



EC3542A Encoder Modulator

DVB-T User Manual



Eurocaster – Engvej 15B – 6200 Aabenraa – Denmark
Tel: +45 7734 0033 – info@eurocaster.eu – www.eurocaster.eu

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Chapter 1 Product Introduction

1.1 Outline

EC3542A series products are EuroCaster's new breakthrough all-in-one devices which integrate encoding (MPEG-2 HD/SD, MPEG-4/AVC H.264 HD/SD) and modulating to convert V/A signals into Digital RF output. It is equipped with 4 HDMI (4 SDI optional) 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 (HDMI/SDI) as needed. The signals source could be from satellite receivers, closed-circuit television cameras, Blue-ray players, and antenna etc.

1.2 Main Features

- **4* HDMI/SDI inputs**
- **MPEG2 & MPEG4 AVC/H.264 HD/SD video encoding**
- **Up to 1920*1080@50P/60P (MPEG4 AVC/H.264)**
Up to 1920*1080@50I/60I (MPEG2 HD)
- **Huge video buffer (for SDI interface)**
- **MPEG1 Layer II, MPEG2-AAC, MPEG4-AAC, AC3 2.0 (Optional) audio encoding**
- **1*ASI input for re-mux and ASI out—(Optional);**
- **1*RF input for mix—(Optional)**
- **Support CC (closed caption) for SDI interface**
- **DVB-C/DVB-T/ATSC/ISDB-T RF out for option**
- **Support IP (4*SPTS or 4*MPTS) output over UDP, RTP/RTSP protocol---DVB-C/DVB-T/ATSC**
- **Support IP (4*SPTS or 2*MPTS) output over UDP, RTP/RTSP protocol---ISDB-T**
- **Extremely low latency**
- **LCN support (Logical Channel Number)**
- **Excellent modulation quality MER≥40dB**
- **RF Frequency range 50Mhz~960Mhz**

- LCD display, Remote control and firmware
- Web NMS management; Updates via web

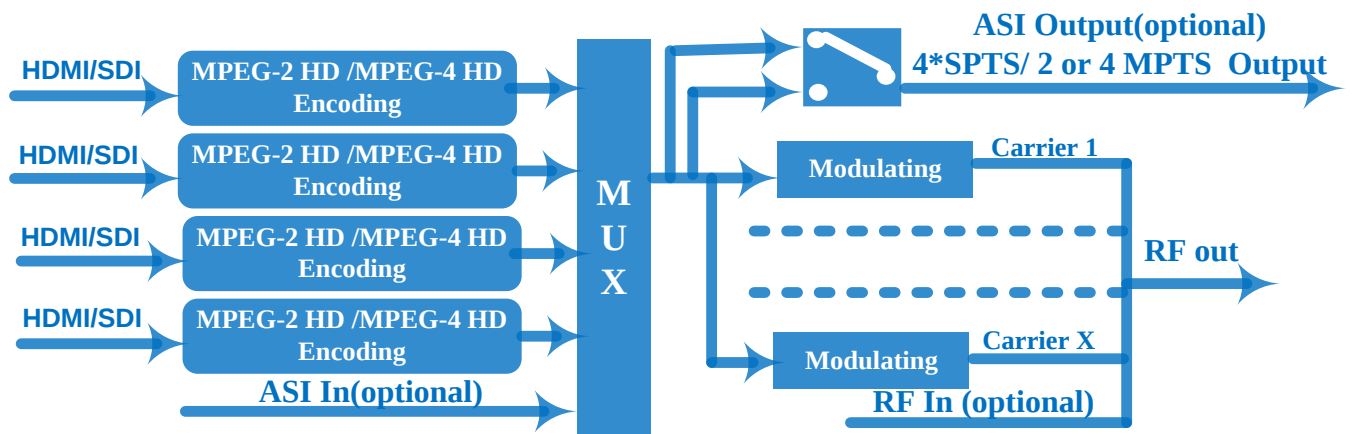
1.3 Technical Specifications

HDMI Encoder Board	Video	Input	HDMI*2
		Encoding	MPEG2; MPEG4 AVC/H.264
		Bitrate	1-19.5Mbps
		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
		Support object resolution (for downscale conversion)	1920*1080_60i, 1920*1080_50i, 1440*1080_60i, 1440*1080_50i, 1280*720_60p, 1280*720_50P 720*480_60i, 720*576_50i
		Low Delay	Normal, Mode 1, Mode 2, Manual
		Chroma	4:2:0
		Aspect Ratio	16:9,4:3
	Audio	Encoding	MPEG1 Layer II;MPEG 2-AAC; MPEG 4-AAC and Dolby Digital AC3 2.0(optional)
		Dialog Normalization Applicable for DD AC3 encoding only)	-31 ~ -1 dB
		Sample rate	48KHz
		Bitrate	64/96/128/ 192/256/320kbps
	SDI Encoder Board	Encoding	MPEG2; MPEG4 AVC/H.264
		Input	SDI*2
		Bitrate	1-19.5Mbps
		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
		Support object resolution (for downscale conversion)	1920*1080_60i, 1920*1080_50i, 1440*1080_60i, 1440*1080_50i, 1280*720_60p, 1280*720_50P 720*480_60i, 720*576_50i
		Low Delay	Normal, Mode 1, Mode 2, Manual
		Chroma	4:2:0
		Aspect Ratio	16:9,4:3
		Encoding	MPEG1 Layer II ,MPEG2-AAC, MPEG4-AAC

			and Dolby Digital AC3 2.0(optional)			
		Dialog Normalization Applicable for DD AC3 encoding only)	-31 ~ -1 dB			
		Sample rate	48KHz			
		Bitrate	64/96/128/ 192/256/320kbps			
Modulator Section	DVB-T	Standard	DVB-T			
		Bandwidth	6M, 7M, 8M			
		Constellation	QPSK, 16QAM, 64QAM			
		Code rate	1/2, 2/3, 3/4, 5/6, 7/8.			
		Guard Interval	1/32, 1/16, 1/8, 1/4			
		Transmission Mode	2K, 4K, 8K			
		MER	≥40dB			
		RF frequency	50~960MHz, 1KHz step			
		RF Out	4*DVB-T carriers(40MHz bandwidth)			
		RF output level	-20~ -3dbm, 0.1db step			
	DVB-C (Optional)	Standard	J.83A (DVB-C), J.83B, J.83C			
		MER	≥40dB			
		RF frequency	50~960MHz, 1KHz step			
		RF output level	-20~ +3dbm, 0.1db step			
		Symbol rate	3.000~9.000Msps adjustable			
		RF Out	4*DVB-C carriers(40MHz bandwidth)			
			J.83A	J.83B	J.83C	
		Constellation	16/32/64/128/ 256QAM	64/ 256 QAM	64/ 256 QAM	
		Bandwidth	8M	6M	6M	
	ATSC (Optional) (under developing)	Standard	ATSC A/53			
		MER	≥40dB			
		RF frequency	50~960MHz, 1KHz step.			
		RF Out	4*ATSC carriers			
		RF output level	-20~ +3dbm, 0.1db step			
		Constellation	8VSB			
	ISDB-T (Optional)	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			
		MER	≥40dB			
		RF frequency	50~960MHz, 1KHz step			
		RF Out	2*ISDBT carriers(30MHz bandwidth)			
		RF output level	-20~ -3dbm, 0.1db step			
	System	Local interface	LCD + control buttons			
		Remote	Web NMS			

General		management	
		Stream Out	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
		DATA Port	1000M
		NMS interface	RJ45, 100M
		Language	English
	Physical Specification	Power supply	100~240VAC, 50/60Hz
		Dimensions	482*400*44mm
		Operation temperature	0~45℃

1.4 Principle Chart



1.5 Major Technical Comparison

	The Former Version	The Current Version (V2)
Bit rate Mode	CBR/VBR option	CBR
Audio Group/Pair option-SDI	No	Yes
Low Delay	Normal/Mode 1/Mode 2	Normal/Mode 1/Mode 2/Manual
Character Encoding option	No	Yes
DATA Port	100M port	1000M port
Frequency Range	30-960MHz	50-960MHz
Symbol Rate--DVB-C	5-9MSPS	3-9MSPS
ISDB-T carriers	1 or 2 carriers for order option	2 carriers

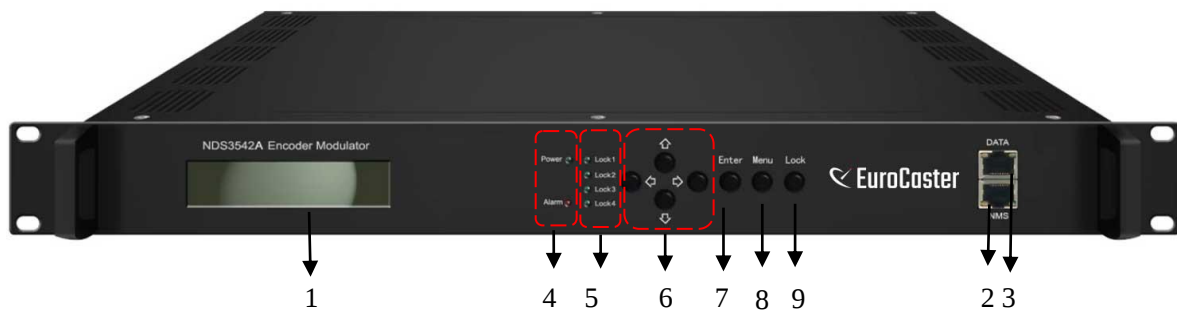
IP out--DVB-C	1 MPTS and 4 SPTS	4 MPTS and 4 SPTS
IP out--DVB-T	4 SPTS	4 MPTS and 4 SPTS
DVB-T carriers	2 carriers	4 carriers

The other differences are existing in Web GUI design and chassis design etc(NMS/DATA port position), no further description here.

Updated on Dec 19th, 2022

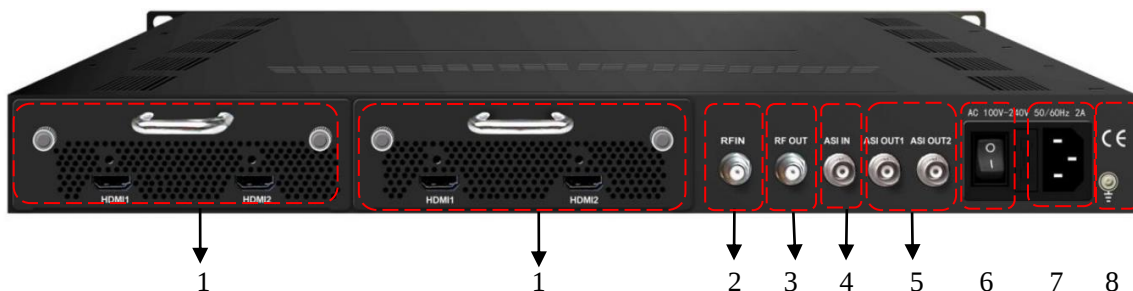
1.6 Appearance and Illustration

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 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.

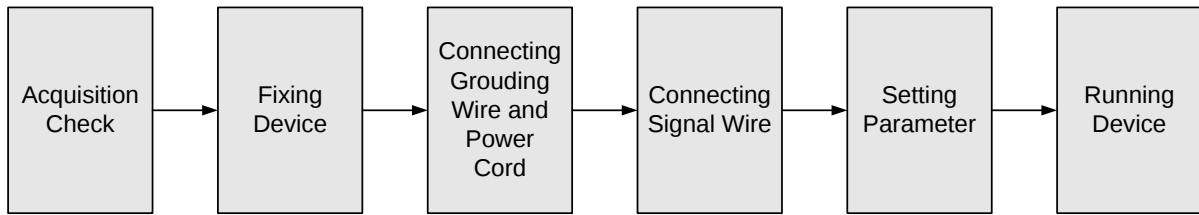
2.2 Installation Preparation

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: $1 \times 10^7 \sim 1 \times 10^{10} \Omega$, Grounding current limiting resistance: 1M (Floor bearing should be greater than 450Kg/m ²)
Environment Temperature	5~40°C(sustainable), 0~45°C(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.

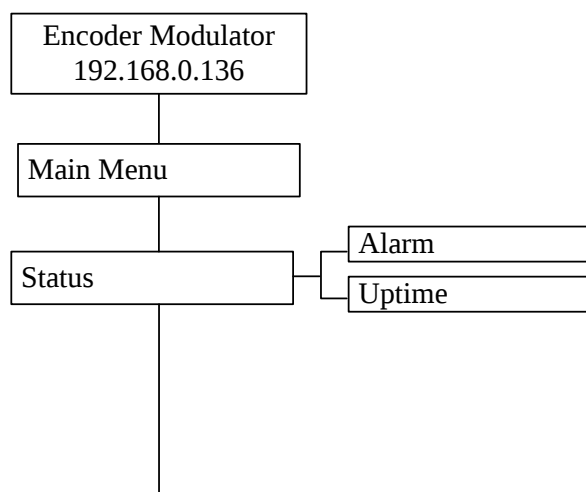
LEFT/RIGHT: To move the “►” to choose or set the parameters.

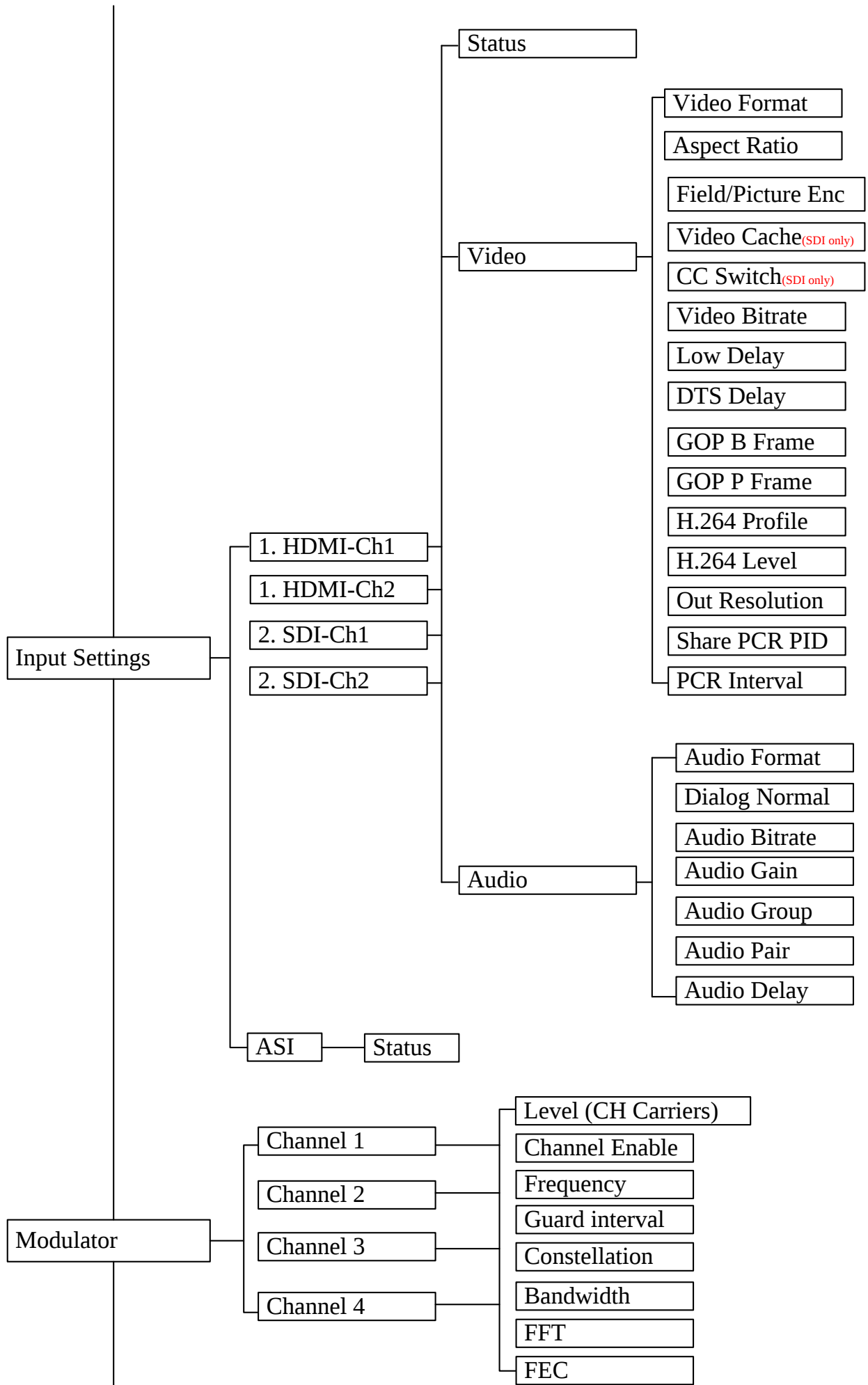
UP/DOWN: To modify activated parameter or page up/down when parameter is inactivated.

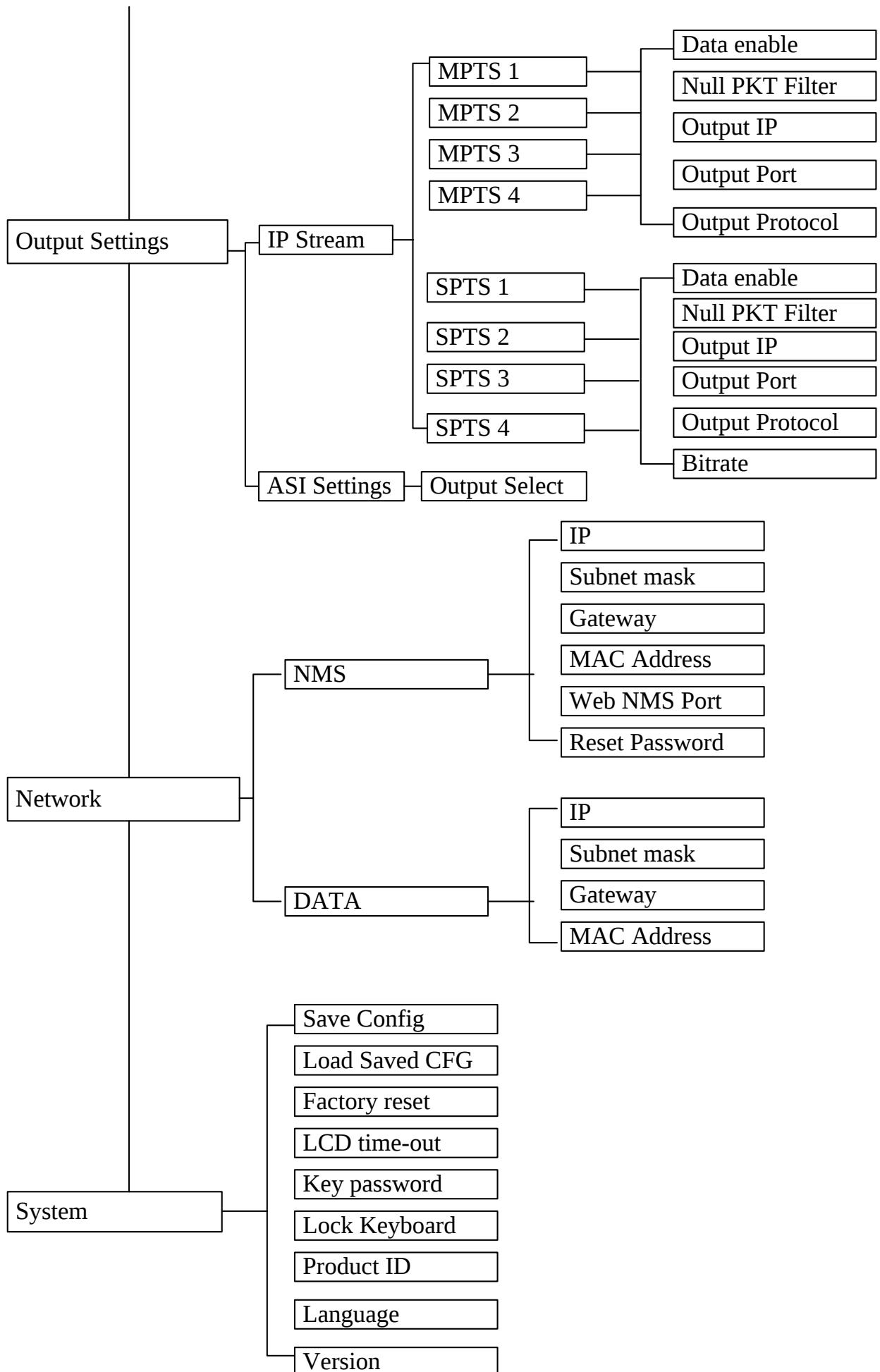
LOCK: To Lock the screen / cancel the lock state. After pressing lock key, the system will question the users to save present setting or not. If not, the LCD will display the current configuration state.

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

3.1 LCD Menu Tree







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 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.

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. Input the Username and Password (Both the default Username and Password are "admin".) and then click "LOGIN" to start the device setting.

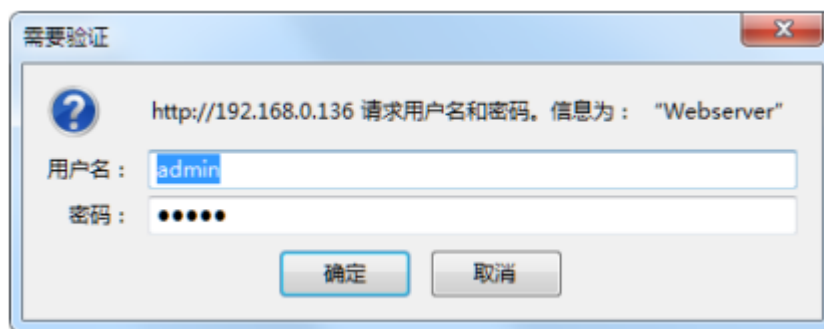


Figure-1

4.2 Operation

Status

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



Figure-2

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 an example) as Figure-3.

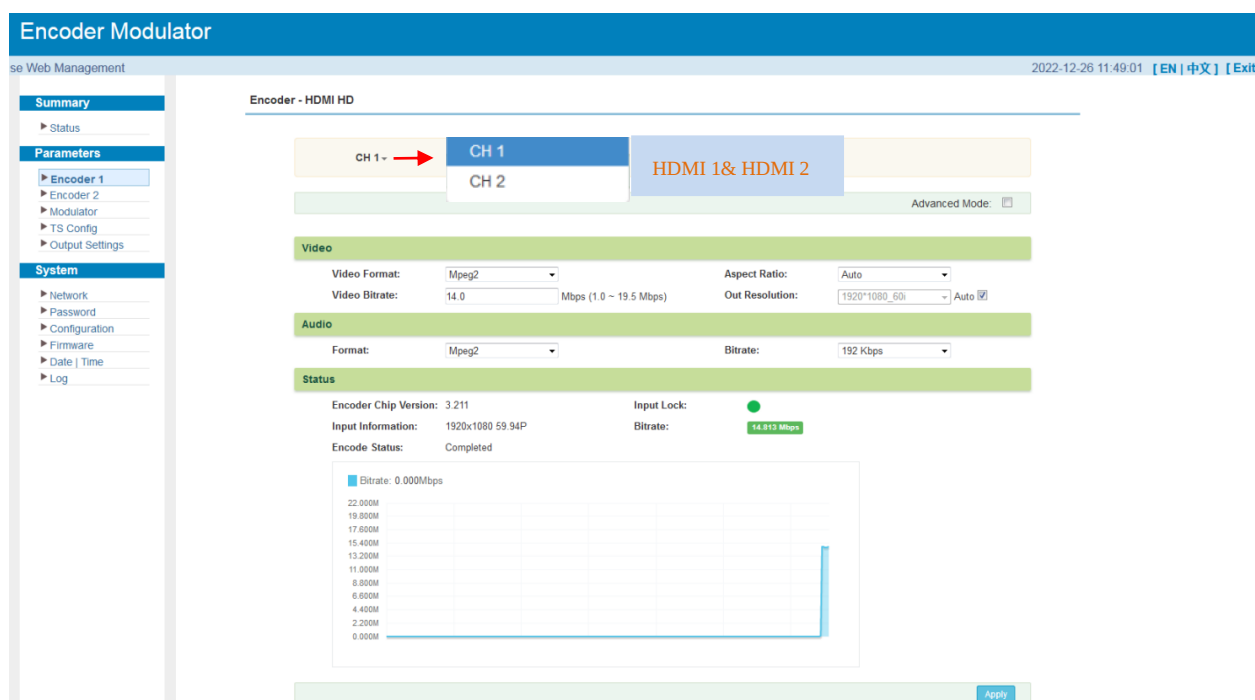


Figure-3

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

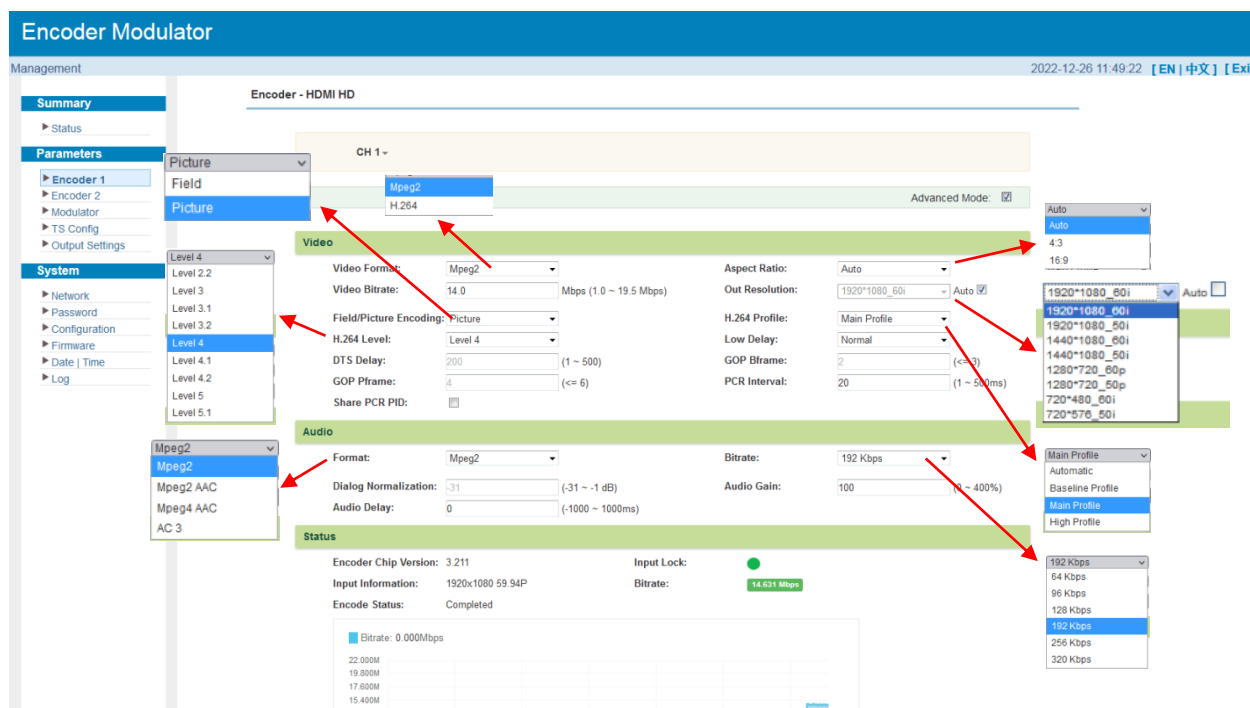


Figure-4

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:

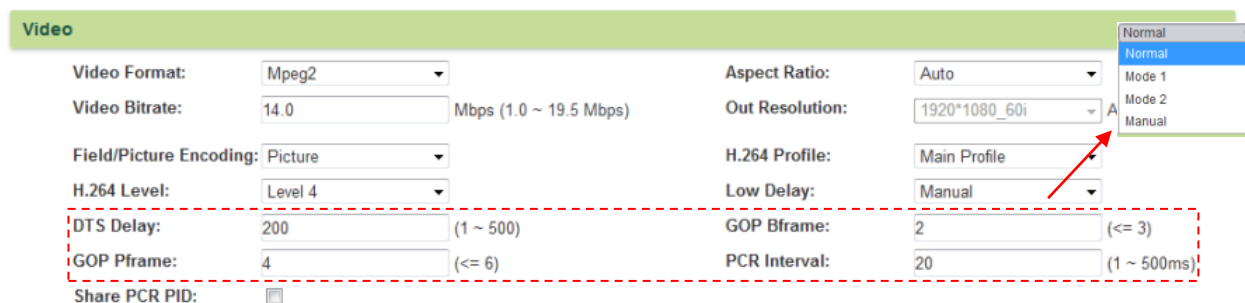


Figure-5

There are 4 low delay options:

1. **Normal:** to disable the low delay function.
2. **Mode 1:** to activate the low delay function in the default Mode 1 configuration.
3. **Mode 2:** to activate the low delay function in the default Mode 2 configuration.
4. **Manual:** to configure DTS Delay, GOP B frame and GOP P frame to get a low delay result accordingly.

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.

Encoder 2

Similarly, from the menu on left side of the webpage, clicking “Encoder 2”, it displays the information of the programs from the 2nd (SDI) encoding board.

The screenshot displays the 'Encoder Modulator' web interface for 'Encoder - SDI HD'. The interface is divided into several sections:

- Summary:** Includes a 'Status' link and a 'Parameters' section with a dropdown menu for 'Encoder 2'.
- System:** Includes links for 'Network', 'Password', 'Configuration', 'Firmware', 'Date | Time', and 'Log'.
- Parameters:** This section is further divided into 'Main Profile', 'Mpeg2', 'Audio', and 'Pair' settings. The 'Main Profile' dropdown is set to 'Main Profile'. The 'Mpeg2' dropdown is set to 'Mpeg2'. The 'Audio' dropdown is set to 'Pair 1'.
- Video Settings:** Includes 'Video Format' (Mpeg2), 'CC Switch' (CC Off), 'Out Resolution' (1920*1080_60i), 'Video Cache' (Off), 'H.264 Profile' (Main Profile), 'Low Delay' (Manual), 'GOP Bframe' (2), 'PCR Interval' (20), 'Aspect Ratio' (Auto), 'Video Bitrate' (14.0), 'Field/Picture Encoding' (Picture), 'H.264 Level' (Level 4), 'DTS Delay' (200), 'GOP Pframe' (4), and 'Share PCR PID' (checked).
- Audio Settings:** Includes 'Format' (Mpeg2), 'Dialog Normalization' (-31), 'Audio Pair' (Pair 1), 'Audio Delay' (0), 'Bitrate' (192 Kbps), 'Audio Group' (Group 1), and 'Audio Gain' (100).
- Status:** Displays 'Encoder Chip Version: 9.1.3.211', 'Input Information: 1920x1080 59.94P', 'Encode Status: Completed', 'Input Lock: [Green Dot]', 'Bitrate: 14.729 Mbps', and a table for 'Bitrate' (0.000Mbps, 22.000M, 19.800M).

Annotations and callouts provide additional information:

- A blue box at the top right states: "Not ticking 'Auto', users can set an output resolution not higher than the input resolution."
- A blue box on the right states: "General Settings for the input programs: Users can edit any item listed as needed. Ticking Share PCR PID means Video PID and PCR PID are the same one."
- A blue box at the bottom right states: "Encoding status monitoring: Signal locking, input resolution, encoding bitrate etc"
- A blue box at the bottom center states: "After parameters setting, clicking 'Apply' to make the setting take effect."
- An 'Apply' button is located at the bottom right.

Figure-6

TS Config

Click “TS Config”, it will display the encoded program information as Figure-7. Users can parse and multiplex encoded programs in this interface.

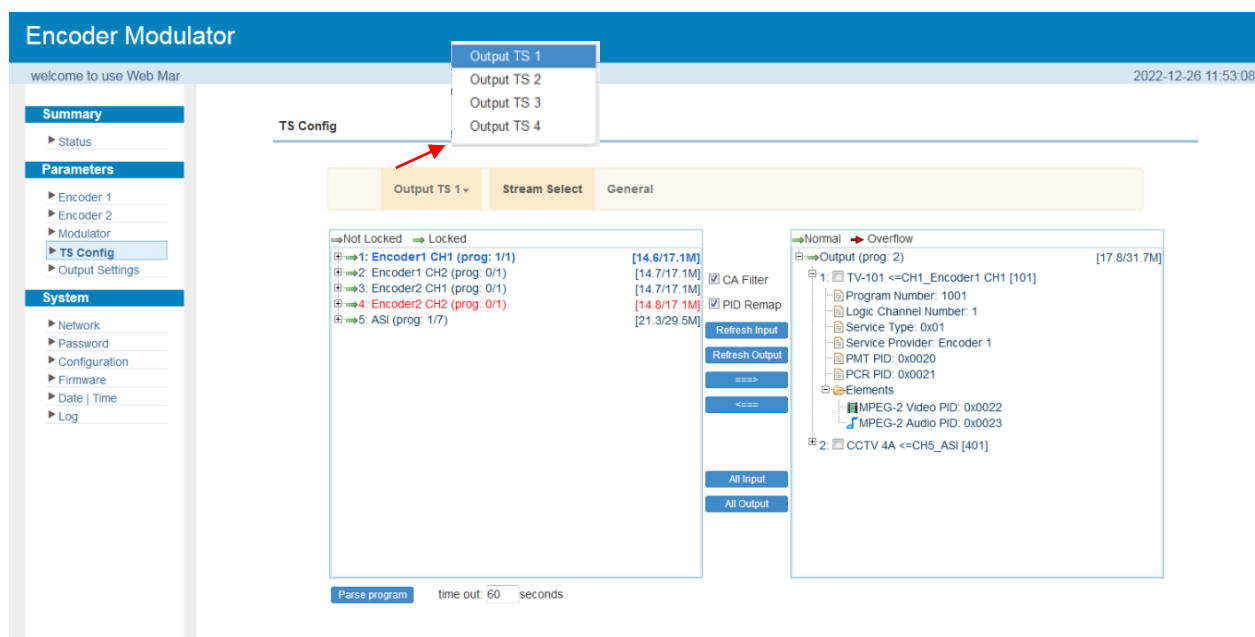


Figure-7

Output TS 1/2/3/4 represents the 4 carrier outputs and 4 MPTS 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

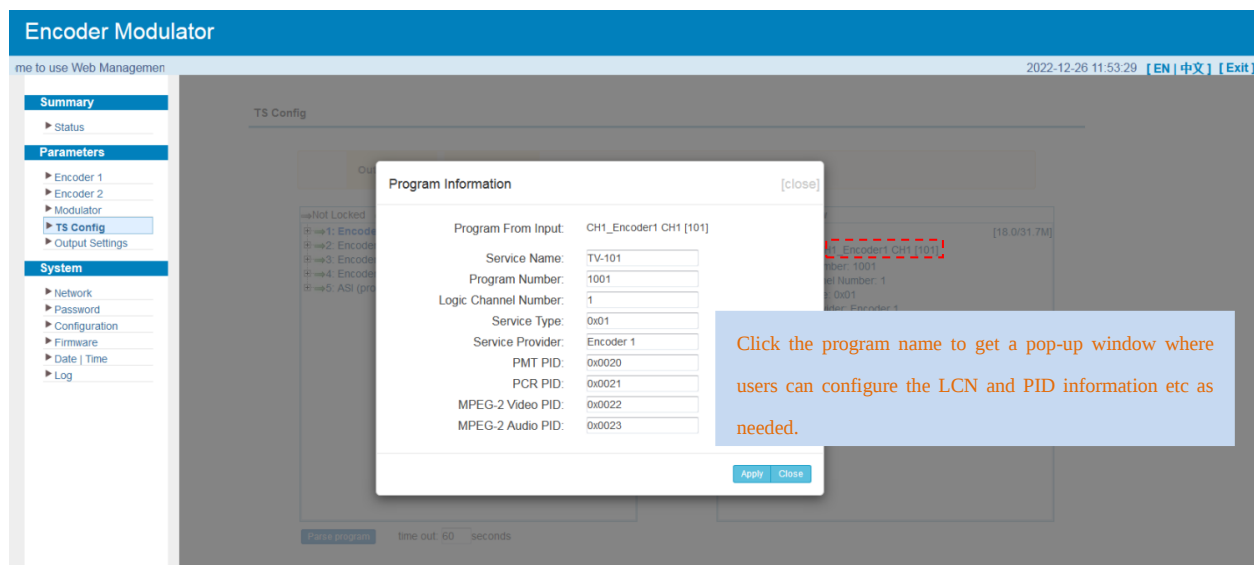


Figure-8

General

Click “General” from the menu to set Character Encoding option according to the program name language and NIT etc as Figure-9.

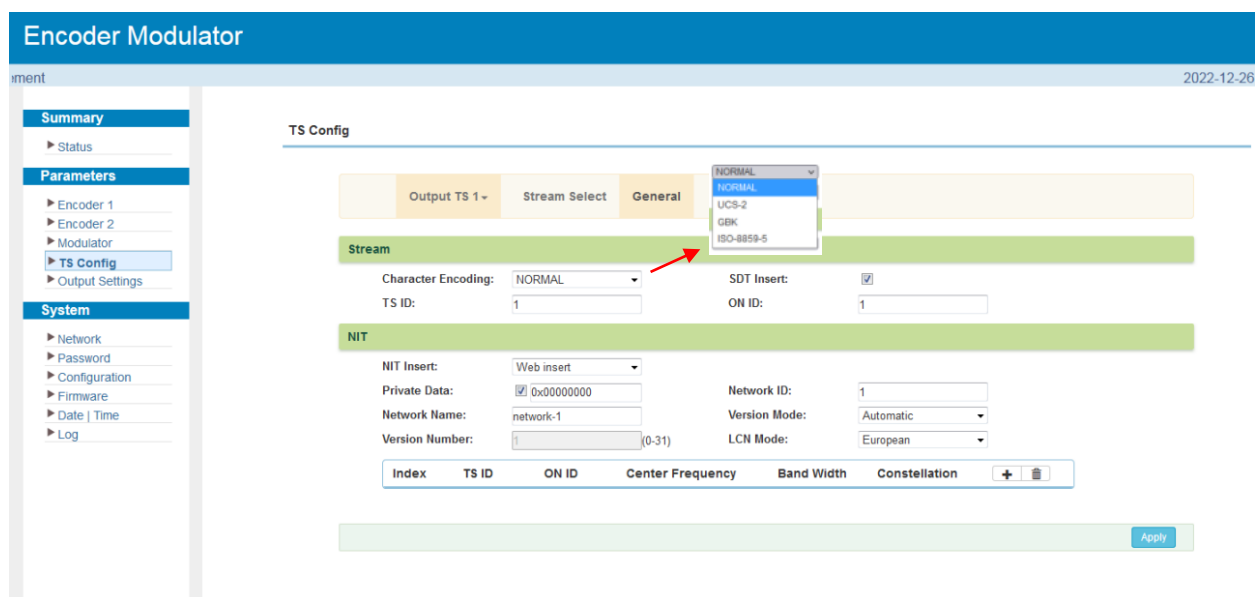


Figure-9

Set Web Insert for NIT Insert and Click “+” from this page, it will display the screen as Figure-10 where it requires to add NIT descriptor. Please follow your configuration in Modulator page to edit the NIT descriptor.

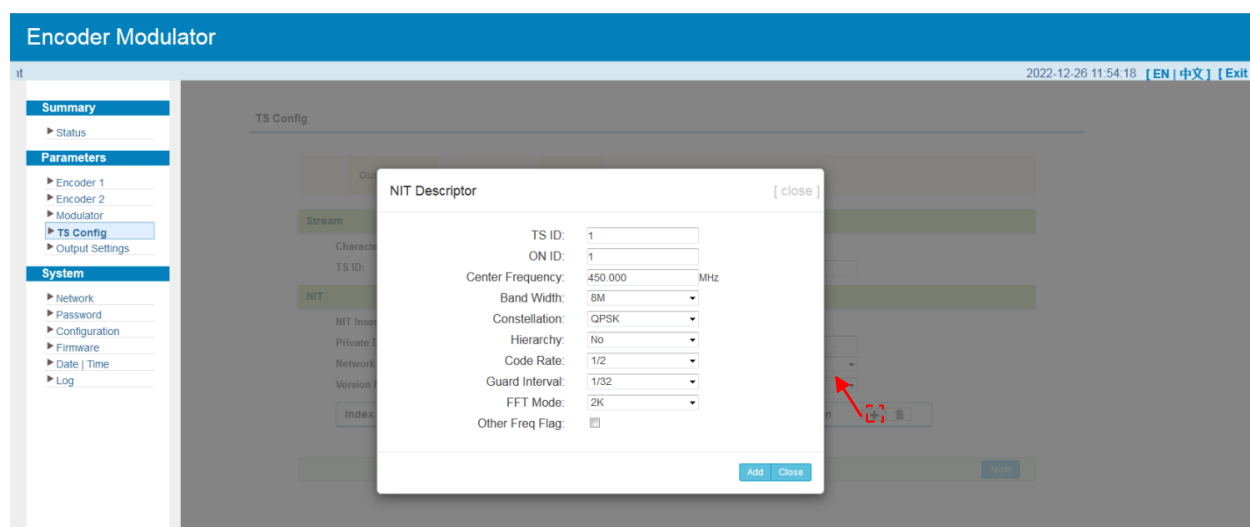


Figure-10

Modulator

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

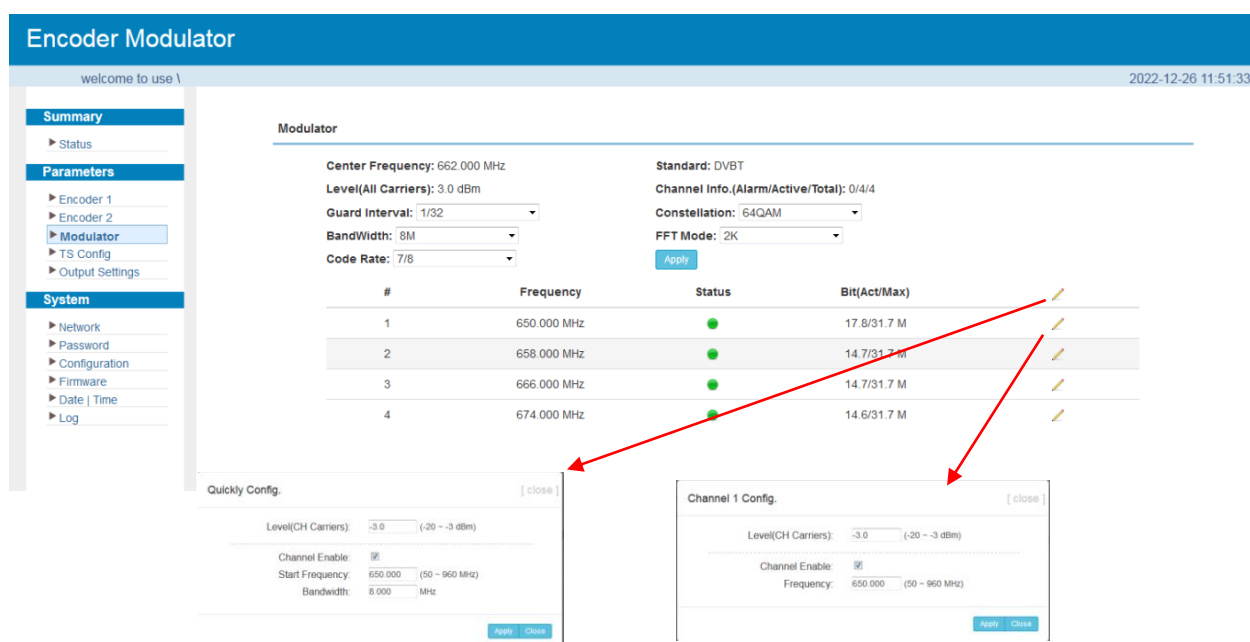


Figure-11

Output Settings

Click "Output Settings" from the left menu, it will display the page as Figure-12 where to configure the 4 MPTS output and 4 SPTS Output by clicking the .

Encoder Modulator

WE

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Summary

Parameters

System

Output Settings

IP Stream(GE_DATA)

Channel Info.(Alarm/Active/Total): 0/8/8

#	IP Address	Port	Protocol	Pkt Length	Null PKT Filter	Program	Status	Bit(Act/Max)
MPTS 1	224.2.2.2	2001	UDP	7	☐		●	17.8/31.7 M
MPTS 2	224.2.2.2	2002	UDP	7	☐		●	14.7/31.7 M
MPTS 3	224.2.2.2	2003	UDP	7	☐		●	14.7/31.7 M
MPTS 4	224.2.2.2	2004	UDP	7	☐		●	14.8/31.7 M
SPTS 1	224.2.2.2	2005	UDP	7	☐	NULL	●	0.0/20.0 M
SPTS 2	224.2.2.2	2006	UDP	7	☐	NULL	●	0.0/20.0 M
SPTS 3	224.2.2.2	2007	UDP	7	☐	NULL	●	0.0/20.0 M
SPTS 4	224.2.2.2	2008	UDP	7	☐	NULL	●	0.0/20.0 M

ASI Settings

Output Select: MPTS1

MPTS1
MPTS2
MPTS3
MPTS4
SPTS1
SPTS2
SPTS3
SPTS4

MPTS 1 Config.

Enable: ☒

IP Address: 224.2.2.2

Port: 2001

Protocol: UDP

Pkt Length: 7

Null PKT Filter: ☐

SPTS 1 Config.

Enable: ☒

Output Bitrate: 20.000 Mbps

IP Address: 224.2.2.2

Port: 2005

Protocol: UDP

Pkt Length: 7

Null PKT Filter: ☐

Program: CCTV 4A(MPTS1)

Figure-12

Network

When user clicks “Network”, it will display the page as Figure-13. It displays the network information of the device. Here users can change the device network configuration as needed.

Encoder Modulator

welcome to use Web IV 2022-12-26

Summary

- Status

Parameters

- Encoder 1
- Encoder 2
- Modulator
- TS Config
- Output Settings

System

- **Network**
- Password
- Configuration
- Firmware
- Date | Time
- Log

Network

NMS

IP Address: 192.168.191.42

Subnet Mask: 255.255.255.0

Gateway: 192.168.6.254

Web Management Port: 80

MAC Address: 20:22:09:20:11:05

DATA

IP Address: 192.168.8.42

Subnet Mask: 255.255.255.0

Gateway: 192.168.8.254

MAC Address: 20:32:09:20:11:05

Apply

Figure-13

Password

From the menu on left side of the webpage, clicking “Password”, it will display the screen as Figure-14 where to set the login account and password for the web NMS.

Encoder Modulator

welcome to use Web Man 2022-12-26

Summary

- Status

Parameters

- Encoder 1
- Encoder 2
- Modulator
- TS Config
- Output Settings

System

- Network
- **Password**
- Configuration
- Firmware
- Date | Time
- Log

Password

Modify the login name and password to make the device safely. If forget the name or password, you can reset it by keyboard. The default login name and password is "admin". Also please note the capital character and lowercase character.

Current Username: admin

Current Password:

New Username:

New Password:

Confirm New Password:

Apply

Figure-14

Configuration

From the menu on left side of the webpage, clicking “Configuration”, it will display the page as Figure-15 where to save, restore, make factory set, backup and load your configurations.

Encoder Modulator

Management2022-12-26

Summary

► Status

Parameters

► Encoder 1

► Encoder 2

► Modulator

► TS Config

► Output Settings

System

► Network

► Password

► Configuration

► Firmware

► Date | Time

► Log

Configuration

SaveRestoreFactory SetBackupLoad

When you change the parameter,you should save configuration ,otherwise the new configuration will lost after reboot.

Save config

Encoder Modulator

welcome to use Web Iv2022-12-26

Summary

► Status

Parameters

► Encoder 1

► Encoder 2

► Modulator

► TS Config

► Output Settings

System

► Network

► Password

► Configuration

► Firmware

► Date | Time

► Log

Configuration

SaveRestoreFactory SetBackupLoad

Load latest saved configuration,after click the "Restore" then please click the "Save config" button,otherwise the "Restore" parameter will lost after reboot.

Restore

Encoder Modulator

ent2022-12-26

Summary

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► Log

Configuration

SaveRestoreFactory SetBackupLoad

Set all configuration back to default, after click the "Factory Set" then please click the "Save config" button,otherwise the default parameter will lost after reboot.

Factory set

Encoder Modulator

ib Management2022-12-26

Summary

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► Log

Configuration

SaveRestoreFactory SetBackupLoad

Backup current configuration to the local file,we suggest do this before set the configuration or update firmware.

Backup config

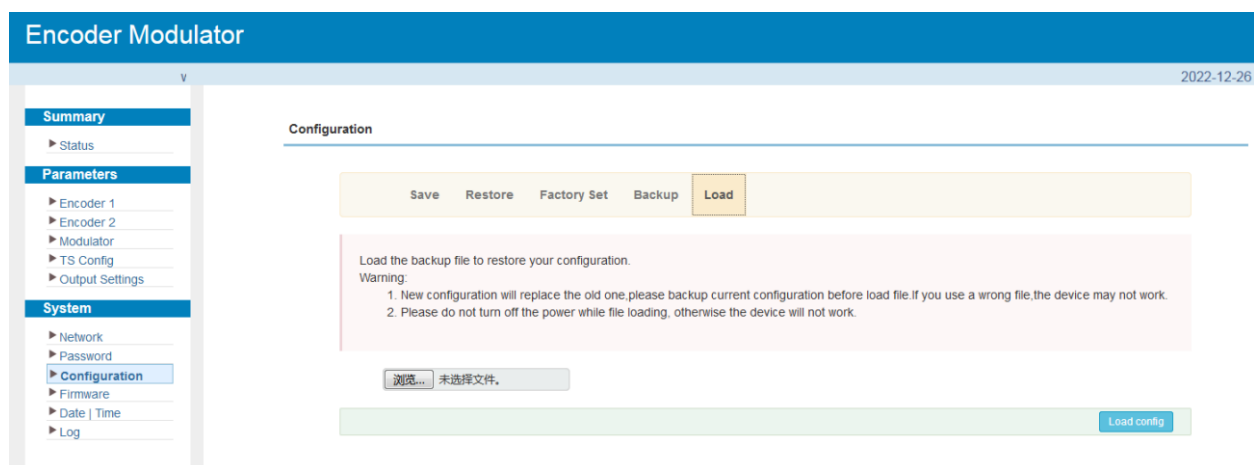


Figure-15

Firmware

From the menu on left side of the webpage, clicking “Firmware”, it will display the screen as Figure-16 where to update firmware for the device.

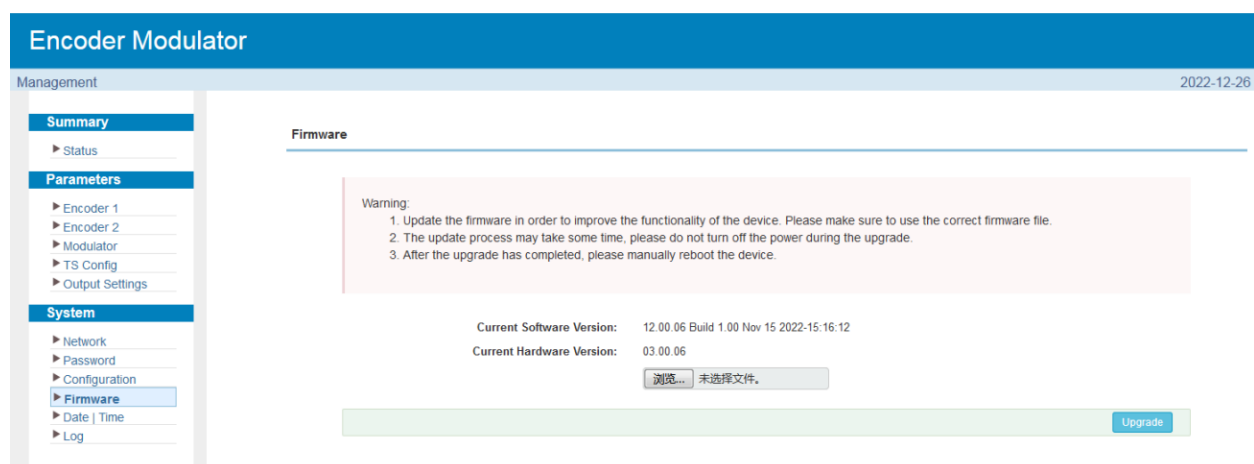


Figure-16

Date | Time

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

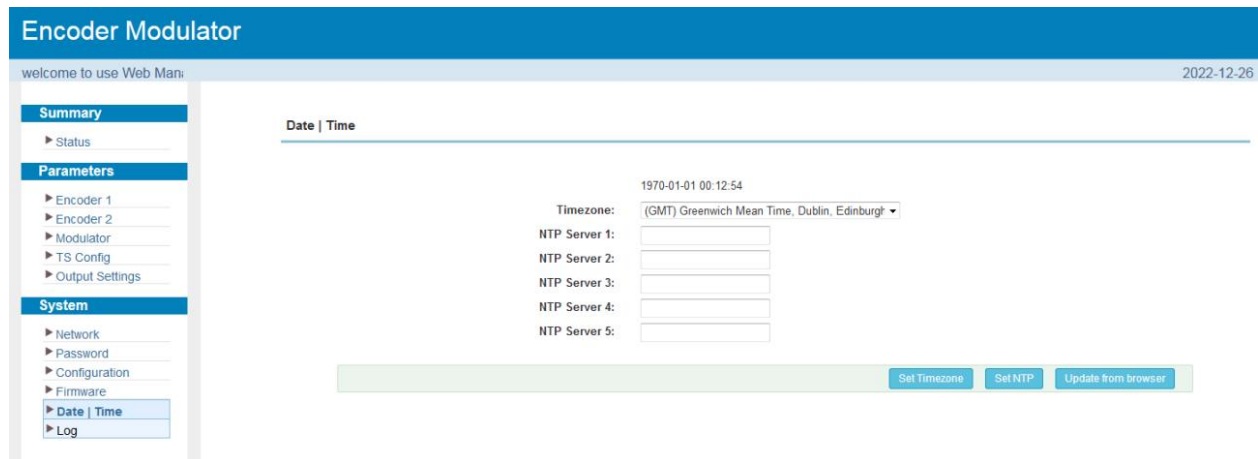


Figure-17

Log:

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

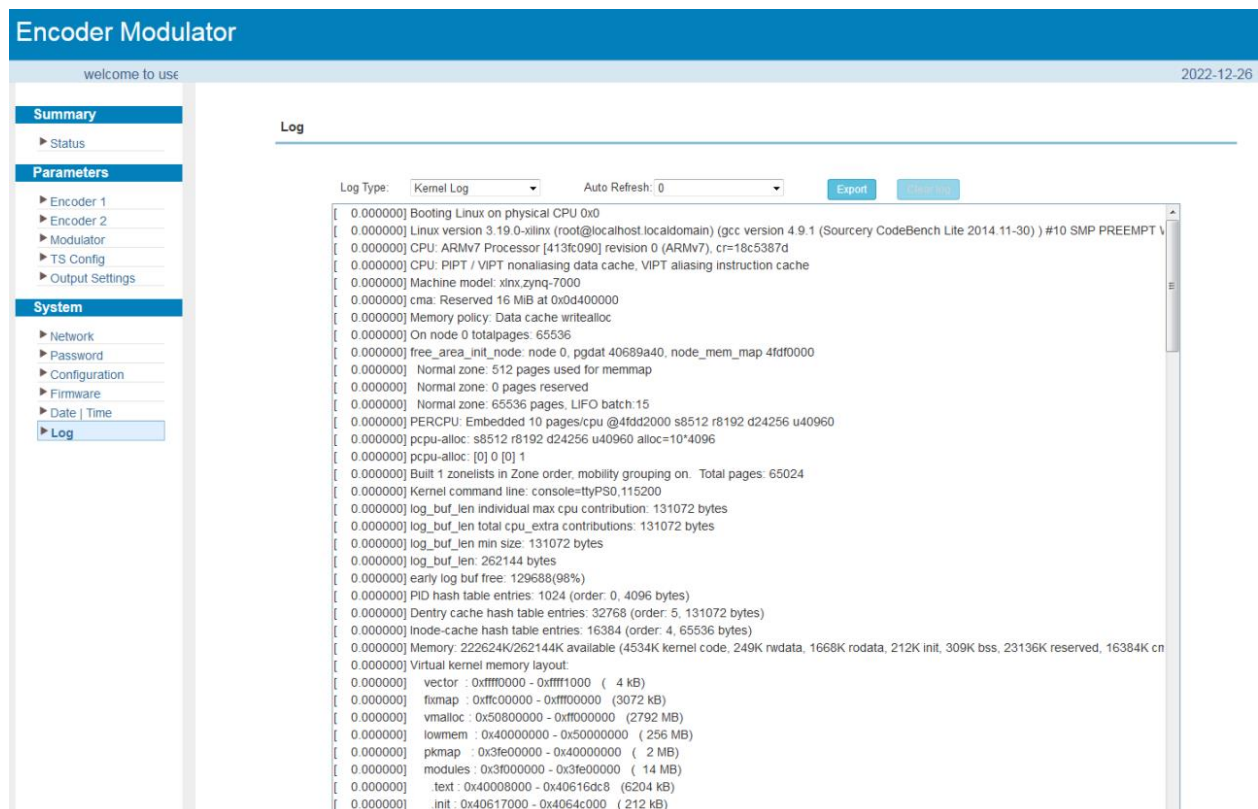


Figure-18

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 |