User Manual

DVB-S/S2 Satellite Modulators

H-4ASI-DVBS2

DIRECTORY

Chapter 1 Product Outline

1.1 Outline

THOR H-4ASI-DVBS2 is a high-performance modulator developed according to DVB-S2 (EN302307) standard which is the standard of second generation of the European broadband satellite telecommunication. It is to convert the input ASI and IP signals alternatively into digital DVB-S/S2 RF output.

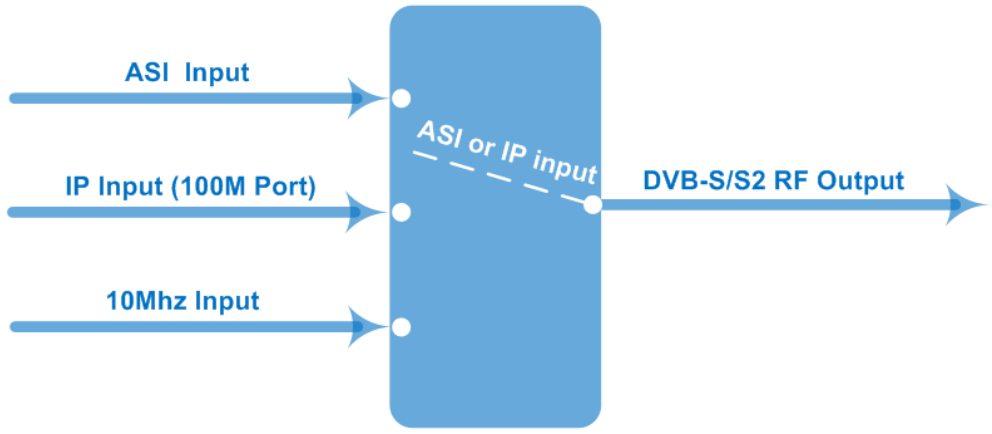
BISS scrambling mode is inserted to this DVB-S2 modulator, which helps to safely distribute your programs. It is easy to reach local and remote control with Web-server NMS software and LCD in the front panel.

With its high cost-effective design, THOR H-4ASI-DVBS2 DVB-S2 modulator is wildly used for broadcasting, interactive services, news gathering and other broadband satellite applications.

1.2 Features

- Fully complying with DVB-S2 (EN302307) and DVB-S (EN300421) standard
- 4 ASI inputs (3 for backup)
- Support IP (100M) signal input
- QPSK, 8PSK, 16APSK, 32APSK Constellations
- Support RF CID setting (Optional as per order)
- Constant temperature crystal oscillator, as high as 0.1ppm stability
- Support coupling 10Mhz clock output through RF output port
- Support 24V power output through RF output port
- Support BISS scrambling
- Support SFN TS transmission
- Output frequency range: 950~2150MHz, 10KHz stepping
- Support local and remote control with Web-server NMS

1.3 Principle Chart



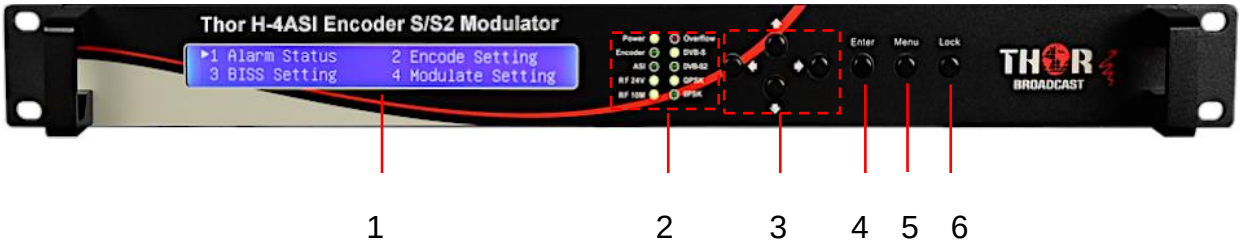
1.4 Specifications

ASI Input	Supporting both188/204 Byte Packet TS Input		
	4 ASI Inputs, Supporting Backup		
	Connector: BNC, Impedance 75Ω		
IP Input	1*IP Input (RJ45, 100M TS Over UDP)		
10MHz Reference Clock	1*External 10MHz Input (BNC Interface); 1*Inner 10MHz Reference clock		
RF Output	RF Range: 950 ~ 2150 MHz, 10KHz stepping		
	Output Level Attenuation： -26 ~ 0 dBm，0.5dBm Stepping		
	MER≥40dB		
	Connector: N type, Impedance 50Ω		
Channel Coding and Modulation	Standard	**DVB-S**	**DVB-S2**
	Outer coding	RS Coding	BCH Coding
	Inner coding	Convolution	LDPC Coding
	Constellation	QPSK	QPSK,8PSK, 16APSK,32APSK
	FEC/ Convolution Rate	1/2, 2/3, 3/4, 5/6, 7/8	**QPSK:** 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 **8PSK:** 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 **16APSK:** 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 **32APSK:** 3/4, 4/5, 5/6, 8/9, 9/10
	Roll-off Factor	0.2, 0.25, 0.35	0.2, 0.25, 0.35

	Symbol Rate	0.05~45Msps	0.05~40Msps (32APSK); 0.05~45 Msps (16APSK/8PSK/QPSK)
	BISS Scramble	Mode 0, mode 1, mode E	
System	Web-server NMS		
	Language: English		
	Ethernet software upgrade		
	24V power output through RF output port		
Miscellaneous	Dimension	482mm×410mm×44mm	
	Temperature	0~45℃(operation), -20~80℃ (storage)	
	Power	100-240VAC±10%,50Hz-60Hz	

1.5 Appearance and Description

Front Panel Illustration



1.	LCD Screen	
2.	Indicators	Power: to indicate power connection
		Alarm: to indicate errors
		Ext 10M: to indicate 10MHz outer reference clock is applied
		TS Overflow: to indicate the input TS bit rate is over the bandwidth of transmission limit
		RF 10M: to indicate the RF 10MHz reference clock is connected and enabled in the system
		RF 24V: to indicate the RF 24V power is enabled
		ASI1-4: to indicate the corresponding ASI input is chosen to modulate
3.	Up/Down/Left /Right key	
4.	Enter: Confirmation key	
5.	Menu key: Step-back key	
6.	Locking key	

Rear Panel Illustration

1.	Fuse 24V (if the version you purchased supports this function)
2.	RF out port
3.	24V power indicator
4.	ASI Input channels 1-4
5.	Data Port for IP source input
6.	Network Management System Port
7.	Input of 10Mhz Reference Clock
8.	Loop out of 10Mhz Internal Clock
9.	Power Switch
10.	Fuse
11.	Power Socket
12.	Grounding pole

Chapter 2 Installation Guide

2.1 Acquisition Check

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

- H-4ASI-DVBS2 DVB-S2 Modulator
- ASI Cable
- Power Cord

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

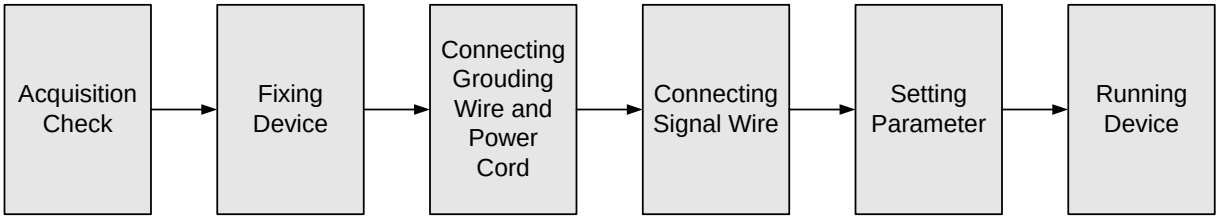
2.2 Installation Preparation

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 modulator
- Connecting signal cables
- Connecting communication port (if it is necessary)

2.2.1 Device's Installation Flow Chart Illustrated as following：



2.2.2 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the

	distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1X10^{7}$~$1X10^{10\Omega}$, Grounding current limiting resistance: 1M (Floor bearing should be greater than 450Kg/㎡)
Environment Temperature	5~40℃(sustainable) , 0~45℃(short time) , installing air-conditioning is recommended
Relative 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 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 100-240V 50-60Hz. Please carefully check before running.

2.2.3 Grounding Requirement

- All function modules' good grounding is 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 cables' 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

- 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 H-4ASI-DVBS2 DVB-S2 modulator, user should set the power switch to "OFF".

2.4 Signal Cable Connection

The signal connections include the connection of input signal cable and the connection of output signal cable. The details are as follows:

2.4.1 ASI input and loop output cable illustration:

2.4.2 RF output interface connection

User can firstly find the RF out interface on the device according to the connector mark described on the rear panel illustration, and then connect the coaxial cable (in the accessories). One end is connected to the modulator's RF out connector while the other end to the power transmitter's RF input. The modulator's RF output interface and its connection are illustrated as follow:

Chapter 3 Operation

H-4ASI-DVBS2 DVB-S2 modulator's front panel is user operation interface. Before operating, user can decide whether directly use the default setting or customize the input and output parameters setting. The detail operations go as follows:

Keyboard Function Description:

LEFT/RIGHT: To choose and set the parameters.

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

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

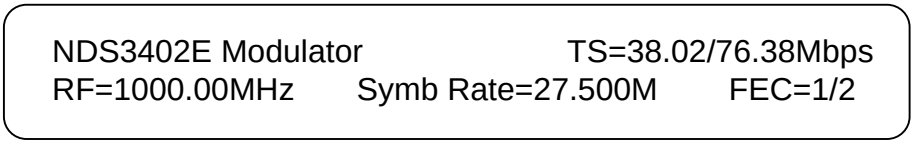
MENU: Canceling presently entered value, resuming previous setting; Return to previous menu.

LOCK: 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 "Resume Factory Setting" page, user can firstly press "ENTER" key, consequently system resumes factory parameter setting.

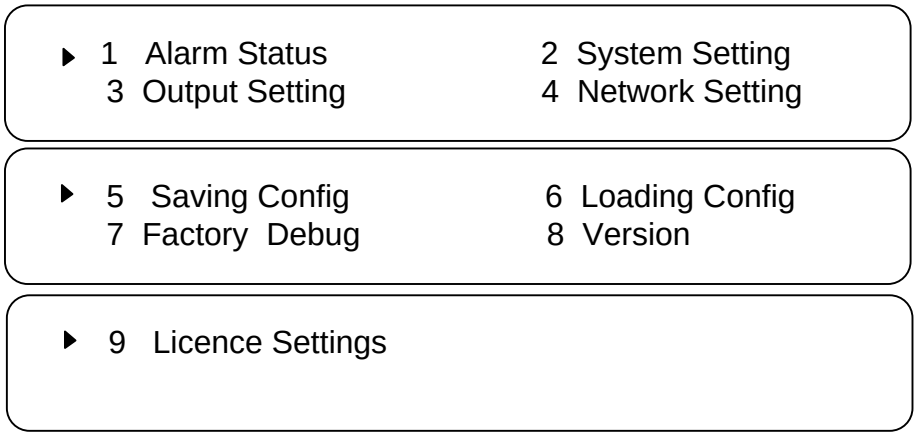
3.1 Main Interface

After switching on the modulator, the LCD will display the device name, real-time input total bit-rate and the maximal bit-rate the modulator can support in the first row, while the output RF frequency, Symbol rate and FEC (Forward Error Correction) rate are displayed in the second row.



3.2 General setting

By pressing "LOCK" key to enter the main menu, the LCD will display the following pages:



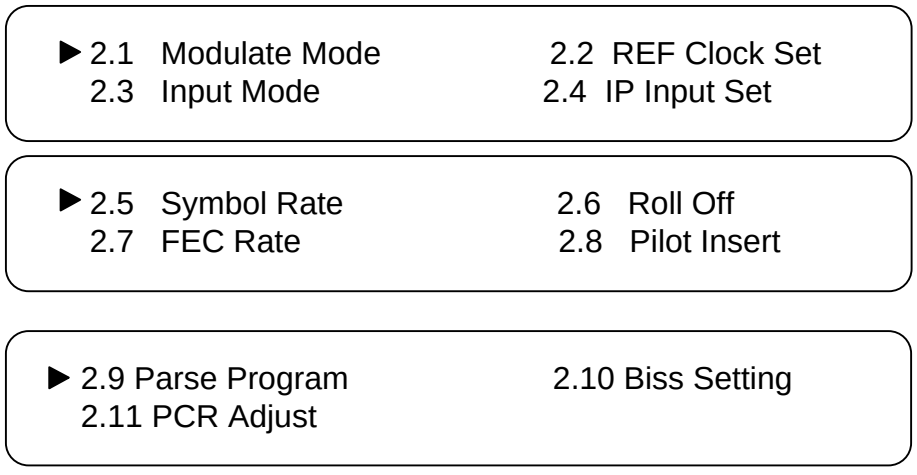
By pressing UP or DOWN key to the specified menu item, and then pressing ENTER, users can enter the submenu as following pages:

3.2.1 Alarm Status

Whenever an abnormal event happens, the alarm indicator will light up and it displays error content in the submenus. For example, when there is no TS input, it shows as below:

3.2.2 System Setting

By pressing UP/DOWN or LEFT/RIGHT to choose this item, ENTER and LEFT/RIGHT to set the parameters. The system displays following pages:



3.2.2.1 Modulate Mode

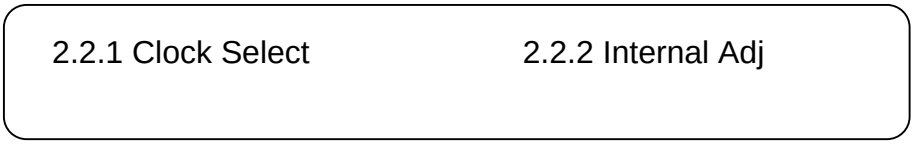
After entering the submenu by pressing ENTER key, user can choose the "modulation mode" to choose the needed modulation mode.

DVB-S: This modulator works under DVB-S standard and the constellation is QPSK.

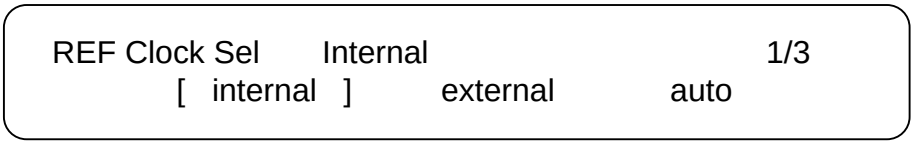
QPSK/8PSK/16APSK/32APSK: these options are the constellations under DVB-S2. If any one of the rest 4 options is selected as the modulate mode, the device works under DVB-S2 with the corresponding constellation.

3.2.2.2 Reference Clock Set

After entering the submenu by pressing ENTER key, user can set the reference clock source.



Clock Select:



Internal: This modulator uses internal 10MHz crystal oscillator as reference clock.

External: This modulator uses external 10 MHz input as reference clock.

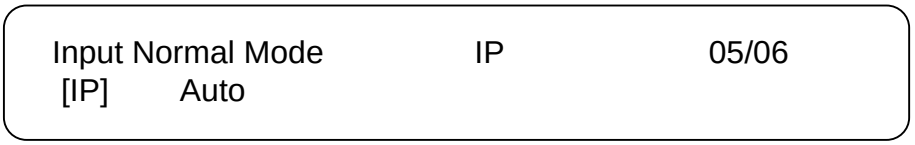
Auto: The modulator will preferably select the external 10MHz input if it exists. Otherwise the modulator will select the internal 10MHz crystal oscillator's output as reference clock.

Internal Adjust:

3.2.2.3 Input Mode

This modulator can receive TS in normal format or from SFN system. Enter 2.3.1 to set the input mode:

Normal, this modulator deals with TS in normal format. Select 'Normal' in 2.3.1 and enter 2.3.2 to select the input channel user actually apply. At this time, H-4ASI-DVBS2 can process one channel TS from any ASI or the IP port.



ASI1/2/3/4: The input TS comes from port ASI1or 2 or 3 or 4.

IP IN: The input signal comes from data port.

Auto: the input signal comes from ASI1-4 or data port automatically.

After entering the submenu by pressing ENTER key, user can choose the channel the input TS comes from.

If users choose 'SFN' as the input mode in 2.3.1, the modulator can deal with TS from SFN system and the receiving side shall use Thor NDS3509 SFN receiver to restore the TS. At this time, the modulator can process TS from multiple ASI ports.

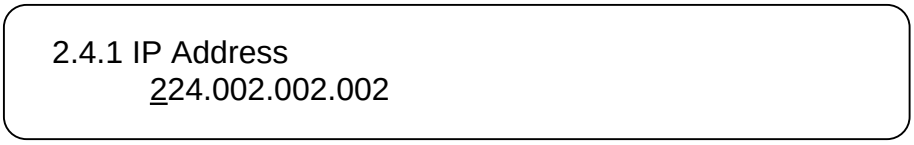
Move the bracket with L/R keys and shift ON/OFF with UP/DOWN key.

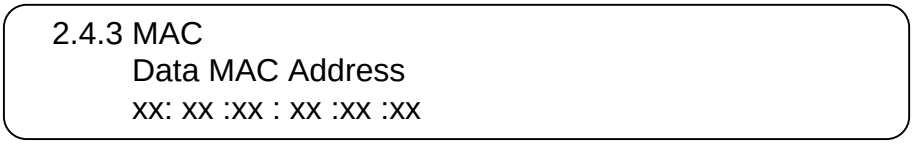
ON: to enable the modulator process SFN TS from the corresponding ASI channel.

OFF: to disable the modulator process SFN TS from the corresponding ASI channel.

3.2.2.4 IP Input Set

When users use IP stream as the signal source to modulate and output (Choose 'Normal' as the input mode under 2.3.1 and 'IP' as the source port under 2.3.2), it needs to configure the IP parameters under '2.4 IP Input Set' according to the actual IP source to receive IP signal. Submenus go as below:

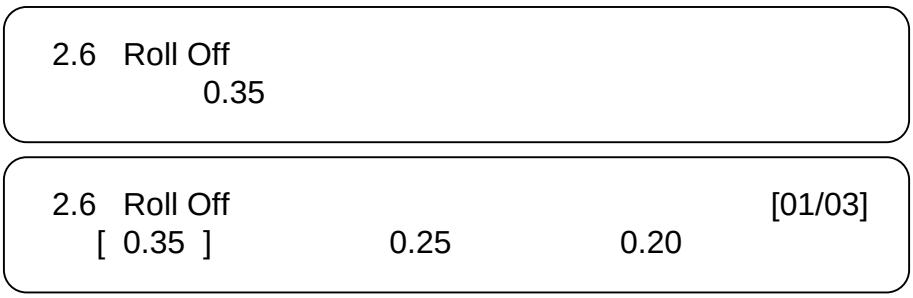




3.2.2.5 Symbol rate

Adjustable Range: DVB-S: 0.5-45M; DVB-S2: 0.05~40Mbps (for 16APSK/32APSK), 0.05~45 Mbps (for 8PSK/QPSK)

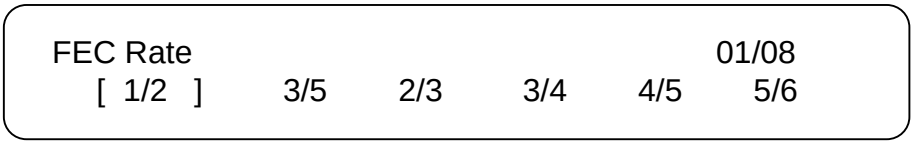
3.2.2.6 Roll-off Factor



User can set the roll-off factor of the DVB-S and DVB-S2

There are 3 possible options, including 0.35, 0.25 and 0.20.

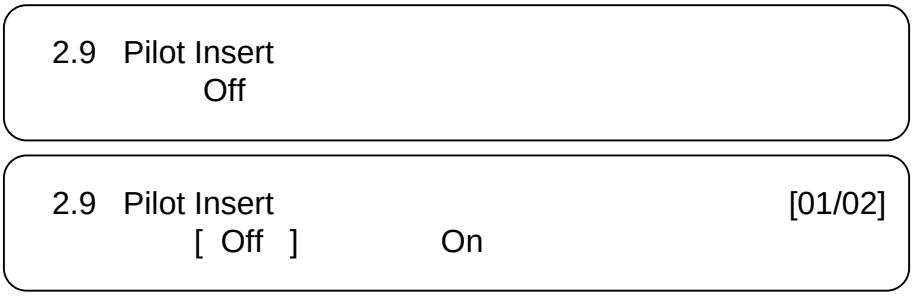
3.2.2.7 FEC Rate



User can set FEC rate at this submenu. Different modulate modes (DVB-S/DVB-S2) and constellations have different FEC rate options. (Refer specifications table in Chapter 1 for details.)

3.2.2.8 Pilot Insert

This menu item is applied to DVB-S2 modulate mode.



User can choose whether to insert the Pilot block.

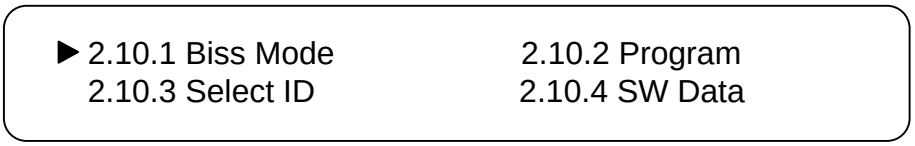
Off: without pilots

On: with pilots

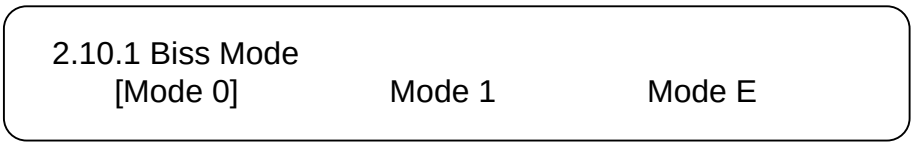
3.2.2.9 Parse Program

Select 2.9 and press Enter key, wait for a while and it displays the program number from the input channel user set under menu 2.3.2. And, only after this procedure, user can view the programs when proceed to BISS scrambling under 2.10.2.

3.2.2.10 BISS Setting



There are three BISS modes to select: Mode 0, Mode 1, Mode E.



Mode 0: to not enable the BISS scrambling function.

Mode 1: When the modulator works under Mode 1, user can select and scramble the input programs manually by entering submenu 2.10.2 and set SW data at submenu 2.10.4 (Users can input 12 characters from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F).

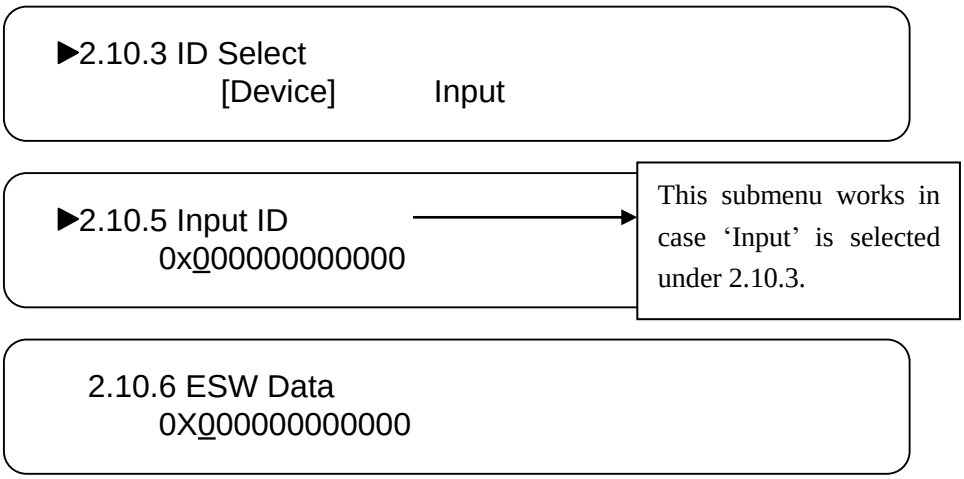
√ : to scramble the corresponding program; X: to not scramble the corresponding program.

Shift ‘ √ ’ and ‘X’ symbols with Enter and navigation buttons.

Mode E: When the modulator works under Mode E, user can select and scramble the input

programs manually by entering submenu 2.10.2 in the same way as Mode 1.

Instead setting SW data under Mode 1, user will set the 2.10.3 Select ID, 2.10.5 Input ID and 2.10.6 ESW Data under Mode E.

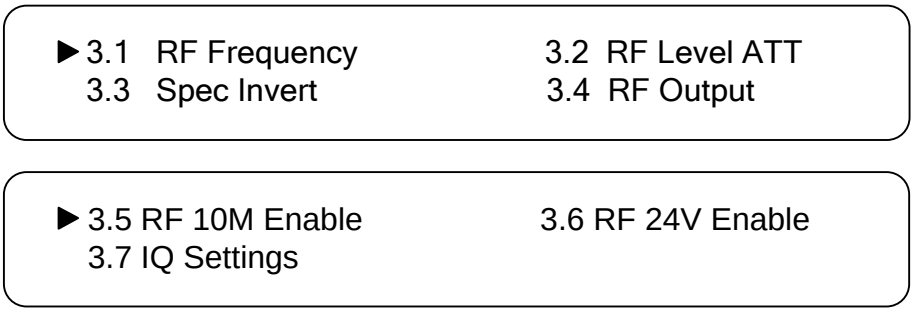


3.2.2.11 PCR Adjust

Users can turn on or off the PCR adjust.

3.2.3 Output Setting

Pressing UP/DOWN or LEFT/RIGHT to choose this item, ENTER and LEFT/RIGHT to set the parameters. The system displays following page:

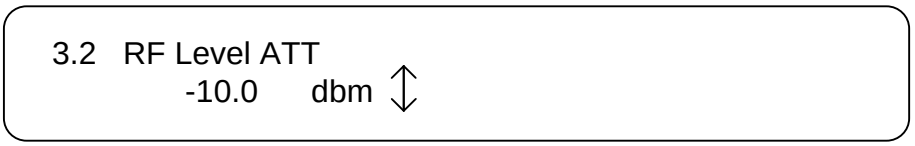


3.2.3.1 RF Frequency Setting

After entering the submenu by pressing ENTER key, user can set RF output frequency. The RF output frequency range is from 950 to 2150MHz.

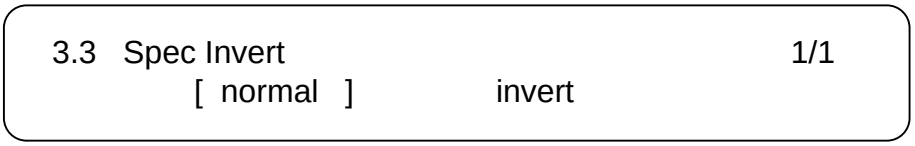
3.2.3.2 RF Level ATT Setting

User can set the attenuation of the RF output at this submenu. The RF attenuation range is from 0 to -26dbm in 0.5dbm step.

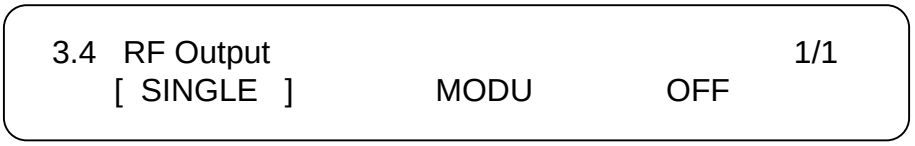


3.2.3.3 Spectrum Invert

User can set the Spectrum of RF output invert or not.



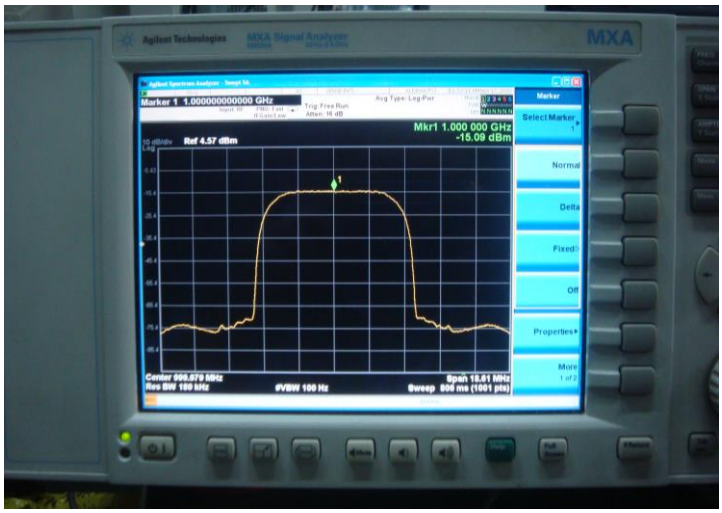
3.2.3.4 RF Output



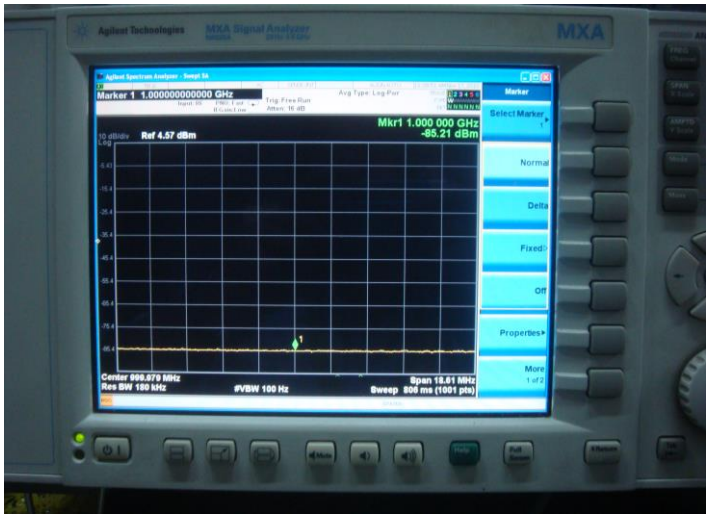
User can set the RF output mode for different applications.

Single Tone: the RF output is only carrier without modulation.

Modulation: The RF output carrier with modulation.



Off: Turn off the RF output.

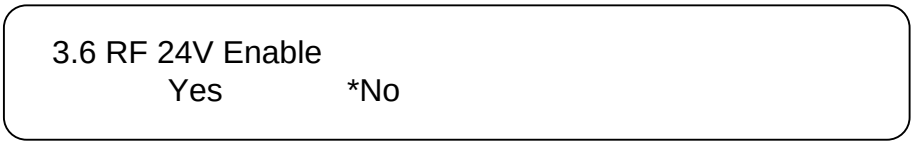


3.2.3.5 RF 10M Enable

Under this menu, users can decide turn on or off the 10MHz reference clock for the RF output.

3.2.3.6 RF 24V Enable

Under this menu, users can decide turn on or off the 24V power output. If the 24V power is on, the modulator can supply 24V power for the BUC or amplifier which is connected to this modulator.



3.2.4 Network Setting

Press “Up/Down” to choose this item. “Enter” and “Left/Right” to set the parameters. The system displays following pages.

Note: The MAC address is according to the factory setting, and it’s unique.

Under the following submenus, there are parameters which can be set manually; user can press “Up/Down” to choose this item. “Enter” and “Left/Right” to set the parameters. The system displays following pages.

4.1 IP Address
192.168.000.136

4.2 Subnet Mask
255.255.255.000

4.3 Gateway
192.168.000.001

4.4 MAC Address
FF: FF: FF: FF: FF: FF

4.5 Default Web User?
▸ NO Yes

4.6 Data Port

Data Port: At this menu, press UP/DWON key and ENTER to set data parameters.

4.6.1 IP Address
224.002.002.002

4.6.2 Subnet Mask
255.255.255.000

4.6.3 Gateway
192.168.002.001

4.6.4 MAC Address
00:72:74:76:78:7A

3.2.5 Saving Configuration

User can choose to save the current configured parameters by pressing ENTER key. The system displays following page:

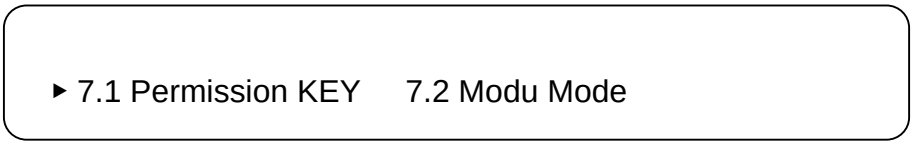
3.2.6 Load Configuration

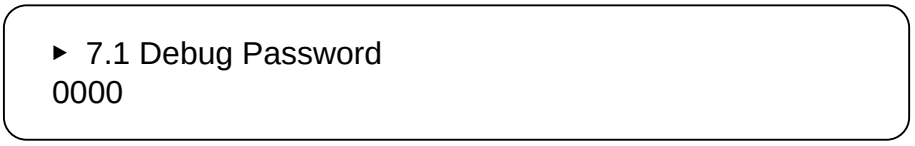
At this menu, press UP/DWON key and ENTER to confirm.

User can restore the device into the last saved configuration by choosing **"6.1"** and restore the device into factory configuration by choosing **"6.2"**.

3.2.7 Factory Debug

After entering the submenu by pressing ENTER key, user can set the debug password and disable or enable the debug for engineer.





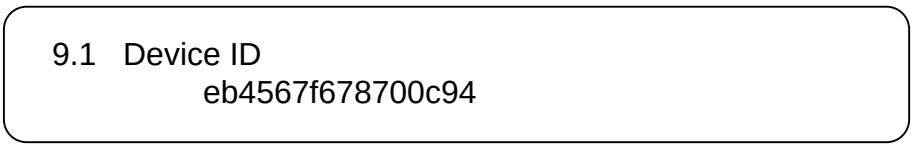
3.2.8 Version

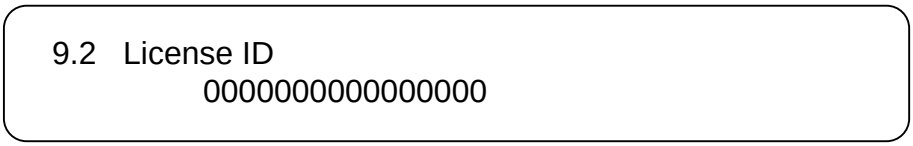
User can check the hardware version and software version of the equipment.

3.2.9 License Settings

After entering the submenu by pressing ENTER key, user can get authorization of CID function.

Note: CID function is optional for H-4ASI-DVBS2, if users need this function, please contact manufacture to get the license ID, after inputting license ID and pressing enter to confirm, the register status will be show “YES” and the CID function will come into effect.





Chapter 4 Web-based NMS Management

In addition to using front buttons to control the device, users can also control and set the configuration with the web Brower in the PC.

4.1 login

The default IP address of this device is 192.168.0.136. (We can modify the IP through the front panel.)

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 device'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.

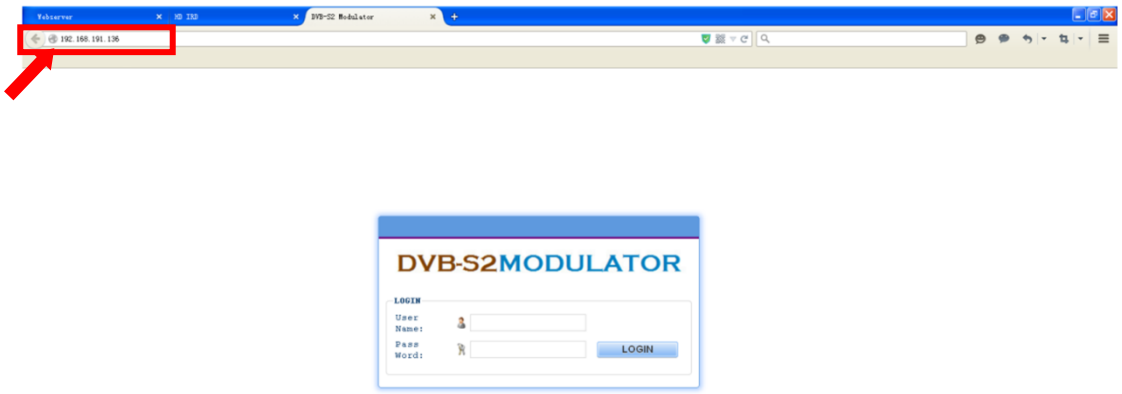
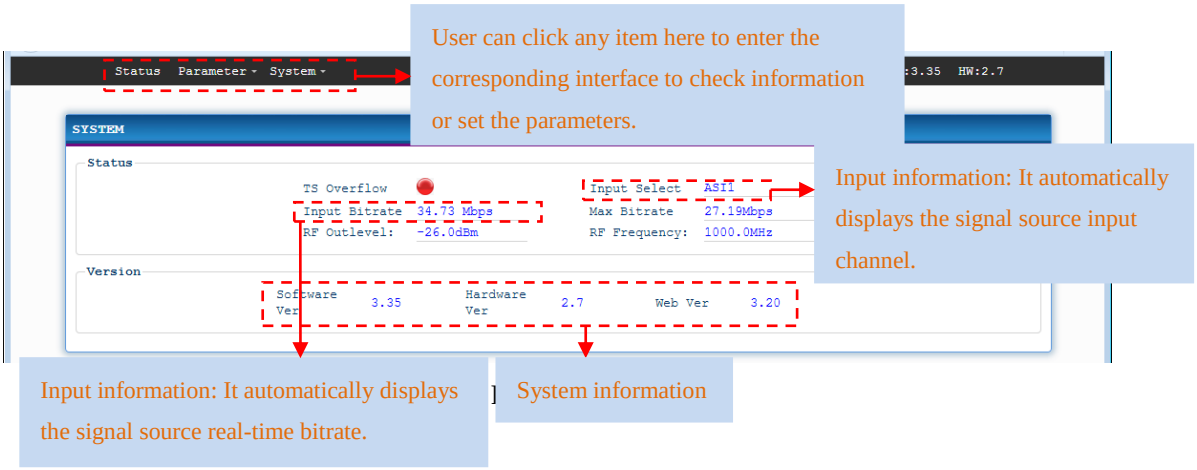


Figure-1

4.2 Operation

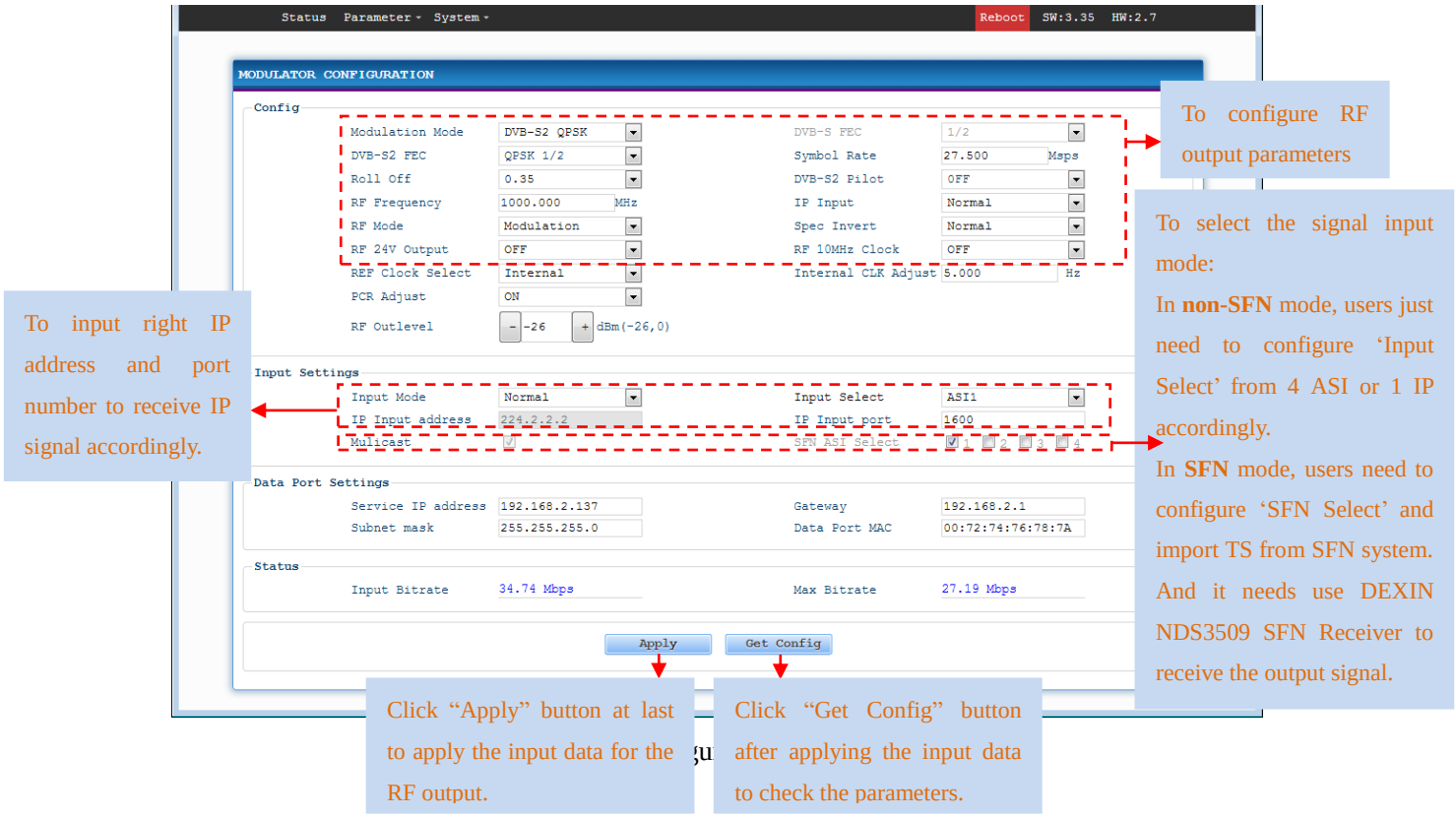
Summary:

When we confirm the login, it displays the WELCOME interface as Figure-2. It is a read-only interface where users can have an overview of the device's system information and working status.



Parameters →Modulator:

From the menu on left side of the webpage, clicking "Modulator", it displays the interface where users can configure the RF output parameters and IP input parameters if needed. (Figure-3)



Parameters →BISS Settings:

From the menu on up side of the webpage, clicking "BISS Config", it displays the interface where users can parse and scramble the input program(s). (Figure-4)

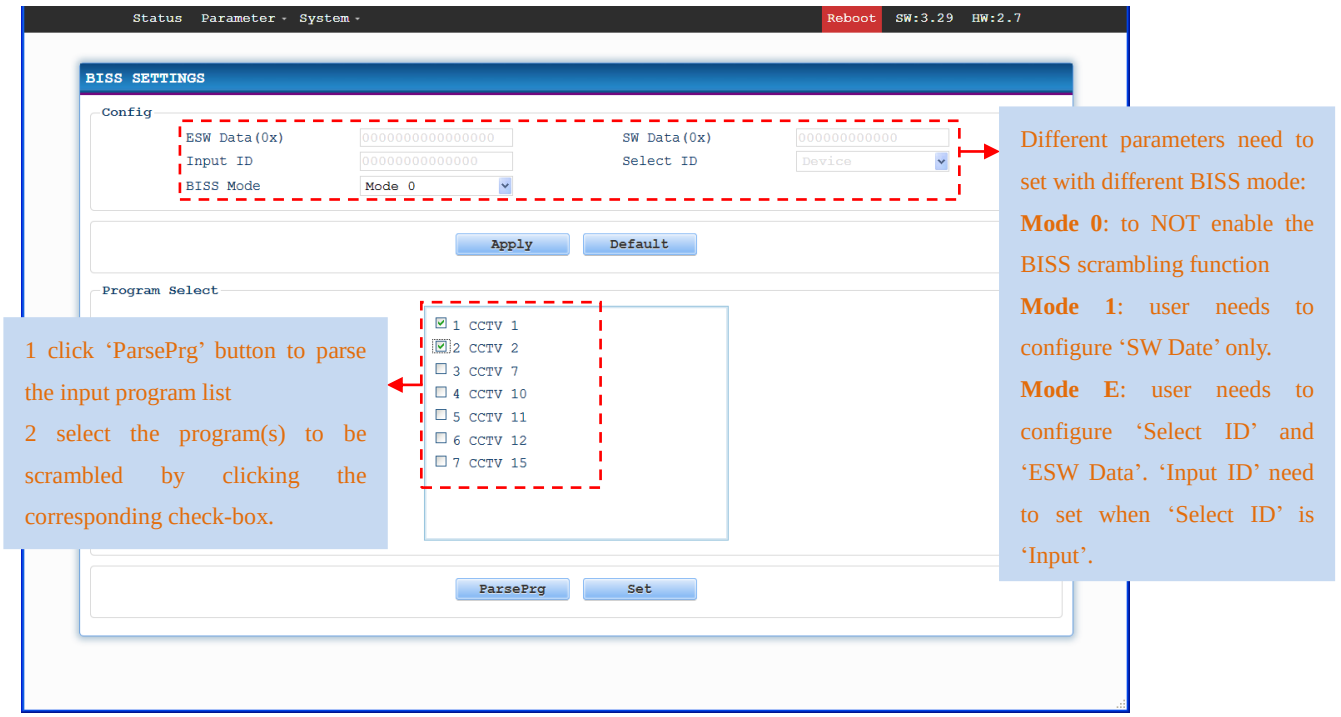


Figure-4

Parameters → CID Settings:

- **RF CID**

From the menu on up side of the web page, clicking "CID Settings", it displays the "RF CID" where the distributor can check the location of device and contact information of the users, which is convenient for distributors to maintain and manage the device. (Figure-7)

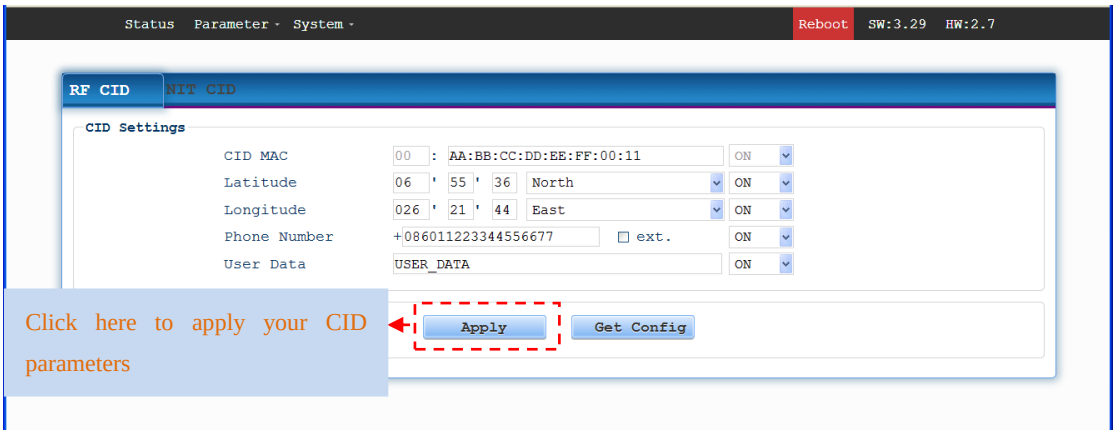


Figure-6

- **NIT CID**

From the menu on up side of the webpage, clicking "CID Settings", it displays the NIT table which is a very important table for describing the network and TS. Users can set the parameters of the output NIT table and check the NIT-CID information. It displays the interface as Figure-6.

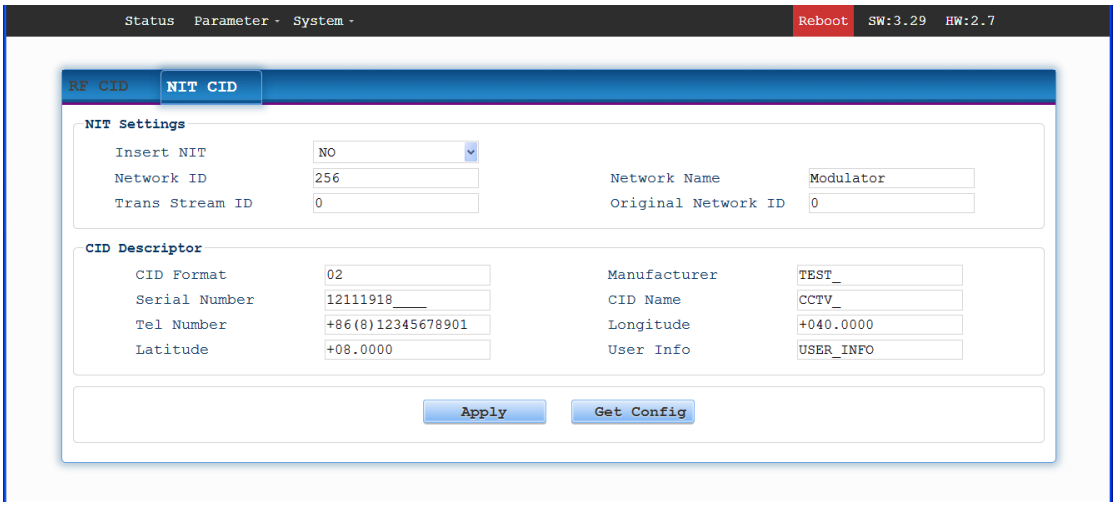


Figure-7

System → Saveload:

From the menu on left side of the webpage, clicking "Saveload", it will display the screen as Figure-8 where to save or restore your configurations.

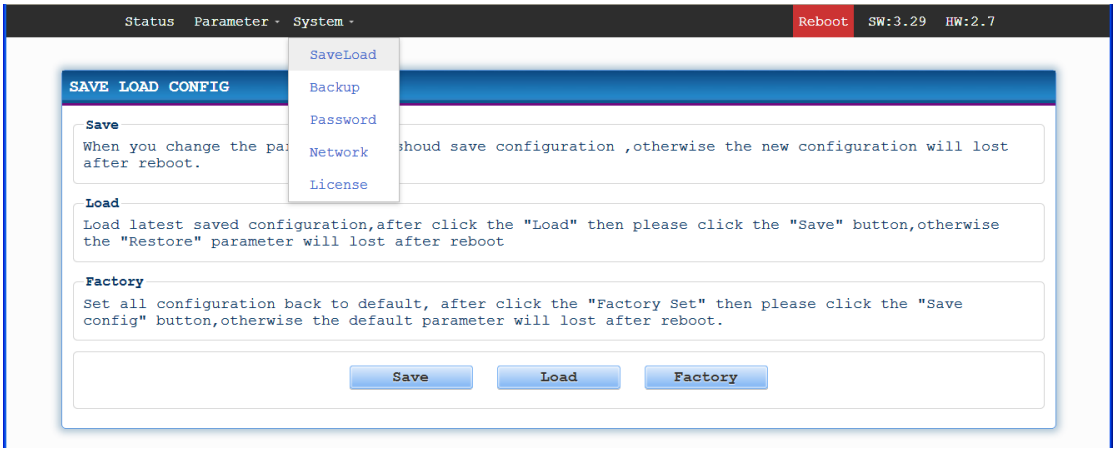


Figure-8

System → Backup:

From the menu on left side of the webpage, clicking "Backup/Load", it will display the screen as Figure-9 where to backup or load your configurations.

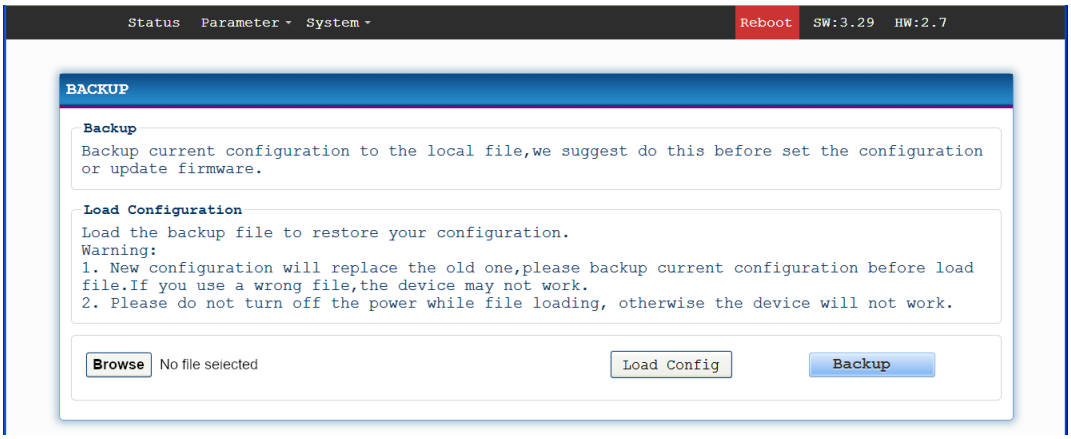


Figure-9

System → Password:

From the menu on left side of the webpage, clicking "Password", it will display the screen as Figure-10 where to reset the login info for the device.

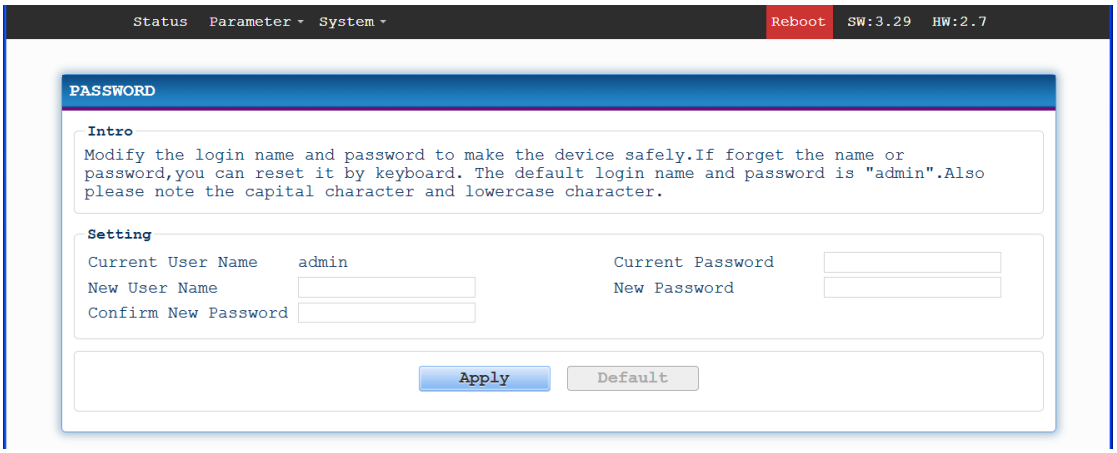


Figure-10

System → Network:

From the menu on left side of the webpage, clicking "Network", it will display the screen as Figure-11 where to configure the network parameters for the device.

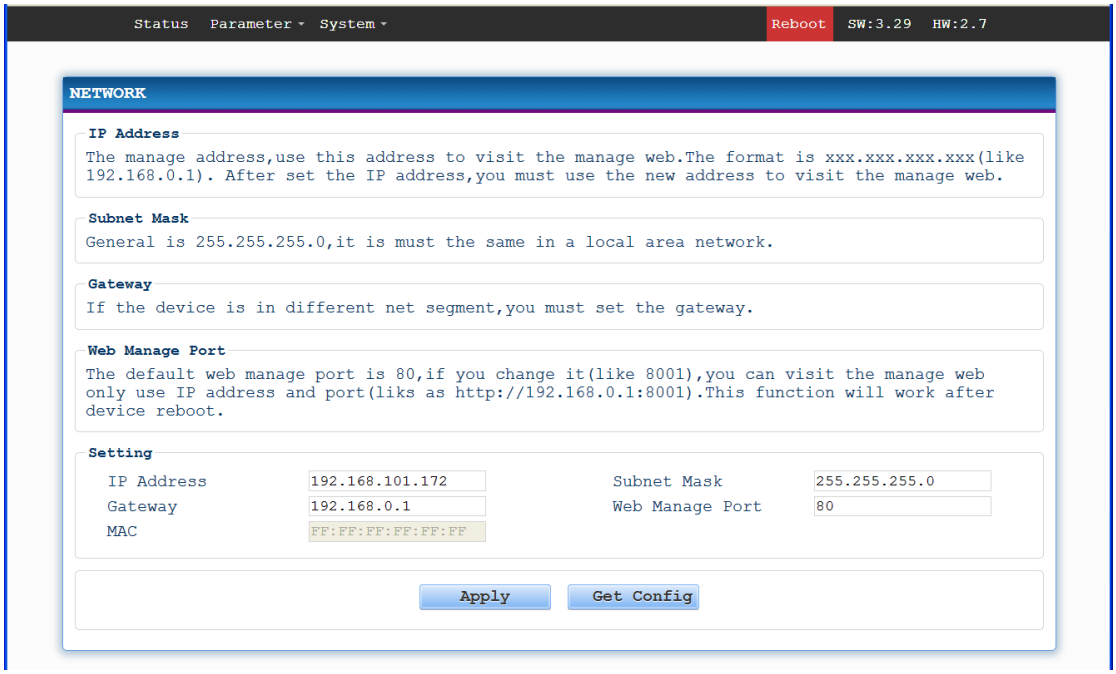
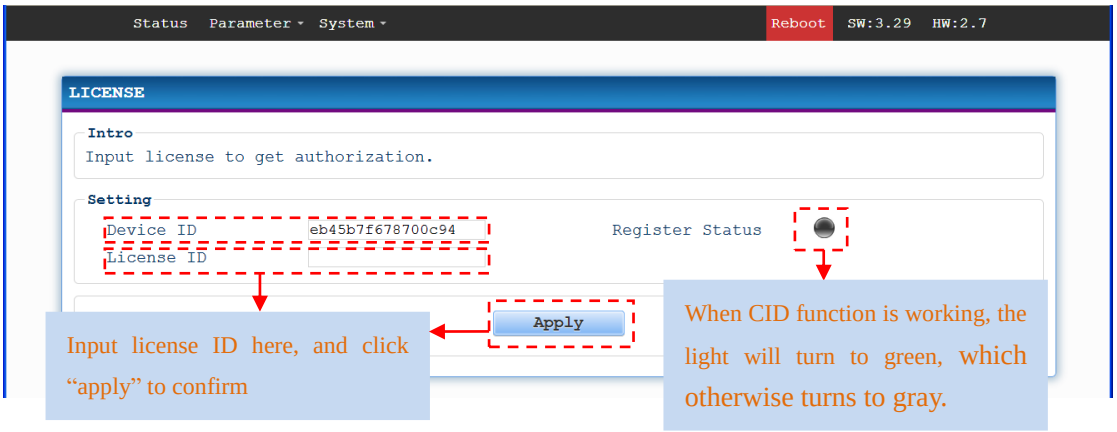


Figure-11

System → License:

From the menu on left side of the webpage, clicking "License", it will display the screen as Figure-11 where to get authorization of CID function.



Chapter 5 Troubleshooting

THOR's ISO9001 quality assurance system has been approved by CQC organization. For guarantee the products' quality, reliability and stability. All THOR 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 THOR. 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 voltage 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

- H-4ASI-DVBS2 DVB-S2 modulator
- Power cord
- ASI wire