          - Video Format
          - Video Bitrate
          - CC Switch
          - Low Delay
        - 2.1.2 Audio
          - Audio Format
          - Audio Bitrate
      - 2.2 Input 2
        - 2.2.1 Video — *(Same content with 2.1.1)*
        - 2.2.2 Audio — *(Same content with 2.1.2)*
      - 2.3 ASI In
        - 2.3.1 Parse Program
        - 2.3.2 Mux Program
    - 3 TS Config
      - 3.1 TSID
      - 3.2 ONID
      - 3.3 Output Bitrate
      - 3.4 NIT Insert
      - 3.5 ASI Output
    - 4 Network
      - 4.1 NMS
        - 4.1.1 NMS IP
        - 4.1.2 Subnet mask
        - 4.1.3 Gateway
        - 4.1.4 MAC Address
        - 4.1.5 Web NMS Port
        - 4.1.6 Reset Password
      - 4.2 IP Stream
        - 4.2.1 MPTS Output
          - Data Enable
          - Null PKT Filter
          - Output IP
          - Output Port
          - Service IP
          - Subnet Mask
          - Gateway
        - 4.2.2 SPTS A — *(Same content with 4.2.1)*
        - 4.2.3 SPTS B — *(Same content with 4.2.1)*
        - 4.2.4 SPTS C — *(Same content with 4.2.1)*
        - 4.2.5 SPTS D — *(Same content with 4.2.1)*
    - 5 System
      - 5.1 Save Config
      - 5.2 Load Saved
      - 5.3 Factory Reset
      - 5.4 LCD time-out
      - 5.5 Version

3.2 Initial Status

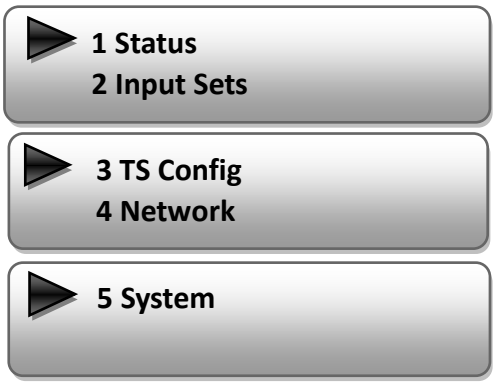
Switch on the device and after a few seconds' initialization, it presents start-up pictures as below:



- **AC3 Encoder**: Device name
- **P1**: Program 1; **P2**: Program 2
- **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 one item and then press ENTER to enter its submenus. Press MENU to step back to upper level menu.

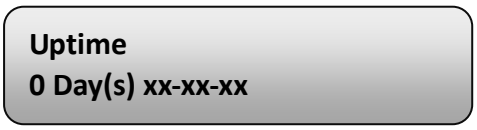
1) Status

➢ **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**

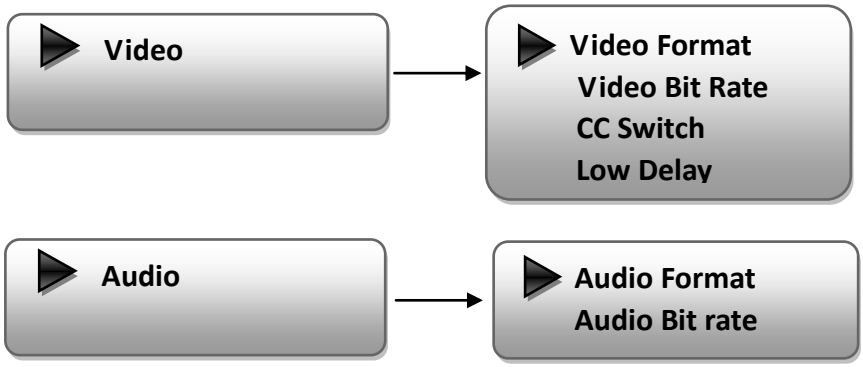
It displays the working time duration of the device. It times upon power on.



2) Input Sets

Under this submenu, the LCD will show "2.1 Input 1", "2.2 Input 2", "2.3 ASI in" to represent the two SDI-input modules and ASI in respectively.

Under submenus 2.1 (or 2.2), user could set the video/audio parameters for the 2 SDI programs respectively.



➢ **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.)

- **Video Bit Rate**

Users can set the video encoding bit rate manually from 1~19.5Mbps in this menu.

```
Video Bit Rate
 14.000 Mbps
```

- **CC Switch**

CC refers to Closed Caption.

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

```
► EIA 608
  EIA 708
```

- **Low Delay**

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

```
► Normal
  Mode 1
  Mode 2
```

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. Please refer to the **Chapter 5** attached for detailed information.

- **Audio Format**

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

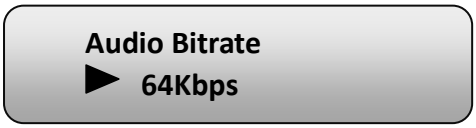
```
► MPEG1 Layer 2
  MPEG2 AAC
```

```
► MPEG4 AAC
  AC3
```

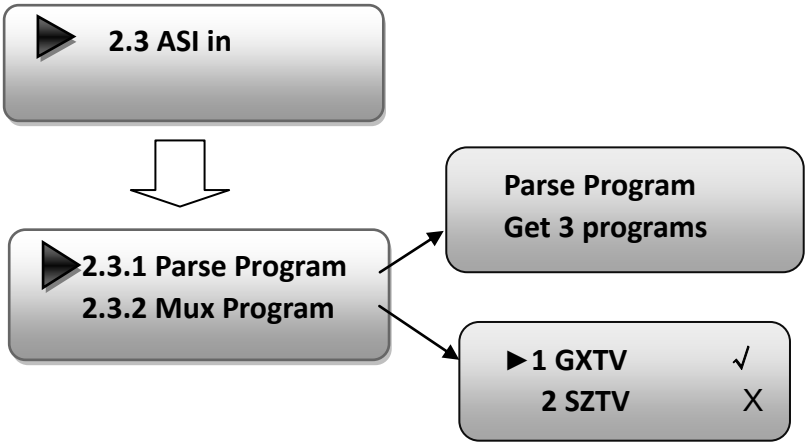
- **Audio Bit Rate**

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

options provided.



"2.3 ASI in" represents the ASI input. User could parse and select program(s) to mux out.

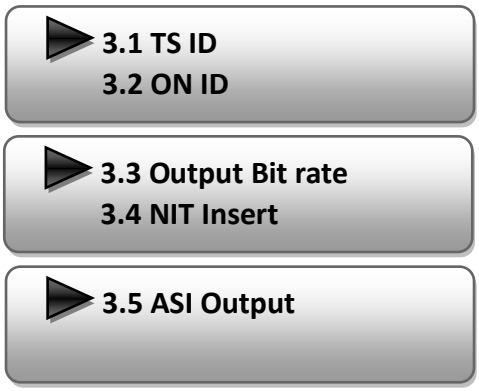


"Parse Program" is for checking the quantity of input programs from the ASI input.

"Mux Program" is for selecting programs from the ASI IN to output. Move the triangle mark to specify the program and press RIGHT/LEFT keys to shift the mark between "√" and "X". ("√": to output the corresponding program; "X": not to output the corresponding program)

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**

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

TS ID
0x0001

ON ID
0x0001

- **Output Bit rate**

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

Output Bit rate
60.000 Mbps

- **NIT Insert**

Users can insert your NIT with operations in the menu.

NIT Insert
▶ Yes No

- **ASI Output**

Users can copy a stream from the IP out streams (1 MPTS & 4 SPTS) to output through ASI.

ASI Output
▶ MPTS

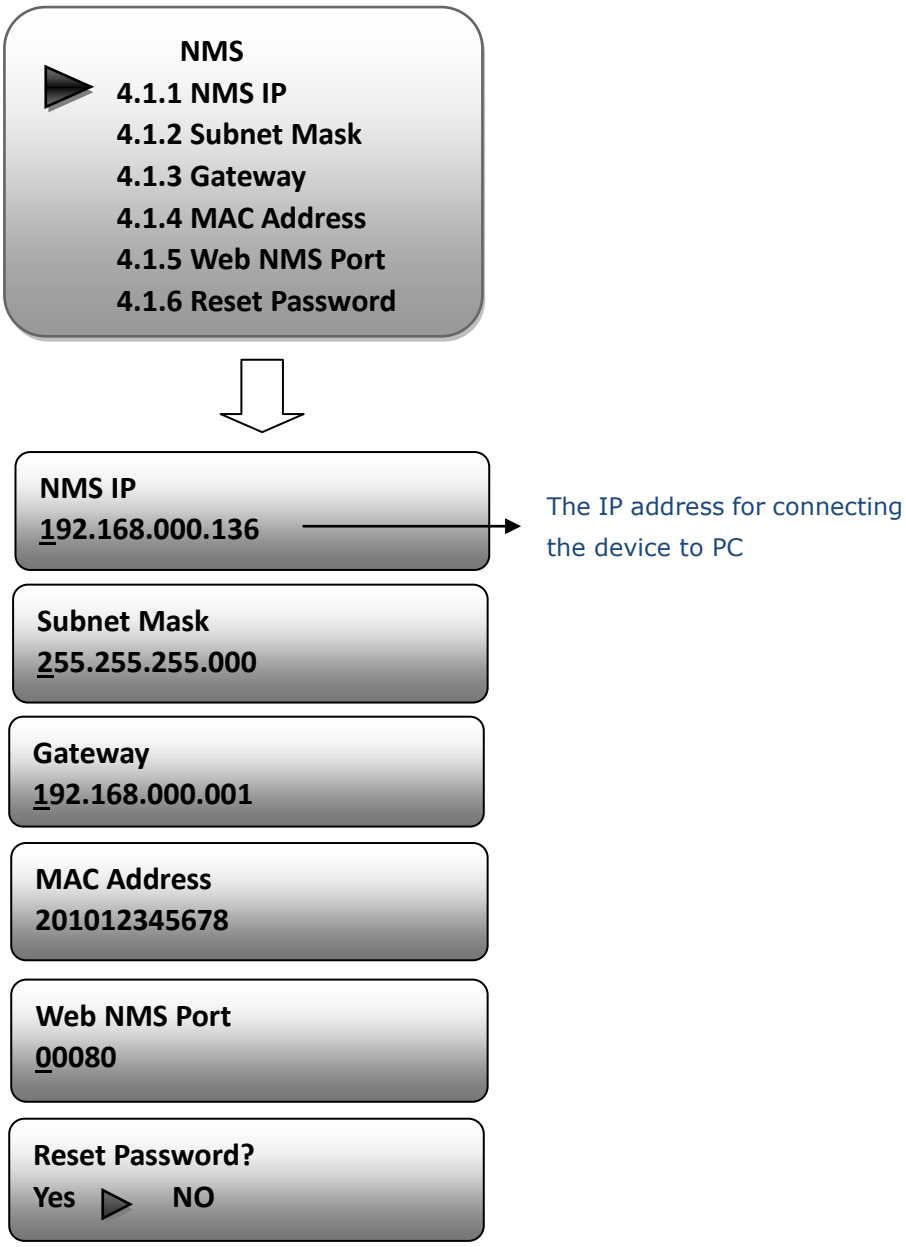
4) Net Work

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

▶ 4.1 NMS
4.2 IP Stream

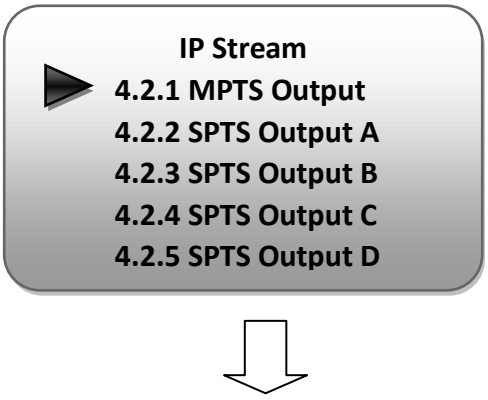
- **NMS**

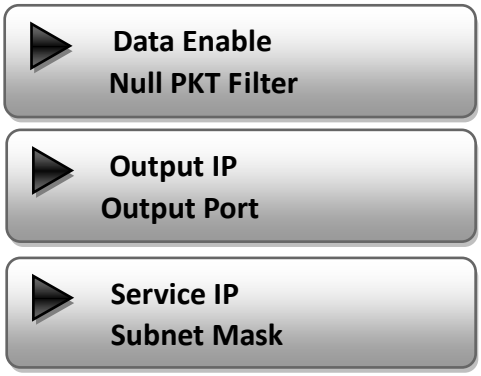
Submenus under 'NMS' are for setting the parameters related to the device connection in the network.



- **IP Stream**

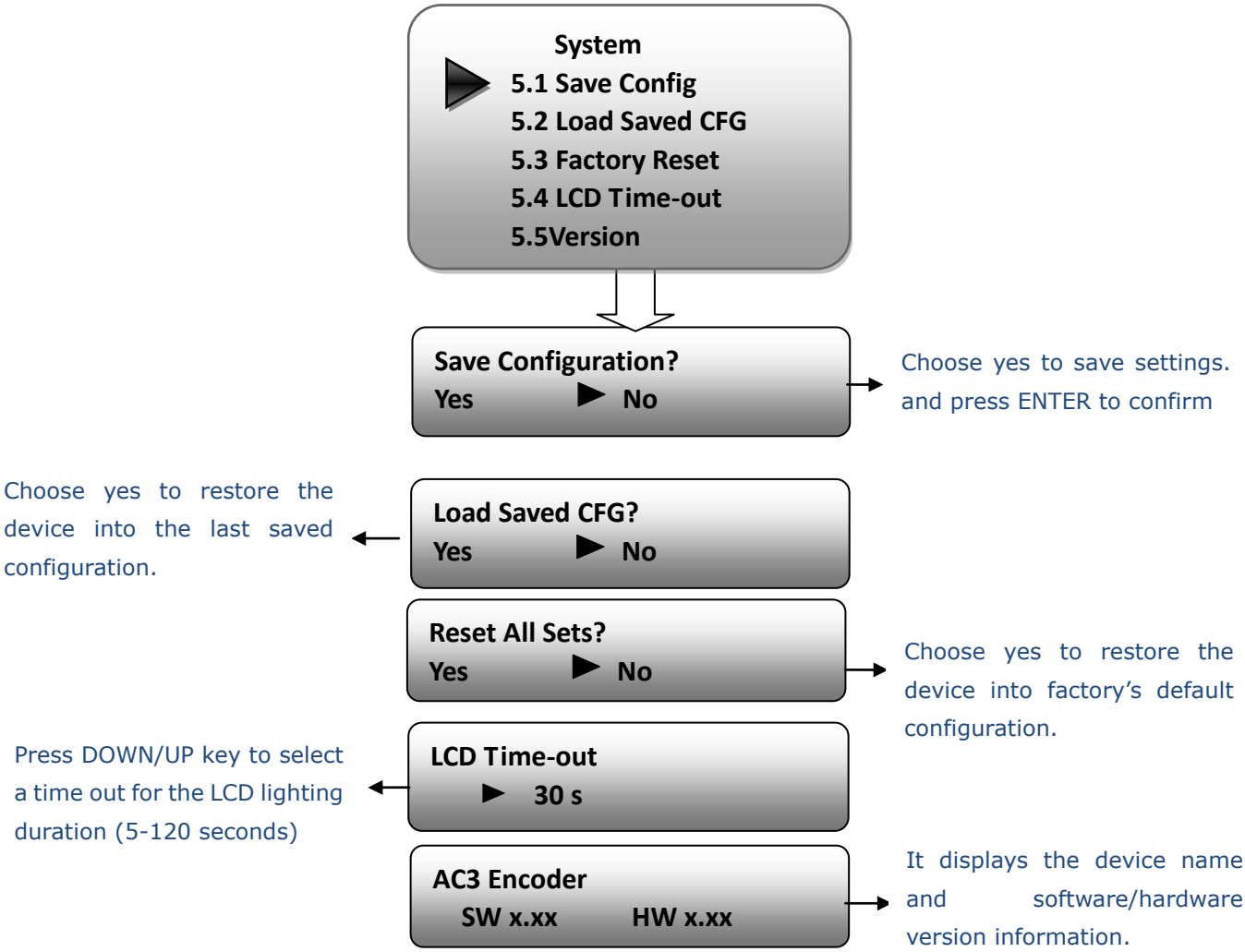
Submenus under 'IP Stream' are for setting the output IP stream in MPTS or SPTS.





5) System

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



Chapter 4 WEB NMS Operation

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.

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 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.

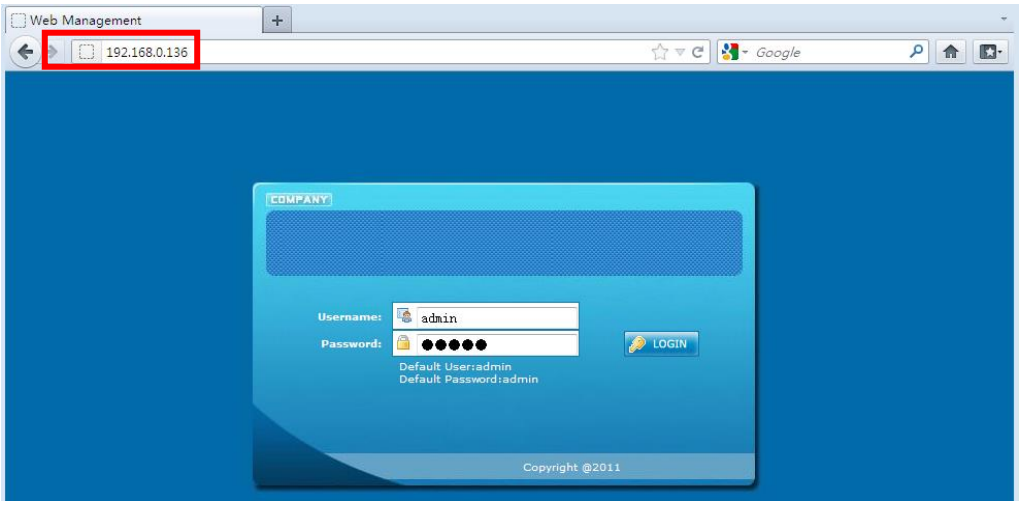


Figure-1

4.2 Operation

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

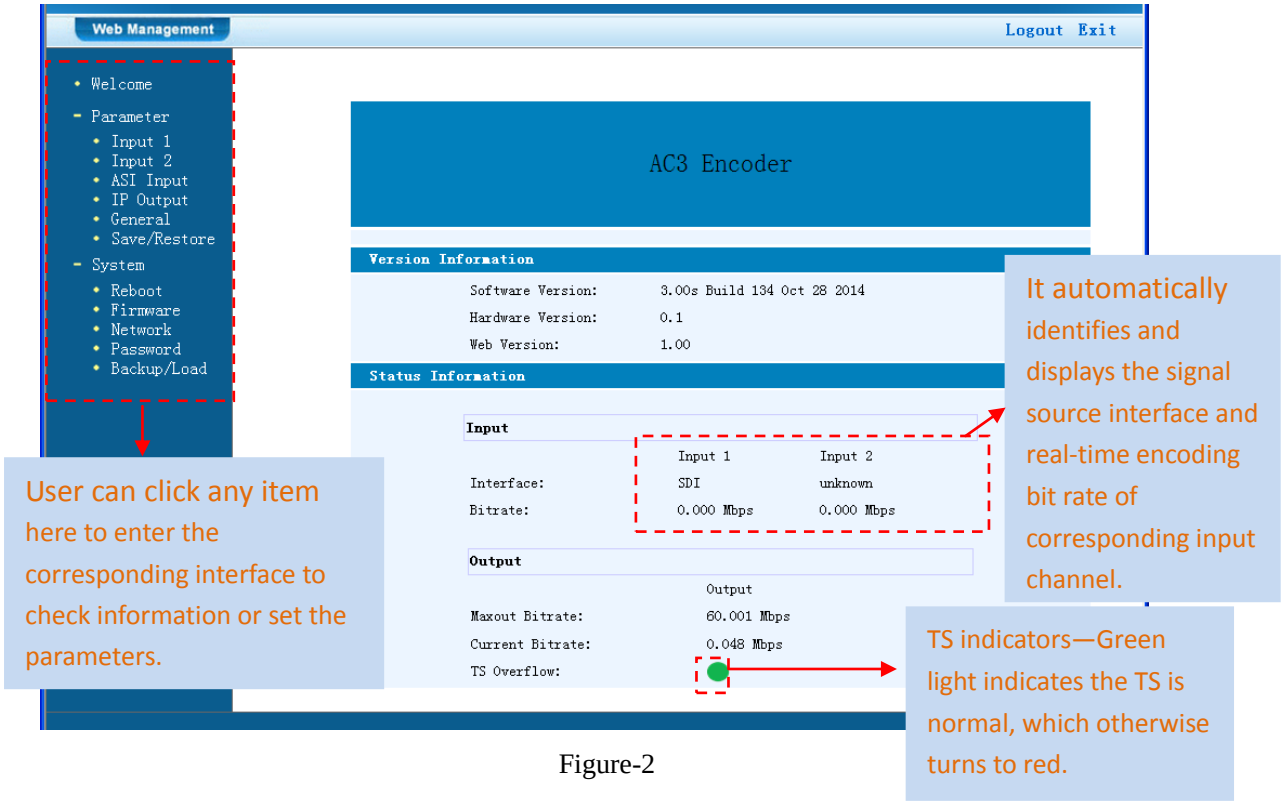


Figure-2

Input 1

From the menu on left side of the webpage, clicking "Input 1", it displays the information of the programs from the 1st SDI encoding module as Figure-3.

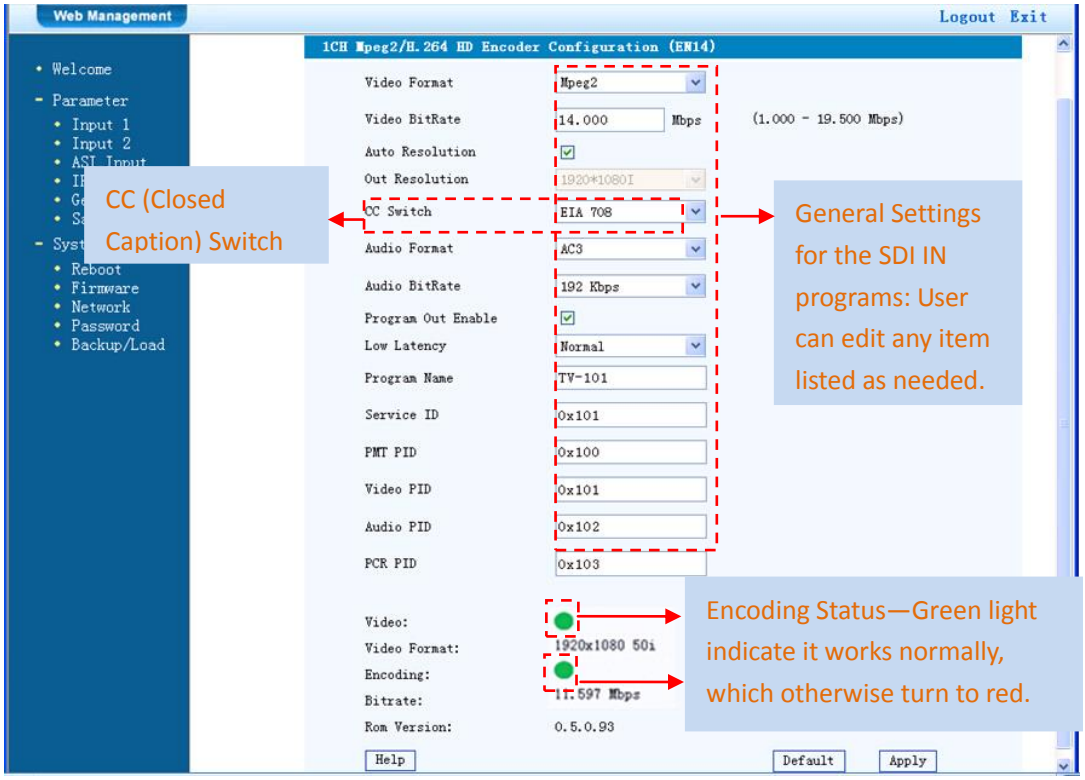
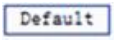


Figure-3

User can choose to output program or not.

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



Click this button to apply the default setting of Input 1

Click this button to apply the modified parameters.

Click this button to select Low delay mode. Please refer to the **Chapter 5** attached for detailed information.

…… **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.

……

Input 2

Similarly, from the menu on left side of the webpage, clicking "Input 2", it displays the information of the programs from the 2ed SDI encoding module.

ASI Input

Click “ASI Input”, it will display ASI input program information as Figure-4. User can parse and multiplex ASI IN programs in this interface.

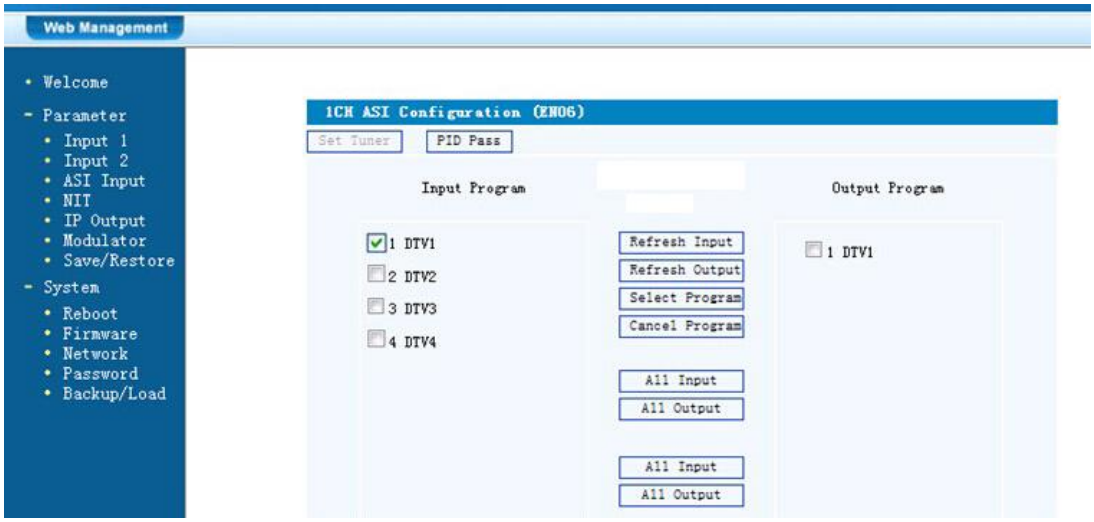


Figure-4

Refresh Input Click “Refresh Input” to refresh the input program list.

Refresh Output Click “Refresh Output” to refresh the output program list.

Select Program When user checks one input program with “√”, one can transfer the checked program to the right box to output.

Here user can select the programs which we want to output or we can output all the programs.

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

All Input & All Output to select all the input/output programs with one-time clicking.

Parse timeout 200 seconds Time limitation to parse the input programs

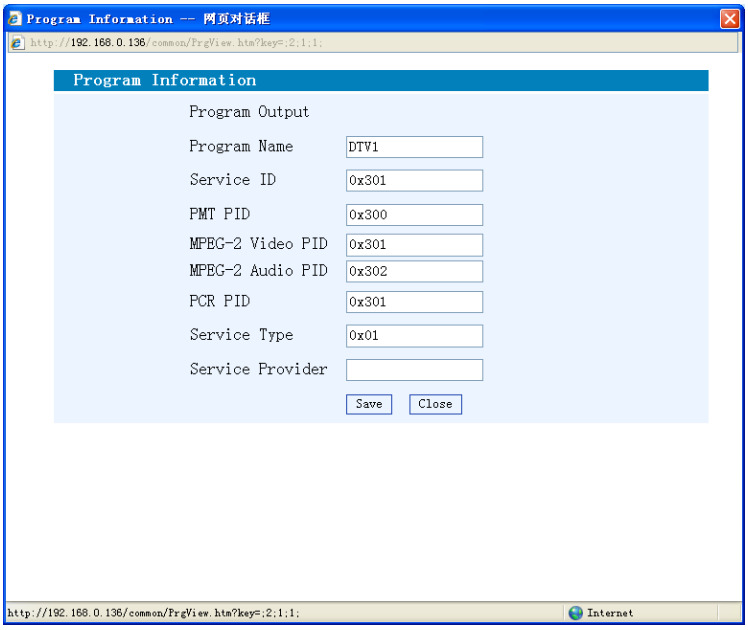
PID Pass Click this button to trigger a dialog box as below, where to add the PIDs which need pass through.

In some occasions, there are some PIDs which won’t belong to any program, such as EPG, NIT tables and so on which user just wants to pass them through the multiplexing module without changing anything. This is the main purpose of this function.

Click "Add" Add to add more boxes for filling the Input & Output PIDs, then click "Apply" to confirm.

Program Info Modification:

1 DTV1 Choose one output program and double click it to trigger a box below, where user can modify the output program information.



IP Output

Click "IP Output", it will display the interface where to configure the output IP stream in MPTS or SPTS the as Figure-5.

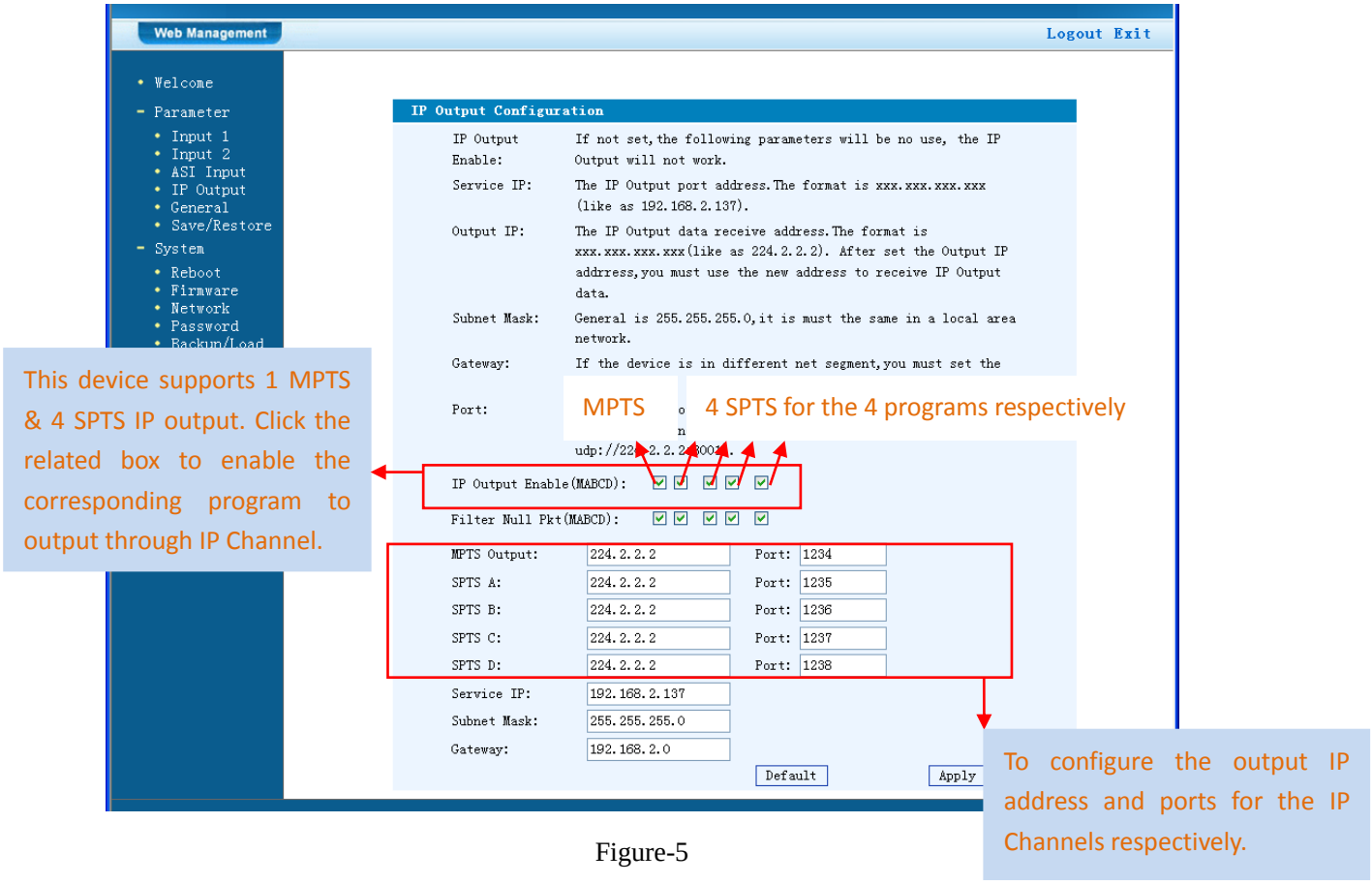


Figure-5

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

General

Clicking “General” from the menu, it will display the interface as Figure-6 where to set the network info for the output TS

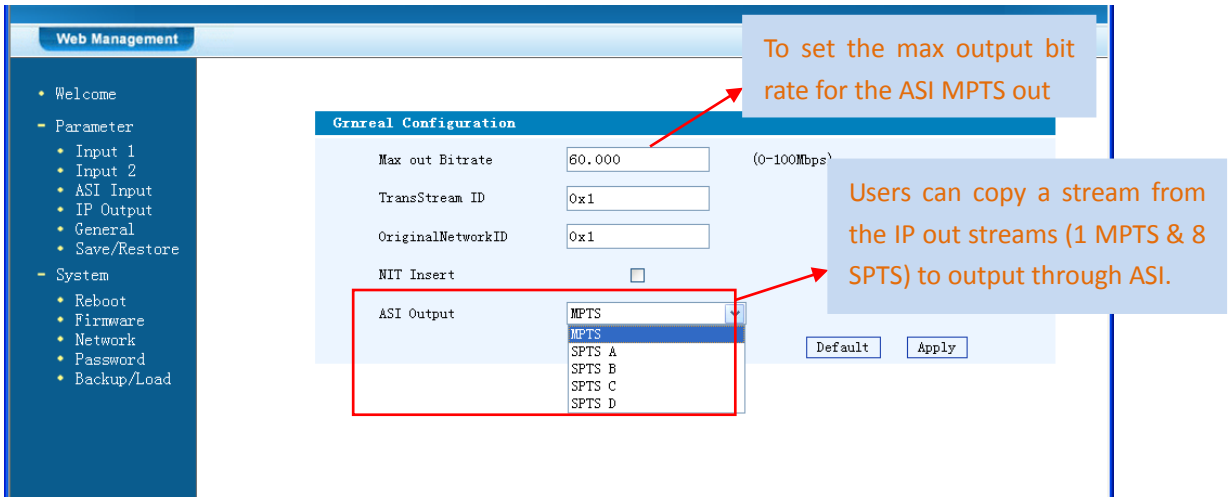


Figure-6

Save/Restore

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

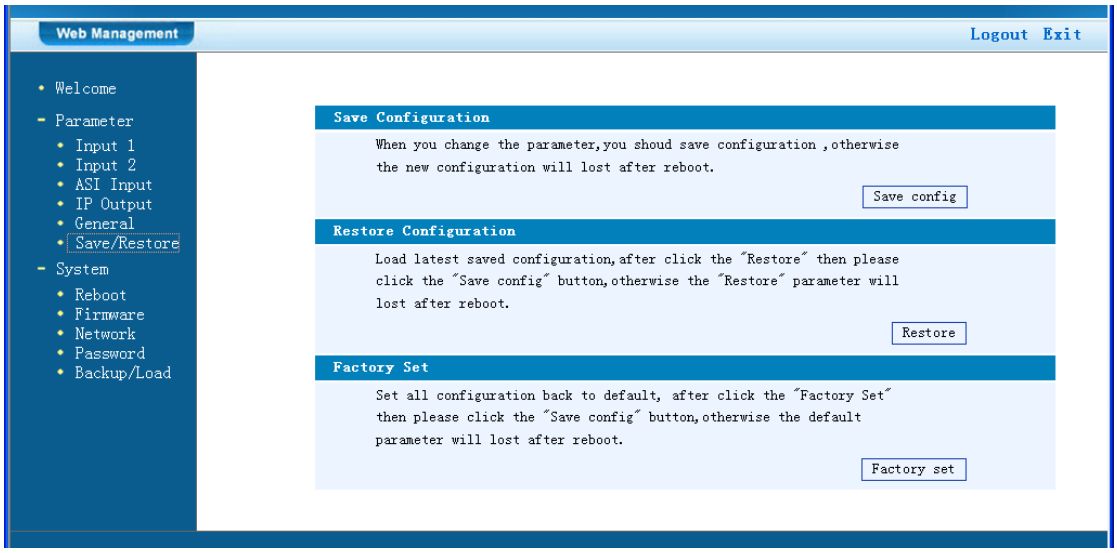


Figure-7

Restart the Device

Click “Reboot” from the menu, the screen will display as Figure-8. Here when clicking “Reboot” box, it will restart the device automatically.

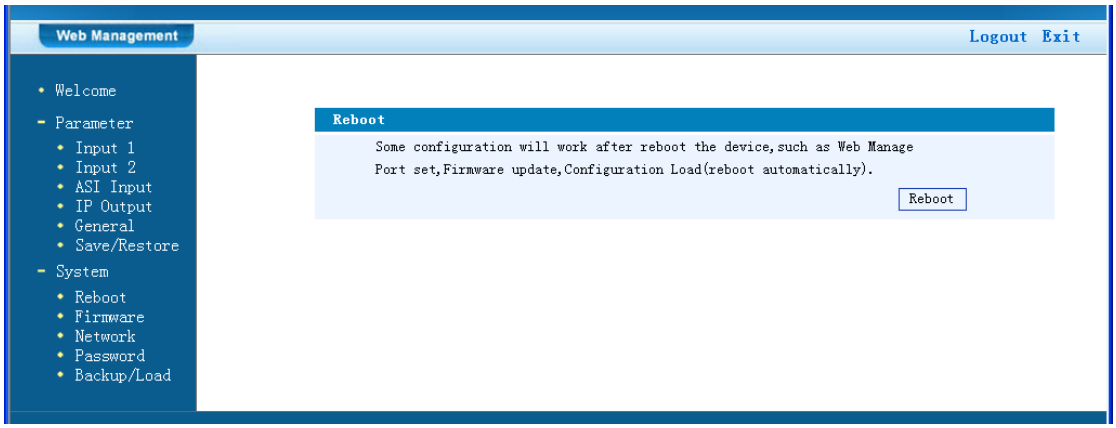


Figure-8

Update the Device

Click “Firmware” from the menu it will display the screen as Figure-9. 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.

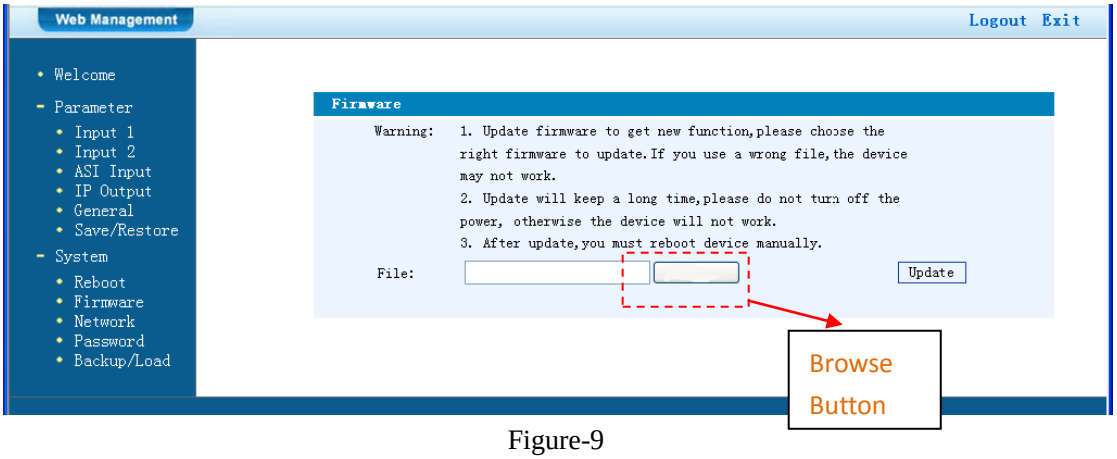


Figure-9

Network

When user clicks “Network”, it will display the screen as Figure-10. It displays the network information of the device. Here user can change the device network configuration as needed.

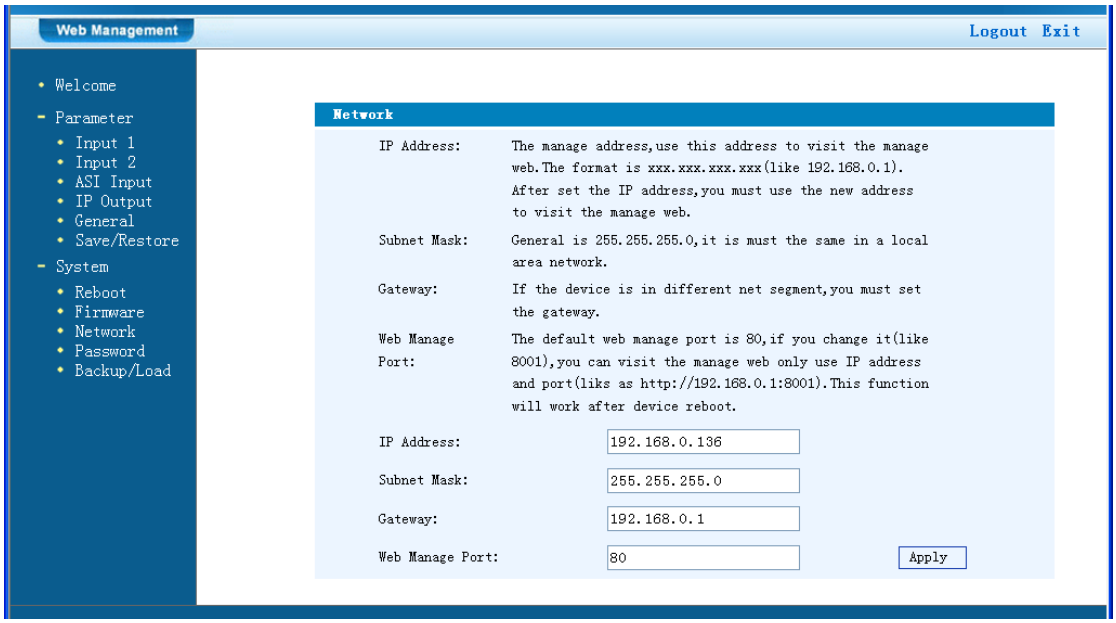


Figure-10

Change Password

When user clicks “Password”, it will display the password screen as Figure-11. Here user can change the Username and Password for login to the device.

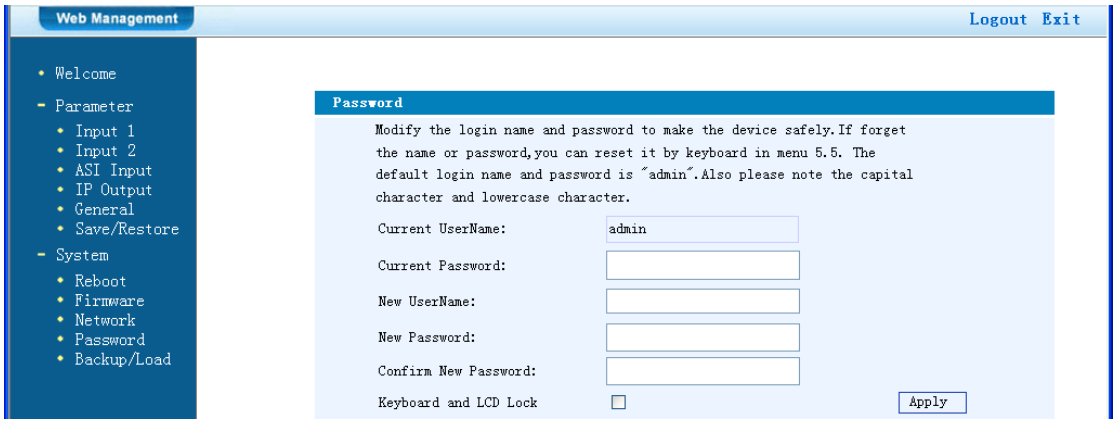


Figure-11

- 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, it will display the screen as Figure-12.

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.

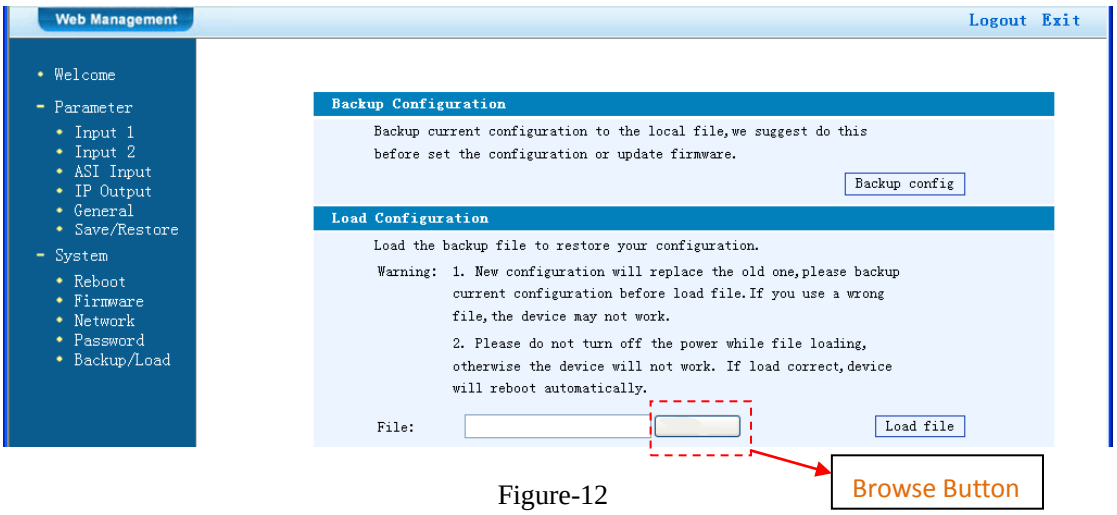


Figure-12

Chapter 5 Low Delay

INTERNAL TEST REPORT OF DELAY

The values of average delay cover the progress from Encoding end to Decoding end.

DTS mode refers to low latency mode: (Mode1: DTS=1; Mode2: DTS=40)

Encoding Details					Average Latency (ms)
Single Source Interface	Bit Rate	Resolution	DTS Mode	Encoding Type	
HDMI	14M	1080i@50	Mode 1	mpeg2	343
				H.264	375
			Mode 2	mpeg2	460
				H.264	513
		720p@50	Mode 1	mpeg2	243
				H.264	400
			Mode 2	mpeg2	405
				H.264	408
		576i@50	Mode 1	mpeg2	418
				H.264	518
			Mode 2	mpeg2	520
				H.264	593
SDI	14M	1080i@50	Mode 1	mpeg2	230
				H.264	310
			Mode 2	mpeg2	400
				H.264	440
		720p@50	Mode 1	mpeg2	220
				H.264	350
			Mode 2	mpeg2	300
				H.264	400
		576i@50	Mode 1	mpeg2	400
				H.264	500
			Mode 2	mpeg2	460
				H.264	570

Chapter 6 Troubleshooting

ISO9001 quality assurance system has been approved by CQC organization. For guarantee the products' quality, reliability and stability. All our products have been passed the testing and inspection before ship out factory. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by our company. To prevent potential hazard, please strictly follow the operation conditions.

Prevention Measure

- Installing the device at the place in which environment temperature between 0 to 45 ℃
- Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary
- Checking the input AC within the power supply working range and the connection is correct before switching on device
- Checking the RF output level varies within tolerant range if 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 greater than 10 seconds.

Conditions need to unplug power cord

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

Chapter 7 Packing List

Encoder	1PC
User Manual	1PC
SDI Cables	4PCs
Power Cord	1PC