User Manual

4K HDMI RF CATV Modulator and IPTV Encoder

H-4K-QUAD-MOD

DIRECTORY

Chapter 1 Product Introduction

1.1 Outline

H-4K-QUAD-MOD 4K encoder modulator is THOR's new breakthrough all-in-one devices which integrate encoding (H.264 /H.265) and modulating to convert V/A signals into Digital RF output. It is equipped with 4 HDMI channels input and 1 ASI input(optional) and output via 2 ASI ports(optional) and 1 DATA (4*SPTS or 2 or 4 MPTS--as per carrier numbers)output over UDP, RTP/RTSP. The latency has been greatly reduced to achieve an extremely low value from the encoding progress to the decoding terminals.

It adopts an inner drawer-type structural design which greatly facilitates the change of encoding modules as needed. The signals source could be from satellite receivers, closed-circuit television cameras, Blue-ray players, and antenna etc.

1.2 Main Features

- **HDMI input with H.265/h.264 video（4K encoding for H.265 only）**
- **DVB-C/DVB-T/ISDB-T/ATSC RF OUT for order option**
- **IP output over UDP, RTP/RTSP from the 100/1000M self-adaptive data port**
- **Support AC3 Pass-through**
- **Support OSD (logo/QR Code) insertion，logo in PPT form is available**
- **Support CC (Closed Caption) /Teletext (CC is not available for H.265 at present)**
- **Excellent modulation quality**
- **LCN support (Logical Channel Number)**
- **LCD Screen for easy management**

1.3 Technical Specifications

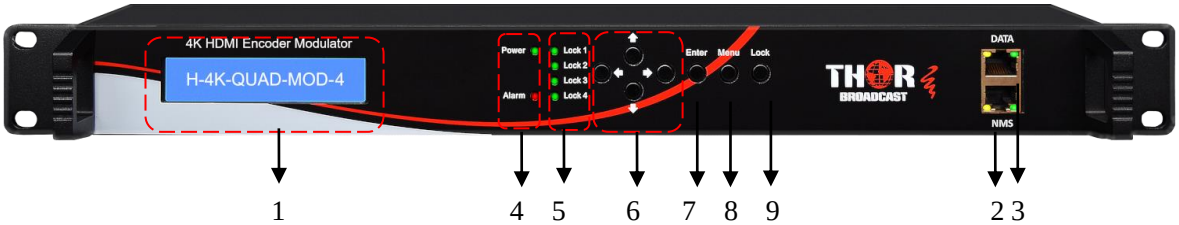
Input	2/4 HDMI in. 2/4 HDMI loop out 1 ASI in for re-mux

Video	Resolution	3840*2160_60/50P(H.265 only), 1920*1080_60/59.94/50P, 1280*720_60/59.94/50P,			
	Encoding	HEVC/ H.265 , MPEG 4 AVC/H.264			
	Bit-rate	2Mbps~20Mbps			
	Rate Control	CBR/VBR			
	Chroma	Input:4:4:4/4:2:2; output:4:2:0			
	GOP Structure	IBBP, IPPP			
Audio	Encoding	MPEG-1 Layer 2, LC-AAC, HE-AAC and AC3 Pass through			
	Sampling rate	32KHz,44.1KHz,48KHz			
	MPEG-1 Layer 2 /LC-AAC Bit-rate	48Kbps~384Kbps			
	HE-AAC Bit-rate	24 Kbps~128 Kbps			
	HE-AAC V2 Bit-rate	18 Kbps~56 Kbps			
Multiplexing	Maximum PID Remapping	255 input per channel			
	Function	PID remapping (automatically or manually)			
		Accurate PCR adjusting			
		Generate PSI/ SI table automatically			
Modulation	DVB-C	QAM Channel	4*DVB-C carriers		
		Standard	EN300 429/ITU-T J.83A/B		
		MER	≥40db		
		RF frequency	50~960MHz, 1KHz step		
		RF output level	-20~+3dbm, 0.1db step		
		Symbol Rate	3.000~9.000Msps adjustable		
		Constellation	J.83A	J.83B	J.83C
			16/32/64/128/256QAM	64/256QAM	64/256QAM
		Bandwidth	8M	6M	6M
	DVB-T	Standard	EN300744		
		Transmission Mode	2K,4K, 8K		
		Bandwidth	6M, 7M, 8M		
		Constellation	QPSK, 16QAM, 64QAM		
		Guard Interval	1/32, 1/16, 1/8, 1/4		
		MER	≥42 dB		
		RF frequency	50~960MHz, 1KHz step		
		RF out	4*DVB-T carriers		
		RFoutput level	-28~ -3 dBm, 0.1db step		
	ATSC	Standard	ATSC A/53		

		Bandwidth	6M
		Constellation	8VSB
		MER	≥40dB
		RF frequency	50~960MHz, 1KHz step
		RF out	4*ATSC carriers
		RF output level	-20~+3dbm(for all carriers), 0.5db stepping
	ISDB-T	Standard	ARIB STD-B31
		Bandwidth	6M
		Constellation	QPSK, 16QAM, 64QAM
		Guard Interval	1/32, 1/16, 1/8, 1/4
		Transmission Mode	2K, 4K, 8K
		Code rate	1/2, 2/3, 3/4, 5/6, 7/8
		MER	≥40dB
		RF frequency	50~960MHz, 1KHz step
		RF out	2*ISDBT carriers
		RF output level	-20dBm~+3dBm, 0.1dB stepping
Stream output	2 ASI out(BNC type, same one mirror out TS as one of 4/2 MPTS outputs and 4 SPTS outputs) DVB-C/DVB-T/ATSC: IP (4 MPTS & 4 SPTS) out over UDP, RTP/RTSP ISDBT: IP (2 MPTS & 4 SPTS) out over UDP,RTP/RTSP		
System function	Network management(WEB)		
	Chinese and English language		
	Ethernet software upgrade		
Miscellaneous	Dimension(W×L×H)	482mm×328mm×44mm	
	Environment	0~45℃(work)；-20~80℃（Storage）	
	Power requirements	AC 110V± 10%, 50/60Hz, AC 220 ± 10%, 50/60Hz	

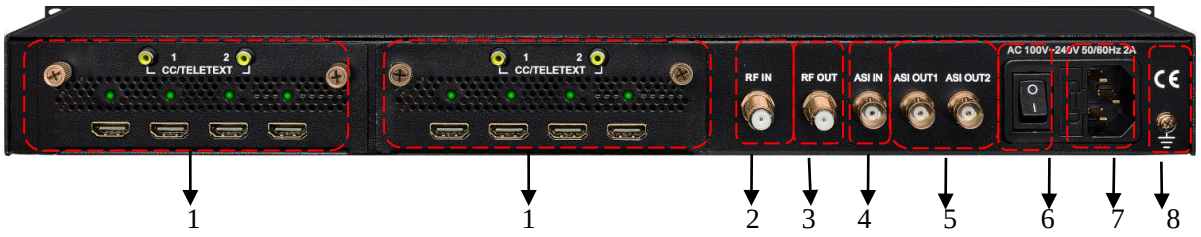
1.4 Appearance and Illustration

Front Panel Illustration:



1. LCD Screen
2. NMS Port
3. DATA Port
4. Power and Alarm Indicators
5. Lock 1 and Lock 2: HDMI/SDI input locking status; Lock 3: ASI in locking status. Lock 4: useless
6. Up and Down, Left and Right Buttons
7. Enter Button: for confirm
8. Menu Button: for back step
9. Lock Button: To Lock the screen / cancel the lock state

Rear Panel Illustration:



1. HDMI&CC/Teletext Input interface
2. RF in for mix
3. RF Output interface
4. ASI in for mux
5. ASI out
6. Power Switch
7. Power Socket
8. Grounding

Chapter 2 Installation Guide

2.1 Acquisition Check

When users open the package of the device, it is necessary to check items according to packing list. Normally it should include the following items:

- Encoder Modulator
- Power Cord
- Ground lead

If any item is missing or mismatching with the list above, please contact local dealer.

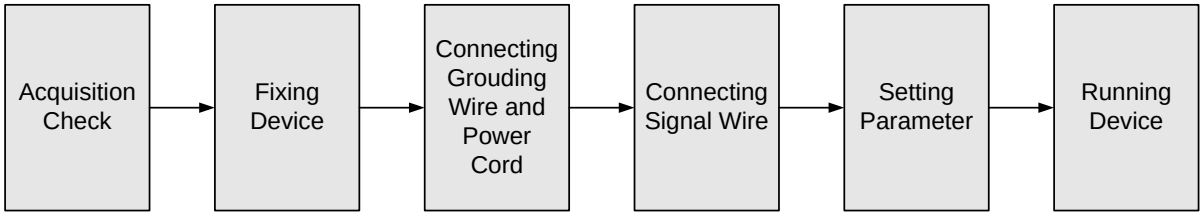
2.2 Installation Preparation

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

The main content of this chapter including:

- Checking the possible device missing or damage during the transportation
- Preparing relevant environment for installation
- Installing Encoder Modulator
- Connecting signal cables
- Connecting communication port (if it is necessary)

2.2.1 Device's Installation Flow Chart is Illustrated as following：



2.2.2 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine 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: 1M (Floor bearing should be greater than 450Kg/㎡)
Environment Temperature	5~40℃(sustainable)，0~45℃(short time)， installing air-conditioning is recommended
Relative Temperature	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 power 220V 50Hz. Please carefully check before running.

2.2.3 Grounding Requirement

- All function modules' good grounding designs are 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.
- Coaxial cable's outer conductor and isolation layer should keep proper electric conducting with the metal housing of device.
- 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 $25mm^2$.

2.2.4 Frame Grounding

All the machine frames should be connected with protective copper strip. The grounding wire should be as short as possible and avoid circling. The area of the conduction between grounding wire and grounding strip should be no less than 25mm^2.

2.2.5 Device Grounding

Connecting the device's grounding rod to frame's grounding pole with copper wire.

2.3 Wire's Connection

The grounding wire conductive screw is located at the right end of rear panel, and the power switch, fuse, power supply socket is just beside ,whose order goes like this, power switch is on the left ,power supply socket is on the right and the fuse is just between them.

- Connecting Power Cord

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

- Connecting Grounding Wire

  When the device solely connects to protective ground, it should adopt independent way, say, share the same ground with other devices. When the device adopts united way, the grounding resistance should be smaller than 1Ω.

☞Caution:

Before connecting power cord to this Encoder Modulator, user should set the power switch to "OFF".

Chapter 3 Keyboard Operation

This Encoder Modulator's front panel is user-operating interface. Before operating, users can decide whether directly use the default setting or customize the input and output parameters setting. The detailed operations go as follows:

Keyboard Function Description:

ENTER: Activating the parameters which need modifications, or confirming the change after modification.

MENU: To cancel presently entered value, resume previous setting and return to previous menu.

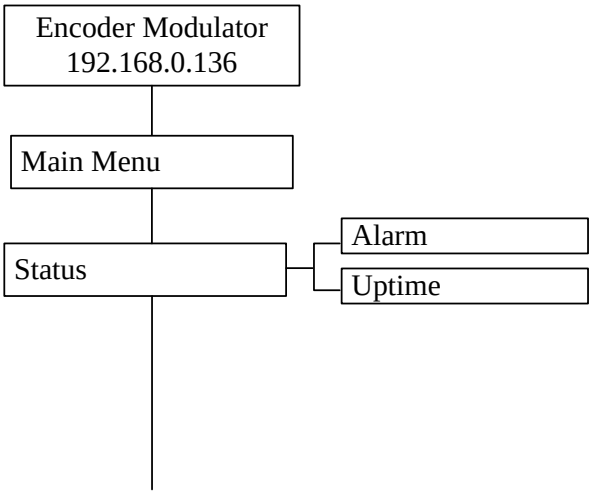
LEFT/RIGHT: To move the "►" to choose or set the parameters.

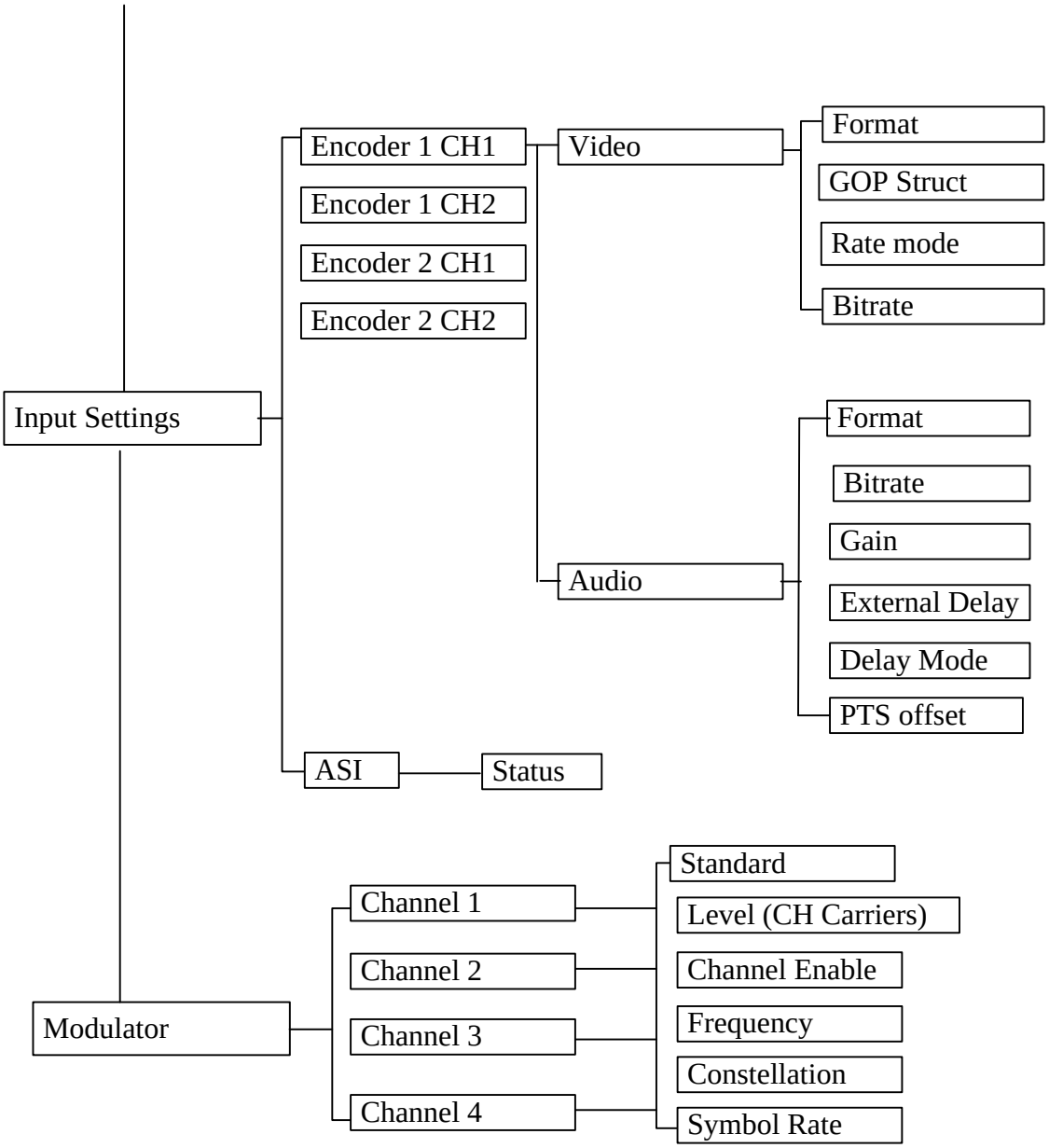
UP/DOWN: To modify activated parameter or page up/down when parameter is inactivated.

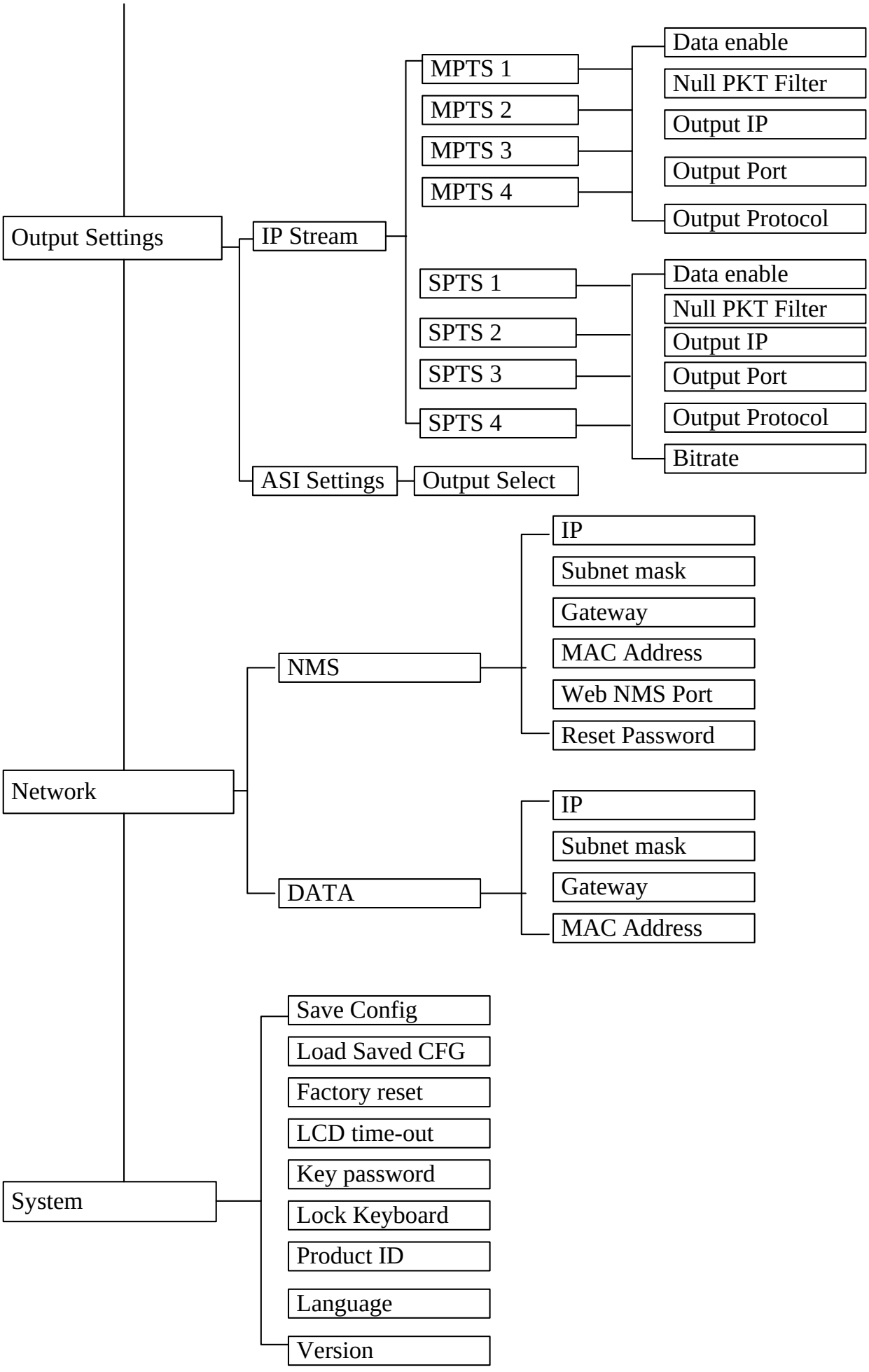
LOCK: To Lock the screen / cancel the lock state. After pressing lock key, the system will question the users to save present setting or not. If not, the LCD will display the current configuration state.

At the "Factory Configuration" page, user can press "ENTER" key to restore the factory default configuration.

3.1 LCD Menu Tree


Encoder Modulator
192.168.0.136
Main Menu
Status
Alarm
Uptime


Input Settings
Encoder 1 CH1
Encoder 1 CH2
Encoder 2 CH1
Encoder 2 CH2
Video
Format
GOP Struct
Rate mode
Bitrate
Audio
Format
Bitrate
Gain
External Delay
Delay Mode
PTS offset
ASI
Status
Modulator
Channel 1
Channel 2
Channel 3
Channel 4
Standard
Level (CH Carriers)
Channel Enable
Frequency
Constellation
Symbol Rate


Output Settings
IP Stream
MPTS 1
MPTS 2
MPTS 3
MPTS 4
Data enable
Null PKT Filter
Output IP
Output Port
Output Protocol
SPTS 1
SPTS 2
SPTS 3
SPTS 4
Data enable
Null PKT Filter
Output IP
Output Port
Output Protocol
Bitrate
ASI Settings
Output Select
Network
NMS
IP
Subnet mask
Gateway
MAC Address
Web NMS Port
Reset Password
DATA
IP
Subnet mask
Gateway
MAC Address
System
Save Config
Load Saved CFG
Factory reset
LCD time-out
Key password
Lock Keyboard
Product ID
Language
Version

Chapter 4 WEB NMS operation

Users can not only use front buttons for setting configuration, but also 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 this device IP address; otherwise, it would cause IP conflict.

4.1 login

The default IP address of this model is https://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.

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 0 to 255 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. Type the Username and Password (User name: admin, and Password: m89xC2F7) and then click "LOGIN" to start the device setting.

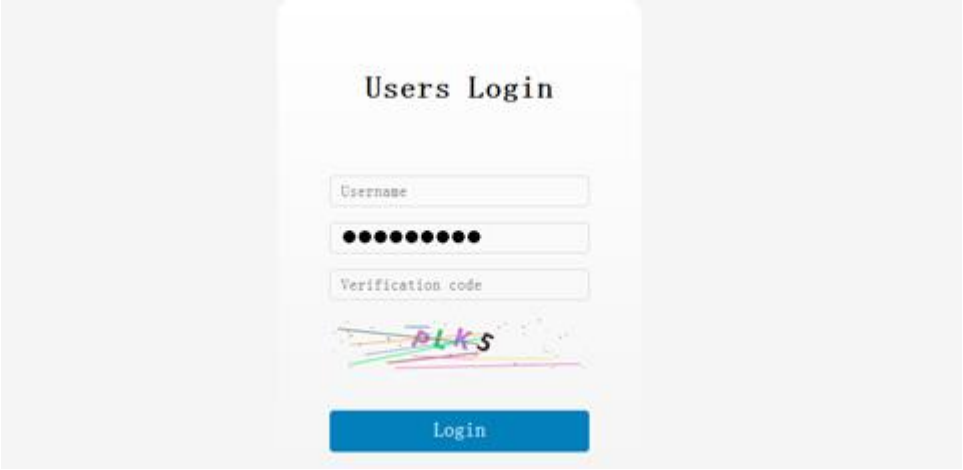


Figure-1

4.2 Operation

Summary-Status

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

Figure-2

Parameters-Encoder 1

From the menu on left side of the webpage, clicking “Encoder 1”, it displays the information of the programs from the 1st encoding board（HDMI board）as Figure-3.

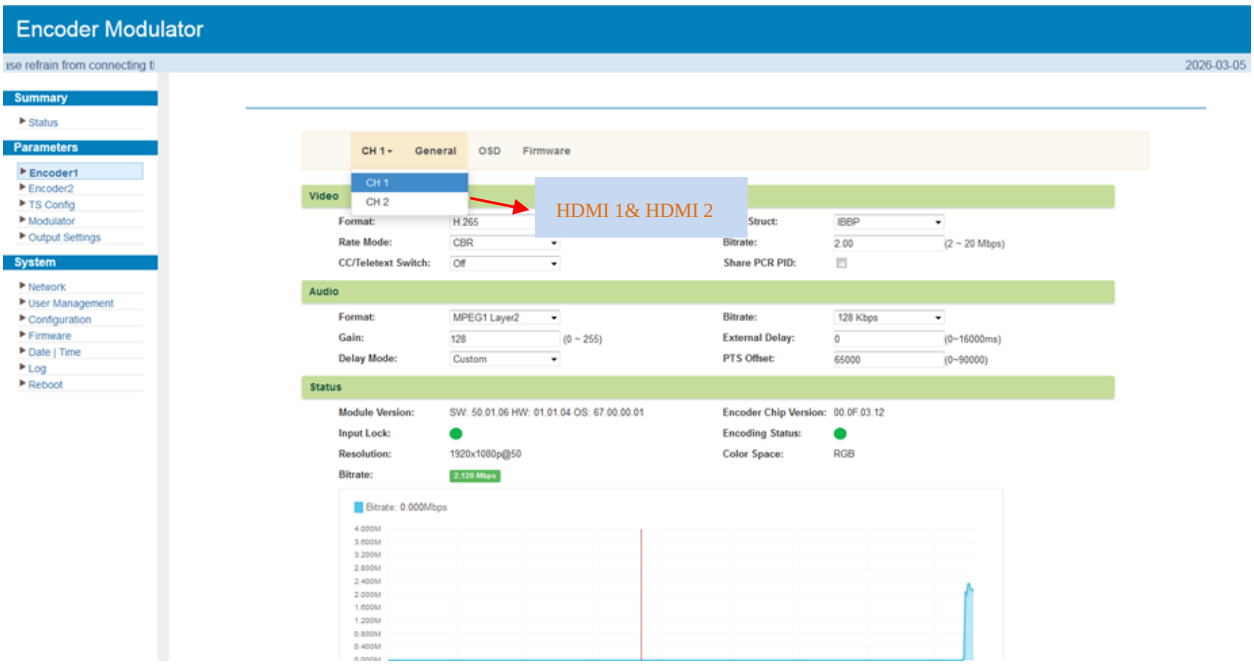


Figure-3

And check the box of Advanced Mode to get a more detailed parameter-setting menu as Figure-4.

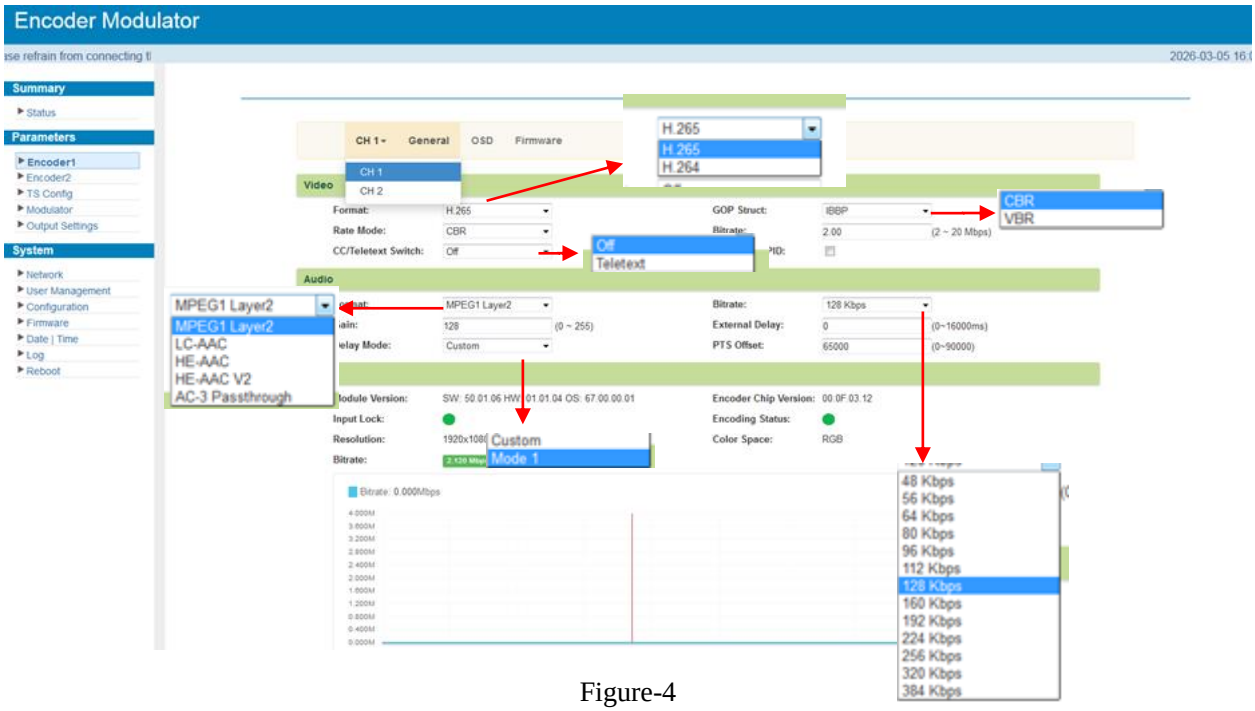


Figure-4

Low Delay setting

This encoder modulator can achieve the low delay from encoding side to STB decoding side. User can configure the low delay option accordingly in the Web GUI as Figure-5:

Figure-5

There are 2 low delay options:

1. **Custom:** to disable the low delay function.
2. **Mode 1:** to activate the low delay function in the default Mode 1 configuration.

The delay is mainly affected by the different combination of **Video Format**, **Video Bit-rate**, **Low delay Mode** and **the Resolution** of signal source etc.

- **NOTE:** The delay duration will also be impacted as the decoding performance of the STB side change. Users need to apply a well-performed STB or other decoding terminals to achieve a low delay.

OSD setting

Click “OSD Settings” on the top column and it displays interface as Figure-6/7. User can insert the logo, QR code and Caption.

Logo–logo insert configuration

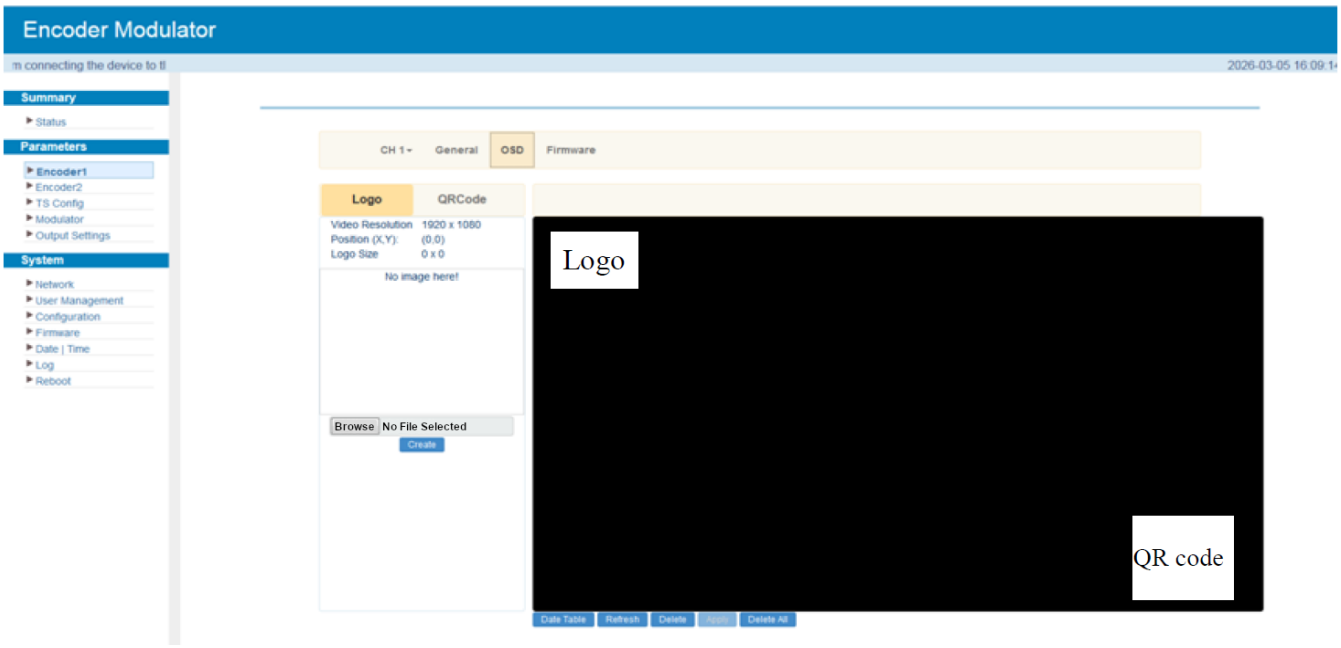


Figure-6

QR code– QR code insert configuration

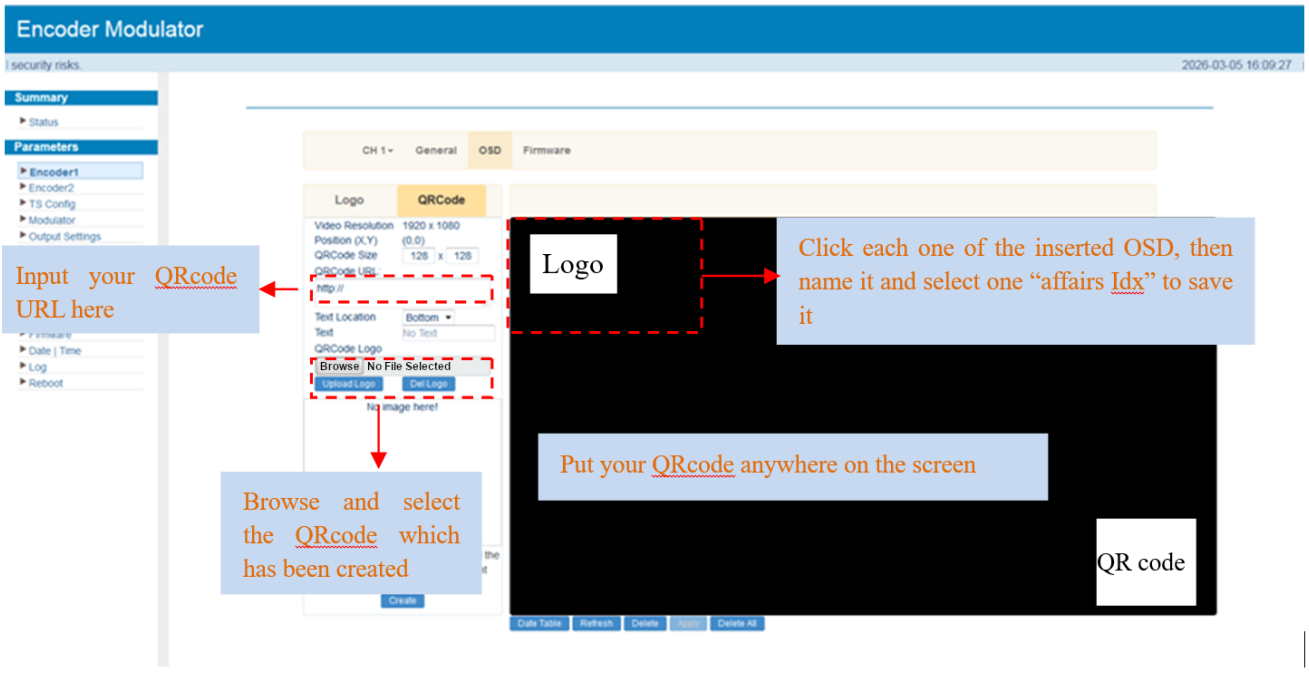


Figure-7

Firmware setting

Click “Firmware Setting” on the top column and it displays interface as Figure-8. User can update SW/HW for this encoding module separately.

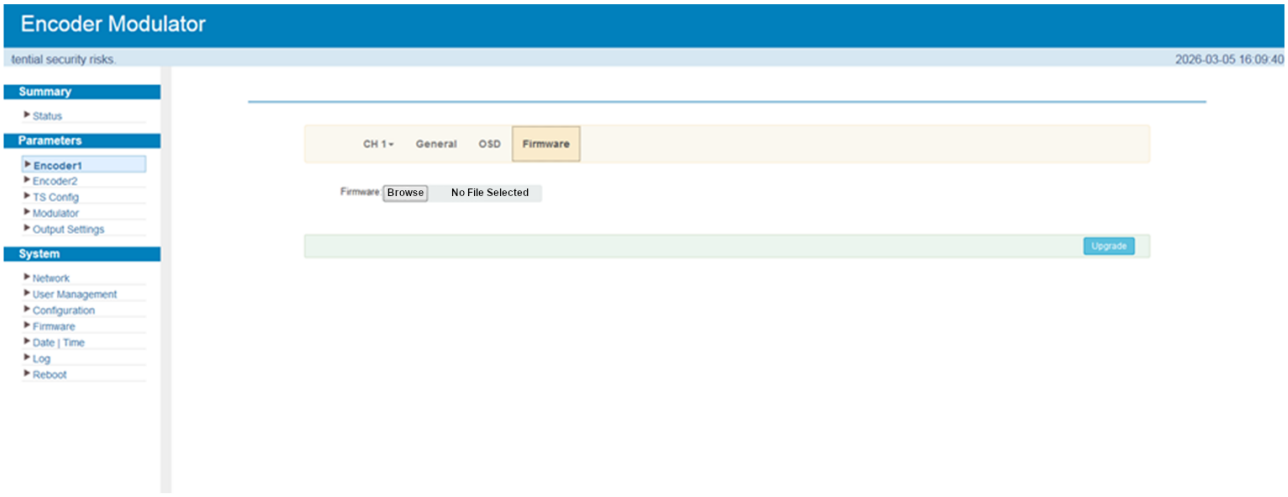


Figure-8

Parameters-Encoder 2

The operation of Encoder 2 part is same with Encoder 1 part

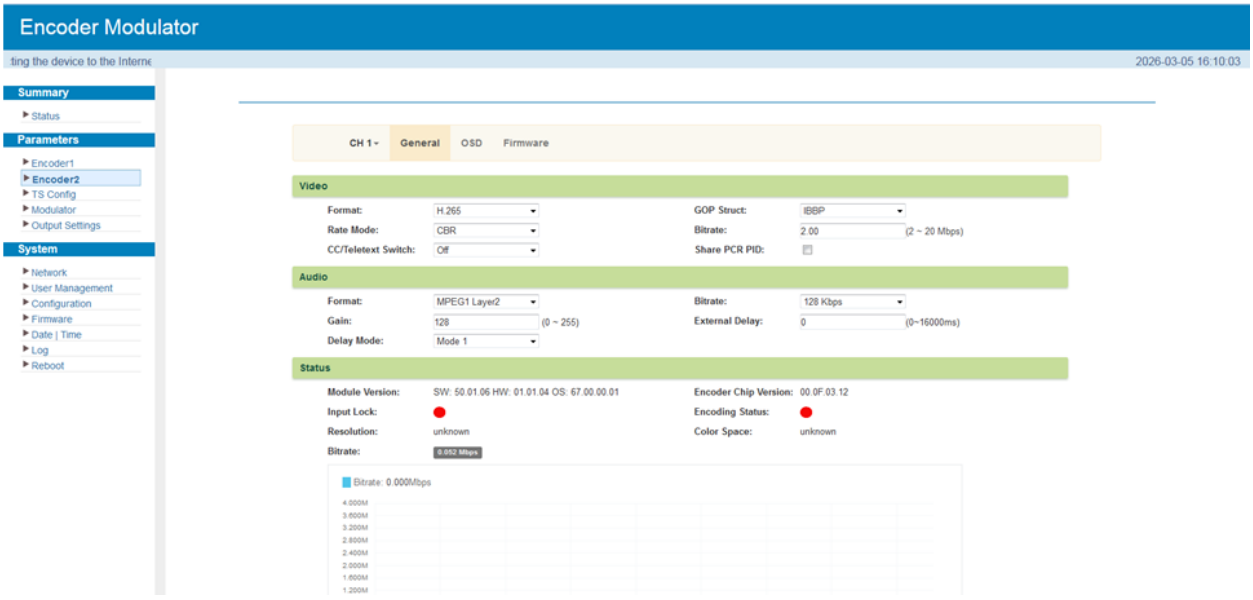


Figure-9

Parameters-TS Config

Click “TS Config”, it will display the encoded program information as Figure-10. Users can parse and multiplex encoded programs in this interface.

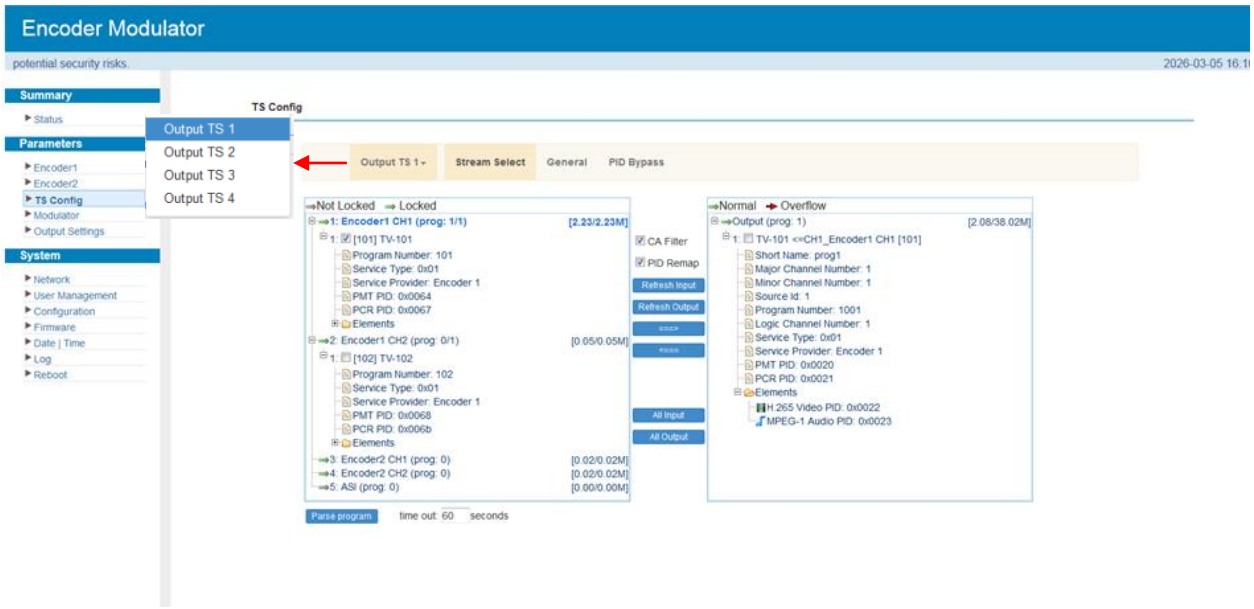


Figure-10

Output TS 1/2/3/4 represents the 4 carrier outputs and 4 MPTS/4SPTS out. Users can configure different program group for each carrier output as needed.

☑CA Filter : To enable/disable the CA filter

☑PID Remap: To enable/disable the PID remapping

Refresh Input To refresh the input program information

Refresh Output To refresh the output program information

==> Select the wanted input program(s) firstly and click this button to transfer the selected program(s) to output.

<== Cancel the multiplexed programs from the output area after your program selection.

All Input To select all the input programs

All Output To select all the output programs

Parse program To parse programs time out: 60 seconds time limitation of parsing input programs

Parameters-General

Click “General” from the menu to set Character Encoding option according to the program name language, VCT and NIT etc as Figure-11.

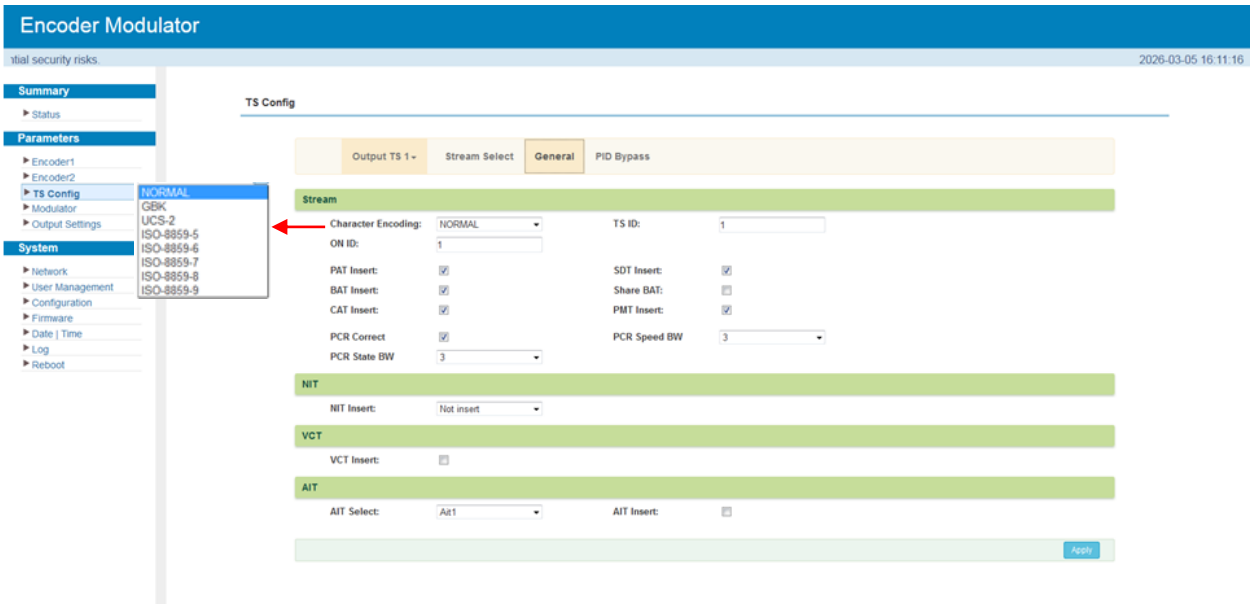


Figure-11

Set Web Insert for NIT Insert and Click "+" from this page, it will display the screen as Figure-12 where it requires to add NIT descriptor. Please follow your configuration in Modulator page to edit the NIT descriptor.

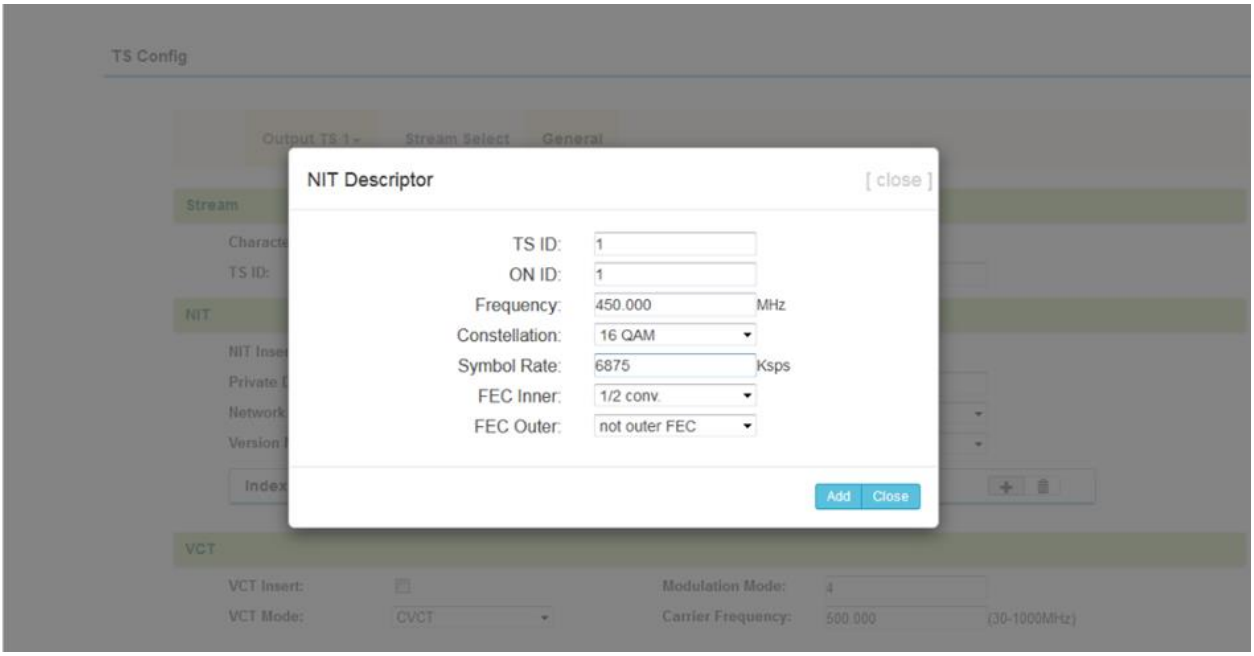


Figure-12

PID Bypass

Click "PID Bypass" from the menu to set PID Pass-through as Figure-13.

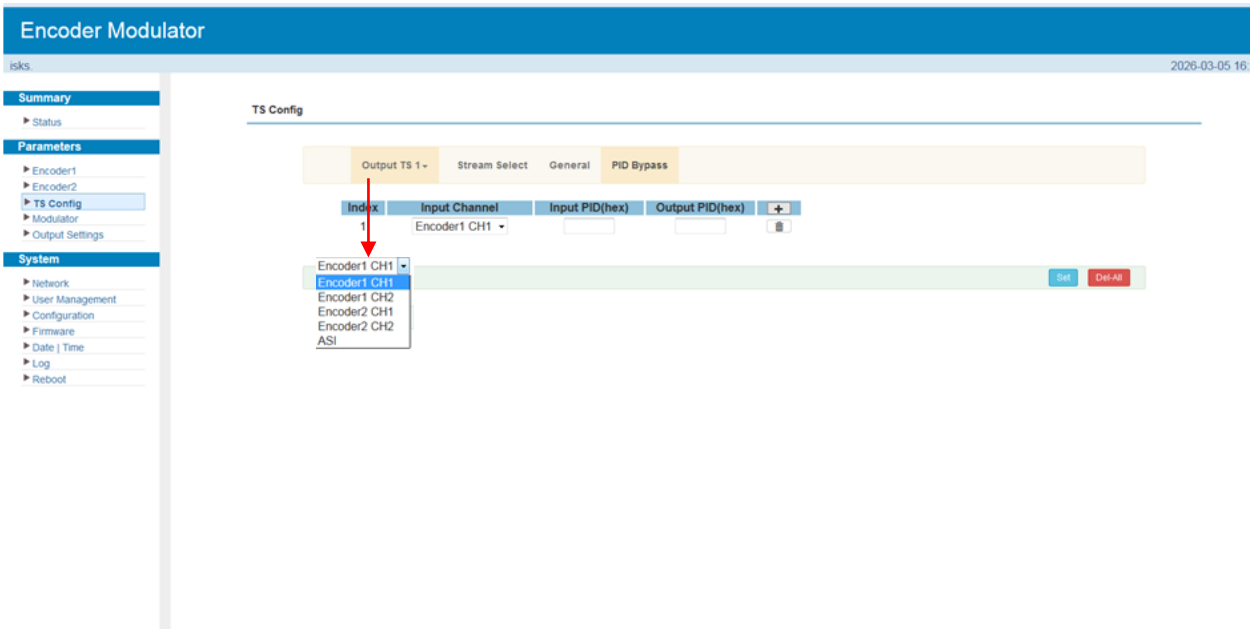


Figure-13

Parameters-Modulator

This unit is equipped with 4 DVB-C frequencies output. User can configure the modulation parameters of the 4 carrier outputs by clicking the .

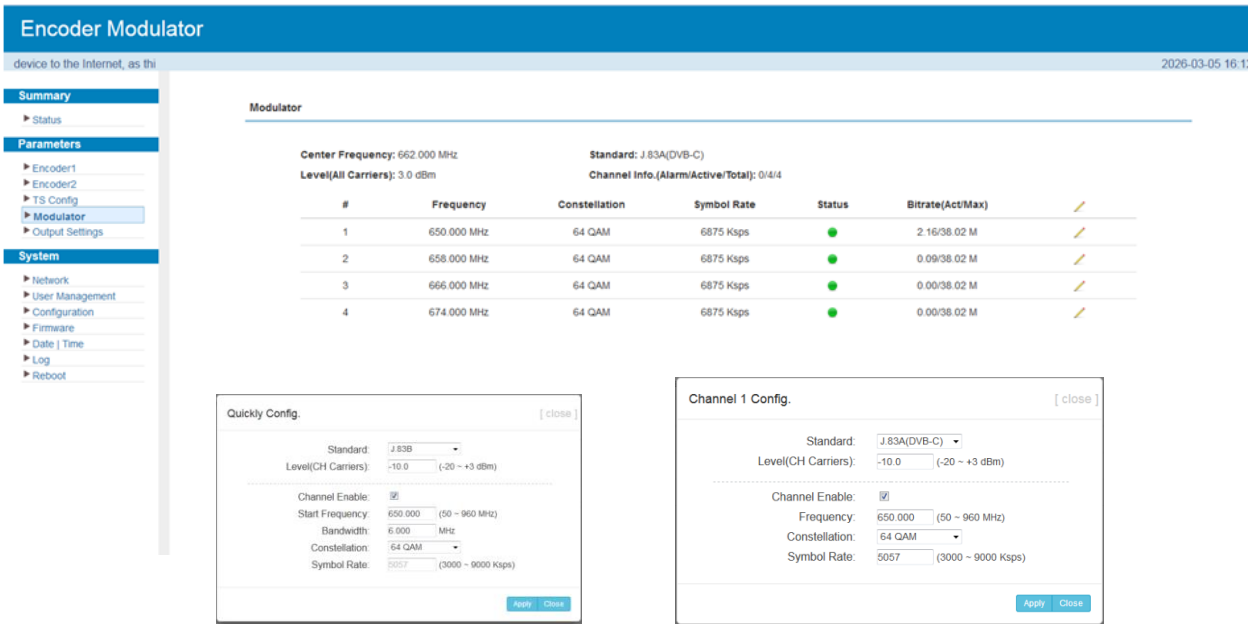


Figure-14

Parameters-Output Settings

Click “Output Settings” from the left menu, it will display the page as Figure-15 where to configure the 4 MPTS output and 4 SPTS Output by clicking the .

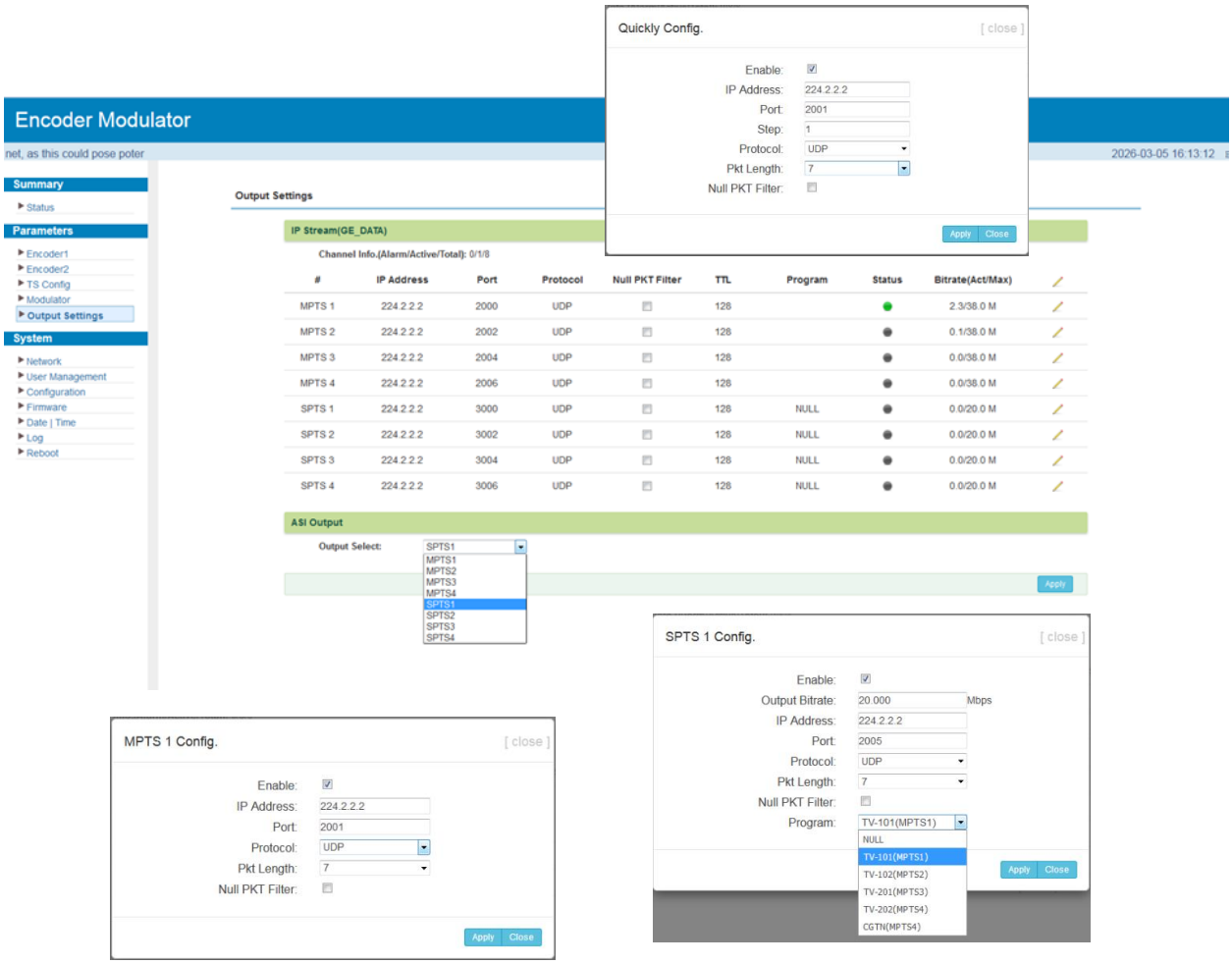


Figure-15

System-Network

When user clicks “Network”, it will display the page as Figure-16. It displays the network information of the device. Here users can change the device network configuration as needed.

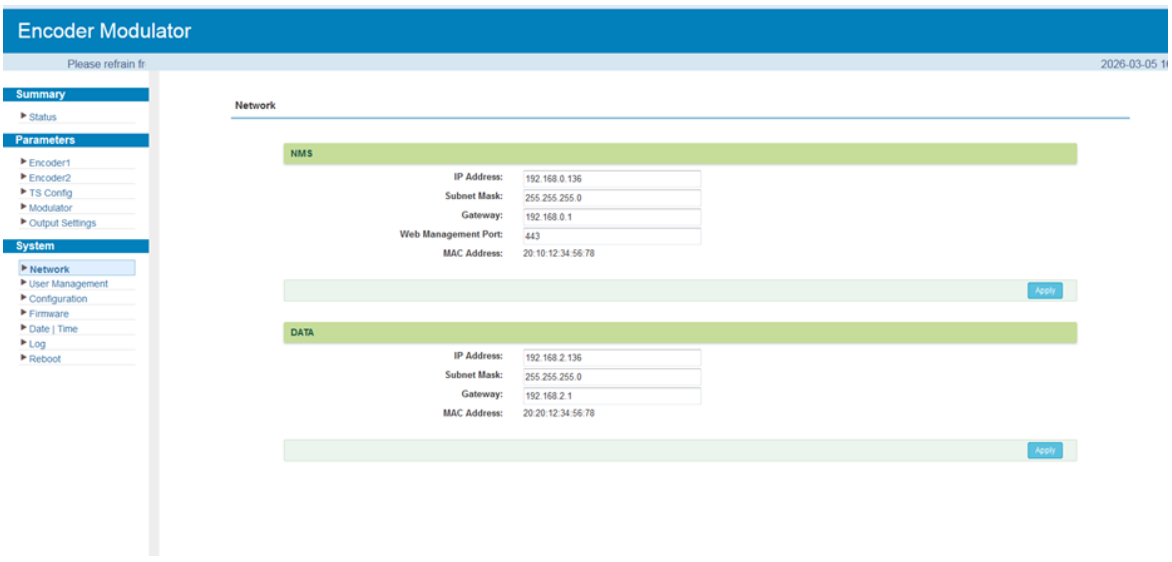


Figure-16

System-User Management

From the menu on left side of the webpage, clicking “User Management”, it will display the screen as Figure-17 where to set the login account and password for the web NMS.

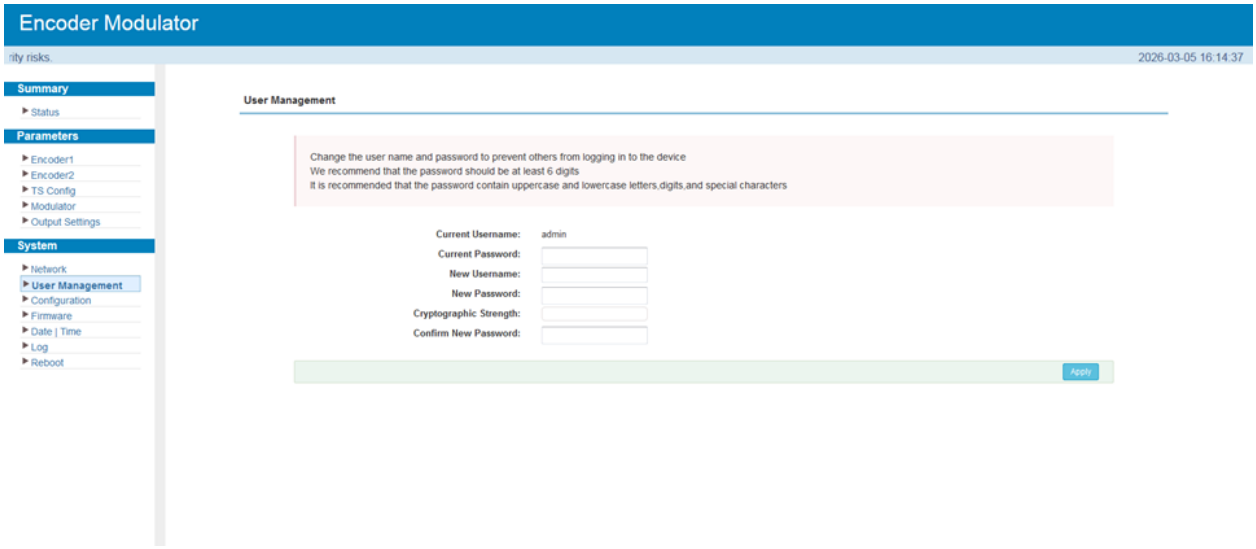


Figure-17

System-Configuration

From the menu on left side of the webpage, clicking “Configuration”, it will display the page as Figure-18 where to save, restore, make factory set, backup and load your configurations.

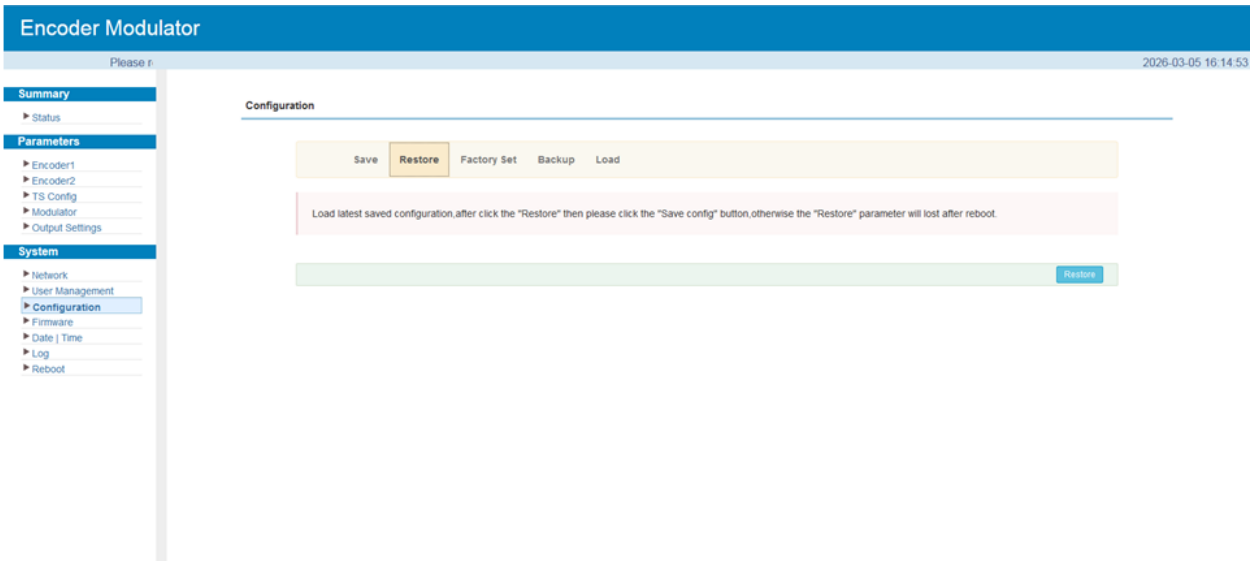


Figure-18

System-Firmware

From the menu on left side of the webpage, clicking “Firmware”, it will display the screen as Figure-19 where to update firmware for the device.

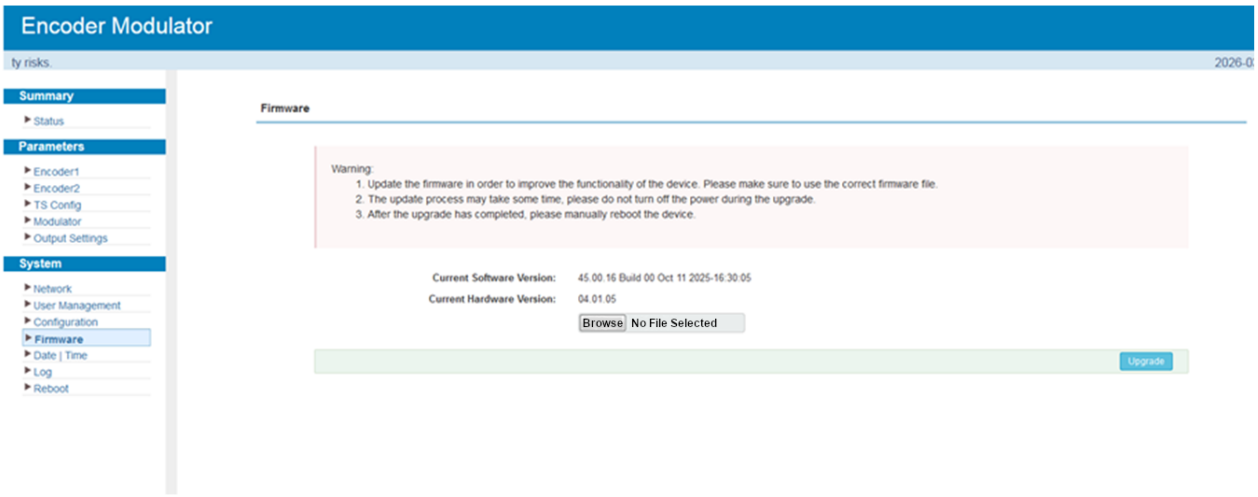


Figure-19

System-Date | Time

Users can set time zone and configure NTP server to update Date and Time in the device.

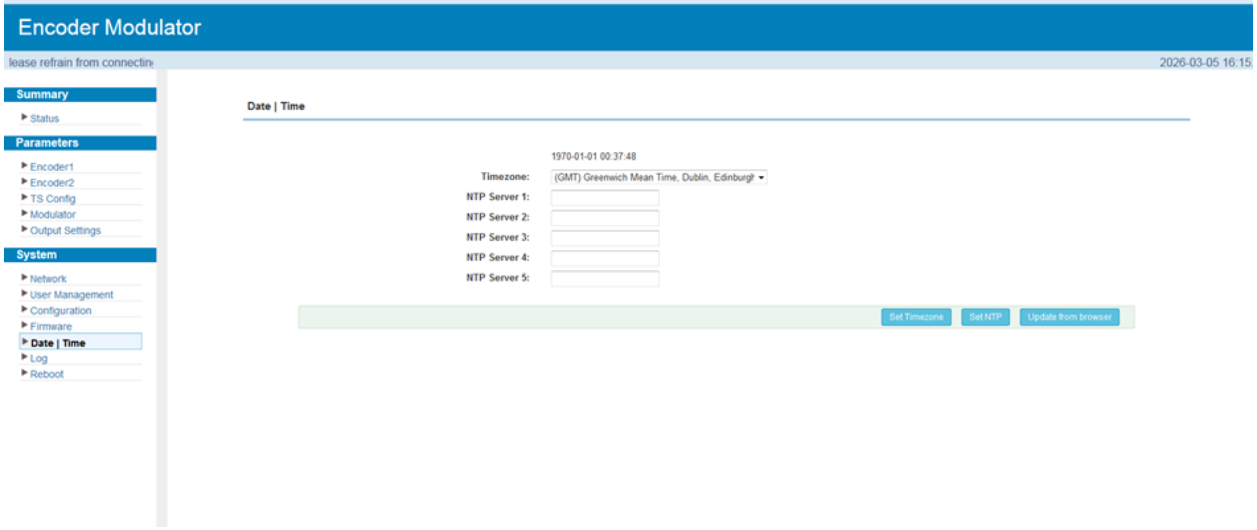


Figure-20

System-Log:

The Kernel and System log here are for the R&D debugging reference.

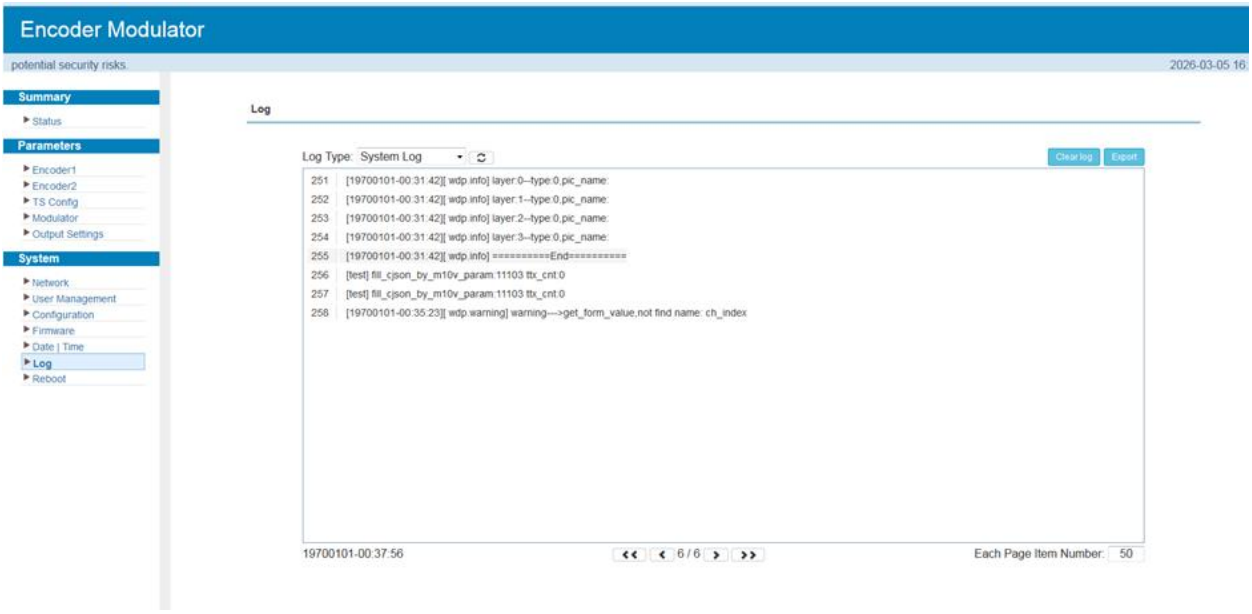


Figure-21

System-Reboot:

User need to reboot the equipment when change the configuration

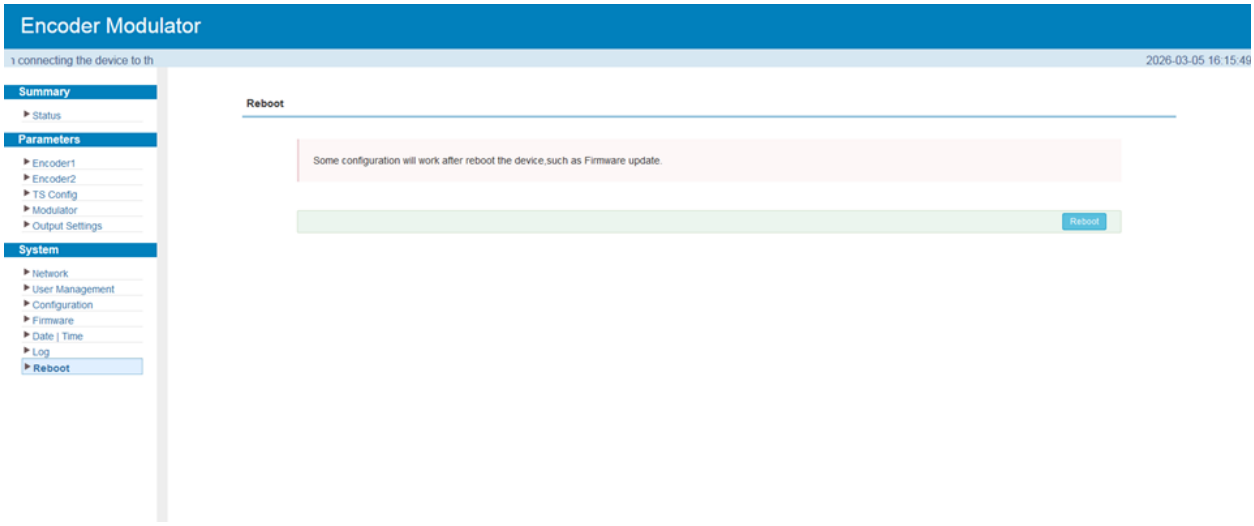


Figure-22

Chapter 5 Troubleshooting

Our ISO9001 quality assurance system has been approved by CQC organization. For guarantee the products' quality, reliability and stability. All of 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 us. 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 °C
- 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 6 Packing list

- Encoder Modulator 1 pc
- Power cord 1 pc
- Ground Lead 1 pc