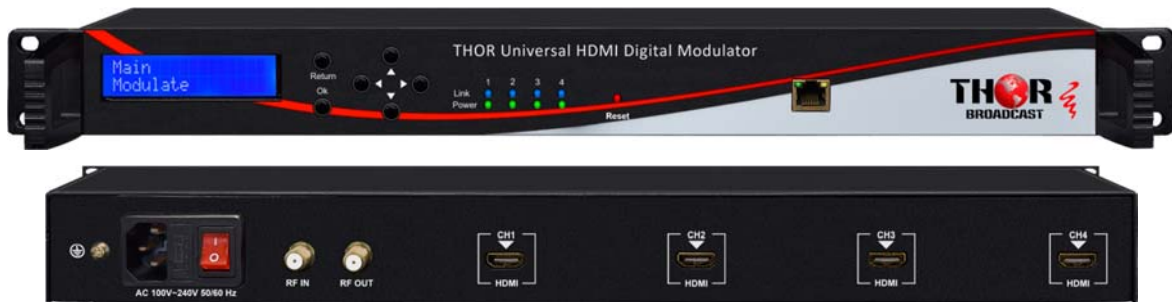


THOR BROADCAST

User Manual



H-THUNDER-4 Modulator

A Note from Thor Broadcast about this Manual

Intended Audience

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

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Chapter 1 – Introduction

Product Overview

The H-THUNDER-4 encoder modulator is Thor Broadcast's new MPEG2 video modulator/encoder which is used to convert HDMI signals into tangible RF channels in DVB-C/T/ATSC/ISDB-T. This low cost and speedy unit supports 4 HDMI inputs, control and upgrade via web NMS, very easy front panel buttons for quick setup.

The signal source could vary from satellite receivers, closed-circuit television cameras, Blu-ray players, and antenna (off air) or any device which outputs an HDMI source in scope with its broadcast resolutions. The Radio Frequencies it outputs can be used with any Television with an RF tuner, STB, etc.

The H-THUNDER-4 units are widely used everywhere such as the mall, market hall, theatre, hotels, restaurants, stadiums, race tracks, amphitheatres and etc. for advertising, monitoring, training and educating in company, schools, campuses, and healthcare.

Convert your local HDMI signal into an RF signal, ready for distribution over coaxial cables. These modulators support all cable and terrestrial standards.

Key features

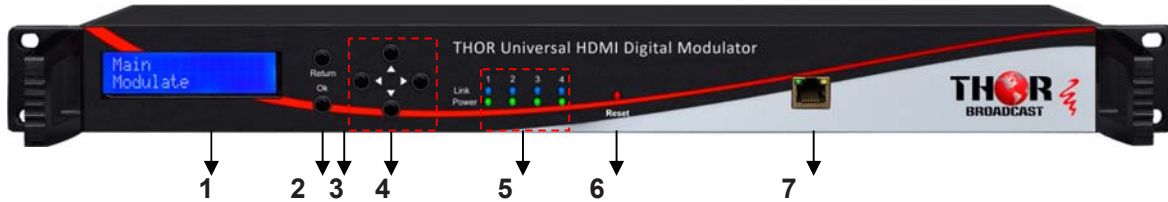
- HDMI input, capable of receiving all resolutions up to 1080p
- MPEG2 video encoding
- MPEG1 layer 2, AAC, and AC3 audio encoding
- 1 RF input, to by-pass terrestrial or cable signals
- DVB-C/T/ATSC/ISDB-T RF output in every device, Modulation dynamic switching
- Each channel supports 1x DVB-C/T/ATSC/ISDB-T output option
- Control via web NMS, and easy updates via web

1.3 Specifications

HDMI Encoding Section		
Input	Interface	HDMI*4
	Encoding	MPEG2
Video	Input	Output
	PAL,NTSC 720@50p 720@60p 1080@50i/p 1080@60i/p	Max.1080@30p
	Bit-rate	2.000~20.000 Mbps
	Rate Control	VBR
	Aspect Ratio	16 :9
	Encoding	MPEG1 layer 2, AAC, AC3
	Sample rate	48KHz
Audio	Bit rate	MPEG1 layer 2(192kbps) AAC (VBR) AC3 (128kbps)
	DVB-C Modulator Section	
	Standard	J.83A (DVB-C), J.83B
MER	≥35dB	
RF frequency	50-1000MHz, 1KHz step	
RF output level	70~100 dBμV, 1dB step	
Symbol rate	3.000~7.000Msp/s ADJ	
	J.83A	J.83B
Constellation	16/32/64/128/256QAM	64/256QAM
Bandwidth	8M	6M
DVB-T Modulator Section		
Standard	DVB-T COFDM	
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, 8K	
MER	≥35dB	
RF frequency	50-1000MHz, 1KHz step	
RF output level	70~100 dBμV, 1dB step	
ISDB-T Modulator Section		
Standard	ARIB STD-B31	
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	
RF frequency	50~1000MHz, 1KHz step	
RF output level	70~100 dBμV, 1dB step	
ATSC Modulator Section		
Standard	ATSC A/53	
Constellation	8 VSB	
MER	≥35dB	
RF frequency	50~1000MHz, 1KHz step	
RF output level	70~100 dBμV, 1dB step	
System		
Management	Web and LCD controlled	
Language	English	
Upgrade	Web update	
General		
Power supply	AC 100V±10%, 50/60Hz or AC 220V±10%, 50/60Hz	
Dimensions	483*136*44mm	
Temperature	0~45℃(operation),- 20~80℃(storage)	

1.4 Appearance and Description

Front Panel Illustration



- | | |
|-----------------------|--|
| 1 - LCD Screen | 5 - Directional Keys (up, down, left, right) |
| 2 - OK (to Confirm) | 6 - Power & Link Indicators |
| 3 - Return (Escape) | 7 - Reset Button |
| 4 - NMS Ethernet Port | |

Rear Panel Illustration



- | | |
|------------------------|--------------------|
| 1 - Power Supply Input | 4 - RF Output |
| 2 - Power Switch | 5 - 4x HDMI Inputs |
| 3 - RF Input | |

Chapter 2 - LCD Operation

Keyboard Function Description:

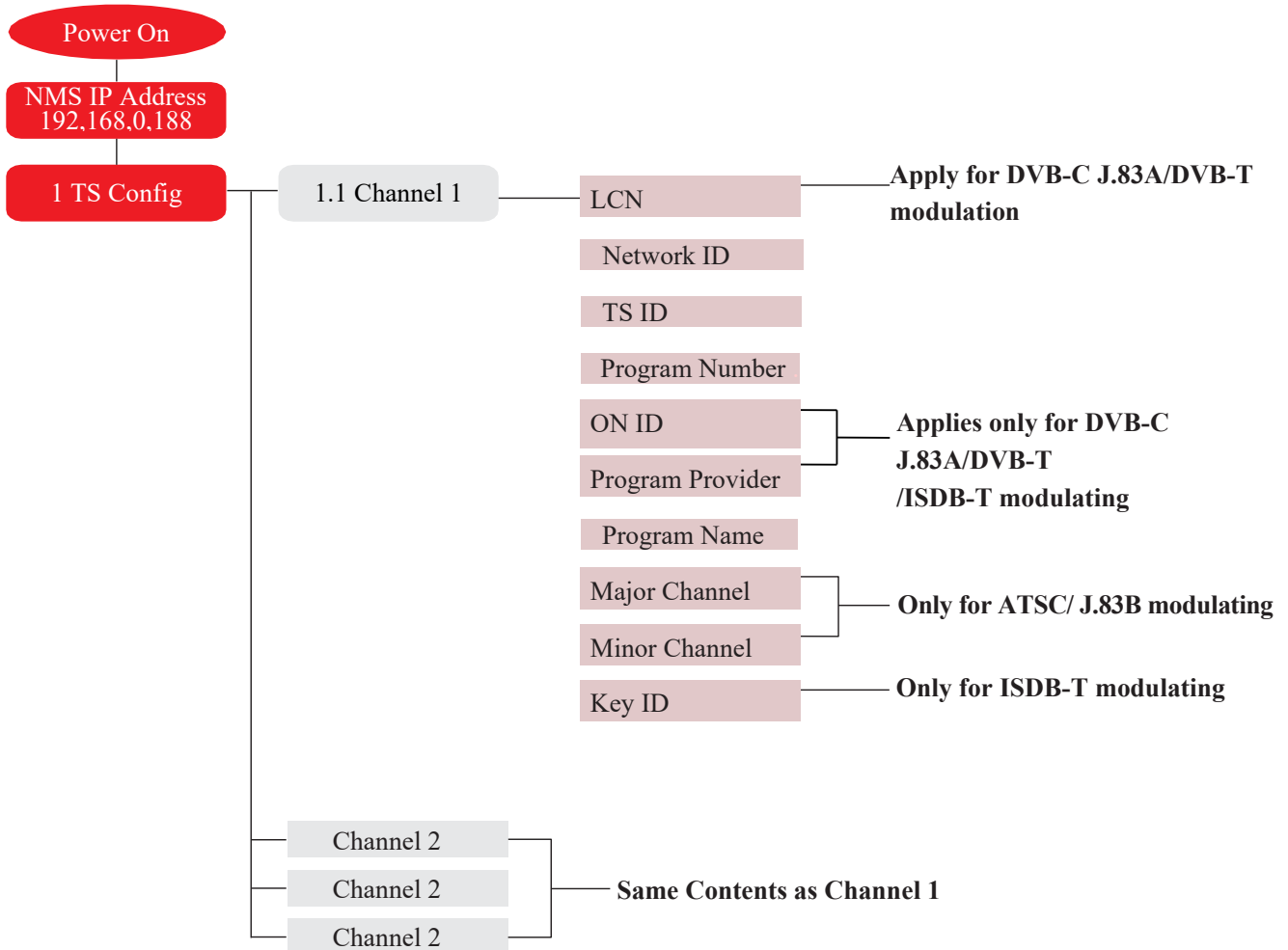
OK: Activate the parameters which need modifications, or confirm the change after modification.

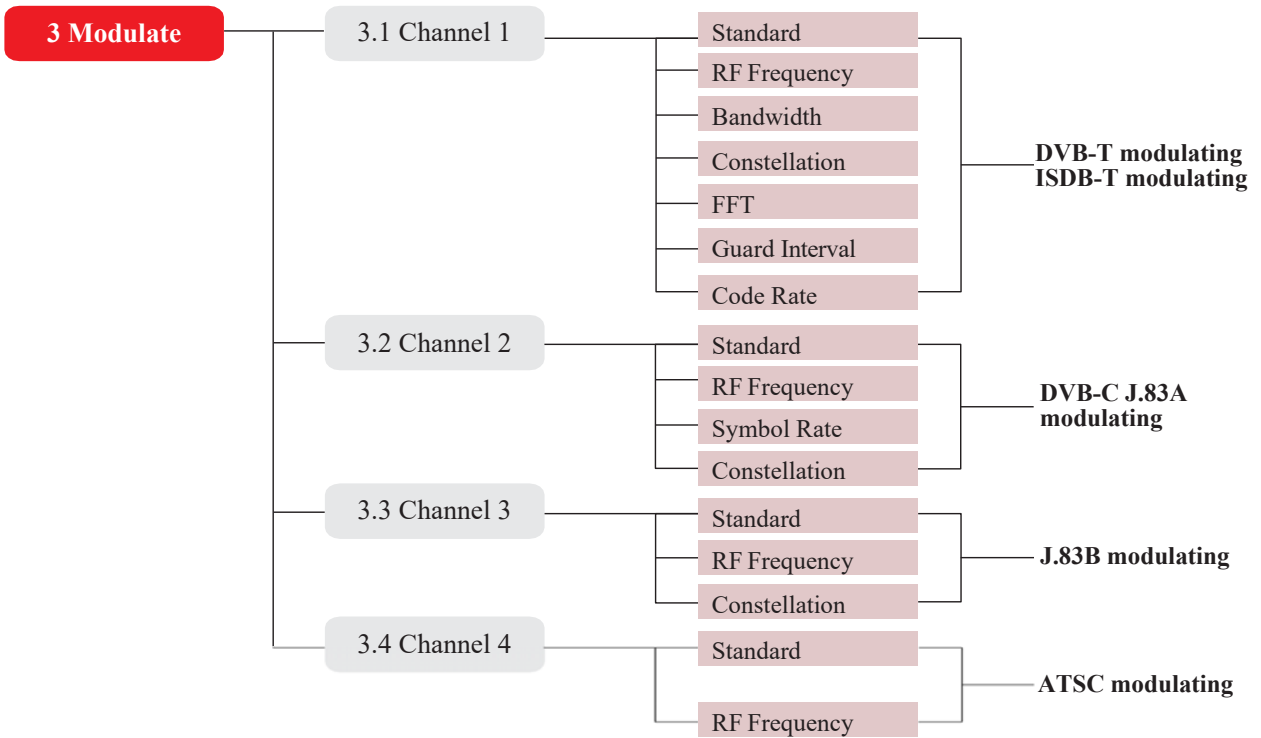
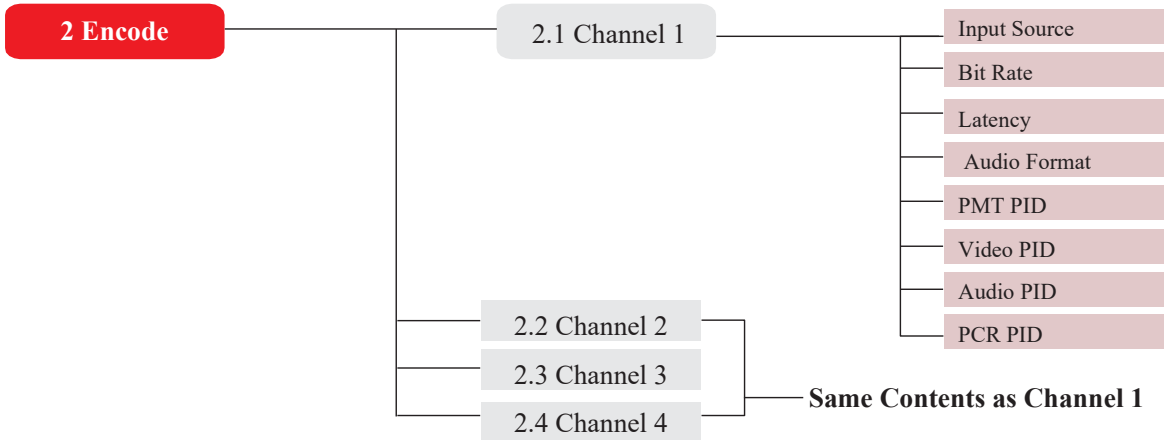
RETURN: Cancel current entered value, resume previous setting; Return to previous menu.

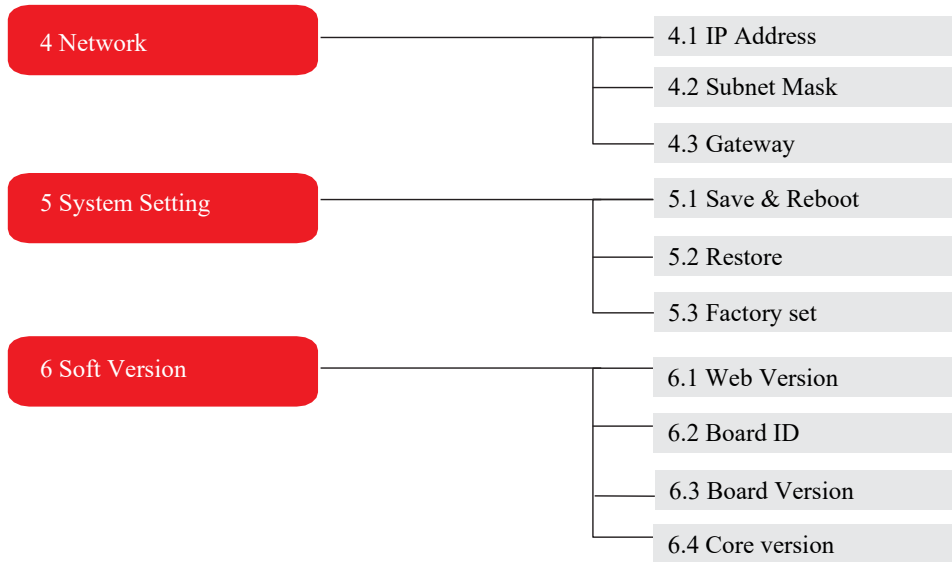
LEFT/RIGHT: Choose and set the parameters.

UP/DOWN: Modify activated parameter or paging up/down when parameter is inactivated.

2.1 LCD Menu Structure

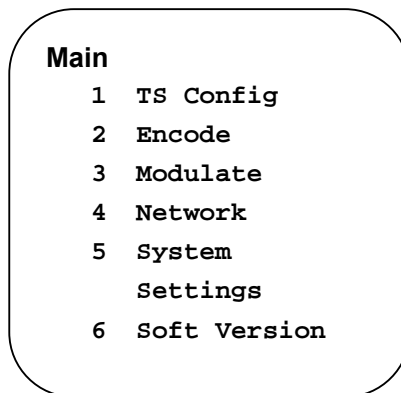






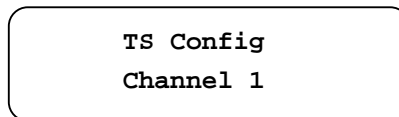
2.2 General Settings

After powering on the device, it will show the device IP address. When you press the OK key, the main interface has 6 menus and sub-menus, press the up and down keys to switch the options, press the OK key to enter the specified sub-menu to modify the parameters.



2.2.1 TS Config

The H-THUNDER-4 outputs up to 4 RF modulation carriers. Under this menu you can enter the corresponding channels (1-4) to set your relevant parameters. Select each channel and set your settings as you see fit.



Channel 1/2/3/4

The H-THUNDER-4 also has can output any standard DVB-C, DVB-T, ATSC or ISDB-T modulation. Select different modulation standards under the modulate menu, the TS parameters will be different with each standard.

DVB-T/ DVB-C J.83A:

LCN
Network ID
TS ID
ON ID
Program Number
Program Provider
Program Name

J.83B/ATSC:

Network ID
Major Channel
Minor Channel
TS ID
Program Number
Program Name

ISDB-T:

Key ID
Network ID
TS ID
ON ID
Program Number
Program Provider
Program Name

2.2.2 Encode

This Broadcast H-THUNDER-4 is will allow you to alter audio and video settings as needed per channel 1/2/3/4 for variable results.

Encode
2.1 Channel 1

Channel 1/2/3/4

The settings for the sub-menus are the same for Channels 1-4, so here we'll show you one channel as an example. Press the OK key and enter the sub-menu, press the up and down keys to switch the options.

```

Channel 1
  Bit Rate
  Audio format
  Latency
  PMT PID
  Video PID
  Audio PID
  PCR PID
    
```

2.2.3 Modulate

The H-THUNDER-4 has up to 4 RF carriers, press the up and down keys to switch the channels, then press OK key enter the corresponding channel to set the relevant RF output parameters.

```

Modulate
Channel
    
```

Channel 1/2/3/4

Press the up and down keys to switch the option. Set these parameters by pressing OK to enter these sub-menus.

DVB-T:

```

Standard
RF Frequency
Bandwidth
Constellation
FFT
Guard Interval
Code Rate
    
```

DVB-C J.83A:

```

Standard
RF Frequency
Symbol Rate
Constellation
    
```

J.83B:

Standard
RF Frequency
Constellation

ATSC:

Standard
RF Frequency

ISDB-T:

Standard
RF Frequency
Constellation
FFT
Guard Interval
Code Rate

Network Setting

The Network Setting has 3 sub-menus as shown below.

IP Address
192.168.0.188

Subnet Mask
255.255.255.0

Gateway
192.168.0.1

System Setting

Save & Reboot

Always save your settings each time you change them, so the next time you restart the unit, they appear as you wanted them.

Save & Reboot
Sure?

- **Restore**

In this menu, press OK key to restore the device the last saved configuration.

Save & Reboot
Sure?

- **Factory Set**

Choose press OK key to restore the device into factory's default configuration.

Save & Reboot
Sure?

- **2.2.6 Soft Version**

Check the CPU, Board and Web version of this modulator under this submenu.

Web Version
X.X.X

Board ID
XXXXXXXX

Board Version
X.X

Core Version
XXXXXXXX

Chapter 3 - WEB NMS Operation

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

3.1 Login

The default IP of this device is 192.168.0.188. We can modify the IP through the front panel. Connect the PC and the device with net cable, and use ping command to confirm they are on the same network segment.

E.G. the PC IP address is 192.168.0.190, we then change the device IP to 192.168.0.xxx (xxx can be 0 to 255 except 190 to avoid IP conflict). Use any web browser to connect the device with the PC by inputting the Encoder & Modulator's IP address in the browser's address bar and press Enter.

It will display the Login interface as Figure-1. Input the Username and Password (Both the default Username and Password are "admin".) and then click "LOGIN" to start the device setting. Both fields of Username and Password are case sensitive.

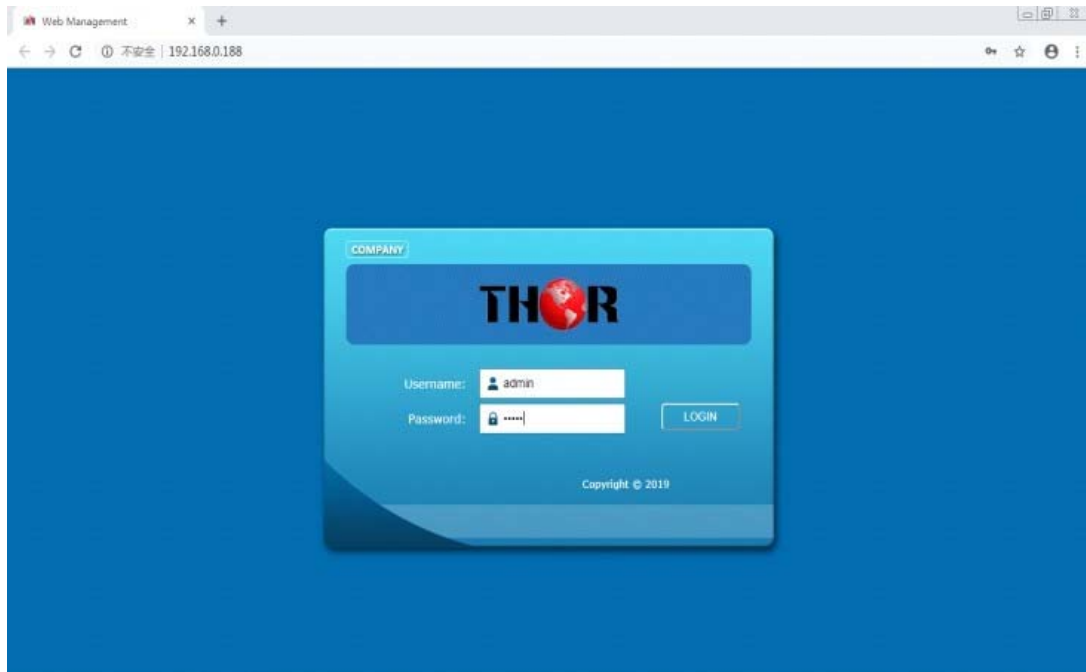


Figure-1

3.2 Operation

Summary

When we confirm the login, it displays the Summary interface as shown in Figure-2.

Encoder & Modulator

Web Management Log out

THOR BROADCAST

Summary

- ▶ Status

Parameters

- ▶ Encode
- ▶ Modulate

System

- ▶ Network
- ▶ Password
- ▶ Firmware
- ▶ Configuration

Status

Version Information

Version: 1.2.0
Board ID: 00020200

Modulator Status

Channel	Status	Standard	Frequency	Video Info.
1	●	J.83B	Ch 65-471.000MHz	1920x1080 60P
2	●	J.83B	Ch 66-477.000MHz	1920x1080 60P
3	●	J.83B	Ch 67-483.000MHz	1920x1080 60P
4	●	J.83B	Ch 68-489.000MHz	1920x1080 60P

Get

Check the version information

Click any item here to enter the corresponding interface to check information or set the parameters.

The modulate channels status summary

Figure-2

Parameters → Encode:

Click [Encode], it displays the information of the program from the 4 HDMI encoded channels, users select different modulating

Encoder & Modulator

Web Management Log out

THOR BROADCAST

Summary

- ▶ Status

Parameters

- ▶ Encode
- ▶ Modulate

System

- ▶ Network
- ▶ Password
- ▶ Firmware
- ▶ Configuration

Encode

Channel 1 Channel 2 Channel 3 Channel 4

Bit Rate: 19 (5-25)MBpps
Latency: 1000
Audio format: AC3
TS ID: 1
Program Number: 1
Program Name: VMT-1
PMT PID: 32
Video PID: 48
Audio PID: 49
PCR PID: 48
Input Source: HDMI
Status: ●
Video Resolution: 1920x1080 50P
Version: 1.9
Core Version: 01030803


Get Apply

J.83B Modulation

HDMI

Encoder & Modulator

Web Management Log out



- Summary
 - Status
- Parameters
 - Encode**
 - Modulate
- System
 - Network
 - Password
 - Firmware
 - Configuration

Encode

Channel 1 | Channel 2 | Channel 3 | Channel 4

Bit Rate:	19	(5-25)Mbps
Latency:	1000	*
Audio format:	MPEG1 Layer2	*
TS ID:	2	
ON ID:	1	
Program Number:	2	
Program Provider:	Video	
Program Name:	VRT-2	
PMT PID:	33	
Video PID:	49	
Audio PID:	50	
PCR PID:	49	
Input Source:	HDMI	*
Status:	<input checked="" type="radio"/>	
Video Resolution:	1920x1080 50P	
Version:	1.9	
Core Version:	01030803	


Get Apply

AC3, AAC,
MPEG1 Layer2
Audio encoding format

DVB-T Modulation

Encoder & Modulator

Web Management Log out



- Summary
 - Status
- Parameters
 - Encode**
 - Modulate
- System
 - Network
 - Password
 - Firmware
 - Configuration

Encode

Channel 1 | Channel 2 | Channel 3 | Channel 4

Bit Rate:	19	(5-25)Mbps
Latency:	1000	*
Audio format:	MPEG1 Layer2	*
TS ID:	3	
ON ID:	1	
Program Number:	3	
Program Provider:	Video	
Program Name:	VRT-3	
PMT PID:	34	
Video PID:	50	
Audio PID:	51	
PCR PID:	50	
Input Source:	HDMI	*
Status:	<input checked="" type="radio"/>	
Video Resolution:	1920x1080 50P	
Version:	1.9	
Core Version:	01030803	

Get Apply

DVB-C(J.83A)
Modulation

Encoder & Modulator

Web Management Log out

- Summary
 - Status
- Parameters
 - Encode**
 - Modulate
- System
 - Network
 - Password
 - Firmware
 - Configuration

Encode

Channel 1 Channel 2 Channel 3 Channel 4

Bit Rate: 19 (5-25)Mbps

Latency: 1000

Audio format: AC3

TS ID: 4

Program Number: 4

Program Name: VMT-4

PMT PID: 36

Video PID: 51

Audio PID: 52

PCR PID: 51

Input Source: HDMI

Status:

Video Resolution: 1920x1080 50P

Version: 1.9

Core Version: 01030803

→ ATSC Modulation

Encoder & Modulator

Web Management Log out

- Summary
 - Status
- Parameters
 - Encode**
 - Modulate
- System
 - Network
 - Password
 - Firmware
 - Configuration

Encode

Channel 1 Channel 2 Channel 3 Channel 4

Bit Rate: 19 (5-25)Mbps

Latency: 1000

Audio format: AAC

TS ID: 1

ON ID: 1

Service ID: 1

Program Provider: Video

Program Name: VMT-1

PMT PID: 32

Video PID: 48

Audio PID: 49

PCR PID: 48

Input Source: HDMI

Status:

Video Resolution: 1920x1080 50P

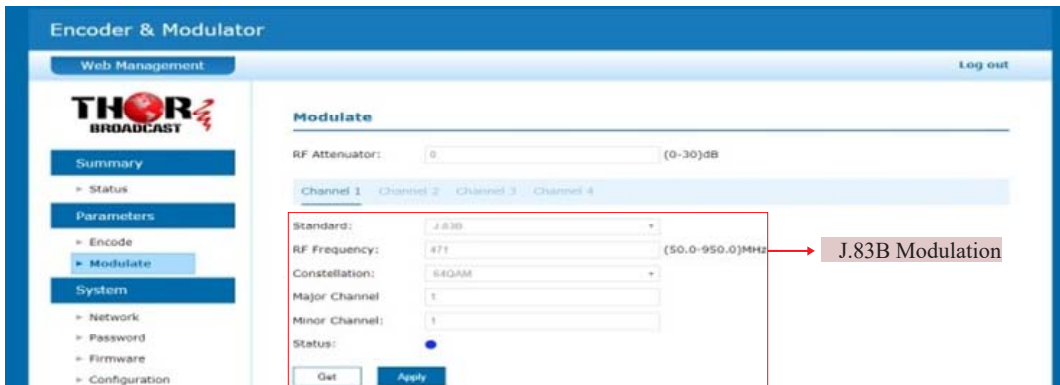
Version: 1.9

Core Version: 01030803

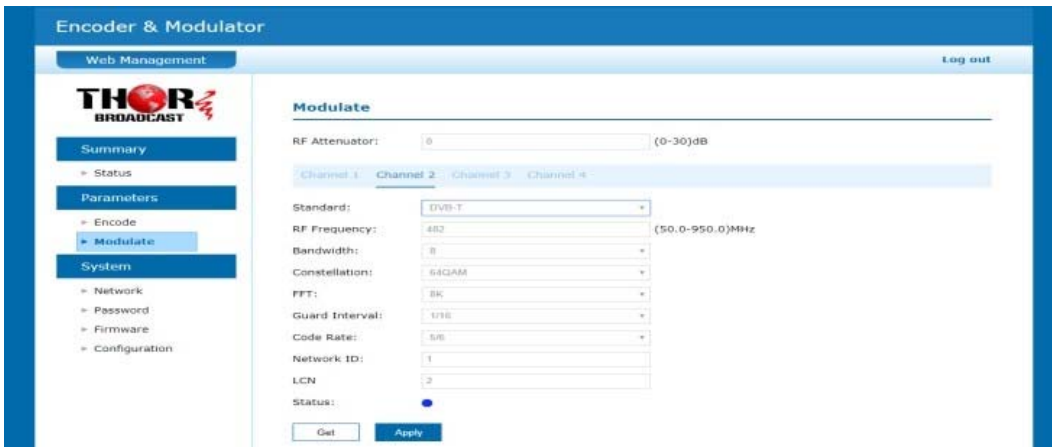
→ ISDB-T Modulation

System → Modulate:

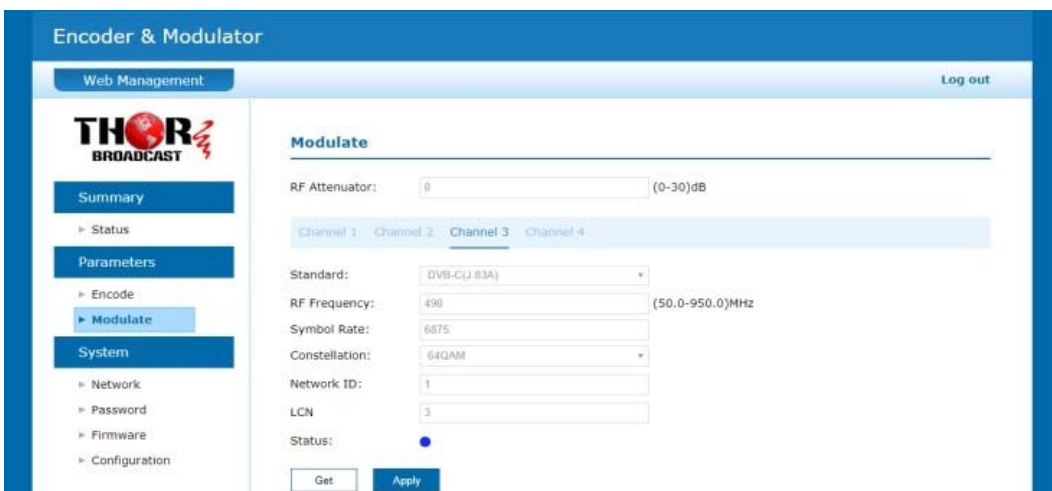
Click [**Modulate**], it displays the interface where users can configure the modulating parameters.



Click [**Channel 2/3/4**], it displays the interface where you can configure the modulating parameters.
Channel 2: DVB-T modulation



Channel 3: DVB-C(J.83A) modulation



Channel 4: ATSC modulation

The screenshot shows the 'Encoder & Modulator' web interface. On the left is a navigation menu with 'Modulate' selected. The main area is titled 'Modulate' and shows settings for Channel 4. The 'RF Attenuator' is set to 0 dB. The 'Standard' is ATSC, 'RF Frequency' is 491 MHz, 'Constellation' is 8VSB, and 'Major Channel' is 17. The 'Minor Channel' is 1. The status indicator is a blue dot. 'Get' and 'Apply' buttons are at the bottom.

Channel 1: ISDB-T modulation

The screenshot shows the 'Encoder & Modulator' web interface. On the left is a navigation menu with 'Modulate' selected. The main area is titled 'Modulate' and shows settings for Channel 1. The 'RF Attenuator' is set to 0 dB. The 'Standard' is ISDB, 'RF Frequency' is 473.143 MHz, 'Constellation' is 64QAM, 'FFT' is 8K, 'Guard Interval' is 1/16, and 'Code Rate' is 5/6. The 'Network ID' is 1 and 'Key Id' is 14. The status indicator is a blue dot. 'Get' and 'Apply' buttons are at the bottom.

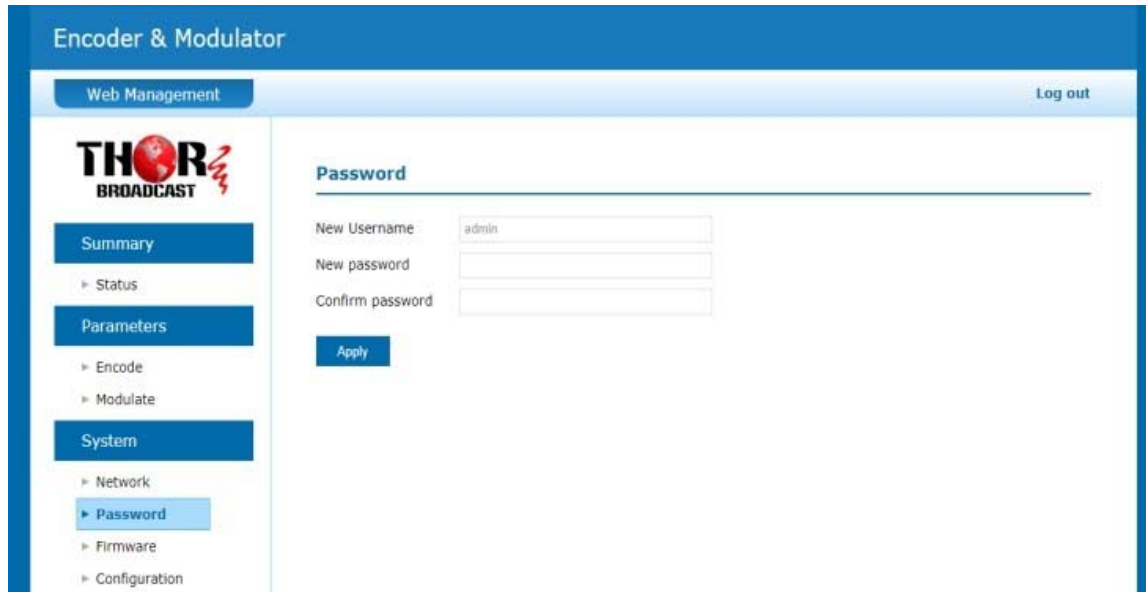
System → Network:

Click [Network], it displays the where to set network parameters.

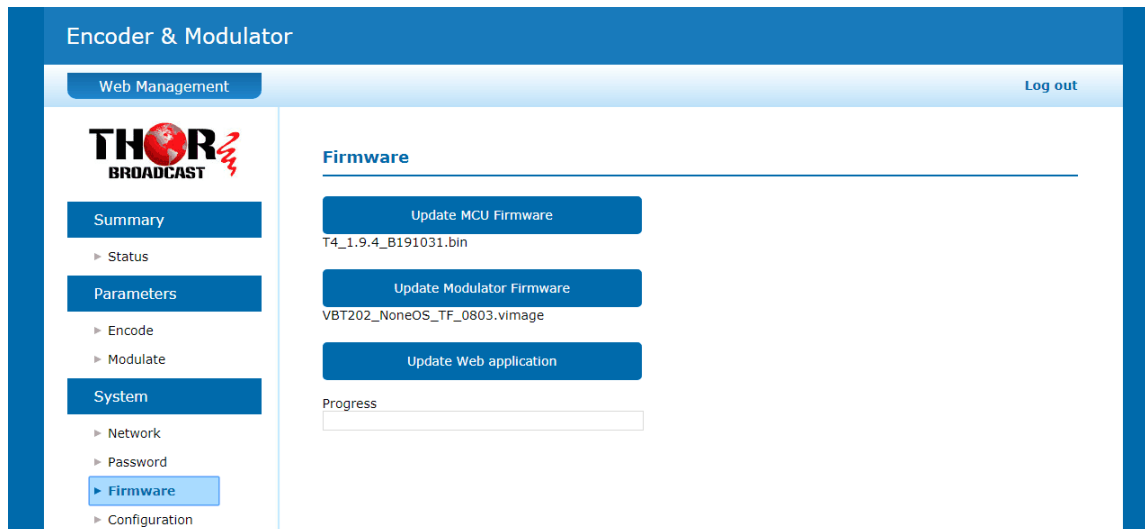
The screenshot shows the 'Encoder & Modulator' web interface. On the left is a navigation menu with 'Network' selected. The main area is titled 'Network' and shows configuration fields: 'IP Address' (192.168.0.108), 'Subnet Mask' (255.255.255.0), and 'Default Gateway' (192.168.0.1). 'Get' and 'Apply' buttons are at the bottom.

System → Password:

Click [**Password**], it displays the screen where to set login password for the web NMS


System → Firmware:

Click [**Firmware**], it displays the screen where to update the firmware on this modulator.


[Remark]
Read this carefully before starting the update operation

1. Make sure the network connection is solid and stable before operation.
2. Do not open same web page in different tab.
3. Ensure network is connected and power is up during whole update process.
4. Do not turn off power while system is restarting after update.

Click [**Update MCU Firmware**] to put file up then auto start update.

Progress shown below.

The screenshot shows the 'Encoder & Modulator' web management interface. On the left is a navigation menu with sections: Summary (Status), Parameters (Encode, Modulate), and System (Network, Password, Firmware, Configuration). The 'Firmware' section is active. The main content area has a 'Firmware' header and three buttons: 'Update MCU Firmware' (highlighted with a red box), 'Update Modulator Firmware', and 'Update Web application'. Below the buttons, a 'Progress' bar shows 100% completion for the MCU firmware update.

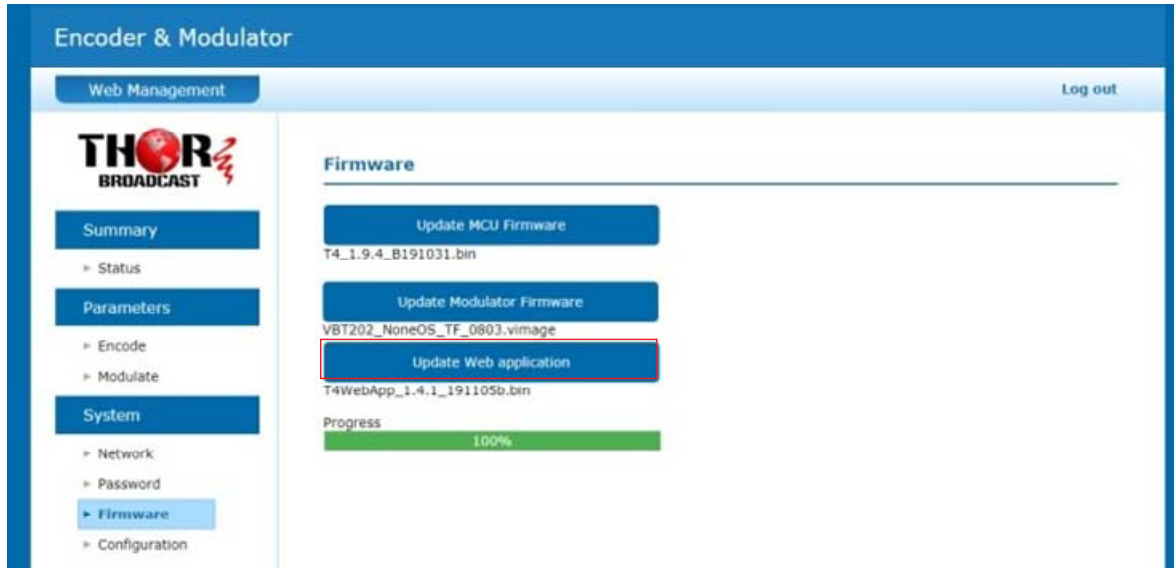
Click [**Update Modulator Firmware**] to put file up then auto start update.

Progress shown below.

The screenshot shows the 'Encoder & Modulator' web management interface. The navigation menu is the same as in the previous screenshot. In the main content area, the 'Update Modulator Firmware' button is highlighted with a red box. Below it, the file name 'VBT202_NoneOS_TF_0803.vimage' is displayed. The 'Progress' bar at the bottom shows 100% completion for the modulator firmware update.

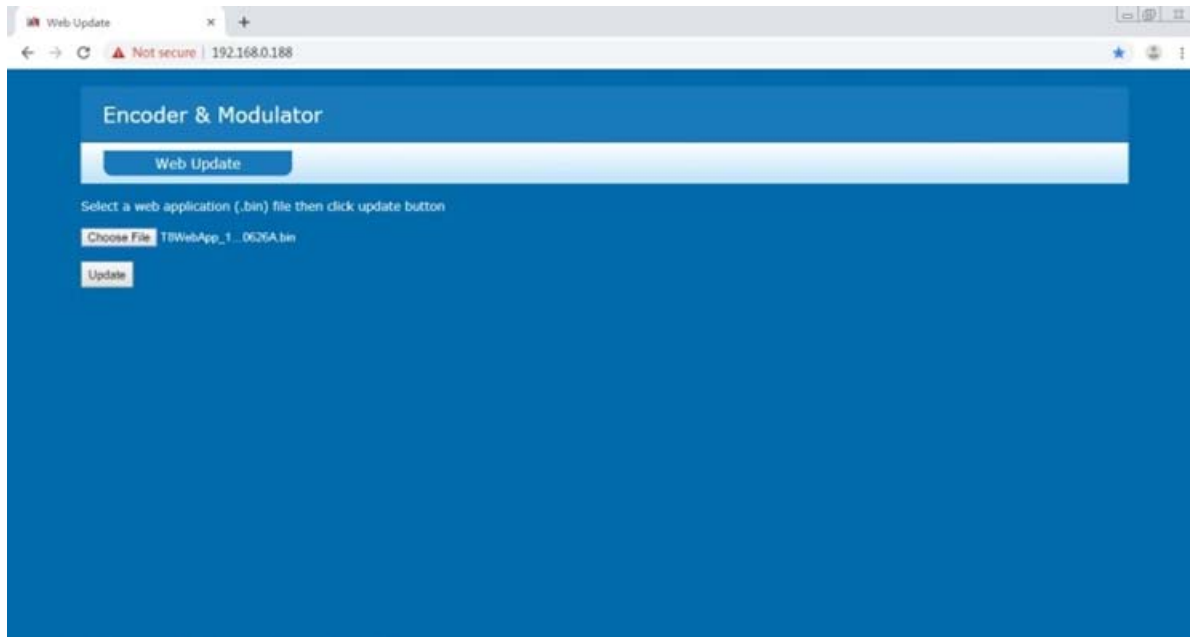
Click [Update Web application] to put file up then auto start update.

Progress shown below.



If the web app cannot open, please try the following:

First, turn off the power supply and press OK button to power on. Then it will be forced to enter the bootloader burning interface and select the file to burn again. During the burning process, the link indications will show blue from left to right, and then green from right to left.

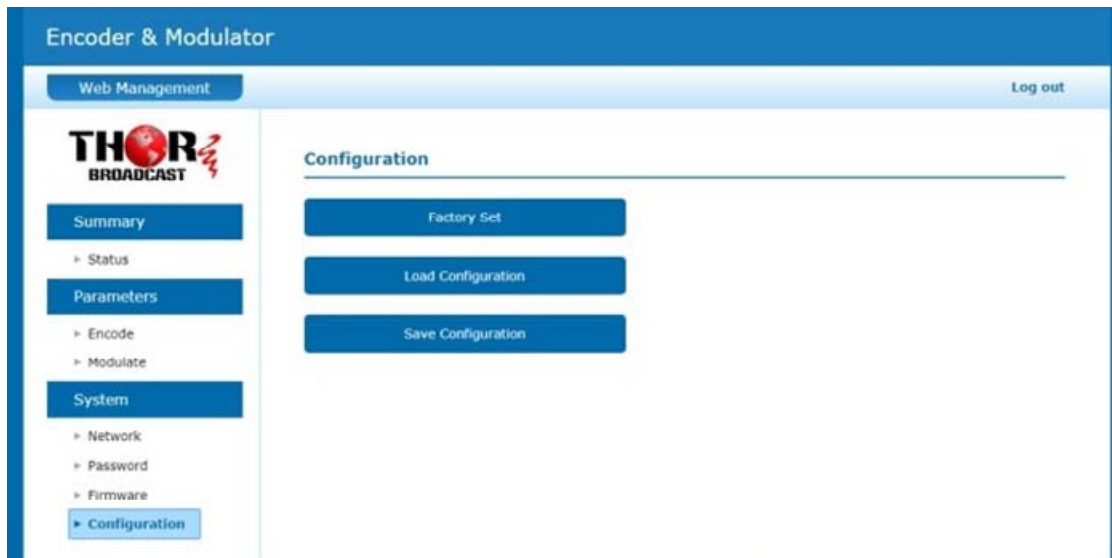


System → Configuration:

Click [**Factory Set**], it displays the screen, Click OK to Factory default Setting.

Click [**Load Configuration**] it will jump a window to upload the file that saved settings before.

Click [**Save Configuration**] it saves parameter settings as a file to convenient uploading.



Chapter 4 - Packing List

BROADCAST H-THUNDER-4	1PC
User's Manual	1PC
HDMI Cable	4 PCS
Power Cord	1PC

For Further Tech Support

1-800-521-Thor(8467)

support@thorfiber.com