12 Channel HDMI or SDI CATV RF Modulator IP Encoder QAM/ATSC/DVB-T/ISDB-T

H-12HDMI-QAM-IPLL



H-12HDMI-QAM-IPLL
H-12HDMI-ATSC-IPLL
H-12HDMI-DVB-T-IPLL
H-12HDMI-ISDB-T-IPLL

H-12SDI-QAM-IPLL



H-12SDI-QAM-IPLL
H-12SDI-ATSC-IPLL
H-12SDI-DVB-T-IPLL
H-12SDI-ISDB-T-IPLL

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

Product Overview

The Thor Broadcast H-12HDMI-QAM-IPLL Encoder-RF Modulator is a professional high capacity solution for any headend that requires integration of encoding, multiplexing, scrambling and modulating. It supports 12 HDMI and 12 CC inputs, one DVB-C tuner input and 512 IP input through Data1 (GE) port. It also supports DVB-C RF out with 16 non-adjacent carries and supports 16 MPTS which mirror the 16 carriers through the Data2 (GE) output port. To meet customers' various requirements, it is also equipped with 1 ASI output as mirror of one of RF output carriers. 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.

Key Features

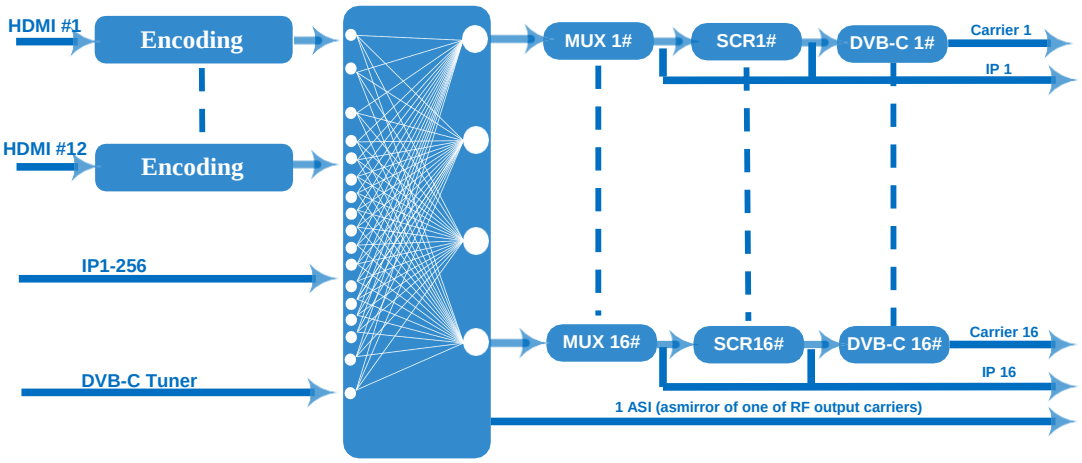
- **12 HDMI inputs with MPEG2 & MPEG4 AVC/H.264 Encoding**
- **12 CC (Closed Caption) inputs**
- **1DVB-C (ATSC optional) tuner input for re-mux**
- **512 IP(DATA1 port only) input over UDP and RTP protocols**
- **MPEG1 Layer II, MPEG2-AAC, MPEG4-AAC, Dolby Digital AC3 (2.0) encoding (Optional), AC3 (2.0/5.1) passthrough**
- **16 groups multiplexing/Scrambling/DVB-C modulating**
- **1 ASI out as mirror of one of RF output carriers**
- **16 MPTS IP (DATA2 port only) output over UDP, RTP/RTSP**
- **PID remapping/ accurate PCR adjusting/PSI/SI editing and inserting**
- **Control via web management, and easy updates via web**

Specifications

Input	12 HDMI inputs 12 CC(closed caption) input, BNC interface 1 DVB-C(ATSC optional) Tuner for re-mux, F type interface 512 IP input over UDP and RTP, DATA1, RJ45		
Video	Resolution	Input	1920*1080_60p, 1920*1080_50p,1920*1080_60i, 1920*1080_50i, 1280*720_60p, 1280*720_50P, 720*480_60i, 720*576_50i
		Output	1920*1080_60p, 1920*1080_50p,1920*1080_60i, 1920*1080_50i, 1440*1080_60i, 1440*1080_50i, 1280*720_60p, 1280*720_50P, 720*576_50p, 720*576_50i, 720*576_30p, 720*576_25p, 720*480_60p, 720*480_60i,720*480_30p, 720*480_25p,320*240_60p,320*240_50p, 320*240_30p, 320*240_25p,320*180_60p, 320*180_50p, 320*180_30p, 320*180_25p, 960*540_50i, 704*576_50i,704*480_60i, 640*576_50i 640*480_60i, 544*576_50i,544*480_60i,
	Encoding	MPEG2 & MPEG4 AVC/H.264	
	Bit-rate	0.8~19Mbps for H.264 encoding 1~19Mbps for MPEG-2 encoding	
	Rate Control	CBR/VBR	
	GOP Structure	GOP B Frame: 0-3, GOP P Frame: 0-6	
	Advanced Pretreatment	De-interlacing, noise reduction	
Audio	Encoding	MPEG1 Layer II, MPEG2-AAC, MPEG4-AAC, Dolby Digital AC3 (2.0) encoding (Optional), AC3 (2.0/5.1) passthrough	
	Sampling rate	48KHz	
	Bit-rate	64Kbps-320kbps each channel	
Multiplexing	Maximum PID Remapping	180 input per channel	
	Function	PID remapping (automatically or manually)	
		Accurate PCR adjusting	
		Generate PSI/ SI table automatically	
Scrambling	Maximum simulcrypt CA	4	
	Standard	ETR289, ETSI 101197, ETSI 103197	
	Connection	Local/remote connection	
Modulation		QAM Channel: 16 non-adjacent carriers output (maximum bandwidth 192MHz)	

	DVB-C	Standard: EN300 429/ITU-T J.83A/B MER: ≥40db RF frequency: 50~960MHz, 1KHz step RF output level: -20~+10dbm, 0.1db step Symbol Rate: 5.0Msps~7.0Msps, 1ksps stepping		
			J.83A	J.83B
		Constellation	16/32/64/128/256QAM	64/256 QAM
		Bandwidth	8M	6M
Stream output	RF output (F type interface)			
	1 ASI output as mirror of one of RF output carriers 16 MPTS output over UDP and RTP/RTSP as mirror of 16 DVB-C carriers, 1*1000M Base-T Ethernet interface			
System function	Network management (WEB)			
	English			
	Ethernet software upgrade			
Miscellaneous	Dimension (W×L×H)	482mm×440mm×44mm		
	Environment	0~45℃(work)；-20~80℃（Storage）		
	Power requirements	AC 110V± 10%, 50/60Hz, AC 220 ± 10%, 50/60Hz		

Flow Chart



Appearance and Description

Front and Rear Panel Illustration



1	RF test and RF out port
2	Power supply and Grounding Pole
3	12 HDMI and 12 CC input port
4	Reset Key
5	LED Indicators
6	ASI output port
7	DATA Port (DATA1 and DATA2 for IP stream input/output, DATA 3 for upgrading modules)
8	NMS port for web-based management
9	RF in and Loop out port

Chapter 2 Installation Guide

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

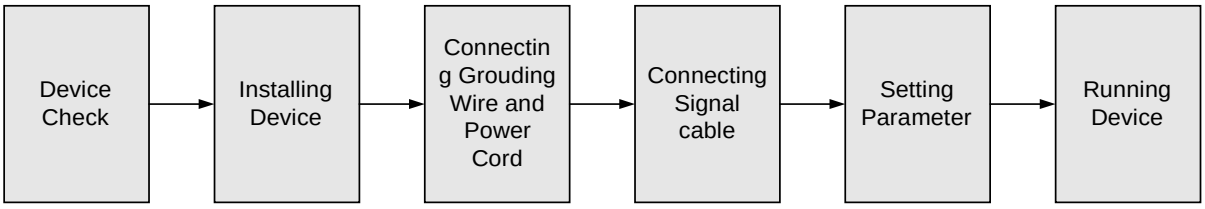
General Precautions

- 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.

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.

Device's Installation Flow Chart Illustrated as following



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 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.

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 WEB NMS Operation

You must connect the Encoder Modulator to a PC in order to setup the configuration, to control and set configure the settings you must plug the device into web NMS Port. Users should ensure that the computer's IP address is different from this device's IP address; otherwise, it would cause IP conflict.

Login

The default IP address of this device is 192.168.0.136.

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.

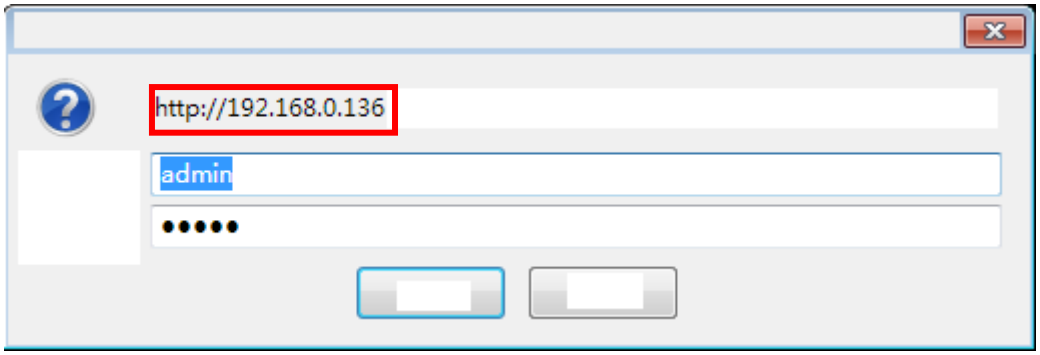


Figure-1

Operation

Summary→Status

When we login into encoder module, it displays the status interface as Figure-2.

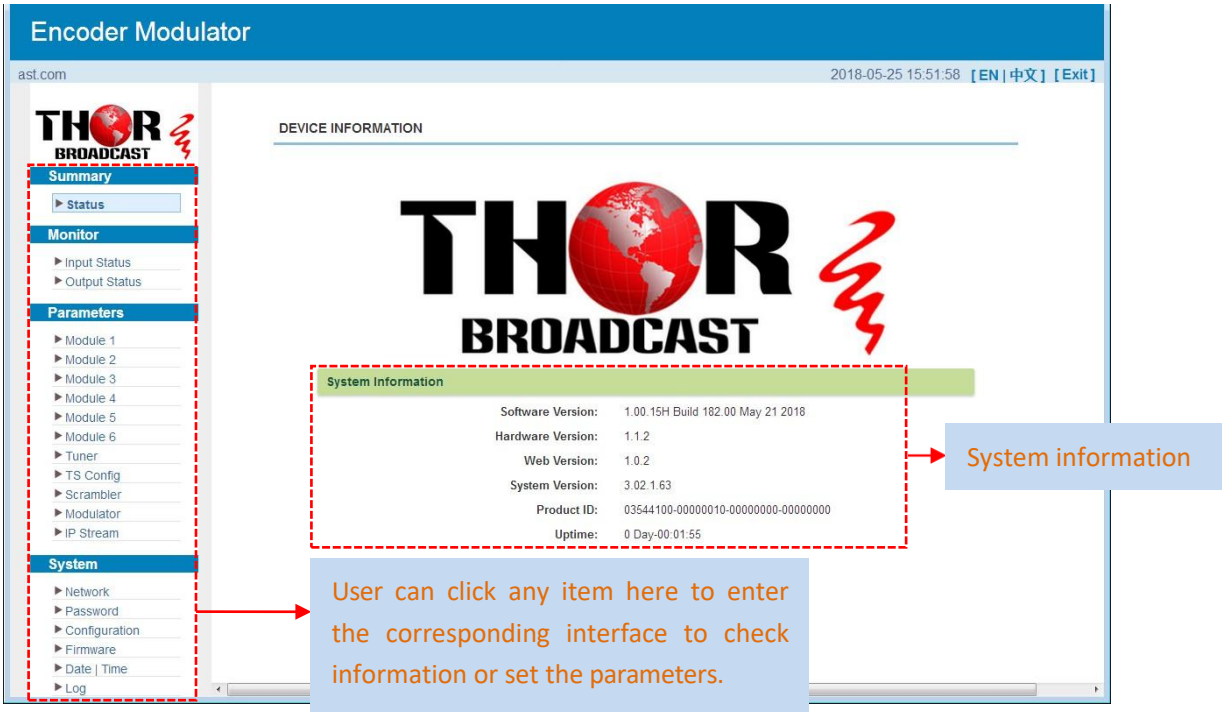


Figure-2

Monitor→Input Status

➢ Module

Clicking "Input Status→Module", it displays the interface where users can check the encoding status of each module as Figure-3.

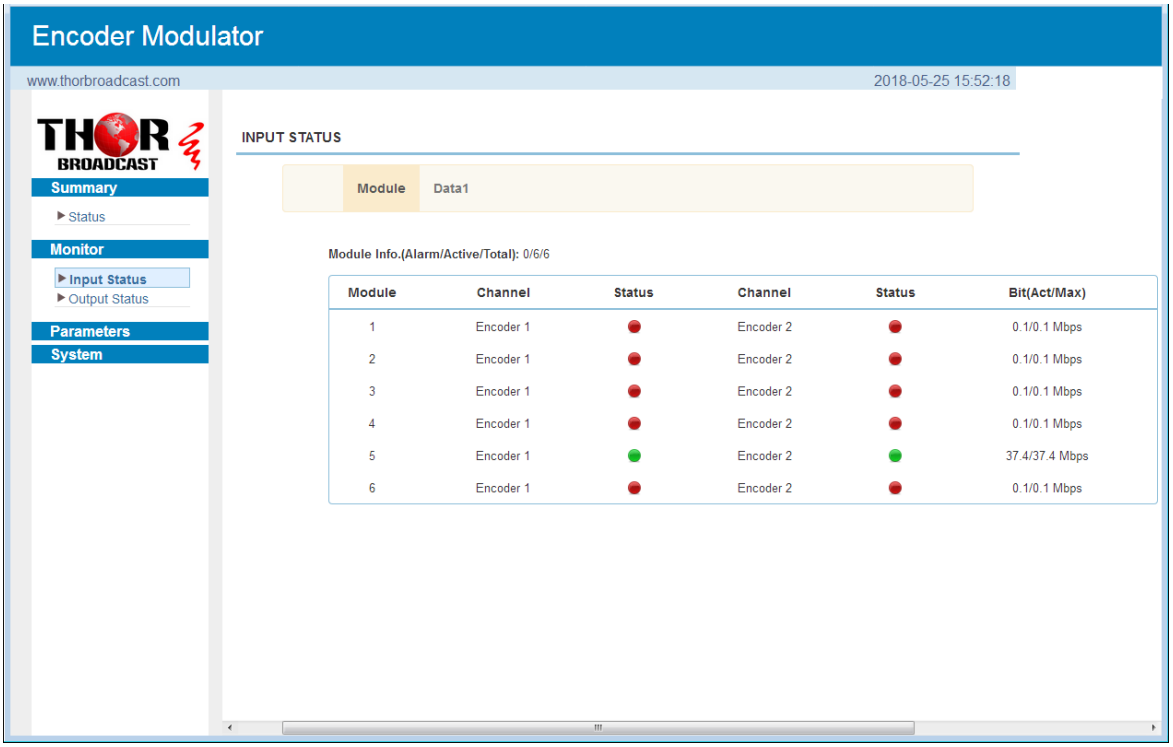


Figure-3

➢ Data1

Clicking "Input Status→Data1", it displays the interface where users can check the Data1 input status after adding IP input from data1 port in the "TS Config", and the interface displays the following as shown in Figure-4.

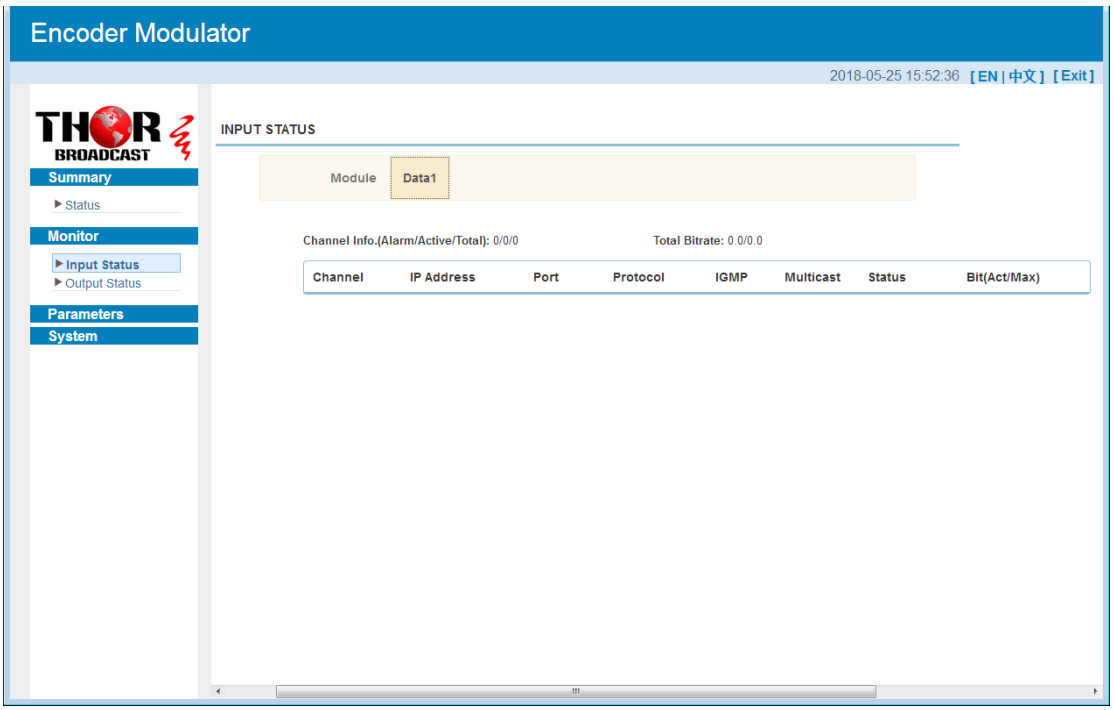


Figure-4

Monitor→Output Status

➢ QAM

Clicking “Output Status→QAM”, it displays the interface where users can check the QAM output status of each carrier as Figure-5.

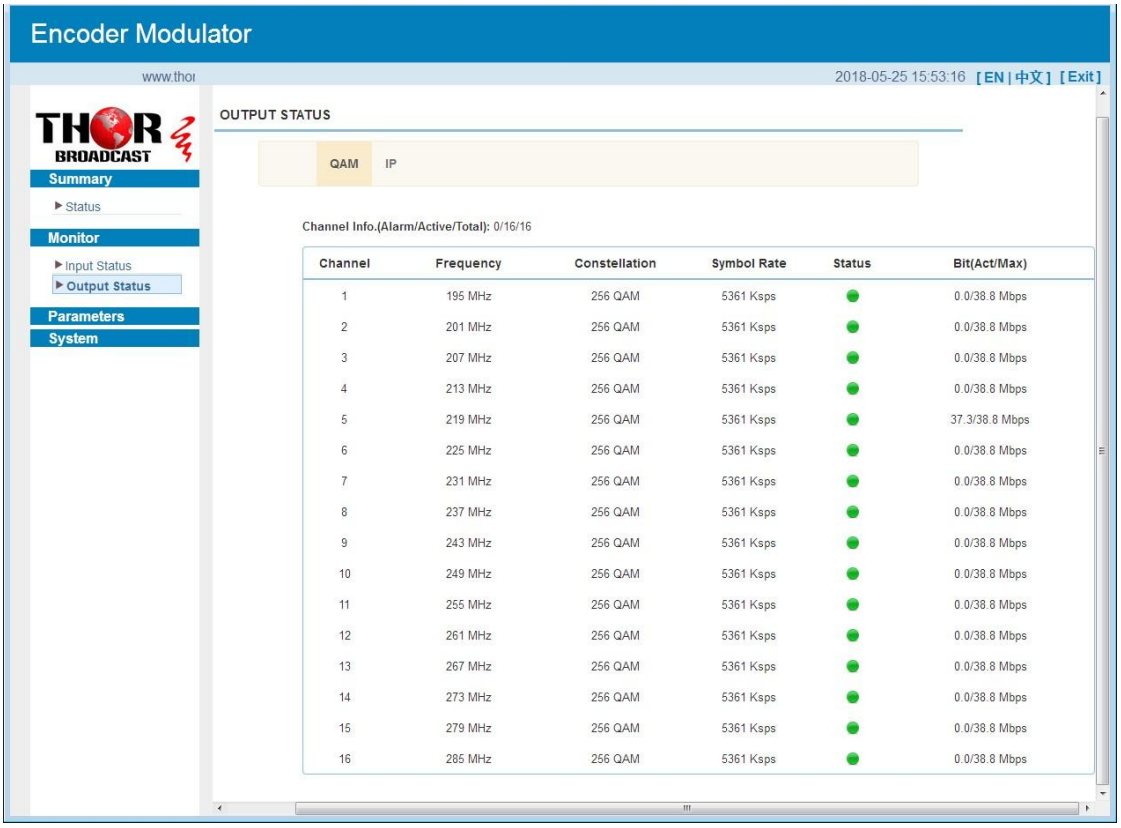


Figure-5

➢ IP

Clicking “Output Status→IP”, it displays the interface where users can check the IP output status after adding IP output in the “IP stream” interface, and it displays as Figure-6.

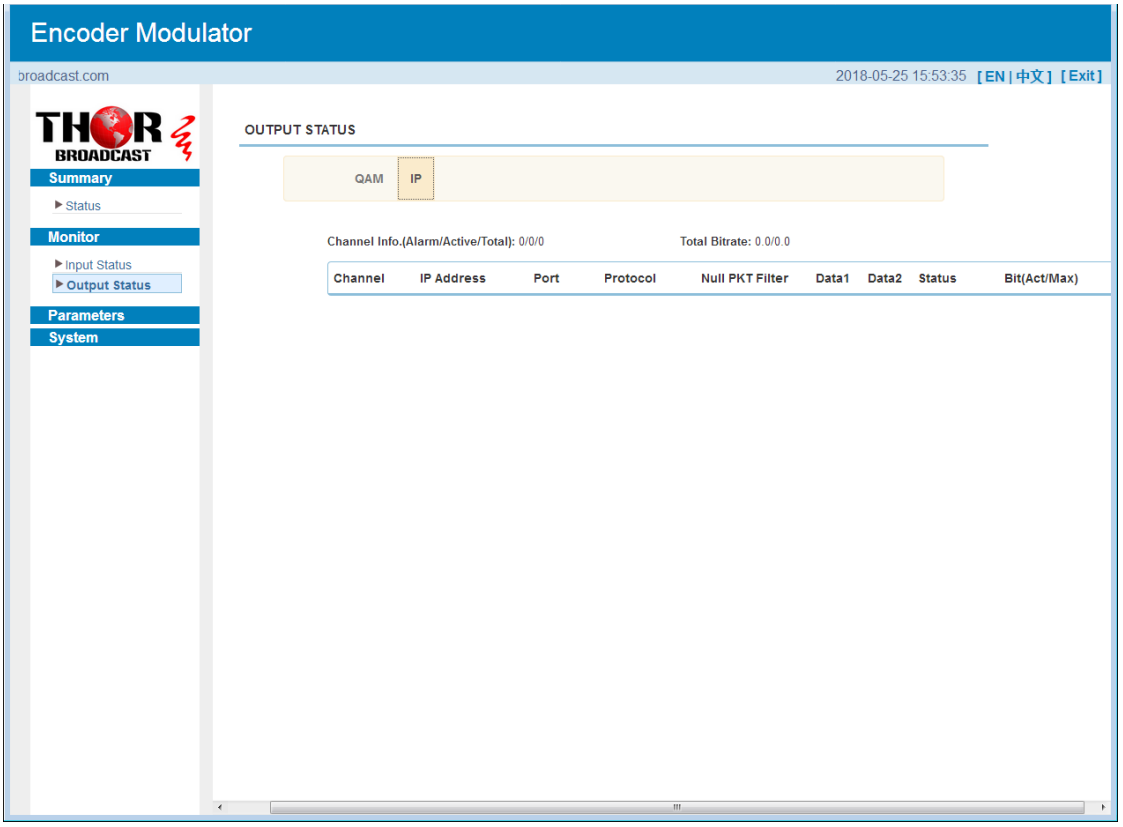


Figure-6

Parameters → Module 1-6

➢ Encoder 1

This encoder modulator supports up to 6 modules, and each module has 2 HDMI inputs. From the menu on left side of the webpage, clicking "Module1-6→Encoder 1", it displays the information of 1st encoding channel (Figure-7) where users can configure the video and audio encoding parameters.

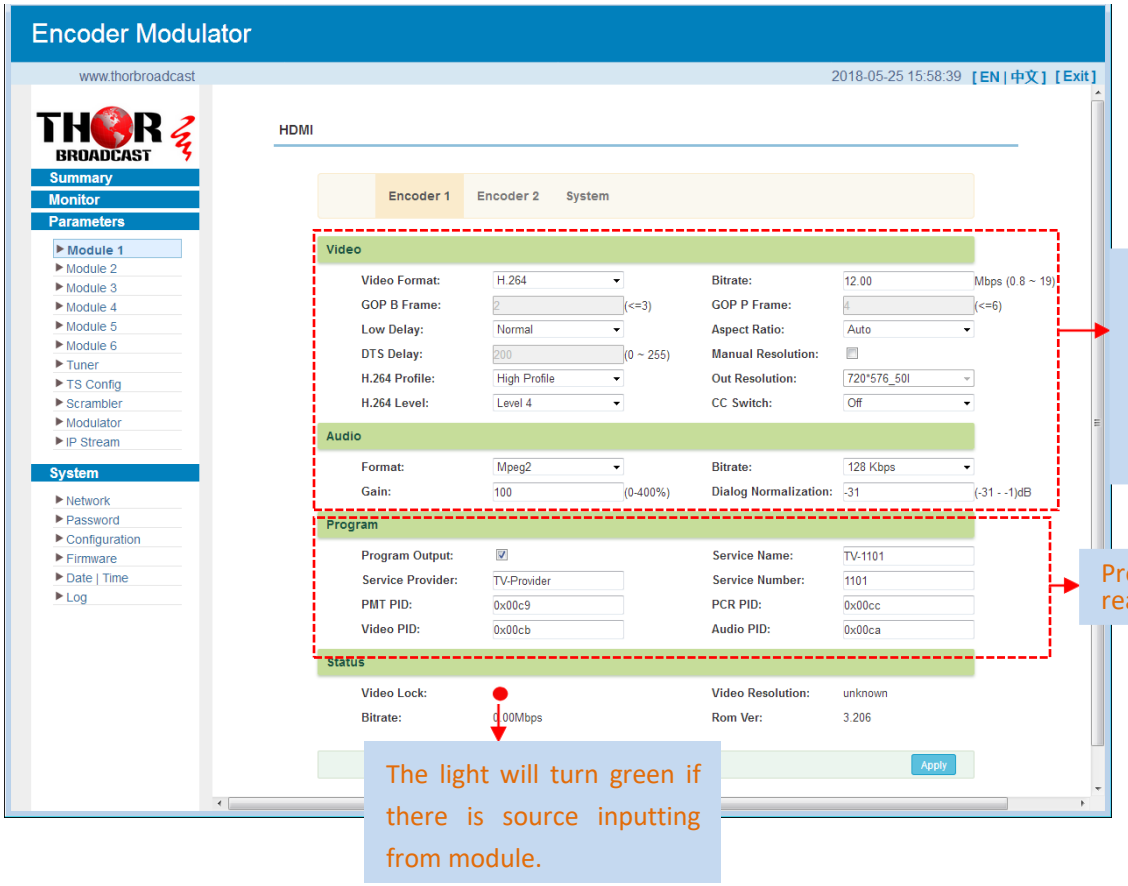


Figure-7

Similarly, clicking “Encoder 2”, it displays the information of the 2nd encoding channel

➢ System

Clicking “System”, it displays the interface where users can check module and TS out information, and save or restore the module configuration as Figure-8.

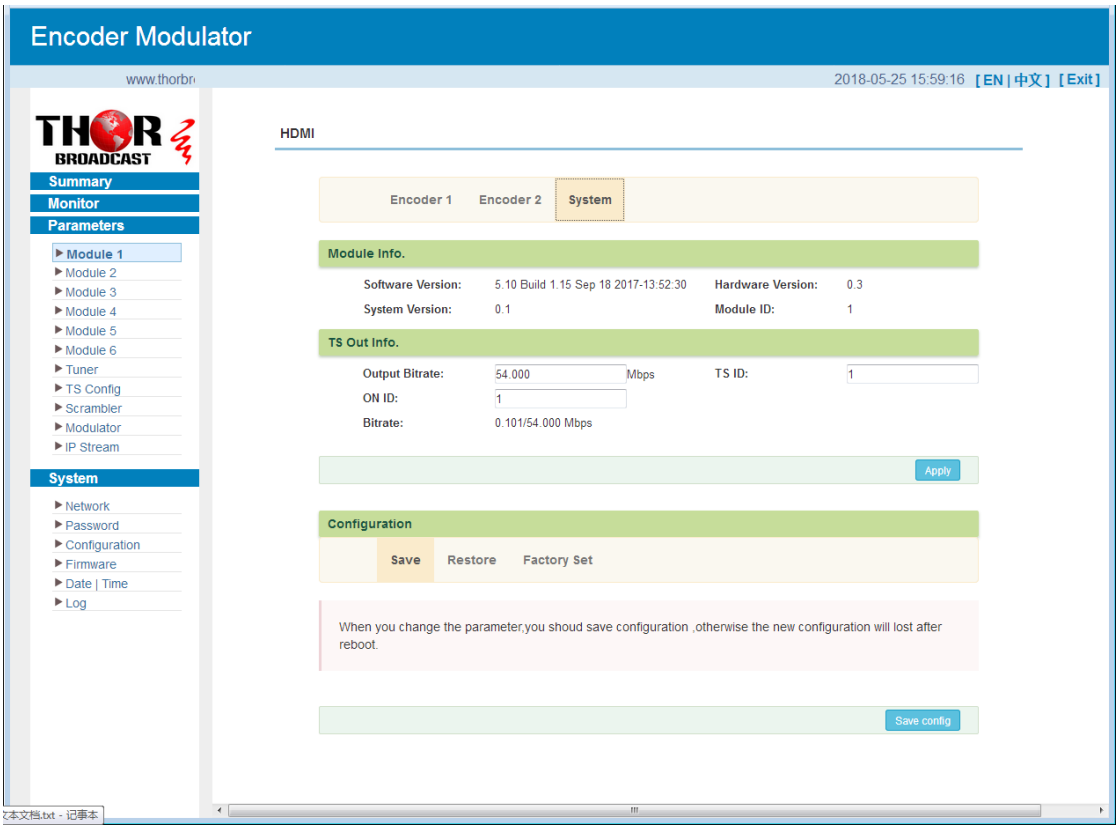


Figure-8

Parameters → Tuner:

Clicking “Tuner”, it displays the interface where users can configure the Tuner input parameters as Figure-9.

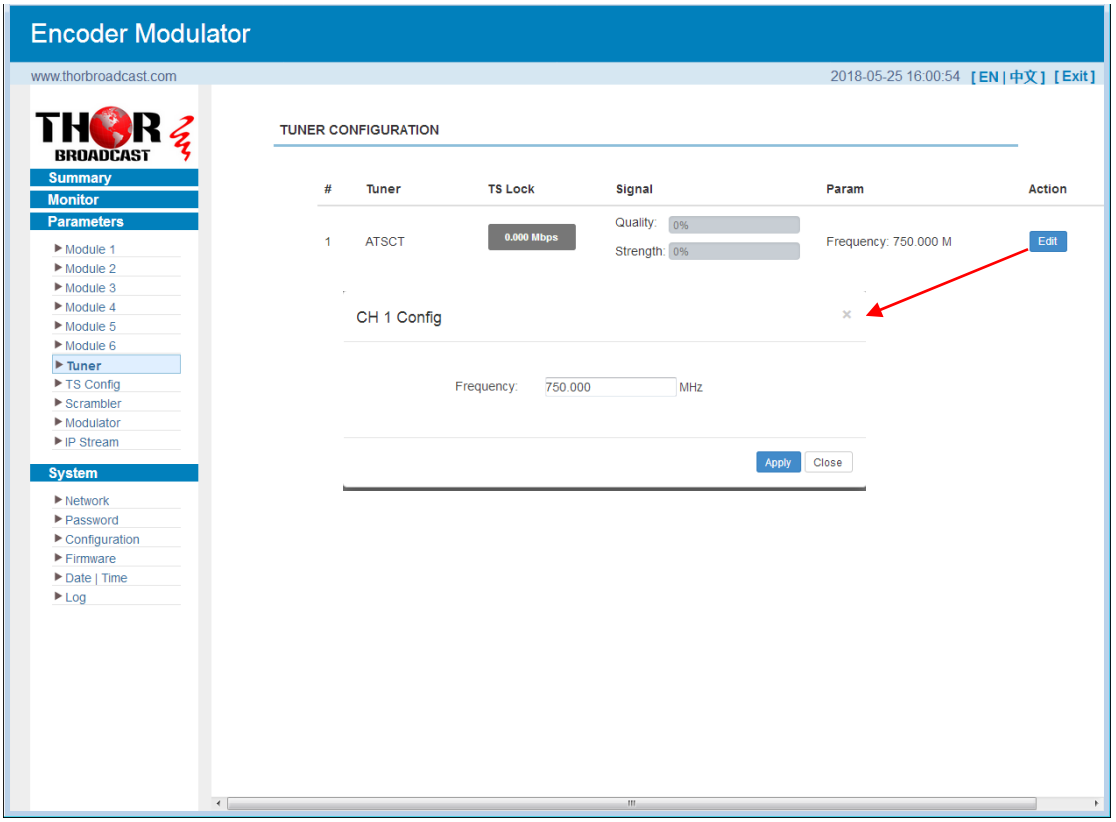


Figure-9

Parameters → TS Config:

Clicking “TS Config”, it displays the interface where users can configure the TS output parameters.

- **TS Config→Output TS X:**

Clicking “Output TS X”, it displays the interface where users can select the TS output carrier (Figure-10)

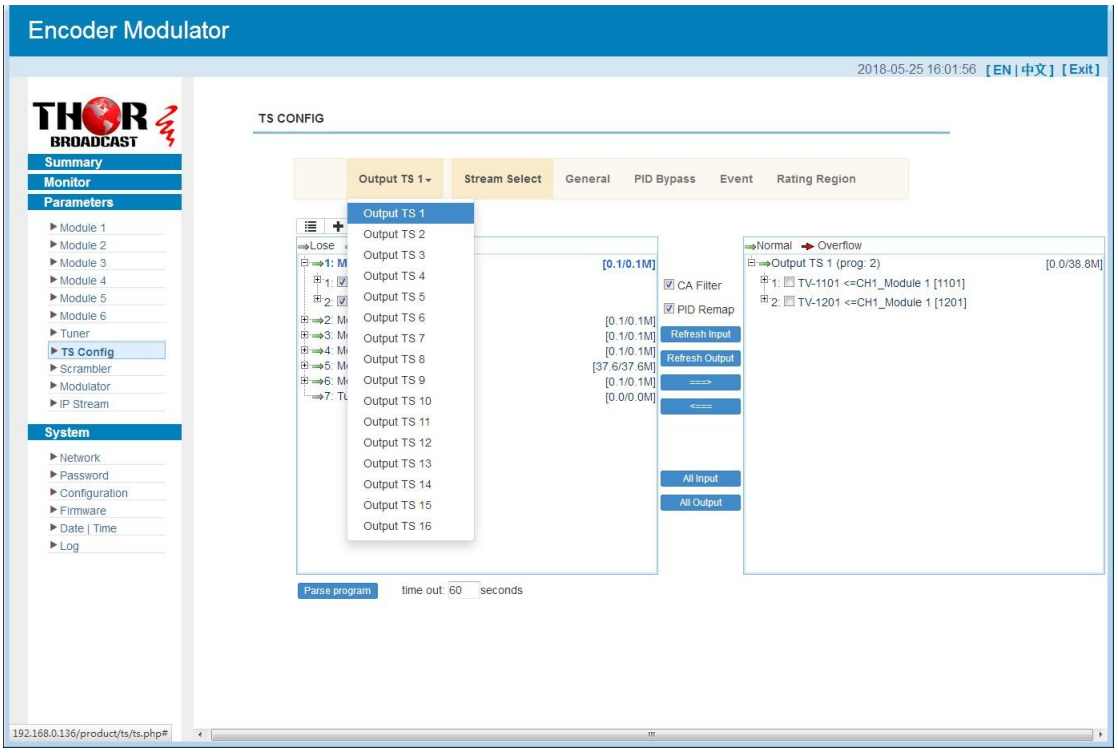


Figure-10

➢ **TS Config→Stream select:**

Clicking "Stream select", it displays the interface where users can select program(s) to multiplex out and modify program info. (Figure-11)

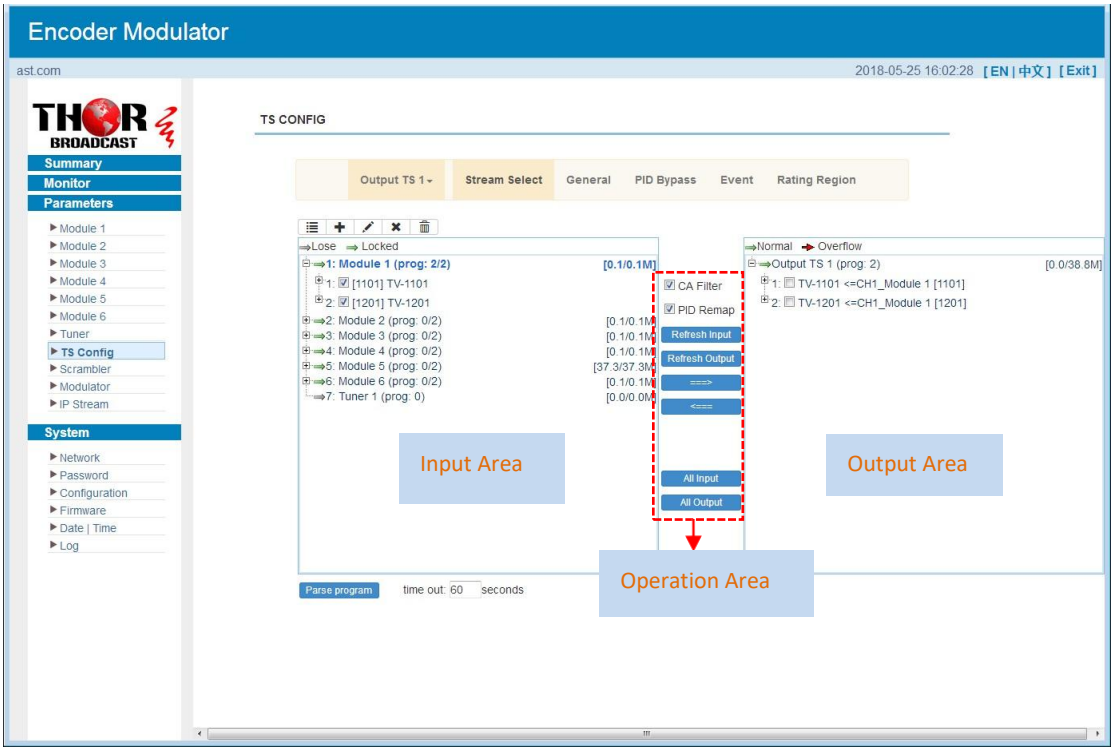


Figure-11

Configure 'Input Area' and 'Output Area' with buttons in 'Operation Area'. Instructions are as below:

: To add input channel which come from Data 1

: To edit the input channel

: To delete the input channel

: To delete all inputs channel

Lose Locked : To check input IP lock or not, green means current IP locked

Normal Overflow : To check current TS overflow or not, red color means current TS overflow, need to reduce program

CA Filter : To filter/not filter the source CA information

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 one input program first and click this button to transfer the selected program to the right box to output.

<=== Similarly, user can cancel the multiplexed programs from the right box.

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

- **Program Modification:**

The multiplexed program information can be modified by clicking the program in the 'output' area. For example, when clicking 1: TV-1101 <=CH1_Module 1 [1101] , it triggers a dialog box (Figure 12) where users can input new information.

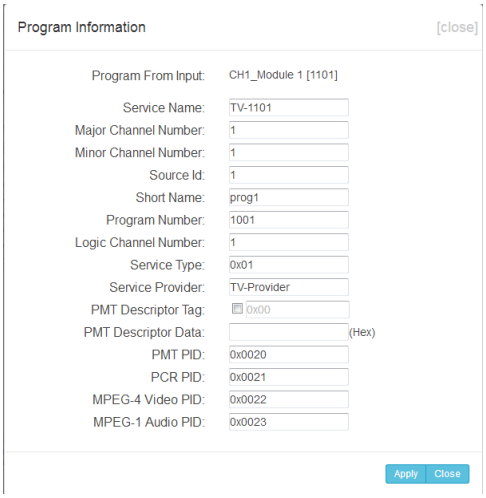


Figure-12

- **TS Config→General:**

Clicking "General", it displays the interface where users can set stream output information, NIT insert/VCT insert and other information. (Figure-13)

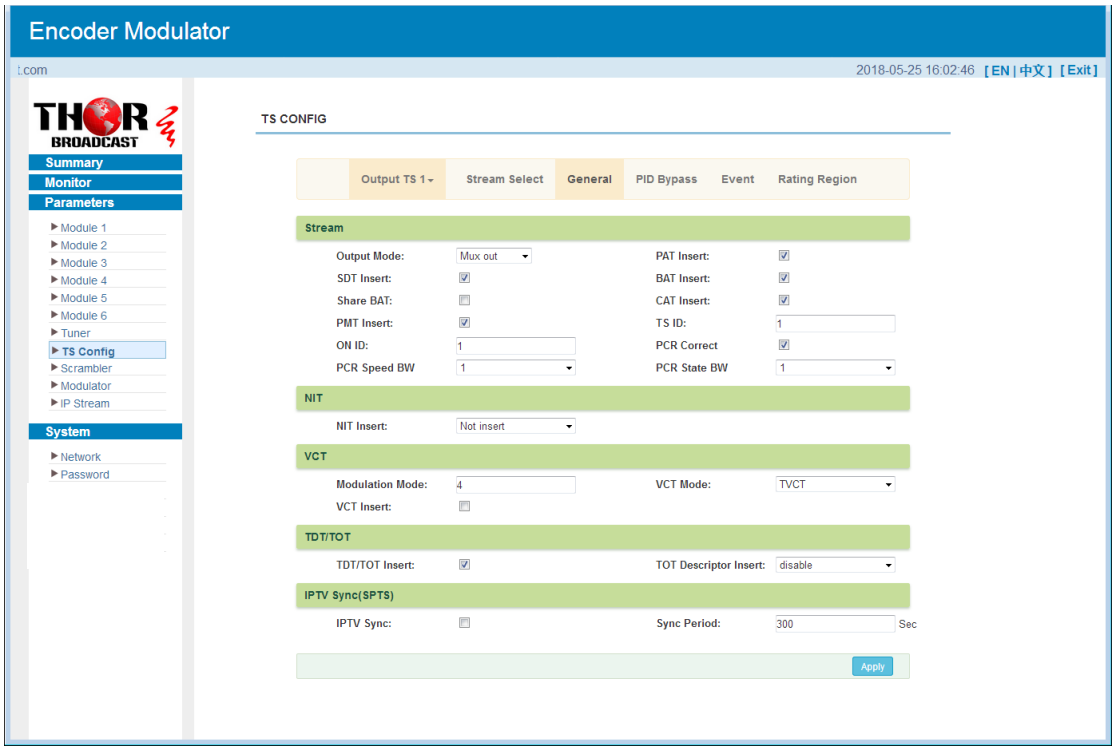


Figure-13

- **TS Config→PID Bypass:**

Clicking "PID Bypass", it displays the interface as Figure-14 where user can add PIDs to be passed, click the "+" symbol, input current IP channel number, then input current IP source Pid and output Pid which is customer needed , then click "set"

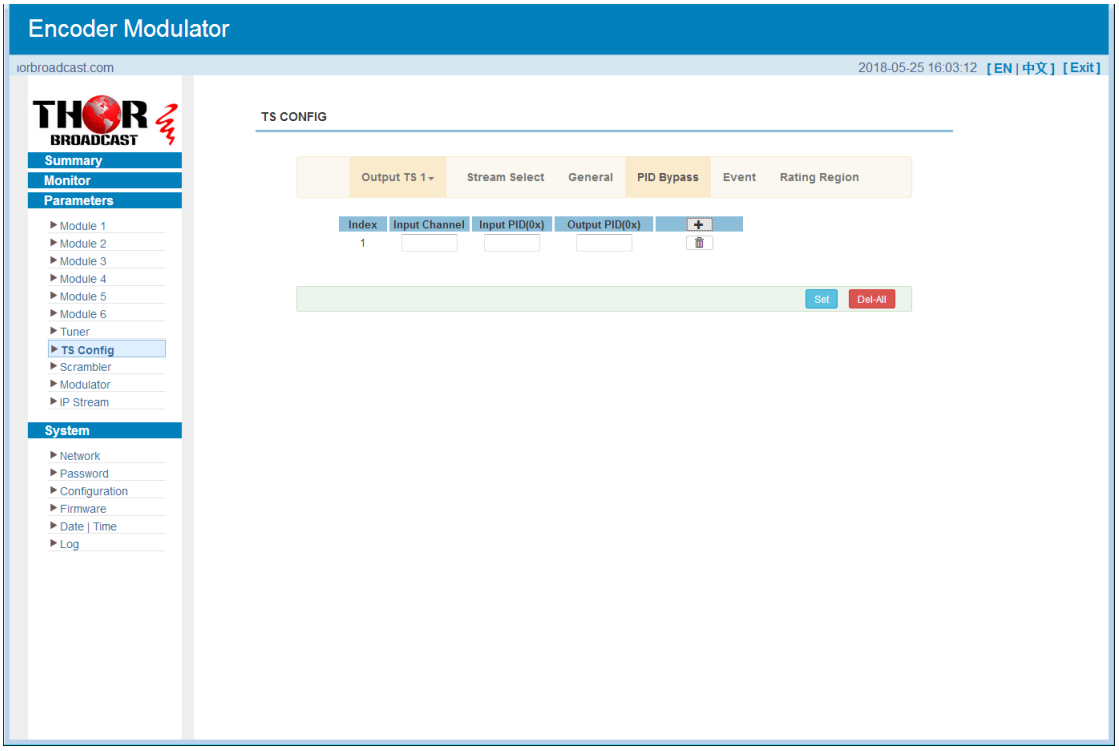


Figure-14

➢ **Event:**

Clicking "Event", it displays the interface as Figure-15 where users can set the upcoming events (programs). This function is only supported in ATSC RF output.

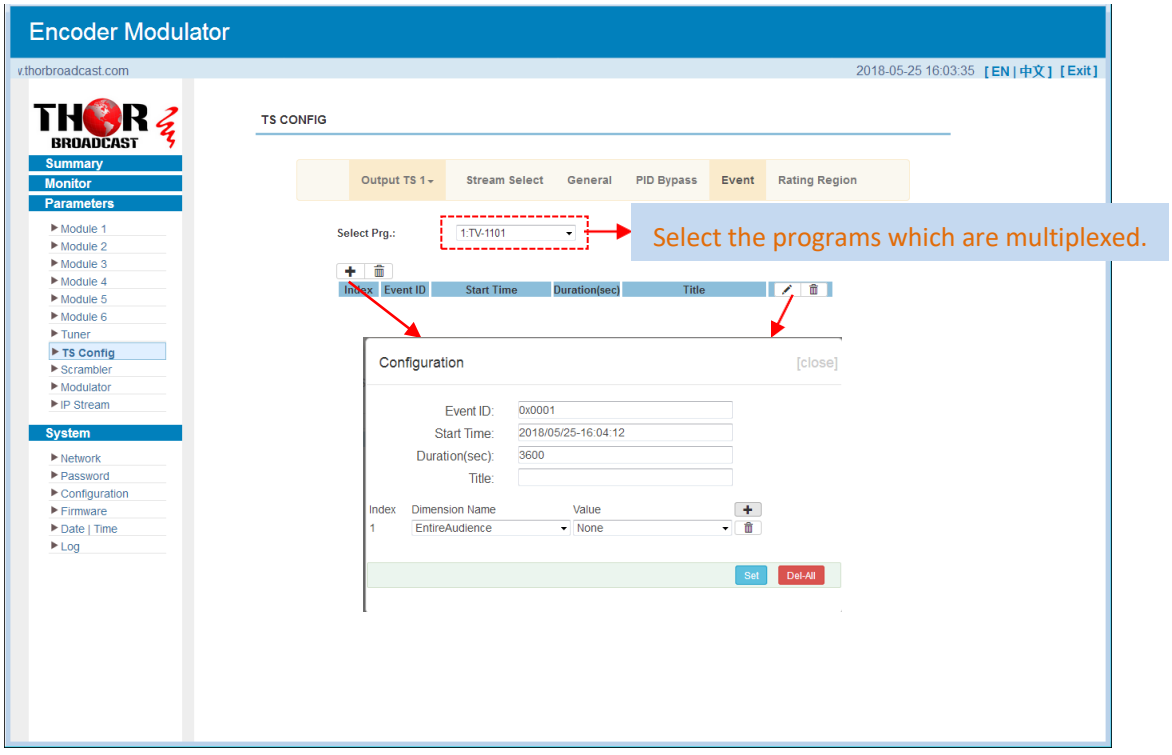


Figure-15

➢ **Rating Region:**

Clicking “Rating Region”, it displays the interface as figure-16 where user can classify the input programs. This function is only supported in ATSC RF output.

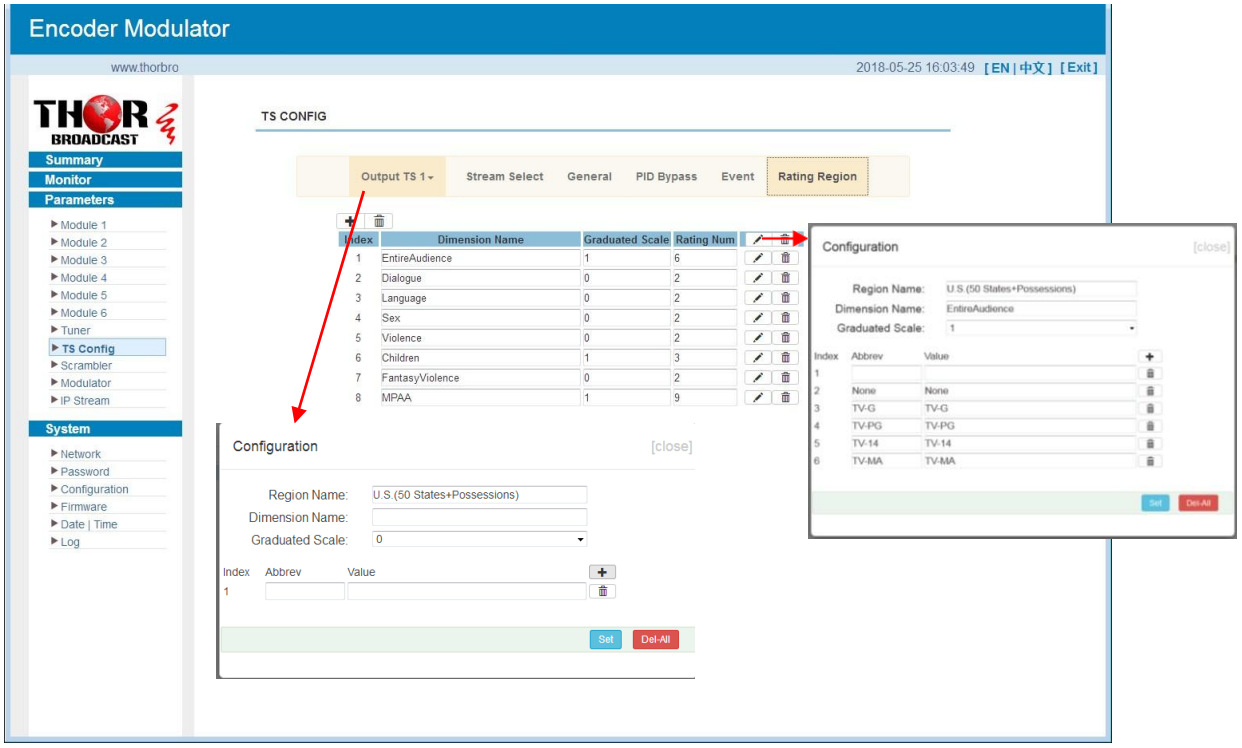


Figure-16

Parameters → Scrambler:

Clicking “Scrambler”, it displays the interface as Figure-17 where user can configure parameters to scramble the programs. Scr CH1-16 is corresponding to Output TS1-16 respectively.

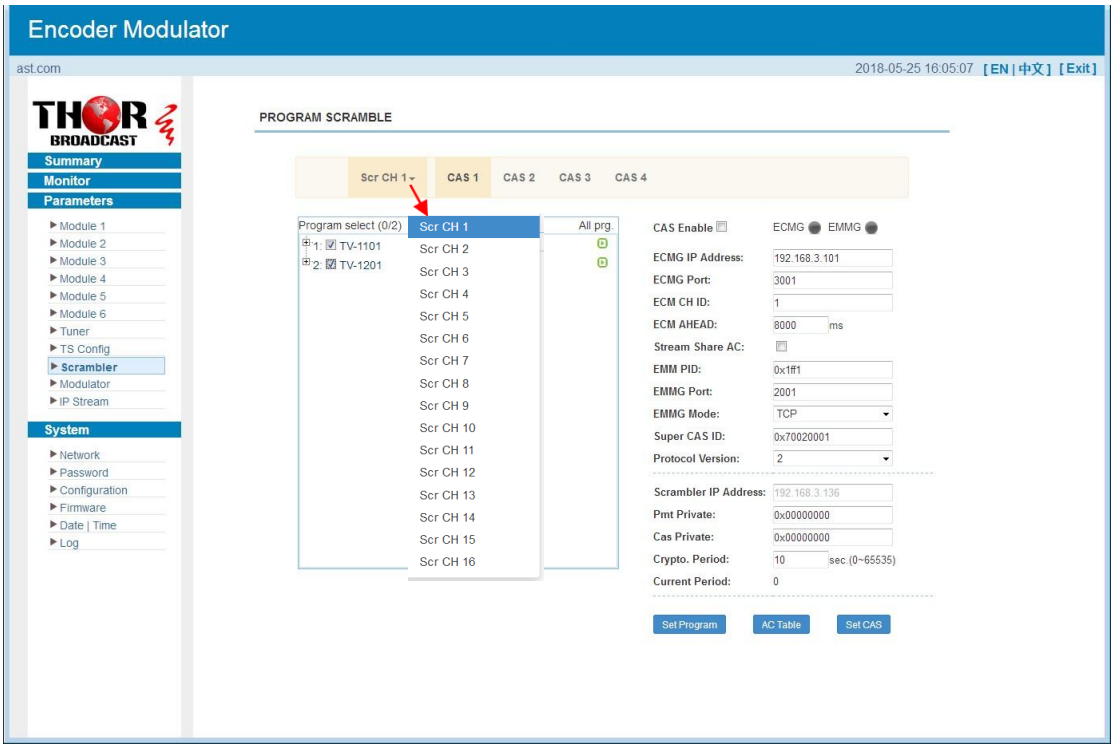


Figure-17

Parameters → Modulator:

Clicking “Modulator”, it displays the Modulator Configuration screen as Figure-18. Here user can set modulating parameters.

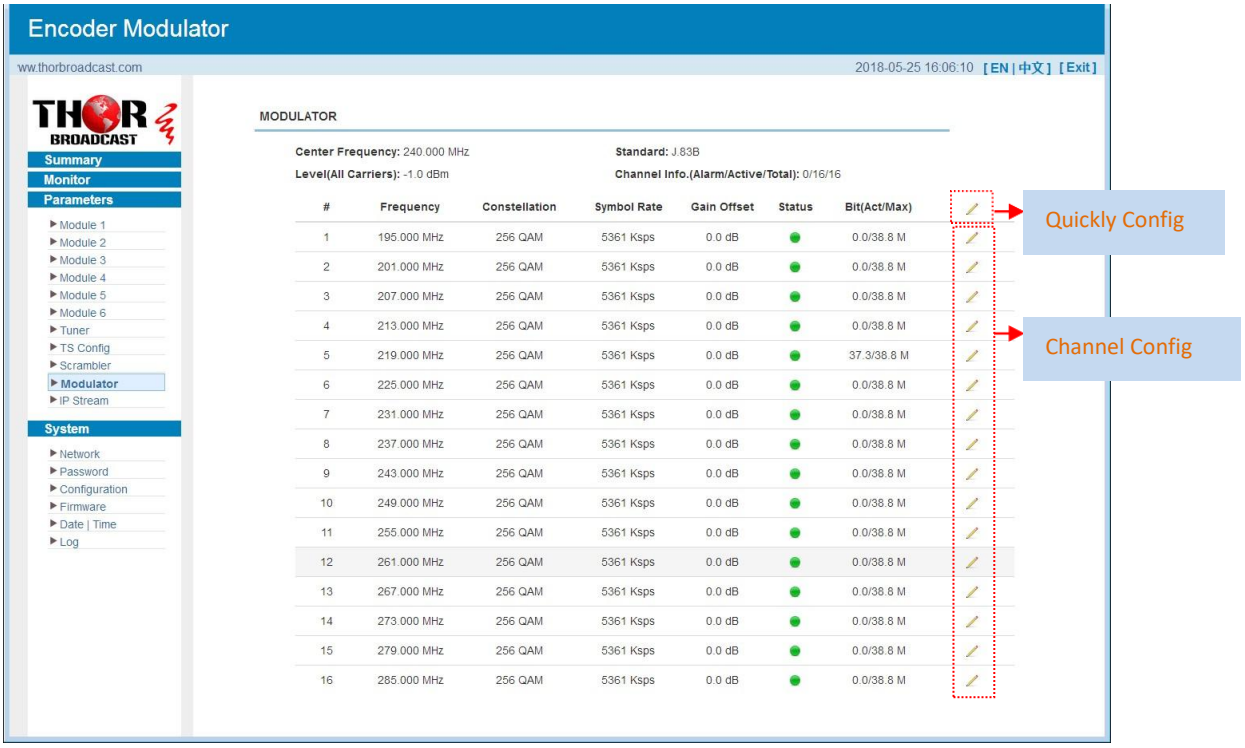


Figure-18

When users click “quickly config” button, it triggers a dialog box (Figure -19) where users can set all channels configration.

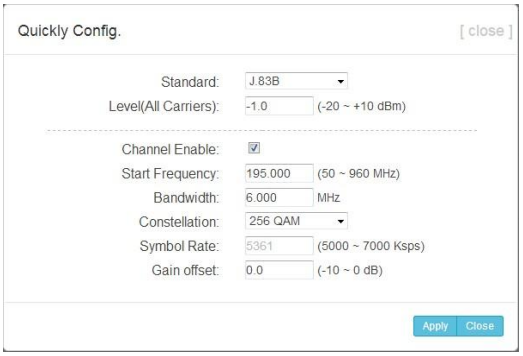


Figure-19

When users click “Channel config” button, it triggers a dialog box (Figure-20) where users can set the corresponding channel configration.

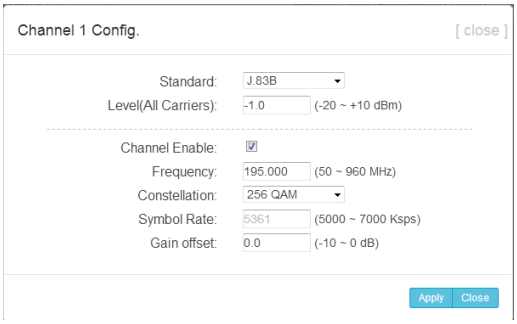


Figure-20

Parameters → IP Stream:

This encoder modulator supports TS to output in IP (16 MPTS) format through DATA 2 port and 1 ASI out as mirror of one RF output carriers.

Clicking “IP Stream”, it displays the interface where to set IP out parameters and choose the ASI out channel (Figure-21).

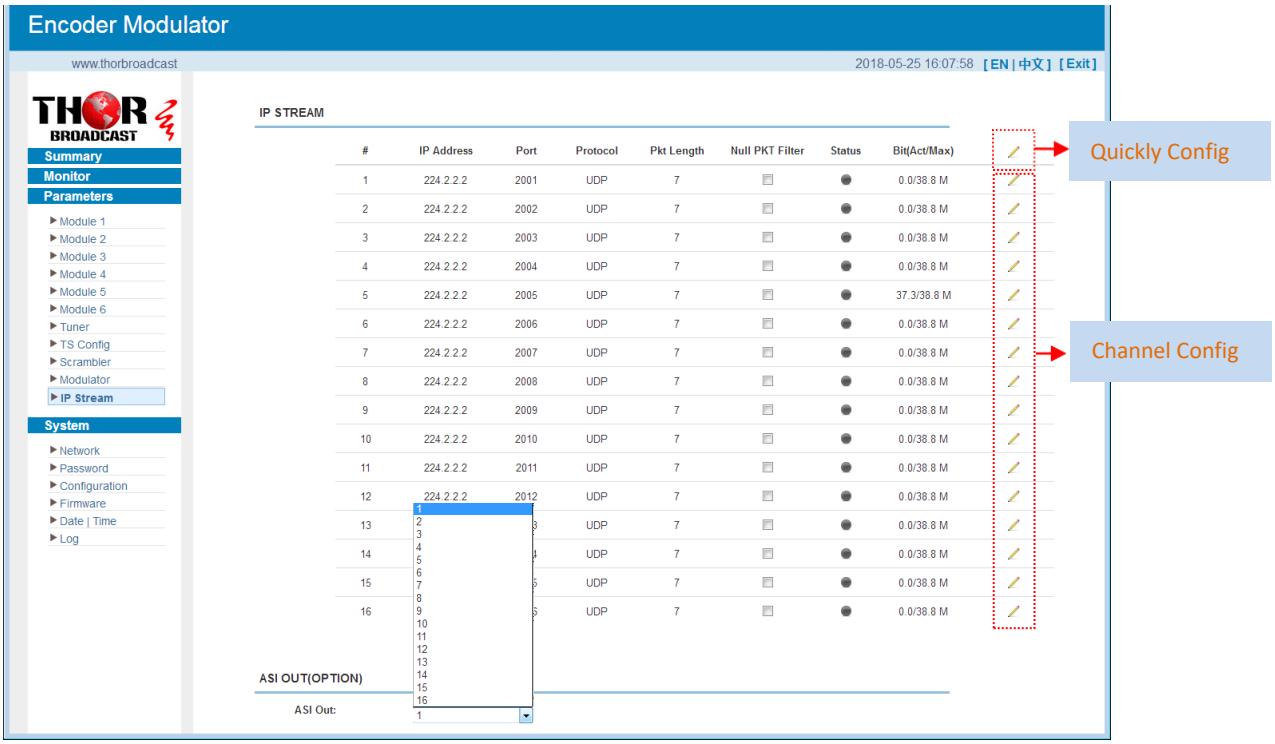


Figure-21

When users click “Quickly Config” button, it triggers a dialog box (Figure-22) where users can set all channels MPTS configration simultaneously.

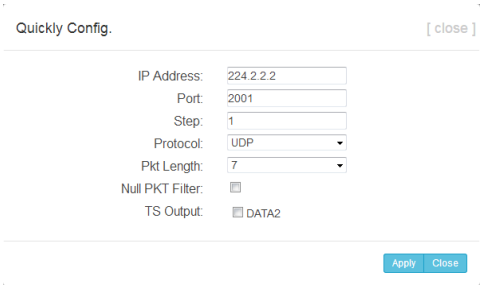


Figure-22

When users click “Channel Config” button, it triggers a dialog box (Figure-23) where users can set corresponding MPTS channel configration.

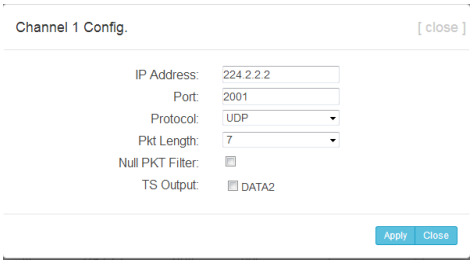


Figure-23

System → Network:

Clicking “Network”, it displays the interface as Figure-24 where to set network parameters.

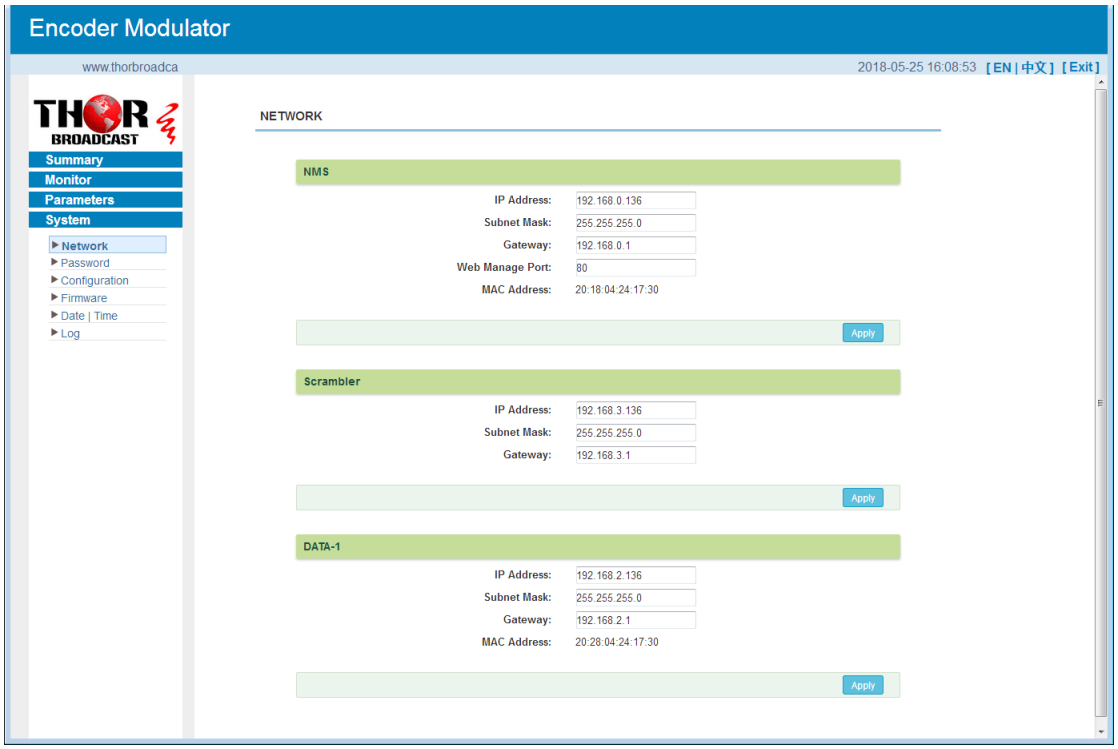


Figure-24

System → password

Clicking “Password”, it displays the screen as Figure-25 where to set the login account and password for the web NMS.

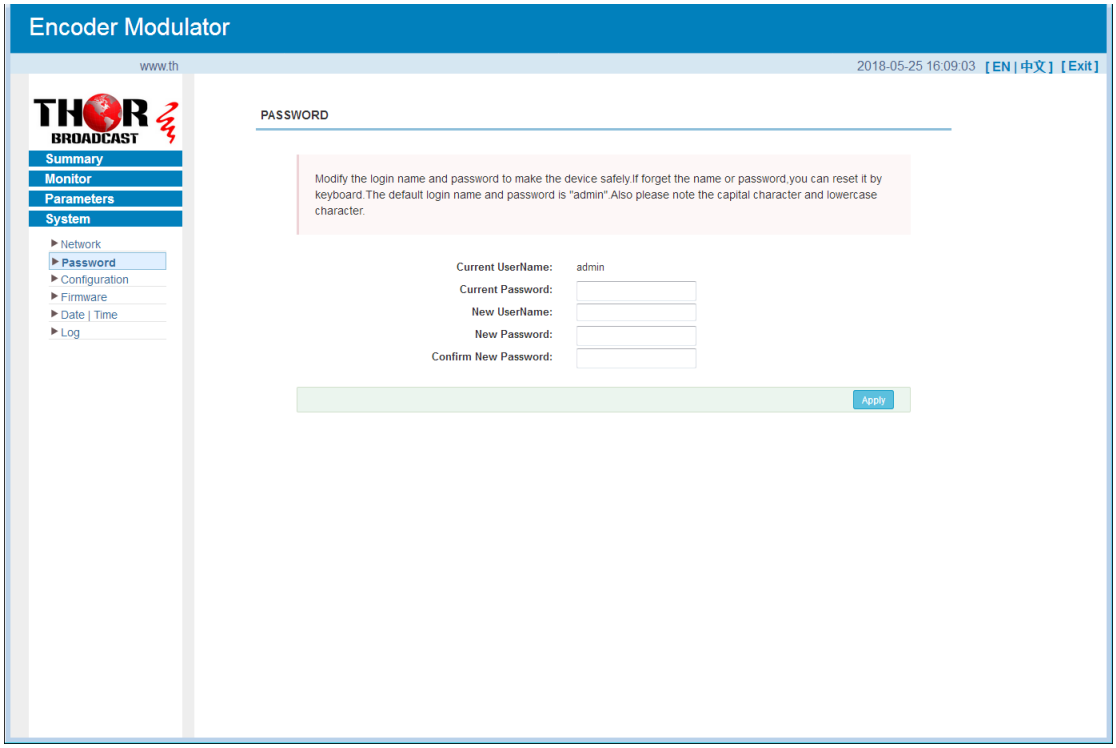


Figure-25

System → Configuration:

Clicking “Configuration”, it displays the screen as Figure-26 where to save/ restore/factory setting/ backup/ load your configurations.

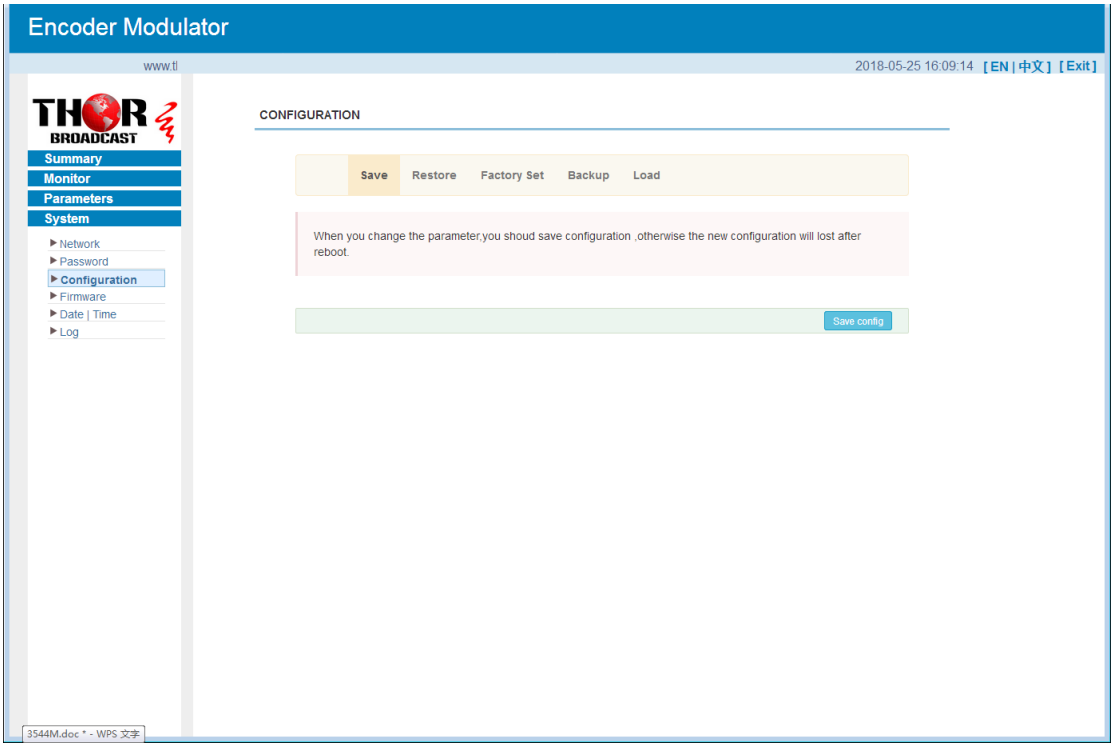


Figure-26

System → Firmware:

Clicking “Firmware”, it displays the screen as Figure-27 where to update firmware for this encoder modulator.

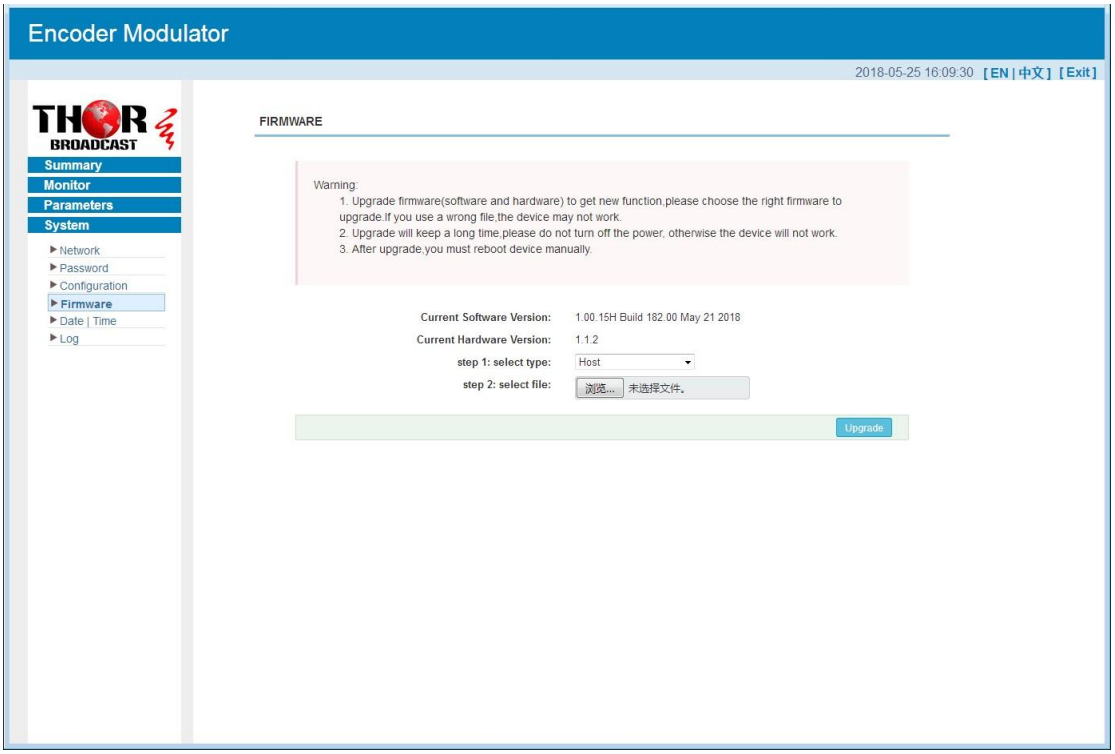


Figure-27

System→ Date/Time:

Clicking “Date/Time”, it displays the screen as Figure-28 where to set date and time for the device.

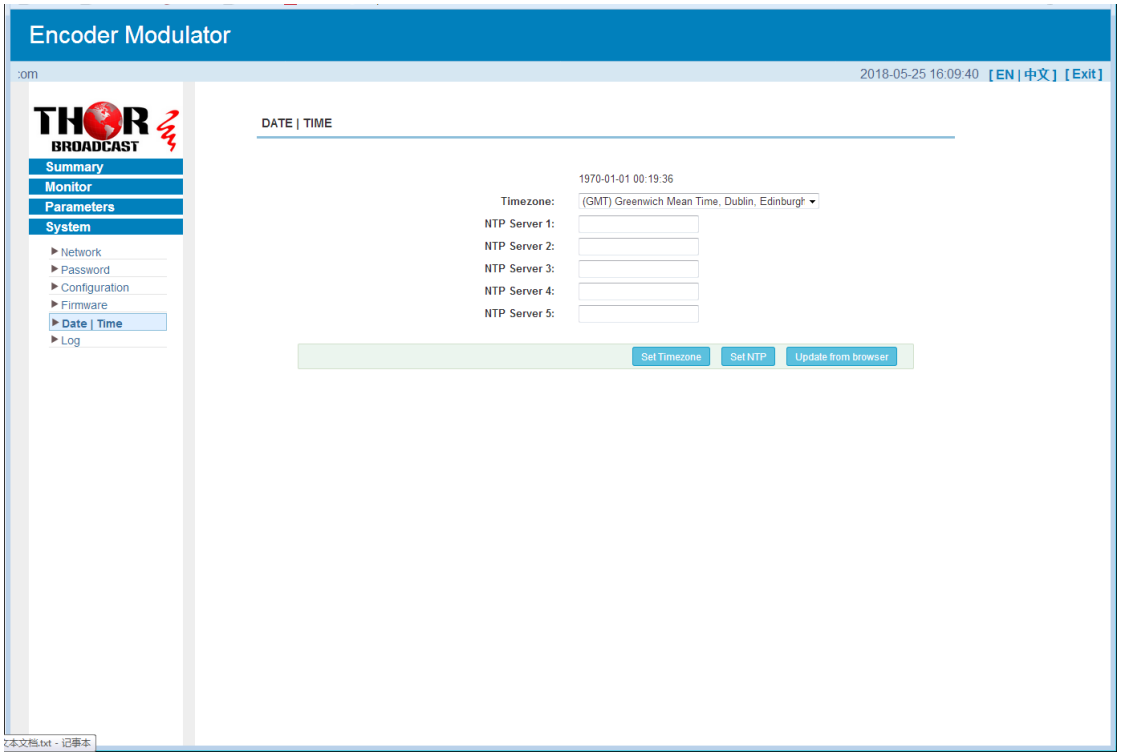


Figure-28

System→ Log:

Clicking “Log”, it displays the log interface as Figure-29 where to check or export the Kernel/System log.

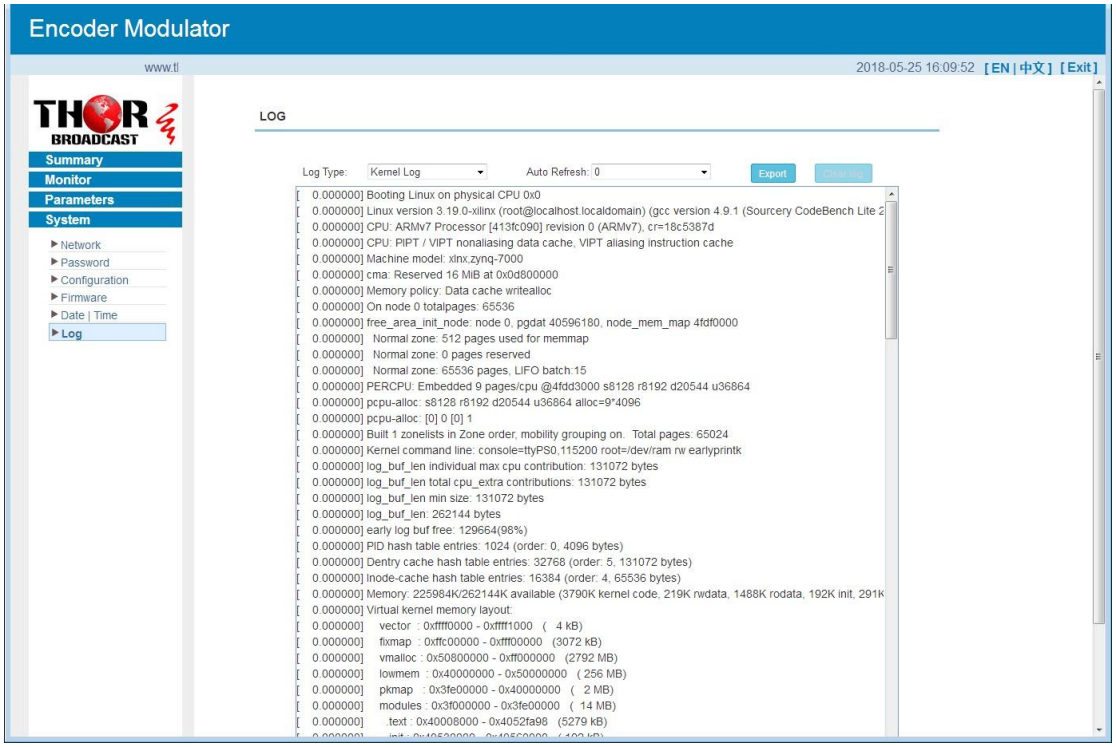


Figure-29

Chapter 4 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 5 Packing List

Thor 12 HDMI HD Encoder-RF Modulator

HDMI cable

Power Cord

For Further Tech Support

1-800-521-Thor(8467)

support@thorfiber.com