

THOR

FIBER

4-ADHD Encoder Modulator

Manual



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

1.1 Product Overview

The Thor 4-ADHD series encoder is an all-in-one device that integrates encoding (MPEG-2, MPEG-4/AVC H.264), modulation, and convert HDMI/YPbPr to a digital RF output signal.

To meet various requirements, the 4-ADHD is also equipped with 1 ASI input, and output with 2 ASI ports and 1 IP port.

The signal source could vary from satellite receivers, closed-circuit television cameras, Blu-ray players, and antenna (off air). Its output signals are to be received by TVs, STB, etc with the correlated standard the unit is set to encode with (ATSC, DVB-T, DVB-C).

The 4-ADHD units are widely used in public places such as the mall, market hall, theatre, hotels, restaurants and etc for advertising, monitoring, training and educating in company, schools, campuses, and healthcare.

1.2 Key features

- **MPEG2 HD & MPEG4 AVC H.264 HD video encoding**
- **DD AC3 (2.0), MPEG4-AAC, MPEG2-AAC, MPEG1 Layer II audio encoding**
- **DD AC3 (2.0/5.1/7.1) passthrough**
- **4* HDMI/YPbPr inputs**
- **1*ASI in for re-mux; 1*RF in for RF mix**
- **4* DVB-C RF out optional; ASI out; IP out**
- **CC (Closed Caption) EIA608, (from CVBS source only)**
- **Low Latency**
- **LCN (Logical Channel Number) support**
- **Excellent modulation quality 1080i(Mpeg-2) 1080p(H.264)**
- **LCD display, Remote control and firmware**
- **Web-based NMS management; Updates via web**

1.3 Specifications

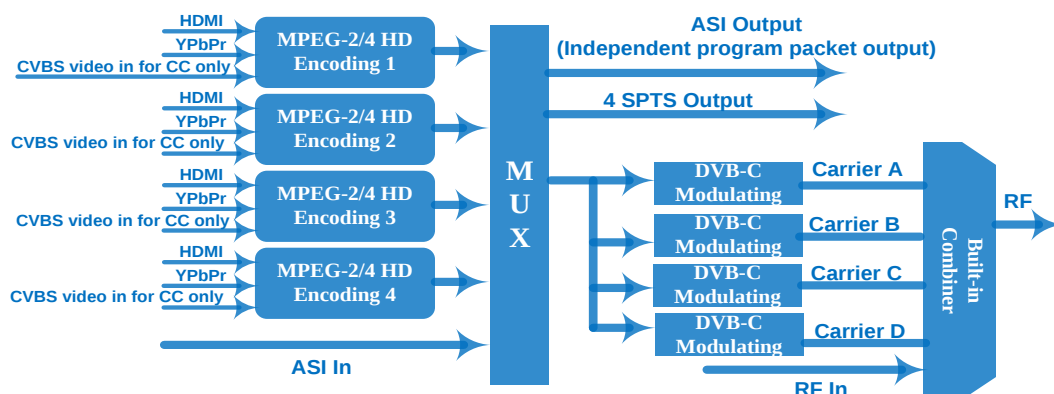
Encoding Section	
Video (HDMI)	
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	HDMI*4
Resolution	1920*1080_60i, 1920*1080_50i, 1280*720_60p, 1280*720_50P
Low Delay	Normal, Mode 1, Mode 2
Aspect Ratio	4:3; 16:9
Audio (HDMI)	
Encoding	MPEG1 Layer II; MPEG2-AAC; MPEG4-AAC; DD AC3(2.0); DD AC3 (2.0/5.1/7.1) passthrough
Interface	HDMI*4 (SPDIF Not Applicable)
Sample rate	48KHz
Bit rate	64/96/128/ 192/256/320kbps
Video (YPbPr)	
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	YPbPr*4 (RCA)
Resolution	1920*1080_60i, 1920*1080_50i; 1280*720_60p, 1280*720_50P
Audio (L/R)	
Encoding	MPEG1 Layer II; MPEG2-AAC; MPEG4-AAC; DD AC3(2.0); DD AC3 (2.0/5.1/7.1) passthrough
Interface	4*Stereo/8*mono
Sample rate	48KHz

Bit rate	64/96/128/ 192/256/320kbps		
DVB-C Modulator Section (Option)			
Standard	J.83A (DVB-C), J.83B, J.83C		
MER	≥43dB		
RF frequency	30~960MHz, 1KHz step		
RF output level	-30~ -10dbm (77~97 dbμV), 0.1db step		
Symbol rate	5.000~9.000Mpsps adjustable		
RF Out	4*DVB-C adjacent carriers combined output		
	J.83A	J.83B	J.83C
Constellation	16/32/64/128/ 256 QAM	64/ 256 QAM	64/ 256 QAM
Bandwidth	8M	6M	6M

System	
Local interface	LCD + control buttons
Remote management	Web NMS
Stream Out	2 ASI mirrored out (BNC type, 100M); IP (4 SPTS) over UDP, RTP/RTSP out (RJ45, 100M)
NMS interface	RJ45, 100M
Language	English

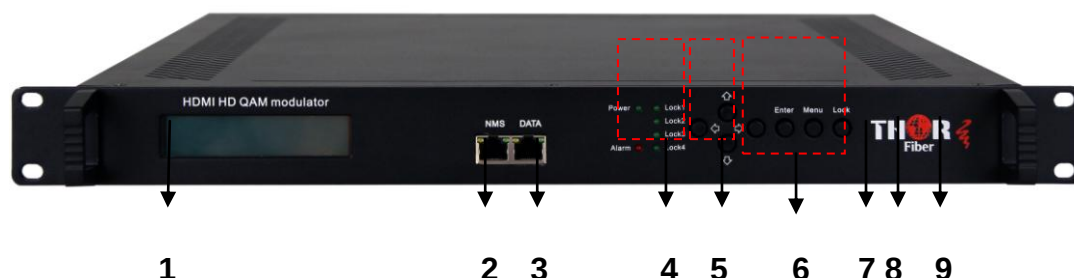
General	
Power supply	AC 100V~240V
Dimensions	482*400*44mm
Weight	4.5 kg
Operation temperature	0~45℃

1.4 Principle Chart



1.5 Appearance and Description

Front Panel Illustration

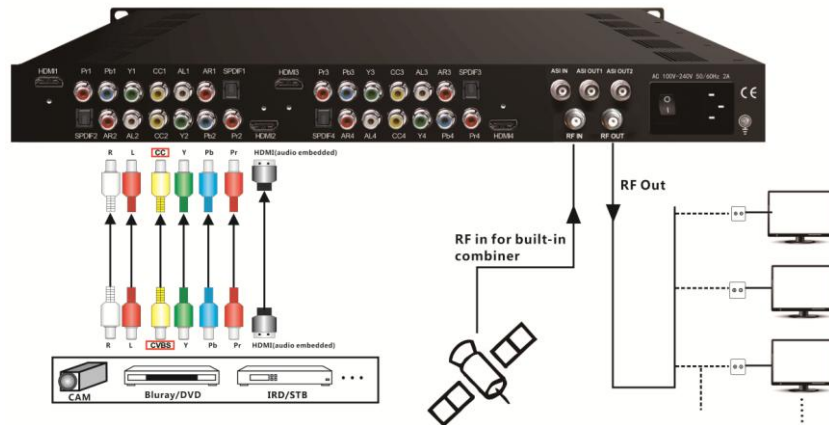


- | | |
|------------------------------|---------------------------------------|
| ① LCD Screen | ⑥ Up and Down, Left and Right Buttons |
| ② NMS Port | ⑦ Enter Button: for confirm |
| ③ Data Port | ⑧ Menu Button: for back step |
| ④ Power and Alarm Indicators | ⑨ Lock Button: press to lock set |
| ⑤ TS Lock Indicators | |

Rear Panel Illustration



- | | |
|---|-----------------------|
| ① HDMI input port | ⑦ ASI Output port 1&2 |
| ② YPbPr input port | ⑧ Power Switch |
| ③ CVBS input port for CC only | ⑨ Power supply Slot |
| ④ L/R Audio input (Stereo or Mono) | ⑩ RF in port |
| ⑤ SPDIF port(Not applicable at present) | ⑪ RF out port |
| ⑥ ASI input port | ⑫ Grounding |



Chapter 2 Installation Guide

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

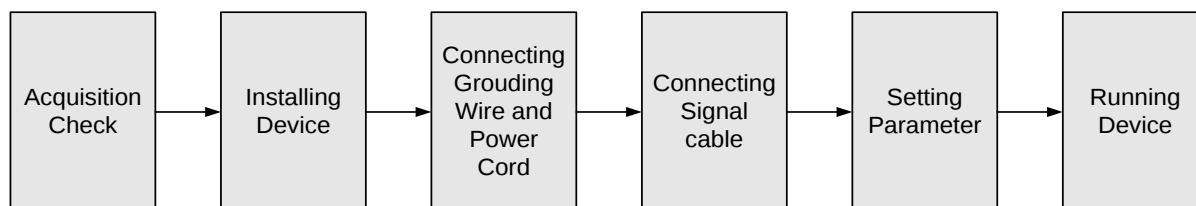
2.1 General Precautions

- ✓ Must be operated and maintained in an area free of dust and debris.
- ✓ The cover should be securely fastened, do not open the cover of the chassis when the power is on.
This will also void Thor's manufacturer's warranty.
- ✓ After installation, securely stow away all loose cables, external antenna, and others.

2.2 Power precautions

- ✓ Be careful when connecting a power source to the device.
- ✓ Do not operate in wet or damp areas. Make sure the extension cable is in good condition
- ✓ Make sure the power switch is off before you start to install the device

2.3 Device's Installation Flow Chart Illustrated as following



2.4 Environment Requirement

Item	Requirement
Machine Hall Space	When installing unit on rack, 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, HVAC anti-static material: $1 \times 10^7 \sim 1 \times 10^{10} \Omega$, Grounding current limiting resistance: $1 M\Omega$ (Floor bearing should be greater than 450 Kg/m^2)
Environment Temperature	$5 \sim 40^\circ \text{C}$ (sustainable), $0 \sim 45^\circ \text{C}$ (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
Fire Protection	Fire alarm system and extinguisher
Power	Device power, HVAC and lighting should be independent to each other. Device power requires AC $110 \text{ V} \pm 10\%$, 50/60Hz or AC $220 \text{ V} \pm 10\%$, 50/60Hz. Please carefully check before running.

2.5 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 m².

Chapter 3 Operation

Keyboard Function Description:

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

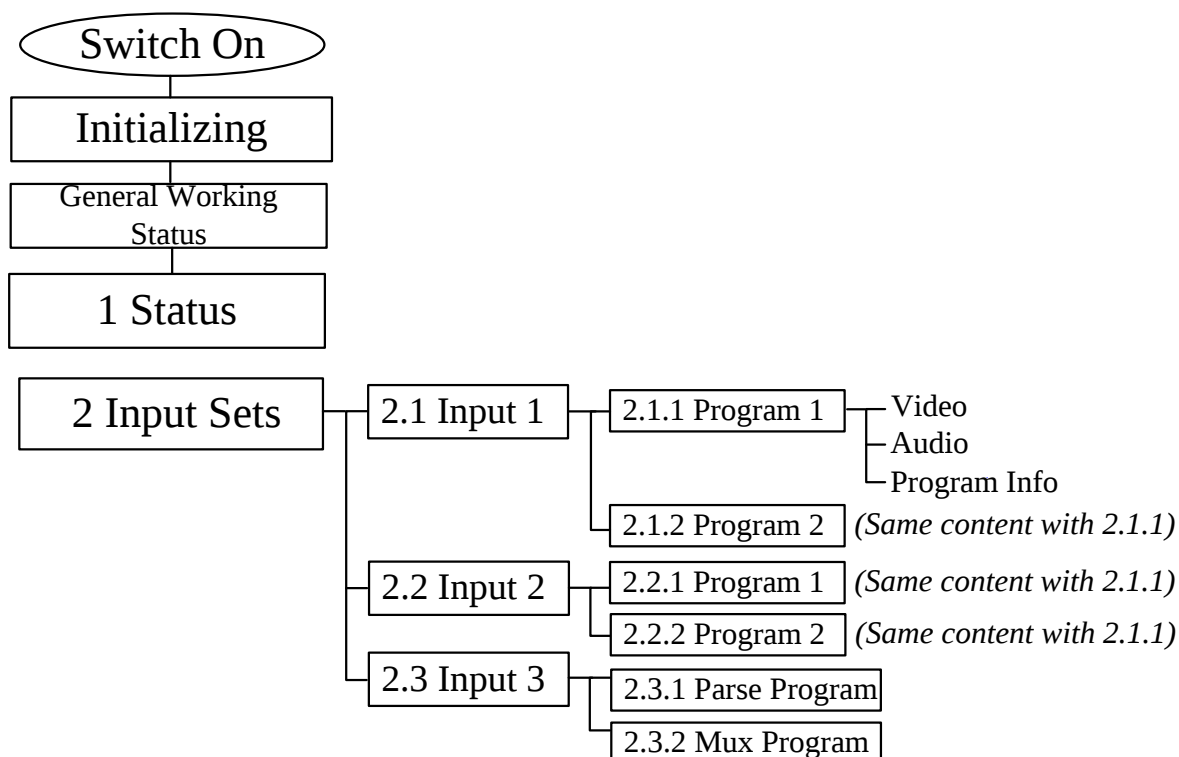
ENTER: Activate the parameters which need modifications, or confirm the change after modification.

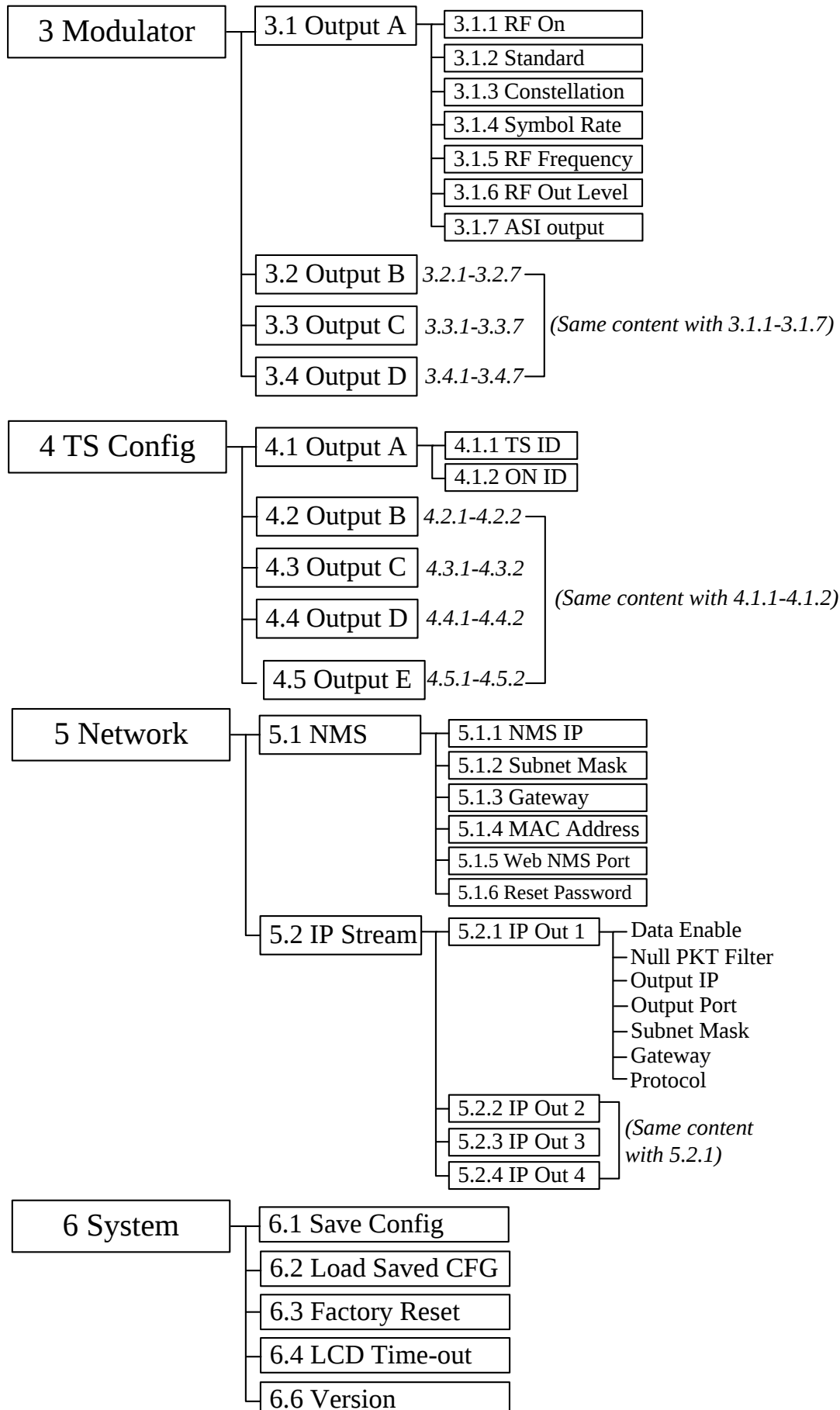
LEFT/RIGHT: Choose and set the parameters.

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

LOCK: Lock the screen/cancel the lock state. After pressing the lock key, the LCD will display the current configuring state.

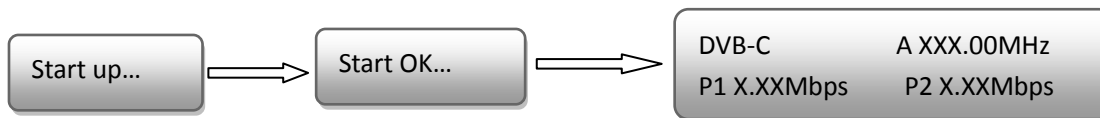
3.1 3.1 LCD Menu Structure





3.1 Initial Status

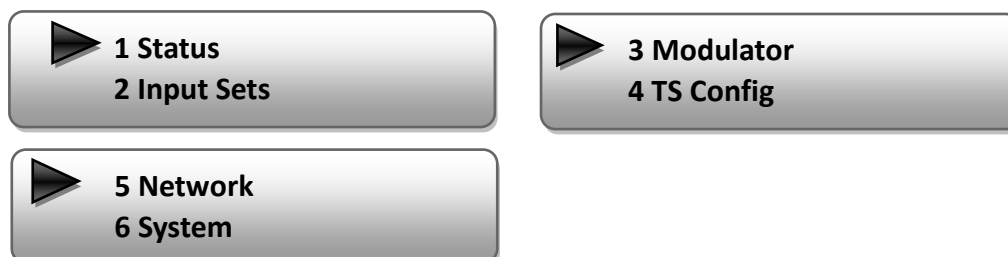
After powering on the device, it will take a few seconds to initialize the system



- **DVB-C:** to indicate the modulation standard of this device.
- **A/B/C/D:** to indicate the 4 carrier outputs
- **XXX.XX MHz:** to indicate the current output frequency (Range: 30~999MHz) of the 4 carriers output, which shows in turn.
- **X.XX Mbps:** to indicate the encoding bit rate of each encoding board respectively.

3.2 General setting for Main Menu

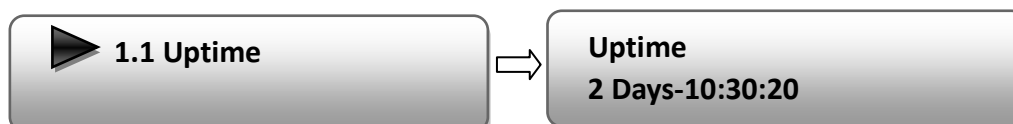
By pressing “Lock” key on the front panel, enter the main menu. The LCD will display the following pages:



Press UP/DOWN buttons to specify menu items, and then press ENTER to enter the submenus as below:

1) Status

Press Enter to enter “Status” and it displays the working time duration of the device

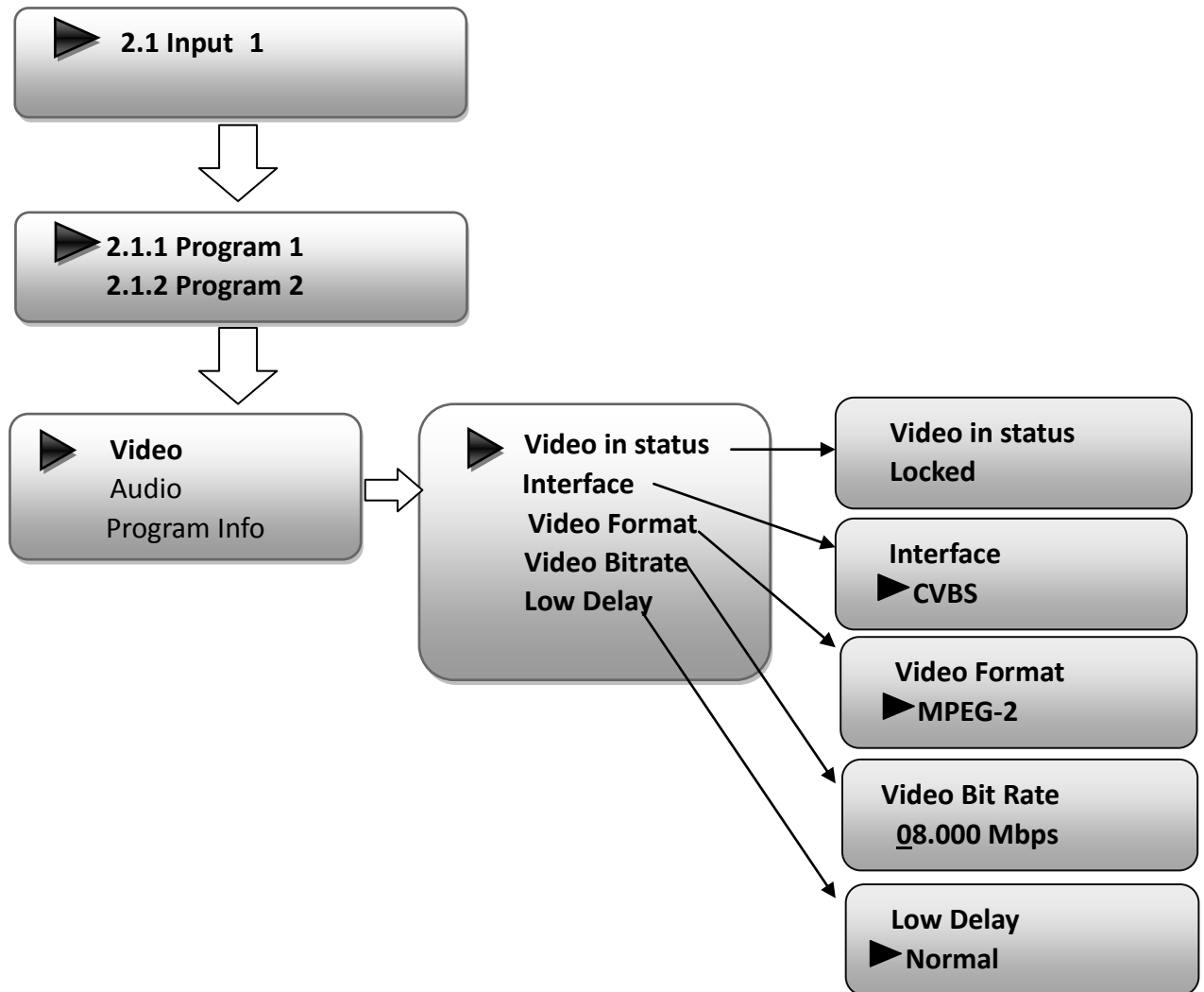


2) Input Sets

Under this submenu, the LCD will show “2.1 Input 1”, “2.2 Input 2” and “2.3 Input 3”.



“2.1 Input 1” and “2.2 Input 2” respectively represent the two encoding boards and there are two programs under each input. User could enter each program to set the interface as per the signal source and set the related video & audio parameters.



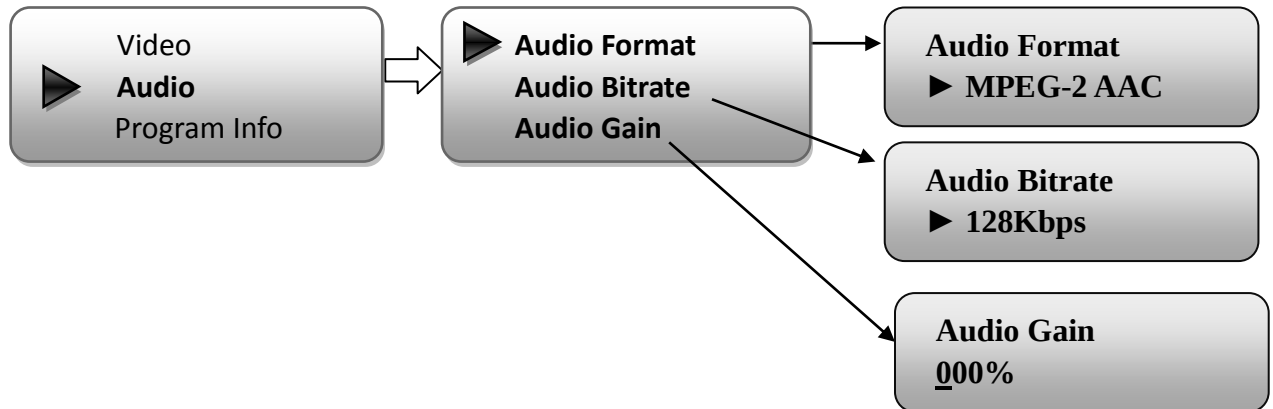
“Interface”: Connect the signal source to the corresponding input channel and select the interface from the options provided in the submenu (CVBS, HDMI optional). Press Enter key to confirm and the system will automatically search the signal source.

“Video Format”: the encoding module supports both MPEG2 and MPEG4 AVC/H.264 formats. Move the triangle mark with LEFT/RIGHT keys to specify the intended format and press ENTER to confirm.

“Video Bit Rate”: Move the underline with LEFT/RIGHT keys and modify the value of frequency (1-19Mbps) with UP/DOWN keys, and press ENTER key to save the settings.

“Low Delay”: Normal: disable the low delay mode.

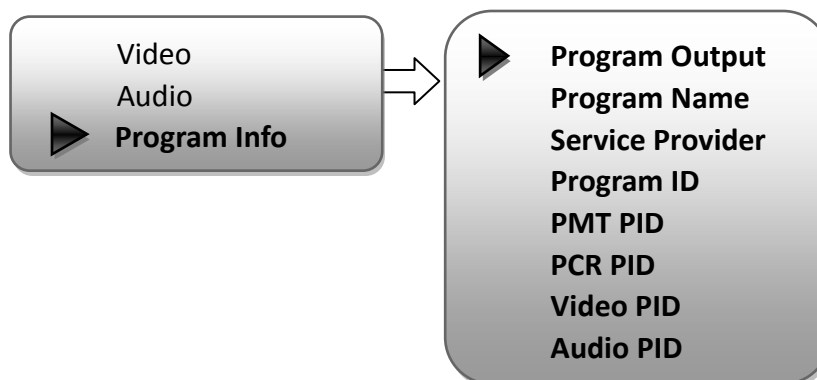
NOTE: The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode** and the **Resolution** of signal source will have an impact on the time latency on receiving side. Please refer to the **Appendix** attached for detailed information.



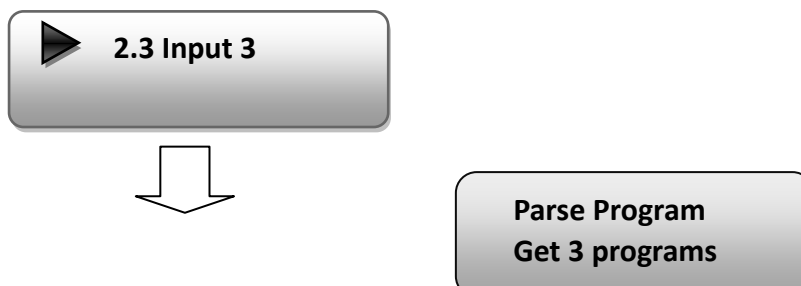
“Audio Format”: MPEG-1 Layer 2, MPEG-2 AAC, MPEG-4 AAC, AC3, AC3 Passthrough optional.

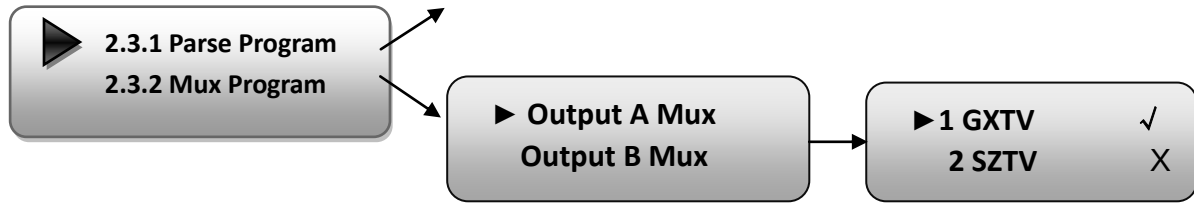
“Audio Bitrate”:64-320Kbps optional.

“Audio Gain”: 000% to 400% adjustable.



“2.3 Input 3” represents the ASI input. User could parse and select program(s) to mux out.





“Parse Program” is for checking the quantity of input programs from the corresponding Tuner input.

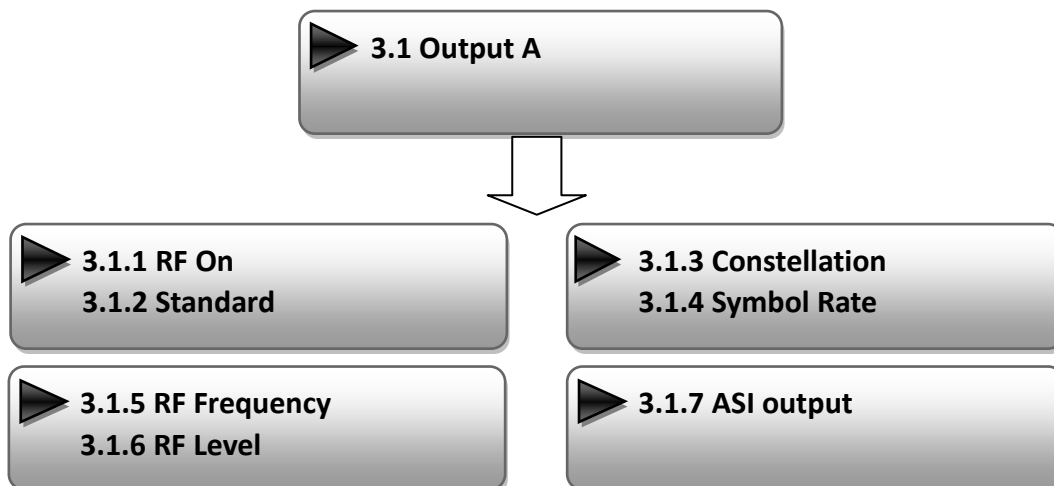
“Mux Program” is for selecting programs from the ASI IN to output via corresponding carrier output or ASI output (A, B, C, D, E optional). Move the triangle mark to specify the program and press RIGHT/LEFT keys to shift the mark between “√” and “X”. (“√”: to output the corresponding program; “X”: not to output the corresponding program)

3) Modulator Setting

When entering “Modulator” submenu, configure the modulating parameters for the 4 carrier output separately:



As the 4-ADHD (DVB-C Modulating) has 4 carrier outputs, “3.1”-“3.4” represent the “Carrier A”, “Carrier B”, “Carrier C”, and “Carrier D” respectively. User can enter “3.1”/“3.2”/“3.4”/“3.4” to set the corresponding modulating parameters. Submenus (taking “3.1” as an example) are as below:



➤ RF On

This interface decides whether to enable the RF (carrier A) output or not.

OFF: to disable programs to output through carrier A.

ON: to enable programs to output through carrier A.



➤ Standard

There are three possible options provided for selecting **Standard**: J.83A (DVB-C), J.83B, J.83C when the display shows them, user just needs to swipe LEFT and RIGHT key to choose.

➤ Constellation

Three different constellations: J.83A (DVB-C), J.83B, J.83C will show on the LCD window when Constellation been entered.

J.83A (DVB-C) contains 16QAM, 32QAM, 64QAM, 128QAM, and 256QAM;

J.83B contains 64QAM, 256QAM;

J.83C contains 64QAM, 256QAM.

16QAM: Quadrature Amplitude Modulation is 16

32 QAM: Quadrature Amplitude Modulation is 32

64QAM: Quadrature Amplitude Modulation is 64

128QAM: Quadrature Amplitude Modulation is 128

256QAM: Quadrature Amplitude Modulation is 256

When the display shows, swipe LEFT and RIGHT key to choose and press “ENTER” for confirm.

➤ Symbol Rate

The symbol rate range of both J.83A (DVB-C) & J.83C is 5Msps to 9Msps and J.83B is fixed and cannot be changed.

➤ RF Frequency

The RF output frequency range is from 30 to 999MHz with 1K stepping. After entering the RF frequency setting submenu, users the can press LEFT, RIGHT, UP, and DOWN buttons to adjust the

frequency and confirm by press ENTER button.

RF Frequency
750.000 MHz

➤ **RF level**

The RF attenuation range is from -30~-10dbm (81~97dbμV) with 0.1db step. After entering this setting submenu, shift UP/DOWN/LEFT/RIGHT key to set the output level and press ENTER to confirm.

RF Level
-10.0 dbm

➤ **ASI Output:**

THOR 4-ADHD encoder & modulator (DVB-C Modulating) has a quad-carrier output A, B, C, D and 1 ASI output E.

Output A: the ASI output programs are same as carrier output A.

Output B: the ASI output programs are same as carrier output B.

Output C: the ASI output programs are same as carrier output C.

Output D: the ASI output programs are same as carrier output D.

Output E: the ASI output programs are set separately.

ASI Output
▶ Output A

NOTE: The setting principle of “3.2”, “3.3”, and “3.4” are the same with “3.1” explained above.

4) TS Config

Enter each menu to configure the TS ID and Original Network ID for the 4 carriers and ASI output.

▶ **4.1 Output A**
4.2 Output B

▶ **4.3 Output C**
4.4 Output D

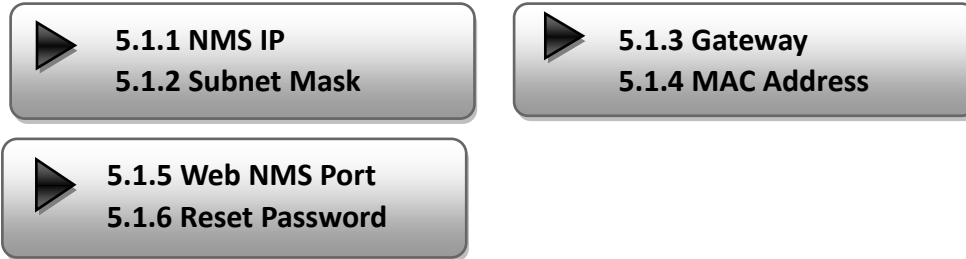
▶ **4.5 Output E**

5) Network

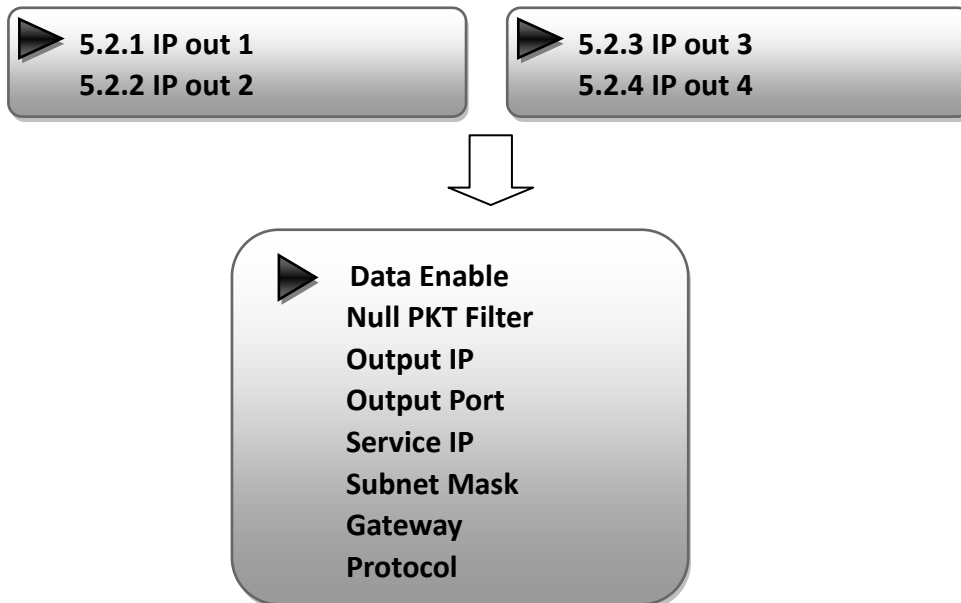
Network contains “5.1 NMS” and “5.2 IP Stream”.



“5.1 NMS” is for setting the network parameters for the connection between the device and PC.

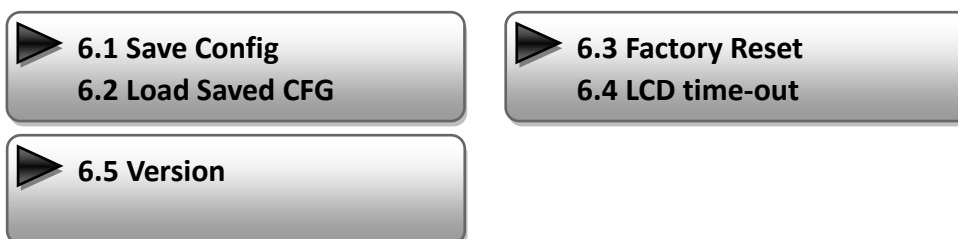


“IP Stream” is for configuring the 4 SPTS output respectively.



6) System

It contains 5 submenus where users can save/load configurations.



Chapter 4 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 THOR 4-ADHD's 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.

E.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 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.

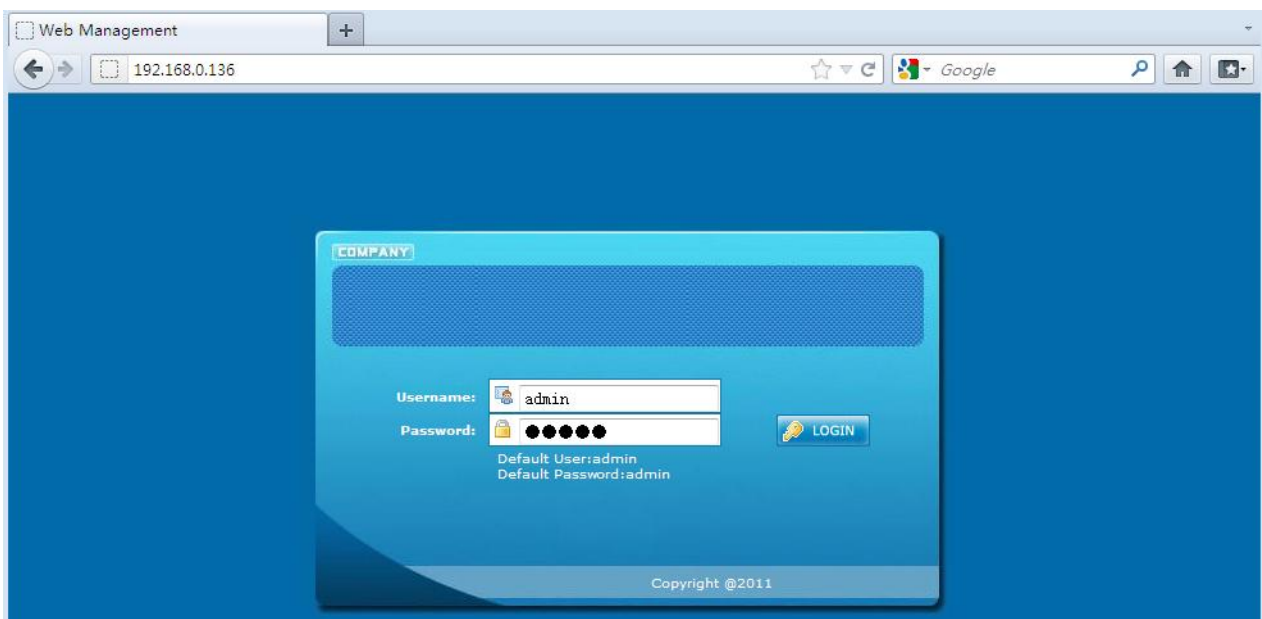
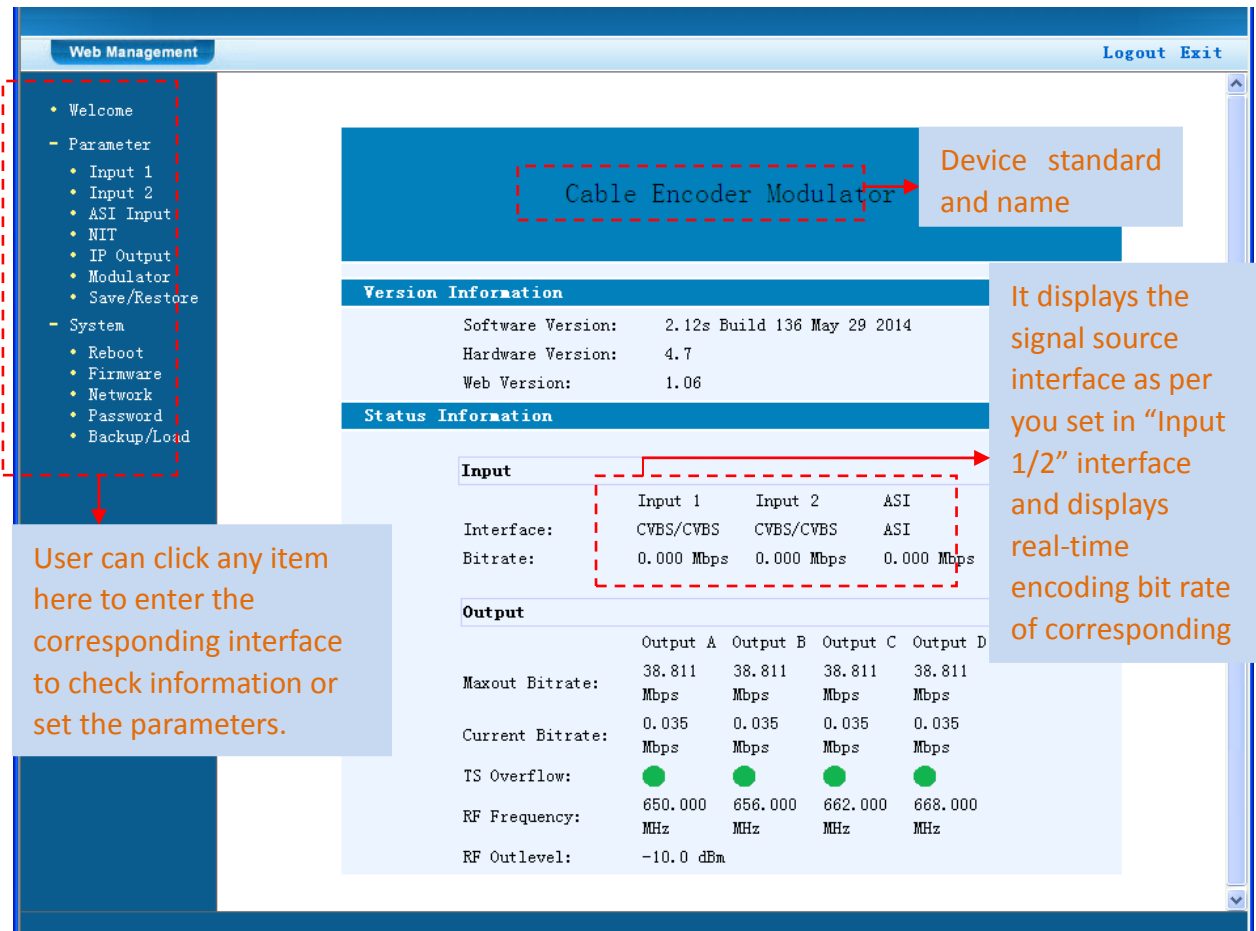


Figure-1

4.2 Operation

Welcome

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



Web Management Logout Exit

- Welcome
- Parameter
 - Input 1
 - Input 2
 - ASI Input
 - NIT
 - IP Output
 - Modulator
 - Save/Restore
- System
 - Reboot
 - Firmware
 - Network
 - Password
 - Backup/Load

Cable Encoder Modulator Device standard and name

Version Information

Software Version:	2.12s Build 136 May 29 2014		
Hardware Version:	4.7		
Web Version:	1.06		

Status Information

Input

	Input 1	Input 2	ASI
Interface:	CVBS/CVBS	CVBS/CVBS	ASI
Bitrate:	0.000 Mbps	0.000 Mbps	0.000 Mbps

Output

	Output A	Output B	Output C	Output D
Maxout Bitrate:	38.811 Mbps	38.811 Mbps	38.811 Mbps	38.811 Mbps
Current Bitrate:	0.035 Mbps	0.035 Mbps	0.035 Mbps	0.035 Mbps
TS Overflow:	●	●	●	●
RF Frequency:	650.000 MHz	656.000 MHz	662.000 MHz	668.000 MHz
RF Outlevel:	-10.0 dBm			

User can click any item here to enter the corresponding interface to check information or set the parameters.

It displays the signal source interface as per you set in "Input 1/2" interface and displays real-time encoding bit rate of corresponding

Figure-2

Input 1

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

Figure-3

Out Enable(ABCDE) ☐ ☒ ☐ ☐ ☐

You can choose the output program from 4 carriers(A, B, C, D) or ASI(E).

[Help](#)

Further assistance if necessary

[Default](#)

Click this button to apply the default settings of Input 1

[Apply](#)

Click this button to apply the modified parameters.

NOTE

The different combination of **Video Format**, **Video Bit-rate**, **Low delay Mode** and the **Resolution** of signal source will have an impact on the latency. Please refer to the **Appendix** attached for detailed information.

Input 2

Similarly, from the menu on left side of the webpage, clicking “Input 2”, it displays the information of the programs from the 2^{ed} encoding board.

ASI Input

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



Figure-4



The letters A to D represent the 4 carrier outputs. E represents the ASI output. Configure different program groups for each carrier output.

☒ **Passthrough** If this item is selected, all the input programs will pass through without any elimination.

☒ **Multiplex** Selecting this item to allow user select programs as required to output.

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

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

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

Select the programs which we want to output or we can output all the programs.

Cancel Program

Similarly, cancel the multiplexed programs from the right box.

All Input

&

All Output

to select all the input/output programs with one-time clicking.

Parse timeout

200

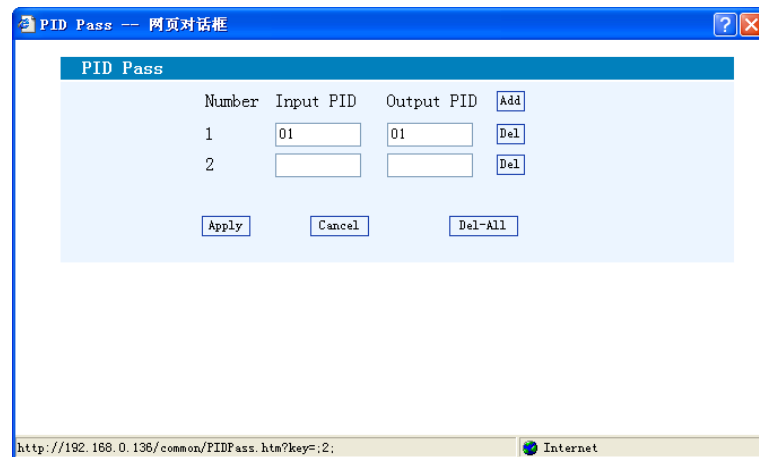
seconds

Time limitation to parse the input programs

PID Pass

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

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



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

NIT Table setting

Click “NIT” from the menu to trigger the screen below. Then click “Add” from this screen to add the program descriptor in NIT Table.

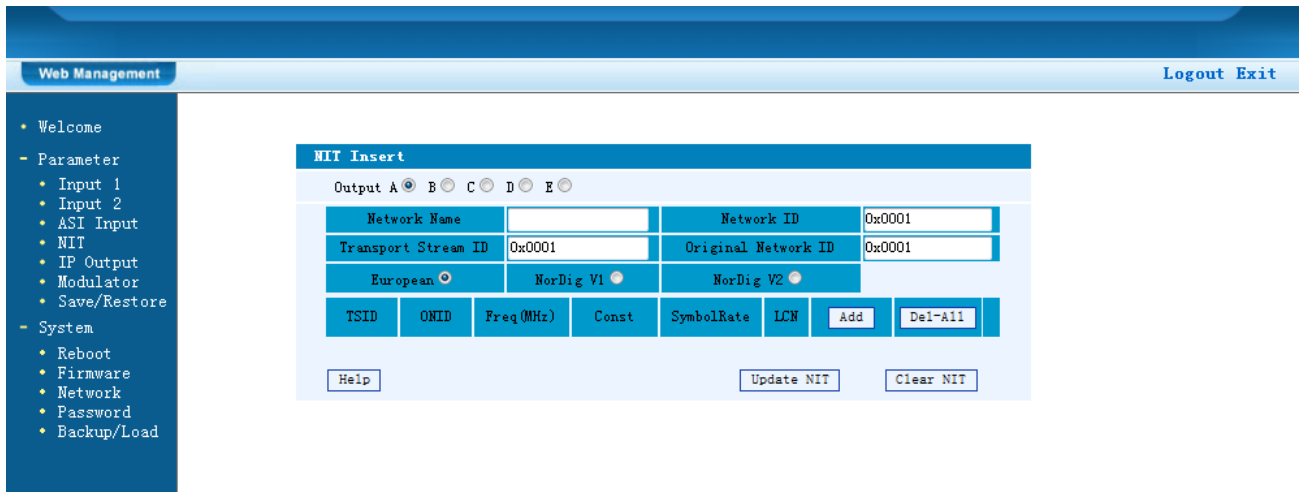


Figure-5

Add

Click “Add” from this page, it will display the screen as Figure-6 shows where it requires to add Service ID and configure other parameters for the programs.



Figure-6

Add

Here by clicking “Add”, users can set the program LCN in its respective field. After setting all the data, users need to click on “Save” **Save** to save the setting. As Figure-7, click “Update NIT” **Update NIT** to update the NIT information.

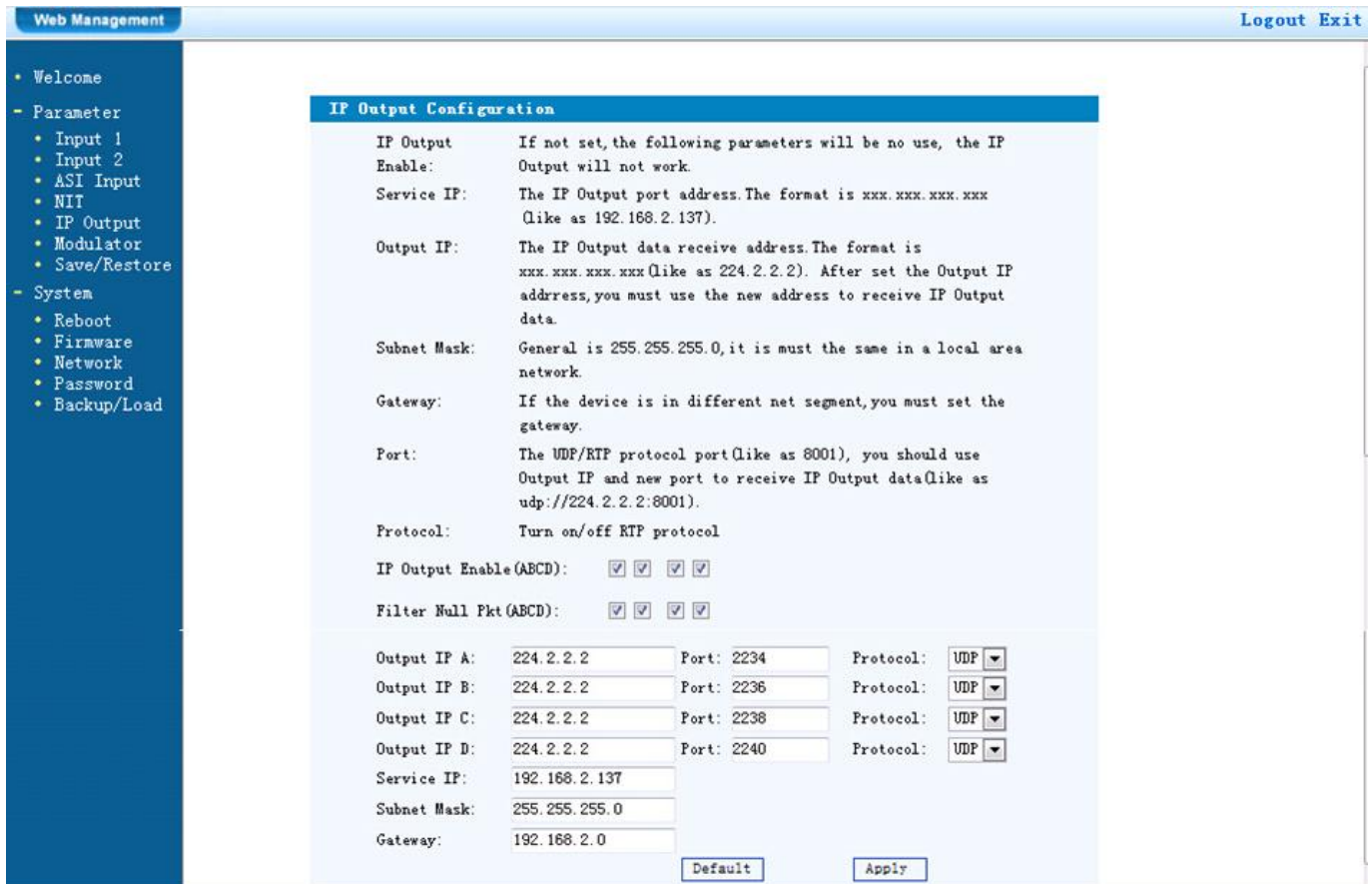
TSID	ONID	Freq(MHz)	Const	SymbolRate	LCN	Add	Del-All
0x0001	0x0001	650.000	256 QAM	5.316	yes	Detail	Del

Figure-7

IP Output

Click “IP Output” from the left menu, it will display the screen as Figure-8 where to configure the 4 IP SPTS Output.

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



IP Output Configuration	
IP Output Enable:	If not set, the following parameters will be no use, the IP Output will not work.
Service IP:	The IP Output port address. The format is xxx.xxx.xxx.xxx (Like as 192.168.2.137).
Output IP:	The IP Output data receive address. The format is xxx.xxx.xxx.xxx (Like as 224.2.2.2). After set the Output IP address, you must use the new address to receive IP Output data.
Subnet Mask:	General is 255.255.255.0, it is must the same in a local area network.
Gateway:	If the device is in different net segment, you must set the gateway.
Port:	The UDP/RTP protocol port (Like as 8001), you should use Output IP and new port to receive IP Output data (Like as udp://224.2.2.2:8001).
Protocol:	Turn on/off RTP protocol
IP Output Enable (ABCD):	☒ ☒ ☒ ☒
Filter Null Pkt (ABCD):	☒ ☒ ☒ ☒
Output IP A:	224.2.2.2
Output IP B:	224.2.2.2
Output IP C:	224.2.2.2
Output IP D:	224.2.2.2
Service IP:	192.168.2.137
Subnet Mask:	255.255.255.0
Gateway:	192.168.2.0
Port:	2234
Port:	2236
Port:	2238
Port:	2240
Protocol:	UDP
Protocol:	UDP
Protocol:	UDP
Protocol:	UDP
Default Apply	

Figure-8

Modulator Setting

This unit is equipped with 4 adjacent frequency output. User can configure 4 carrier outputs here.

NOTE: Different modulation standards have different bandwidths. (see specifications in Chapter 1).

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

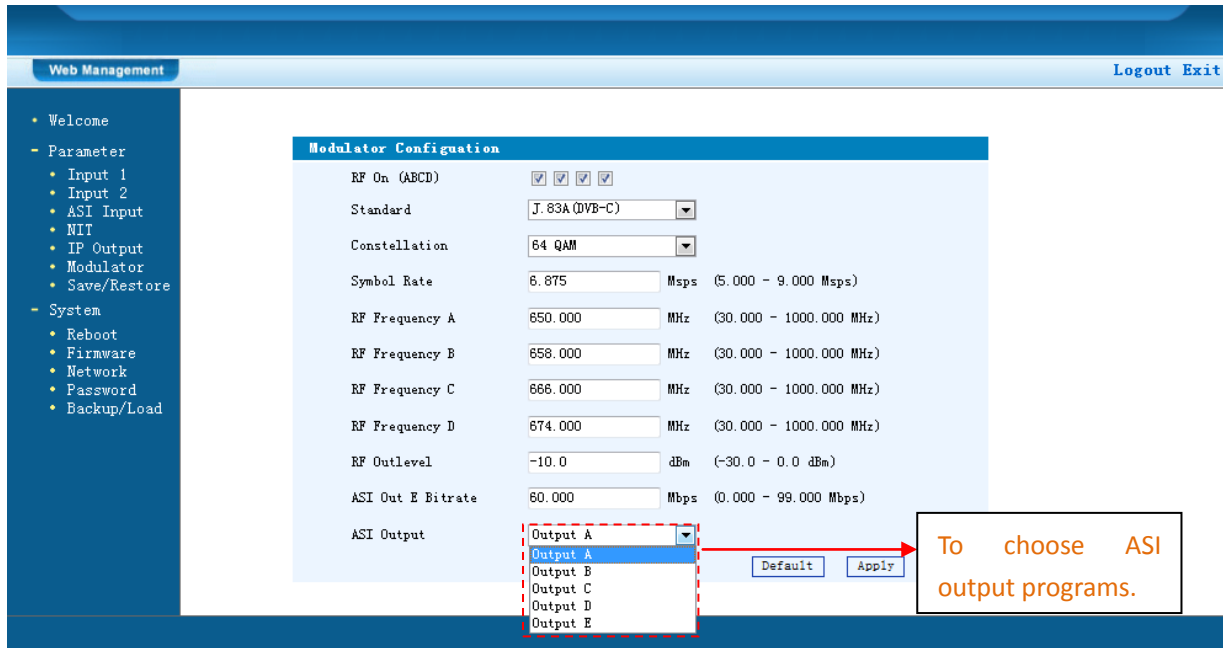


Figure-9

Save/Restore

Clicking “Save/Restore” from the menu, it will display the screen as Figure-10 where can save the configuration permanently to the device. Click “Save Configuration”, for store the data permanently to the device.

By using “Restore Configuration” user can restore the latest saved configuration to the device.

By using “Factory Set” user can import the default factory configuration.

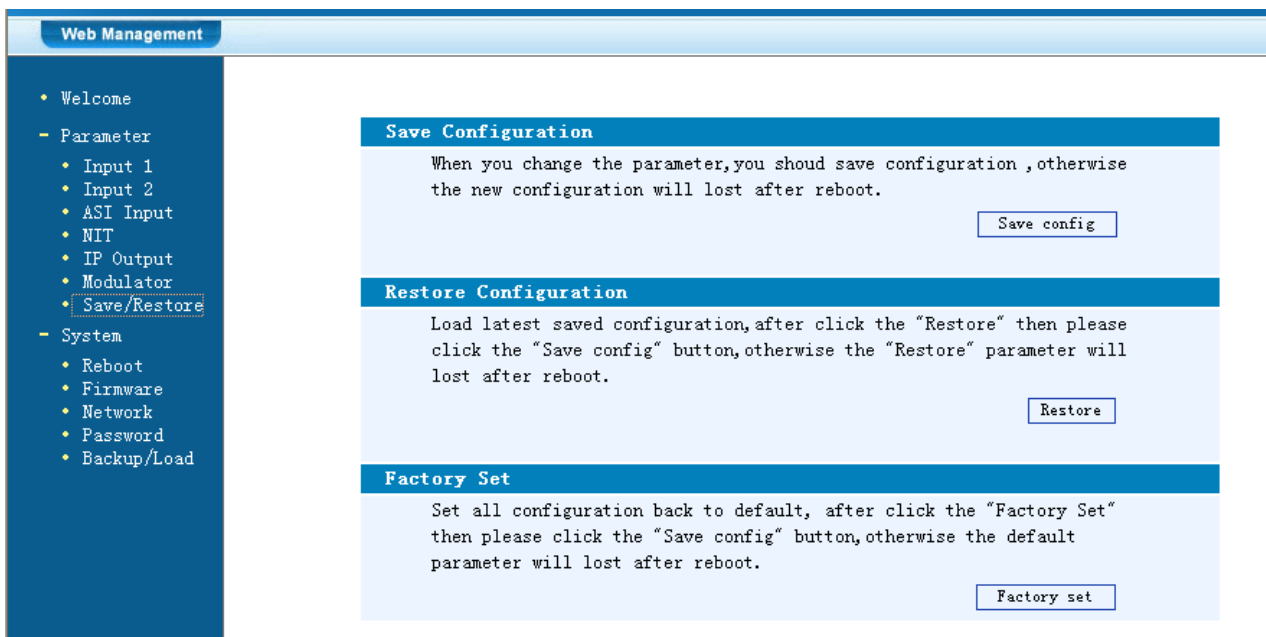


Figure-10

Restart the Device

Click “Reboot” from the menu, the screen will display as Figure-11. Here when clicking “Reboot” box, it will restart the device automatically.

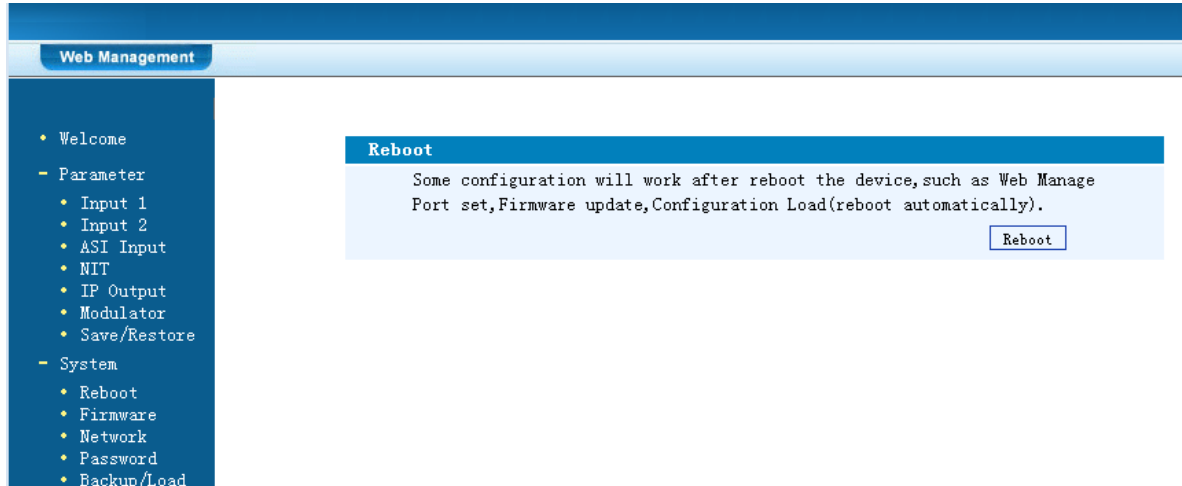


Figure-11

Update the Device

Click “Firmware” from the menu it will display the screen as Figure-12. Here user can update the device by using the update file.

Click “Browse” to find the path of the device update file for this device then click “Update” to update the device.

After updating the device, user needs to restart the device by using Reboot option.

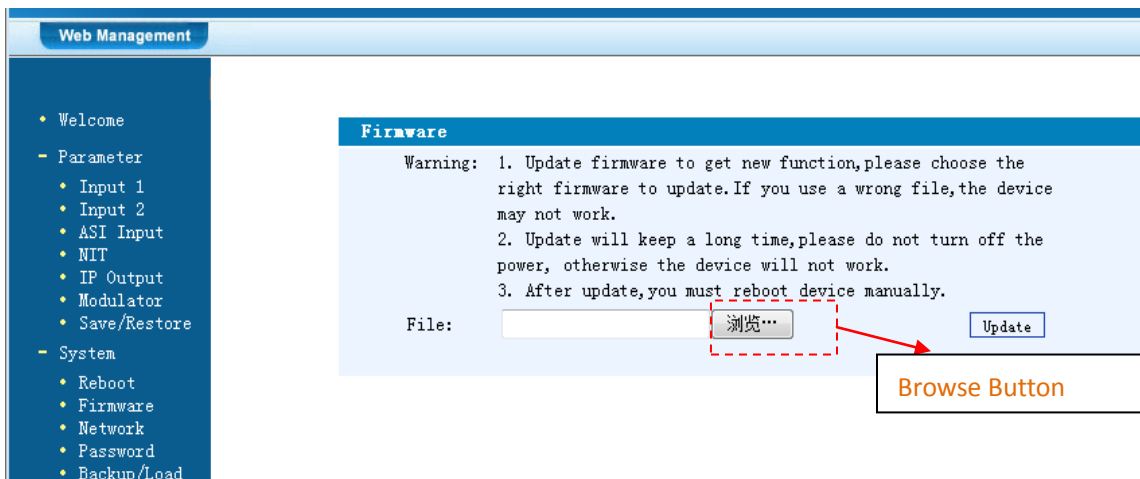


Figure-12

Network

When user clicks “Network”, it will display the screen as Figure-13. It displays the network

information of the device. Here user can change the device network configuration as needed.

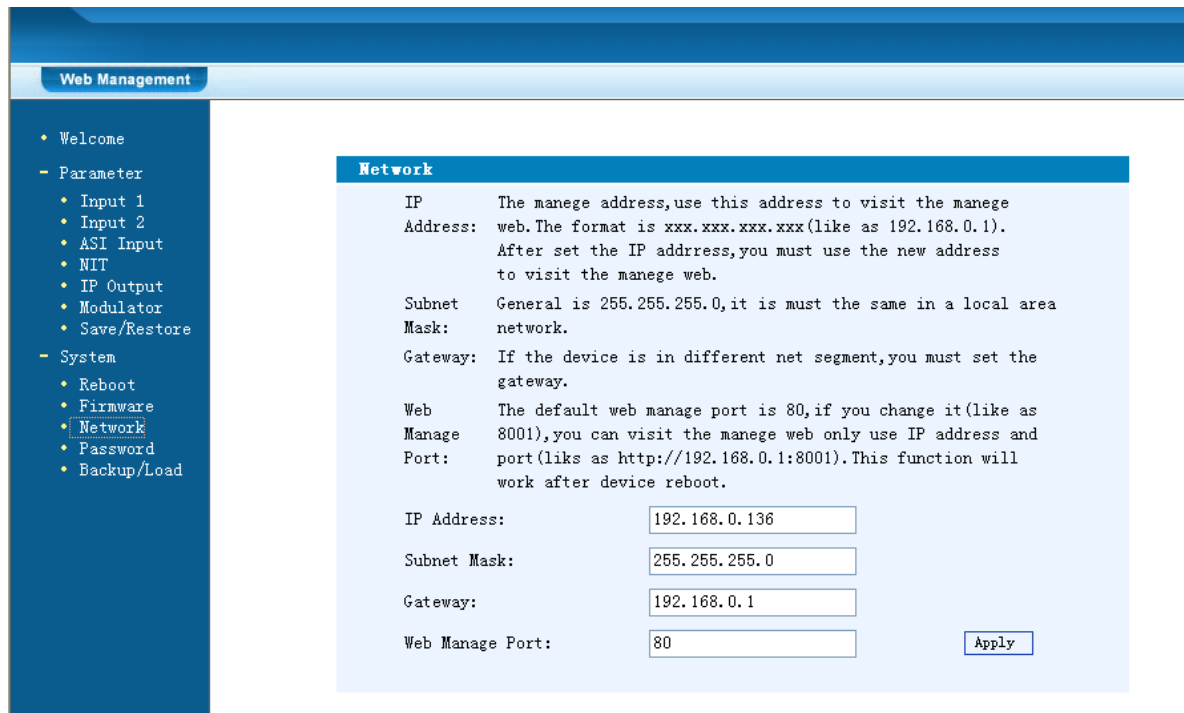


Figure-13

Change Password

When user clicks “Password”, it will display the password screen as Figure-14. Here user can change the Username and Password for login to the device.

After putting the current and new Username and Password, click Apply” to save the configuration.

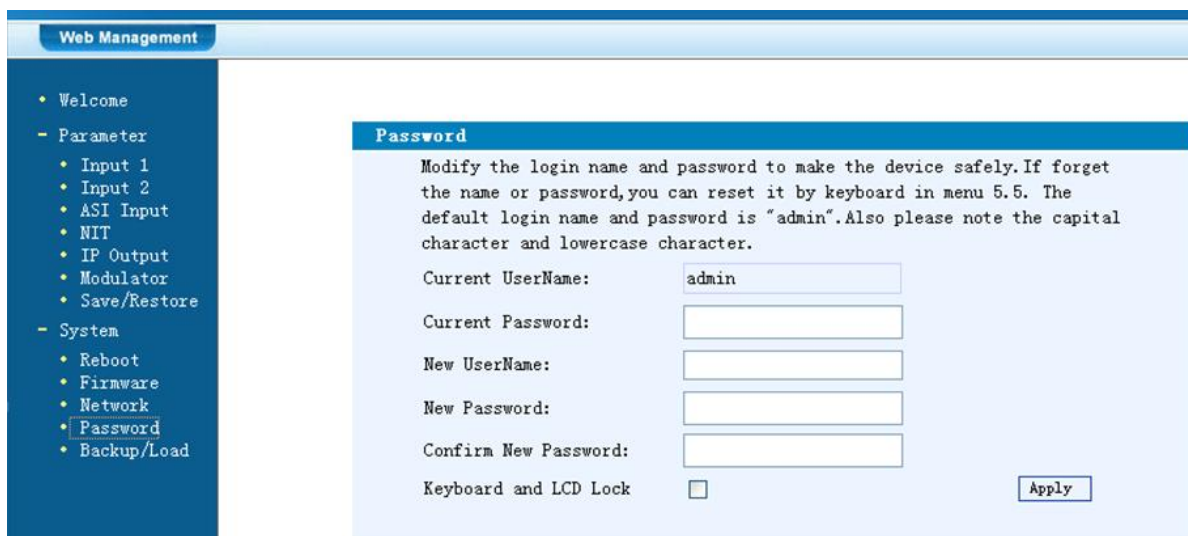
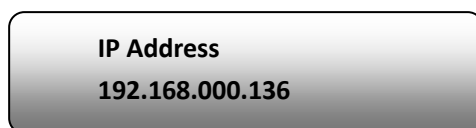


Figure-14

Keyboard and LCD Lock ☐

- Keyboard and LCD Lock: If it is marked with “√”, the LCD and keyboard will be locked to

avoid unexpected modification or view of the device information and configurations. User can't operate the keyboard & LCD while only the device IP address can be noted in the LCD window.



Backup/Load

Click “Backup/Load” from the menu, it will display the screen as Figure-15.

Backup Configuration – To back up the device configuration file to a folder

Load Configuration – If user needs to load the old configuration to the device, click “Browse” and find the backup configuration file path. After selecting the file, click “Load File” to load the backup file to the device.

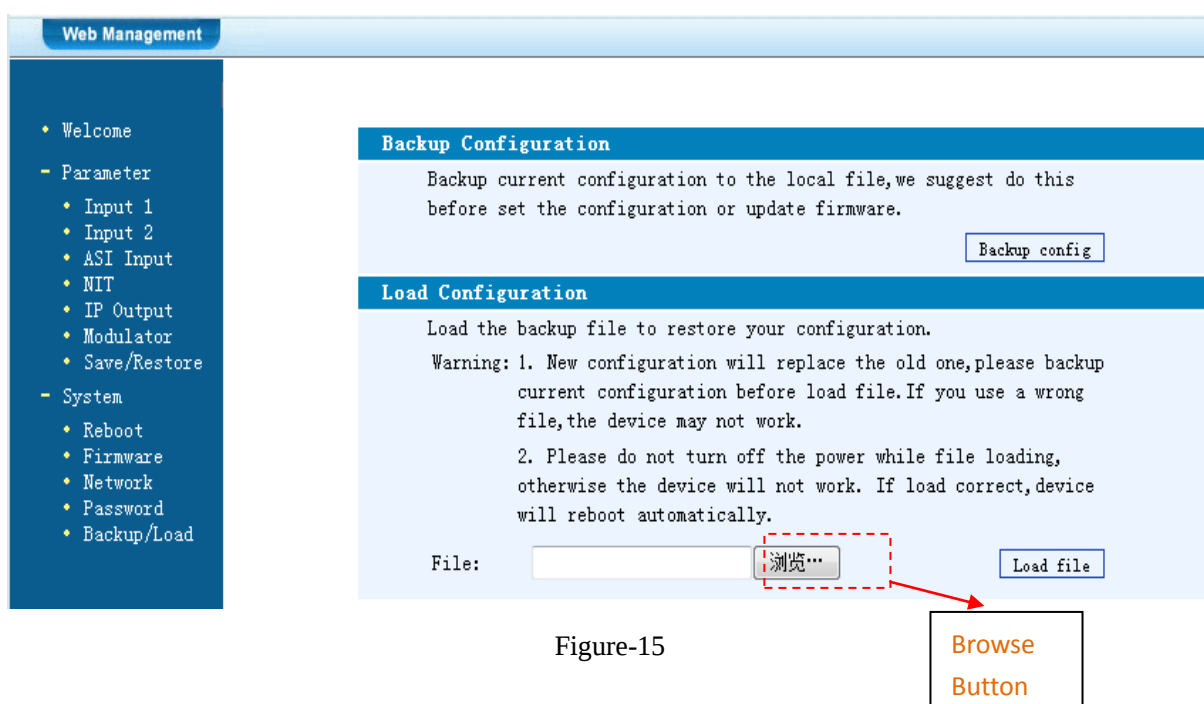


Figure-15

Chapter 5 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 have 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

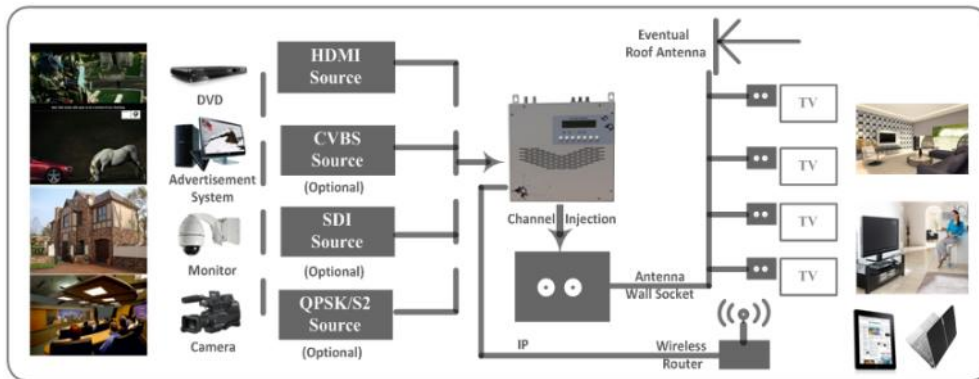
Chapter 6 Packing List

THOR4-ADHD Encoder Modulator	1PC
User's Manual CD	1PC
HDMI Cables	2PCS
YPbPr Cables	2PCS
CVBS Cables	2PCS
Power Cord	1PC

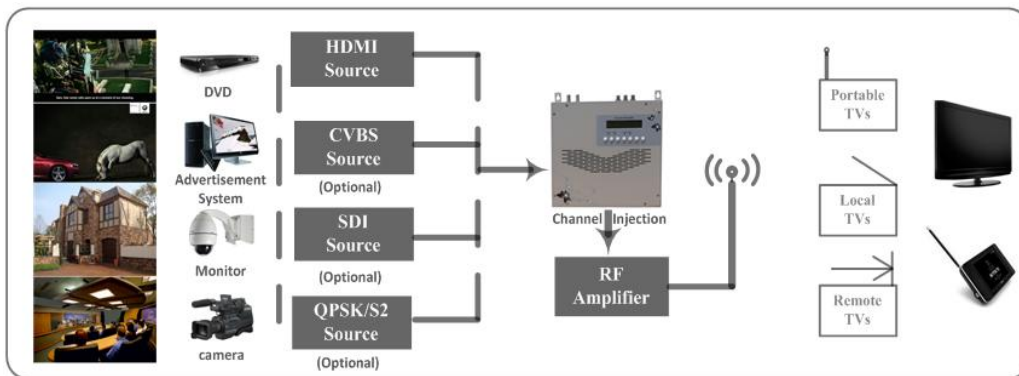
Chapter 7 Application

7.1 application example

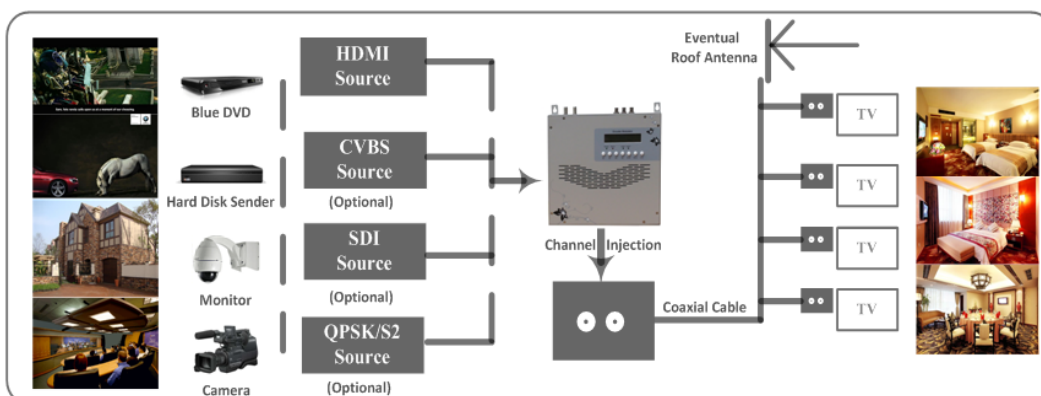
1). Residences and Private Homes Video content DVB-T/ISDB-T distribution



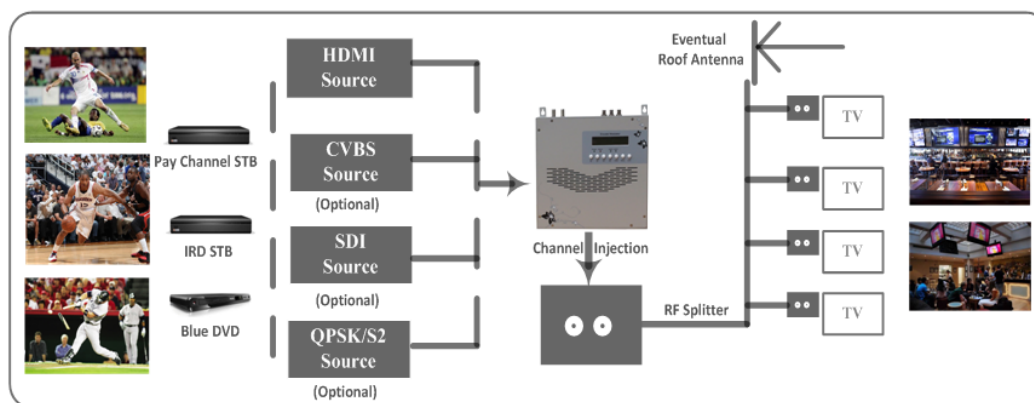
2) Outside Audio- Video contents ON- AIR DVB- T/ISDB-T distribution



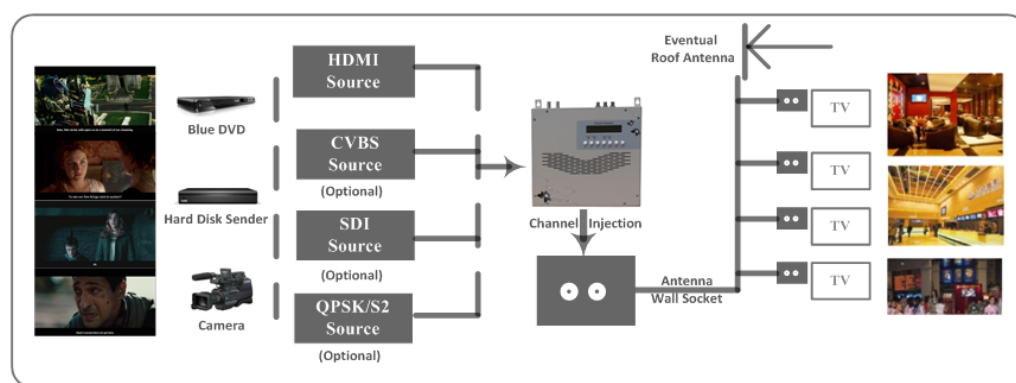
3) Hotel Audio- Video contents DVB- T/ISDB-T distribution



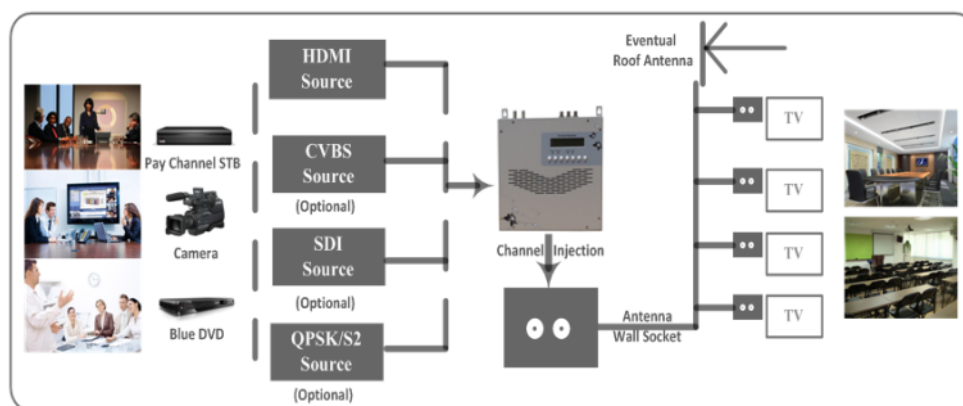
4) Bar Audio- Video contents distribution



5) Cinema Audio- Video contents DVB- T/ISDB-T distribution



7) Company Audio - Video contents distribution



APPENDIX

INTERNAL TEST REPORT OF DELAY

(The values of average latency cover the progress from Encoding to Decoding.)

Decoding Terminal	Encoding Details					Average Delay (ms)
	Single Source Interface	Bit Rate Mode	Resolution	Low Delay Mode	Encoding Type	
DVB-C HD STB	CVBS	VBR	576i@50	Mode 1	mpeg2	310
					H.264	225
				Mode 2	mpeg2	430
					H.264	440