QUESTTEL

Broadcast Systems

4 HDMI & YPbPr, CVBS to ASI, IP & RF Digital Encoder Modulator

User Manual

B-QAM-HDMI-IP-4CH

About This Manual

Intended Audience

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

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. QuestTel shall have no liability for any error or damage of any kind resulting from the use of this document.

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Chapter 1 Introduction

1.1 Product Overview

All-in-one 4 Channel Full HD Compact Encoder Modulator which integrates encoding MPEG-2, MPEG-4/H.264 modulation to convert HDMI/YPbPr /CVBS signals to digital RF output. To meet customers various requirements the B-QAM-HDMI-IP-4CH is also equipped with 1 ASI input and 2 ASI output ports. In addition, two ethernet network ports are provided, one for configuration (NMS GUI) and a second for IPTV output. The B-QAM-HDMI-IP-4CH is ideal solution to distribute 4 SD or HD 720p / 1080i / 1080p Video Signals to an unlimited number of HD Television over the existing coax cables. QuestTel Encoder/Modulators capable of modulating both standards QAM and ATSC, using the NMS GUI. QuestTel's Encoder Modulator series products are wildly used in public places such as metro, market hall, theatre, hotels, restaurants and etc for advertising, monitoring, training and educating in company, schools, campuses, hospitals.

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**
- **Support DD AC3 (2.0/5.1/7.1) passthrough**
- **Support AC3 Dialog Normalization**
- **4* HDMI/YPbPr/CVBS (Pr in) channels in**
- **1*ASI in for re-mux; 1*RF in for RF mix**
- **4* DVB-C & 4 ATSC RF out in one device**
- **2 separate ASI output to mirrior MPTS or one carrier programs**
- **IP(2*SPTS & 1*MPTS) out**
- **Support CC (Closed Caption) EIA608**
- **Support Low Delay**
- **LCN (Logical Channel Number) support**
- **VCT (Virtual Channel Table) support**
- **Excellent modulation quality**
- **LCD display, Remote control and firmware**
- **Web-based NMS management; Updates via web**

1.3 Specification

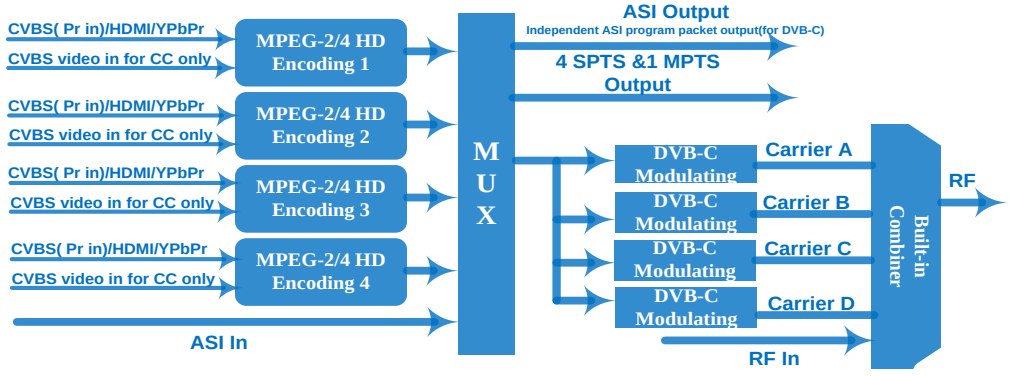
Encoding Section	
Video (HDMI)	
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	HDMI*4
Resolution	1920*1080_60P, 1920*1080_50P (For MPEG 4 AVC/H.264 only), 1920*1080_60i, 1920*1080_50i, 1280*720_60p, 1280*720_50P
Low Delay	Normal, Mode 1, Mode 2
Aspect Ratio	4:3; 16:9
Audio (HDMI)	
Encoding	MPEG1 Layer II; MPEG2-AAC; MPEG4-AAC; DD AC3(2.0); DD AC3 (2.0/5.1/7.1) passthrough
Interface	HDMI*4 /SPDIF*4
Sample rate	48KHz
Bit rate	64/96/128/ 192/256/320kbps
Video (YPbPr/CVBS)	
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	CVBS/YPbPr*4 (RCA)
Resolution	CVBS: 720*576_50i, 720*480_60i YPbPr: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/4*SPDIF
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	5.000~9.000Msps 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&1MPTS) over UDP, RTP/RTSP out (RJ45, 100M)
NMS interface	RJ45, 100M
Language	English

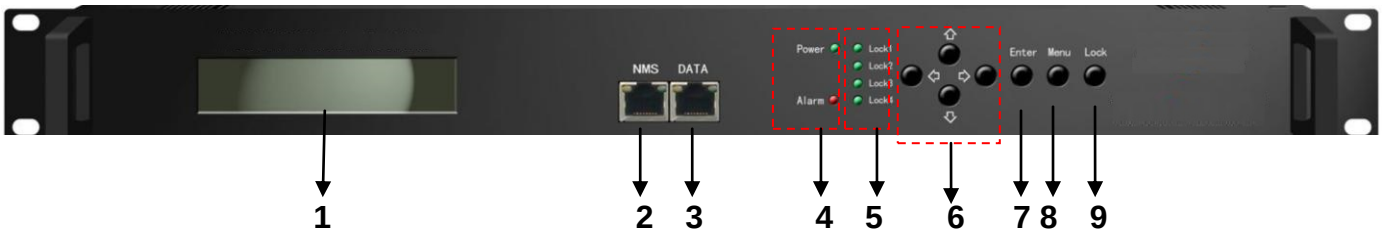
General	
Power supply	AC 100V~240V
Dimensions	482*400*44mm
Weight	4.5 kg
Operation temperature	0~45℃

1.4 Principle Chart



1.5 Appearance and Description

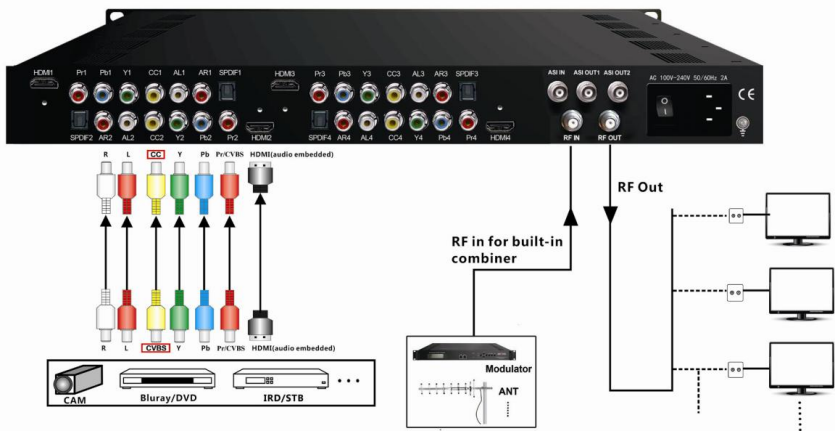
Front Panel Illustration



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

Rear Panel Illustration

① HDMI input port
② YPbPr/CVBS(Pr) input port
③ CVBS input port for CC only
④ L/R Audio input (Stereo or Mono)
⑤ SPDIF Audio input port
⑥ ASI input port
⑦ ASI Output port 1&2
⑧ Power Switch
⑨ Power supply Slot
⑩ RF in port
⑪ RF out 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.

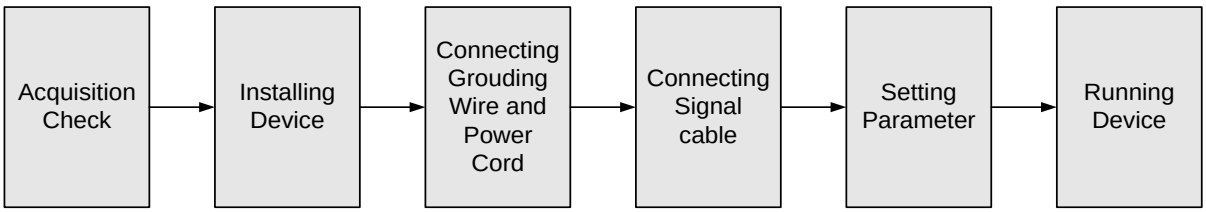
2.1 General Precautions

- ✓ Must be operated and maintained free of dust or dirty.
- ✓ The cover should be securely fastened, do not open the cover of the products when the power is on.
- ✓ After use, securely stow away all loose cables, external antenna, and others.

2.2 Power precautions

- ✓ When you connect the power source, make sure if it may cause overload.
- ✓ Avoid operating on a wet floor in the open. Make sure the extension cable is in good condition
- ✓ Make sure the power switch is off before you start to install the device

2.3 Device's Installation Flow Chart Illustrated as following



2.4 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine frame array in one machine hall, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than

	0.8m.
Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1X10^{7}$~$1X10^{10}\Omega$，Grounding current limiting resistance: 1MΩ (Floor bearing should be greater than 450Kg/㎡)
Environment Temperature	5~40℃(sustainable)，0~45℃(short time)， installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
Door & Window	Installing rubber strip for sealing door-gaps and dual level glasses for window
Wall	It can be covered with wallpaper, or 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 110V±10%, 50/60Hz or AC 220V±10%, 50/60Hz. Please carefully check before running.

2.5 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.
- ✓ 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 25 ㎡.

Chapter 3 Operation

The front panel of B-QAM-HDMI-IP-4CH Encoder Modulator is the user-operating interface and the equipment can be conveniently operated and managed by user according to the procedures displayed on the LCD:

Keyboard Function Description:

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

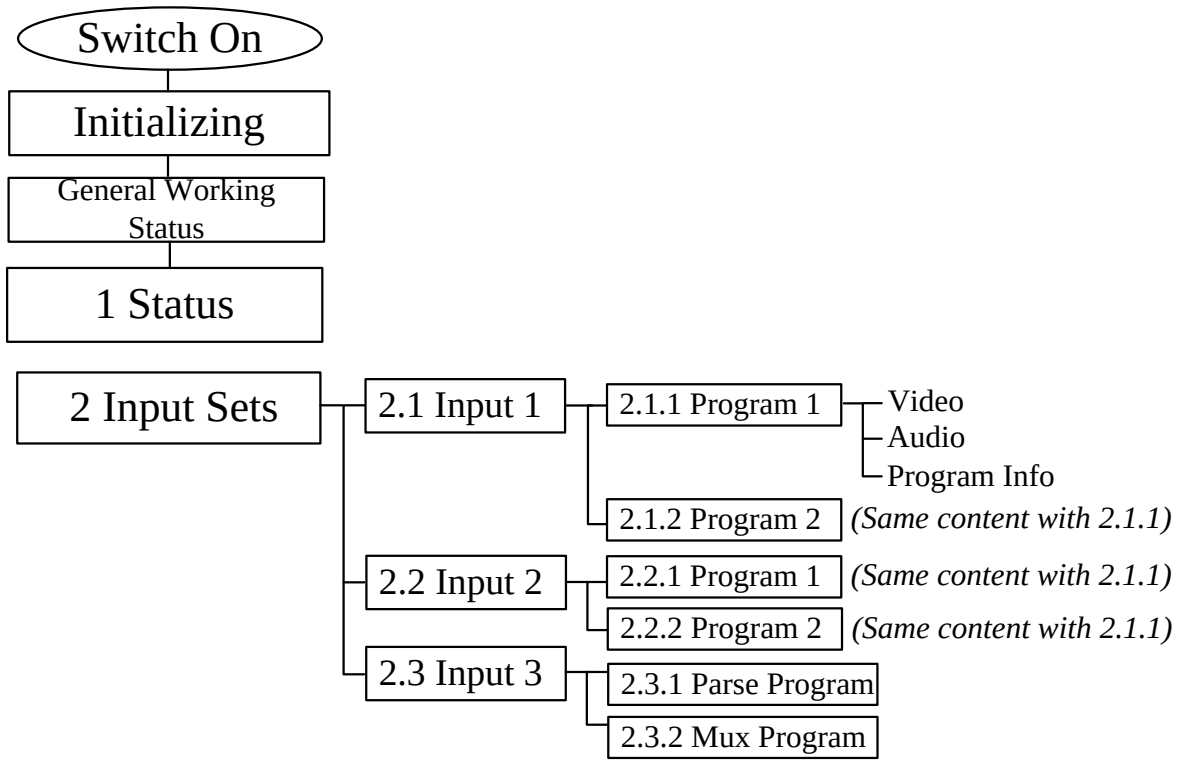
ENTER: Activate the parameters which need modifications, or confirm the change after modification.

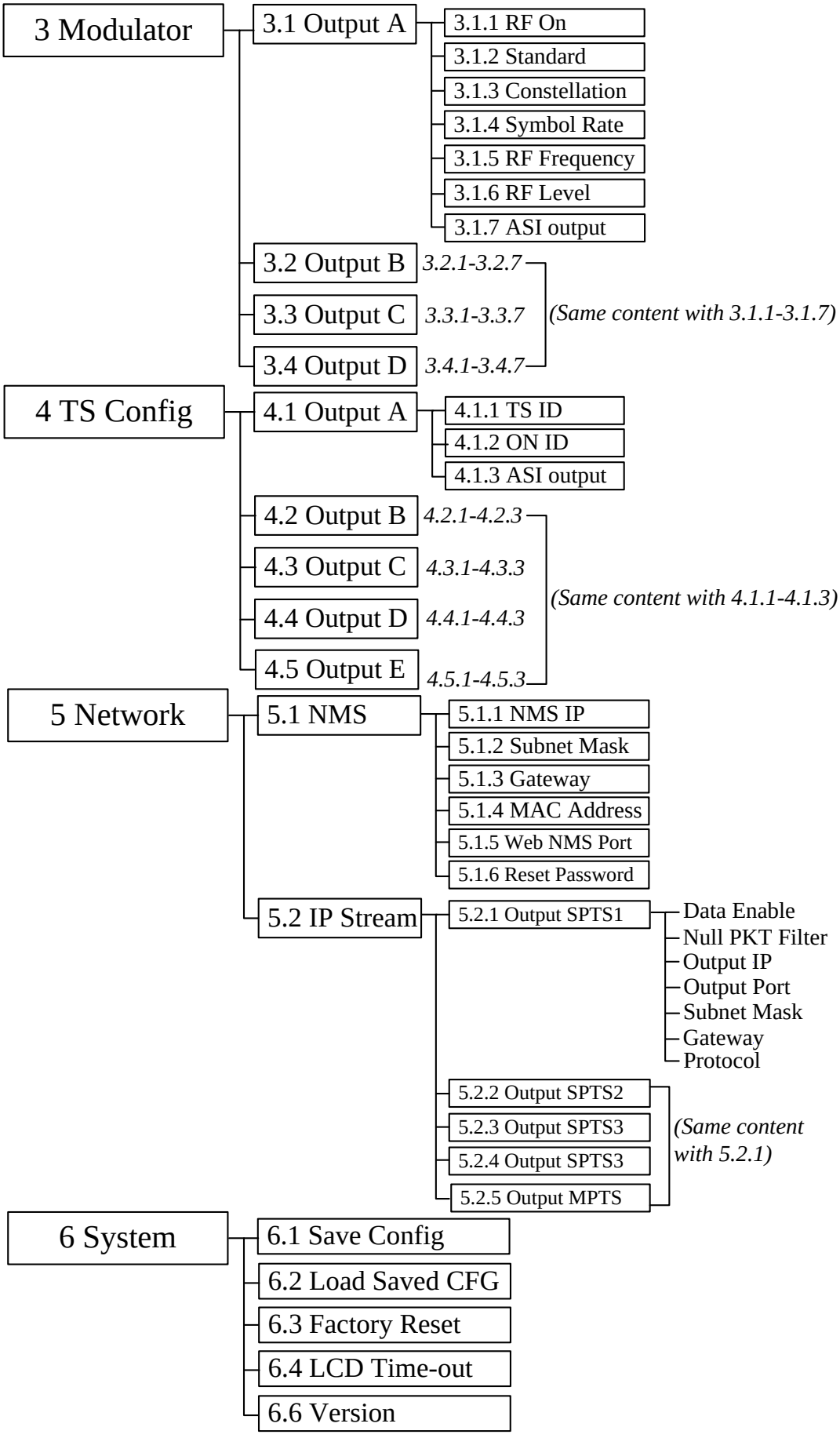
LEFT/RIGHT: Choose and set the parameters.

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.

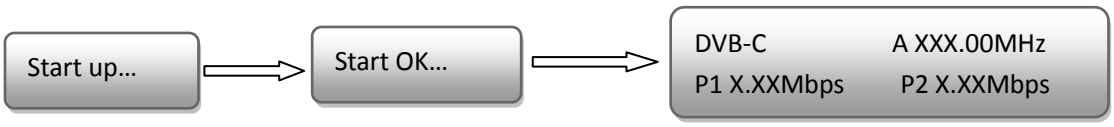
3.1 3.1 LCD Menu Structure




3 Modulator
3.1 Output A
3.1.1 RF On
3.1.2 Standard
3.1.3 Constellation
3.1.4 Symbol Rate
3.1.5 RF Frequency
3.1.6 RF Level
3.1.7 ASI output
3.2 Output B
3.2.1-3.2.7
3.3 Output C
3.3.1-3.3.7
3.4 Output D
3.4.1-3.4.7
(Same content with 3.1.1-3.1.7)
4 TS Config
4.1 Output A
4.1.1 TS ID
4.1.2 ON ID
4.1.3 ASI output
4.2 Output B
4.2.1-4.2.3
4.3 Output C
4.3.1-4.3.3
4.4 Output D
4.4.1-4.4.3
4.5 Output E
4.5.1-4.5.3
(Same content with 4.1.1-4.1.3)
5 Network
5.1 NMS
5.1.1 NMS IP
5.1.2 Subnet Mask
5.1.3 Gateway
5.1.4 MAC Address
5.1.5 Web NMS Port
5.1.6 Reset Password
5.2 IP Stream
5.2.1 Output SPTS1
Data Enable
Null PKT Filter
Output IP
Output Port
Subnet Mask
Gateway
Protocol
5.2.2 Output SPTS2
5.2.3 Output SPTS3
5.2.4 Output SPTS3
5.2.5 Output MPTS
(Same content with 5.2.1)
6 System
6.1 Save Config
6.2 Load Saved CFG
6.3 Factory Reset
6.4 LCD Time-out
6.6 Version

3.1 Initial Status

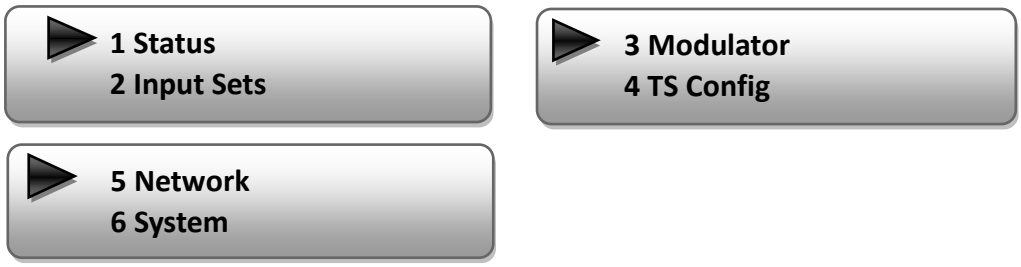
After powering on the device， it will take a few seconds to initialize the system It shows as below:



- **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

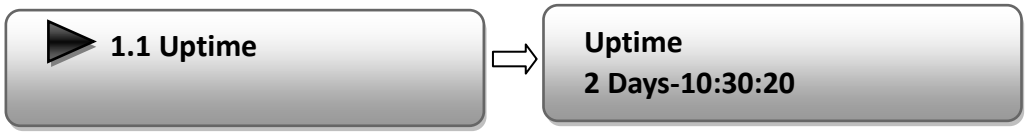
By pressing “Lock” key on the front panel, user can enter the main menu. The LCD will display the following pages:



User can press UP/DOWN buttons to specify menu item, and then press ENTER to enter the submenus as below:

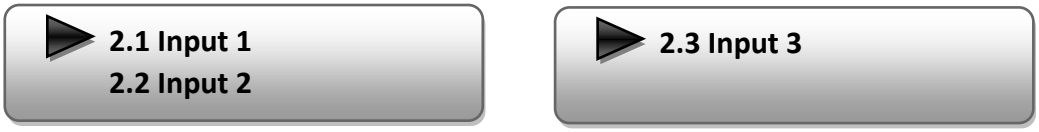
1) Status

Press Enter to enter “Status” and it displays the working time duration of the device. It times upon power on

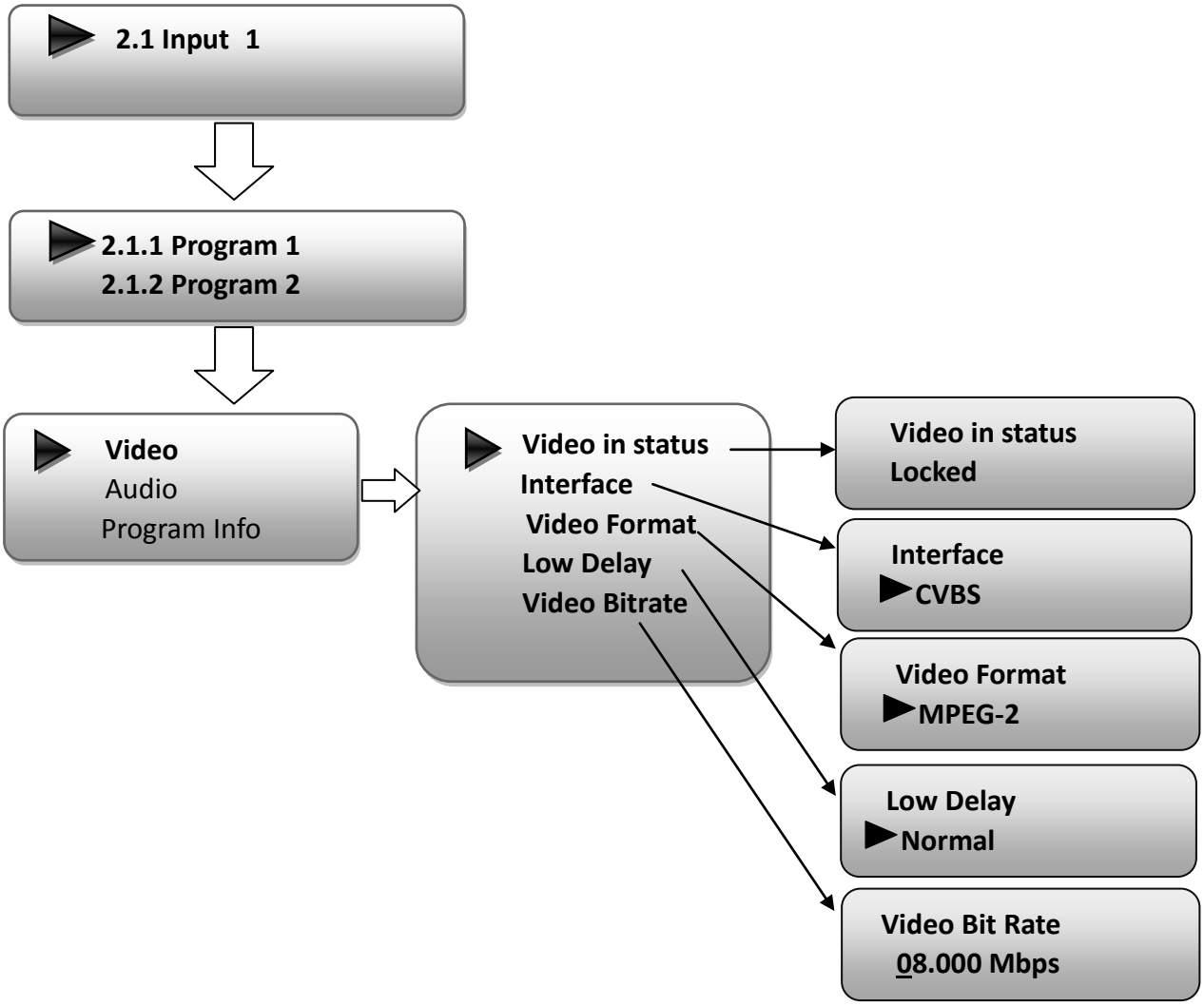


2) Input Sets

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 (YPbPr, CVBS and HDMI optional). Press Enter key to confirm and the system will automatically search the signal source.

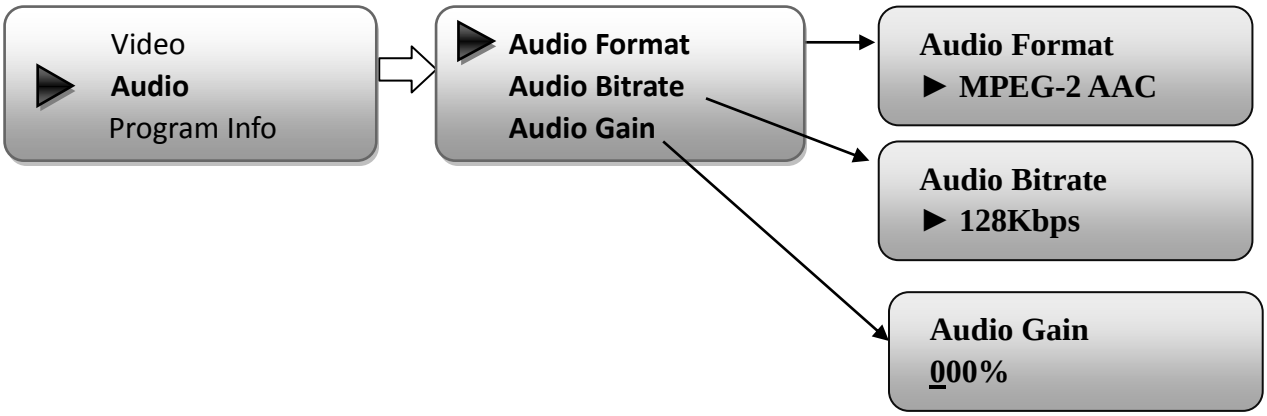
"Video Format": the encoding module supports both MPEG2 and MPEG4 AVC/H.264 formats. Move the triangle mark with LEFT/RIGHT keys to specify the intended format and press ENTER to

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: not to enable the low delay mode.

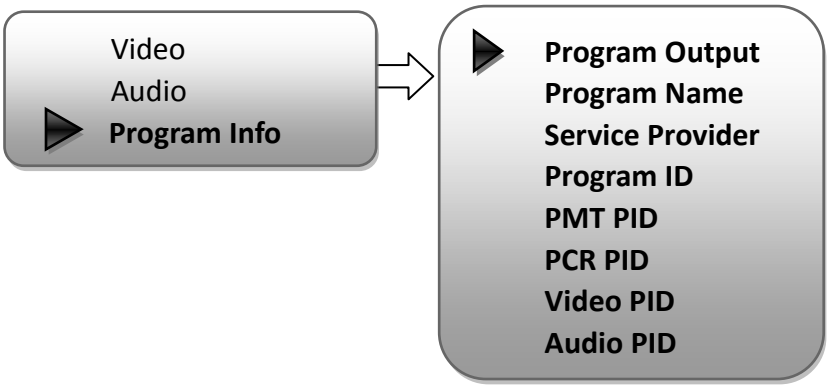
- **NOTE:** The different combination of **Video Format**, **Video Bit-rate**, **Low Delay Mode** and **the Resolution** of signal source will have an impact on the time latency on receiving side. Please refer to the **Appendix** attached for detailed information.



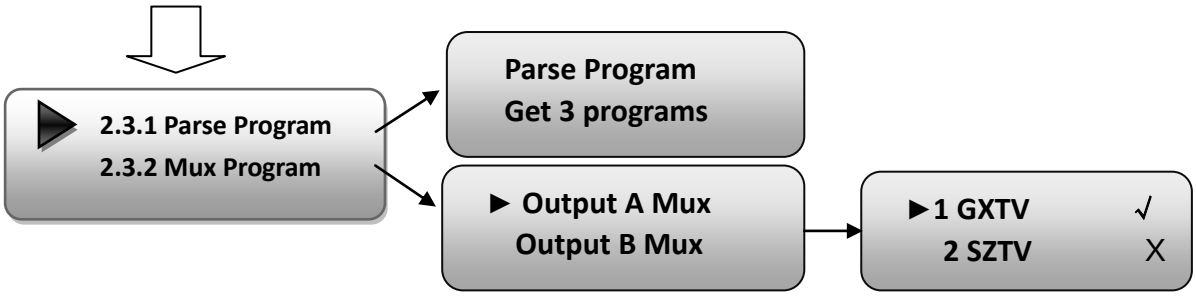
"Audio Format": MPEG-1 Layer 2, MPEG-2 AAC, MPEG-4 AAC, AC3, AC3 Passthrough optional.

"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.



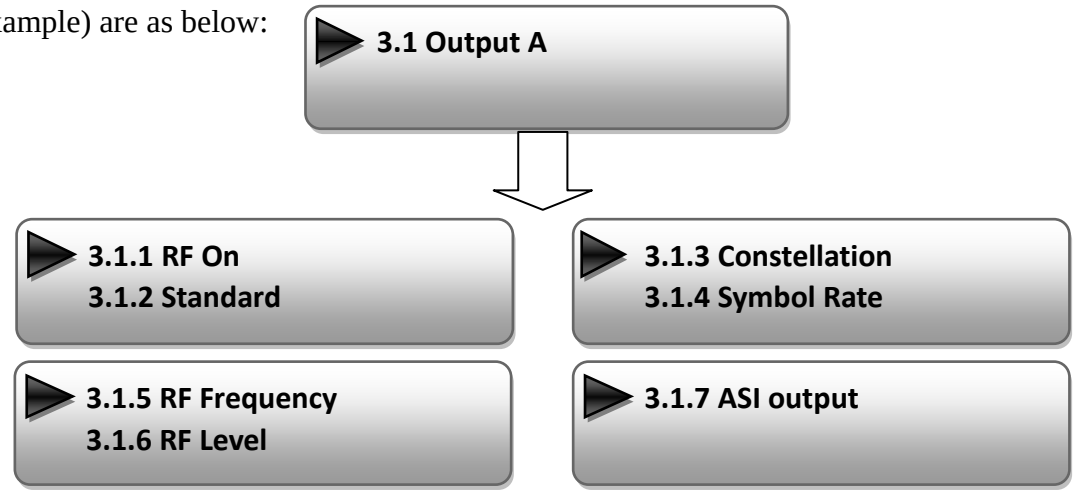
"Parse Program" is for checking the quantity of input programs from the corresponding Tuner input.

"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, user can configure the modulating parameters for the 4 carrier output separately:

As the B-QAM-HDMI-IP-4CH (DVB-C Modulating) is with 4 carrier outputs, "3.1"-"3.4" represent the "Carrier A", "Carrier B", "Carrier B", 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 is to decide 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 need swift 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

Setting method is just the same. When the display shows them, user just need swift LEFT and RIGHT key to choose and repressing “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 level**

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

- **ASI Output:**

B-QAM-HDMI-IP-4CH encoder & modulator (DVB-C Modulating) is with 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.

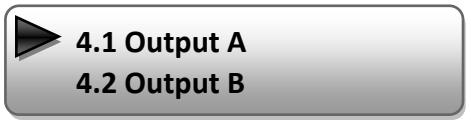
Output D: the ASI output programs are same as carrier output D.

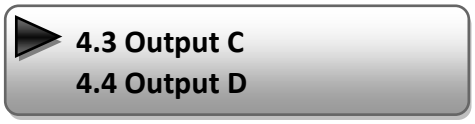
Output E: the ASI output programs are set separately.

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.

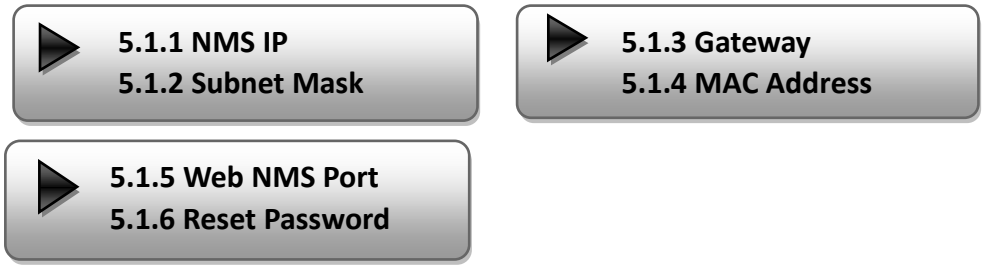




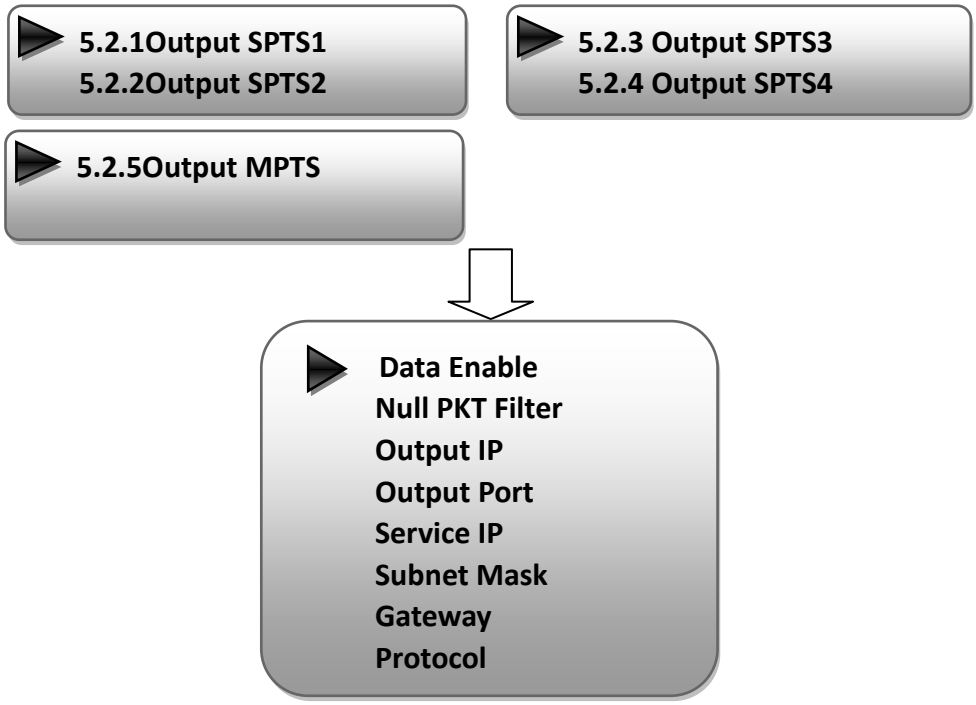
5) Network

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.

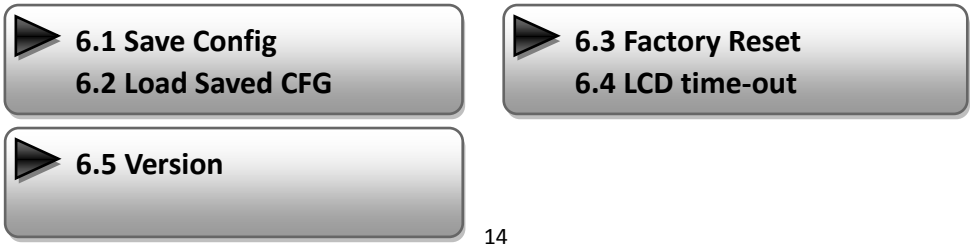


“IP Stream” is for configuring the 4 SPTS and 1 MPTS output respectively.



6) System

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



Chapter 4 WEB NMS operation

User not only can use front buttons for setting configuration, but also can 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 the B-QAM-HDMI-IP-4CH'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.

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.

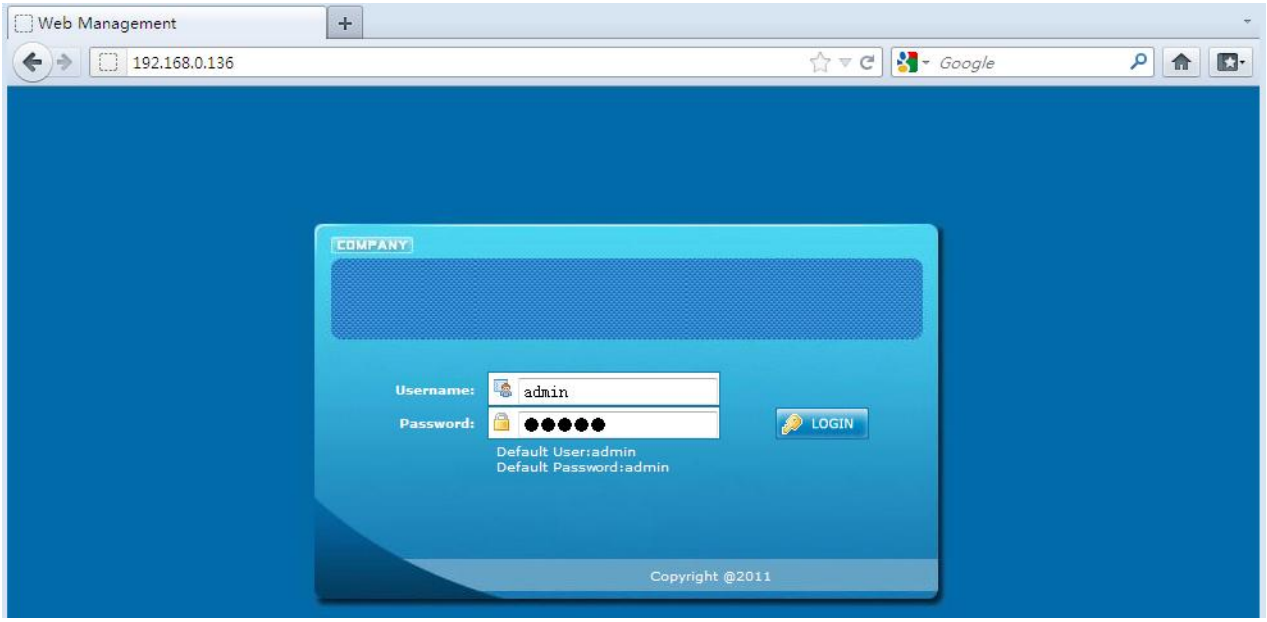


Figure-1

4.2 Operation

Welcome

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

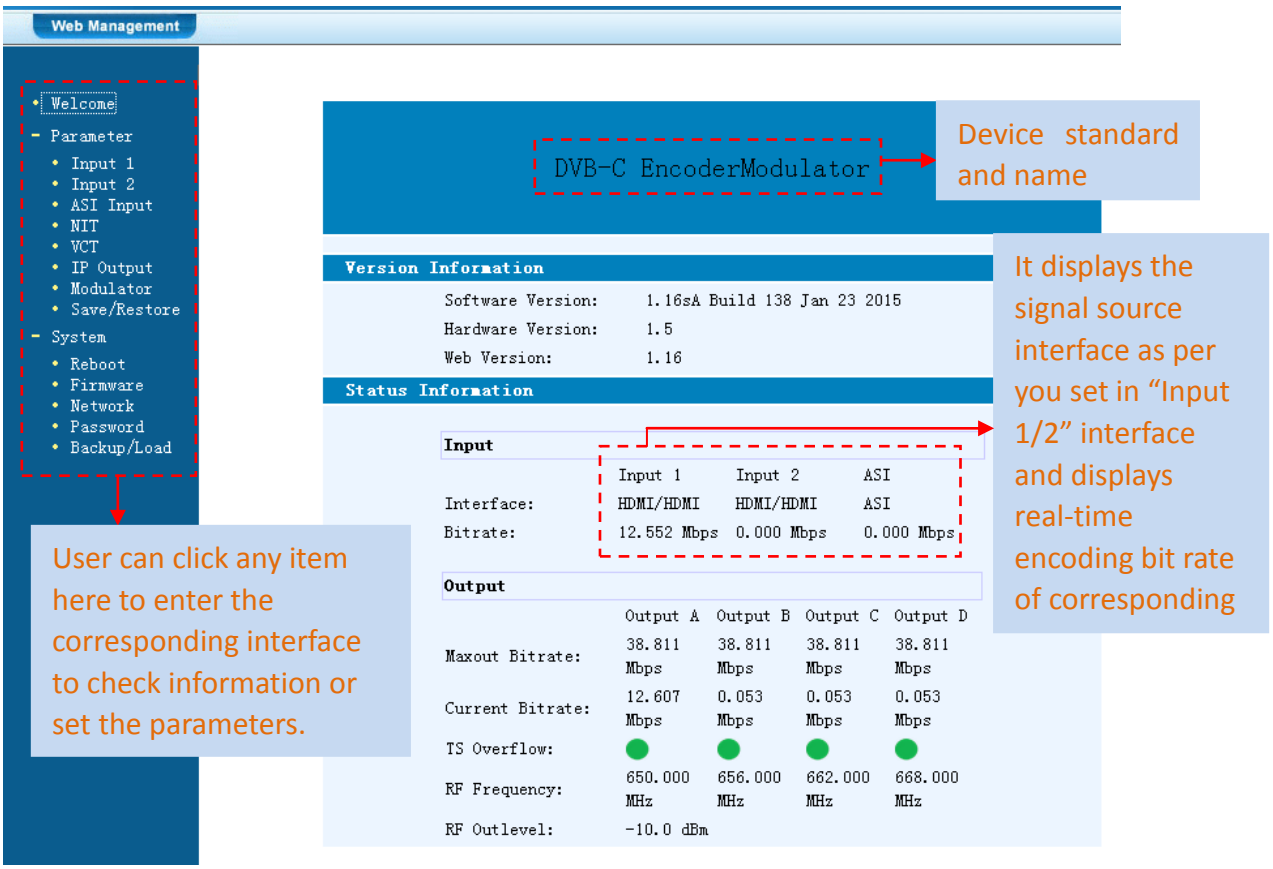


Figure-2

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.

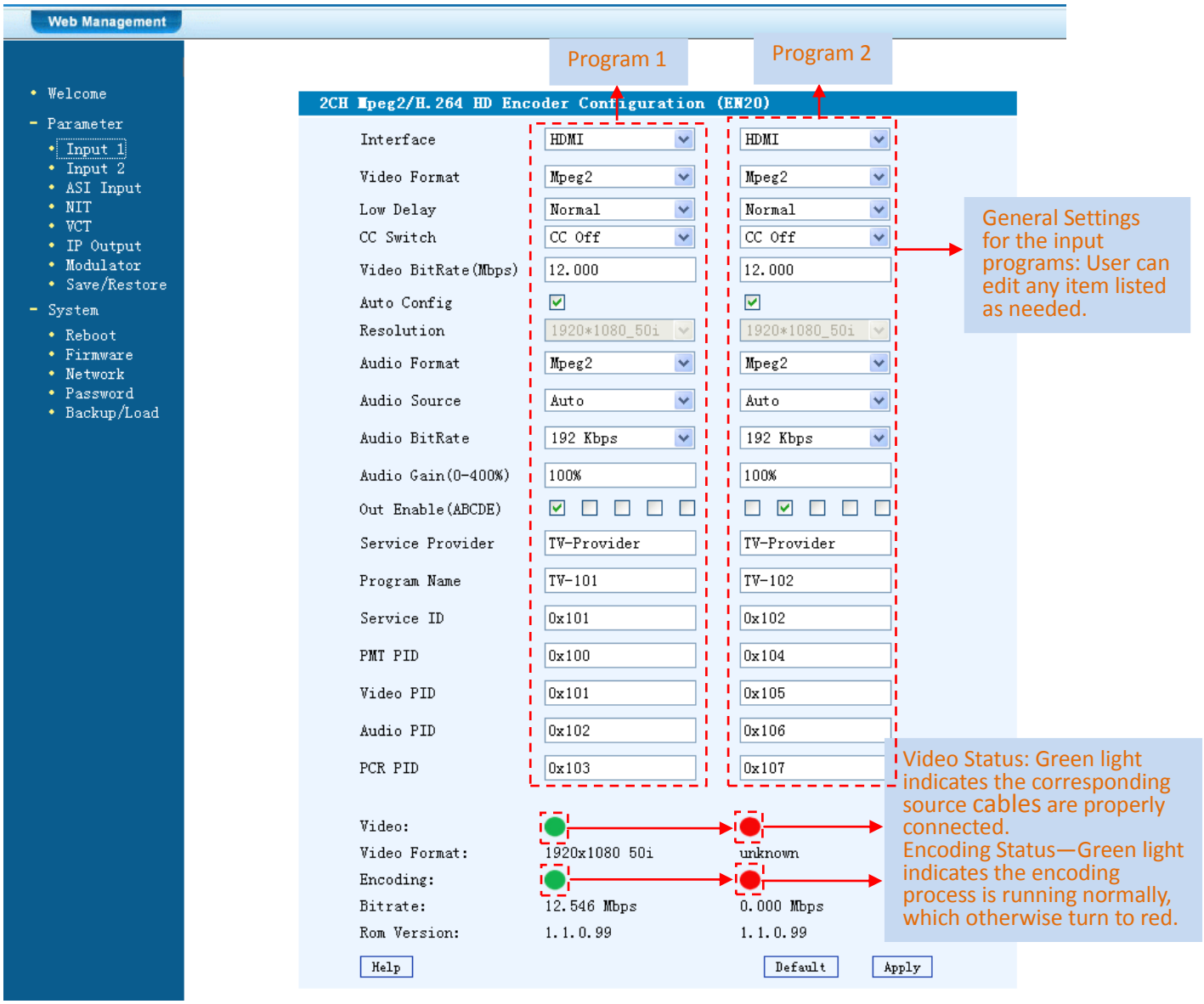


Figure-3

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

Help For user to turn to refer detailed explanation of terms on this interface

Default Click this button to apply the default setting of Input 1

Apply Click this button to apply the modified parameters.

CC Switch Please refer to the **Chapter 5** attached for detailed information.

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 **Chapter 6** 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 Figure-4. User can parse and multiplex ASI IN programs in this interface.

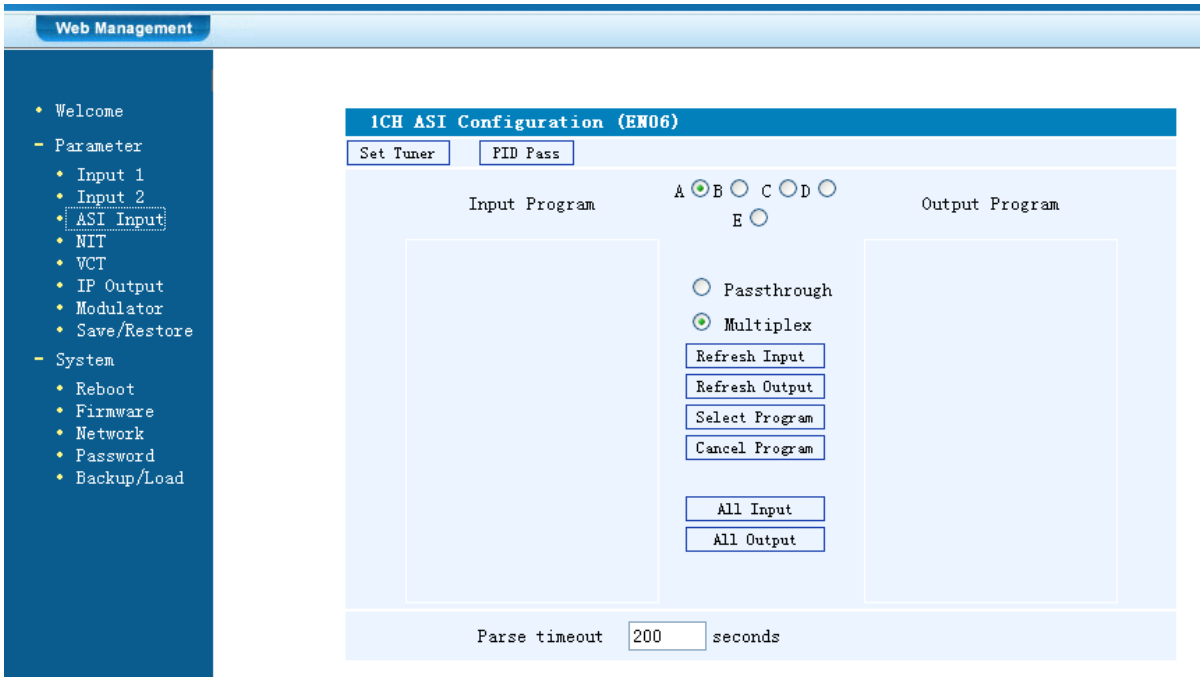
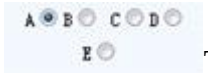
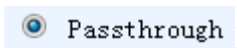


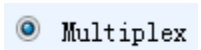
Figure-4



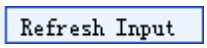
The letters A to D represent the 4 carrier outputs. E represent the ASI output. User can configure different program group for each carrier output.



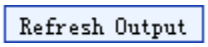
If this item is selected, all the input programs will pass through without any elimination.



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



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



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.

Here user can select the programs which we want to output or we can output all the programs.

Cancel Program Similarly, user can 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 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 as Figure-5. Then click "Add" from this screen to add the program descriptor in NIT Table.

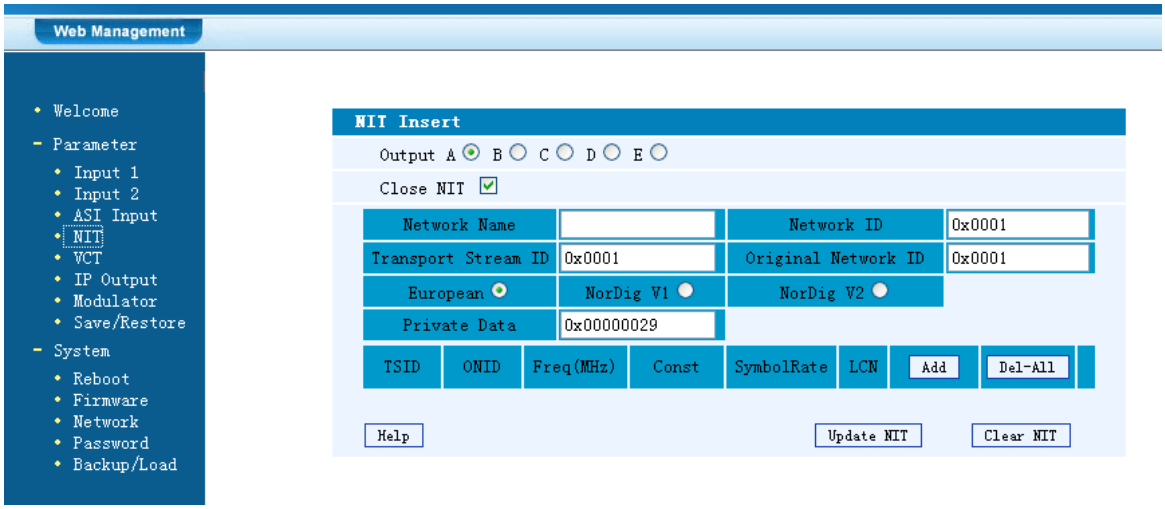


Figure-5

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

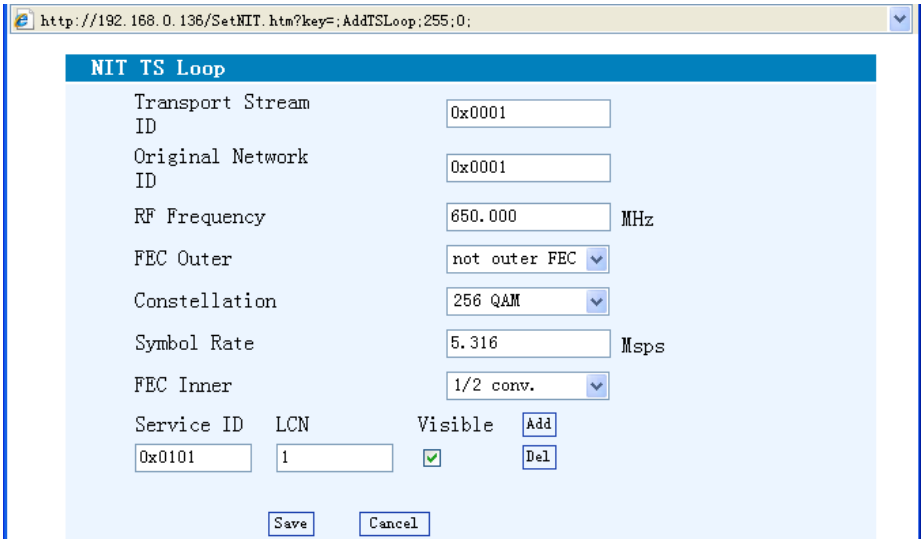


Figure-6

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.

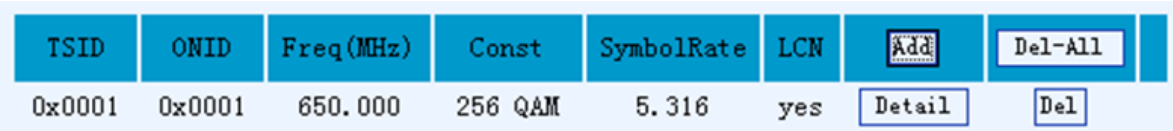


Figure-7

VCT (Virtual Channel Table) Setting

Click “VIT” from the menu to trigger the screen as Figure-8. Then click “Add” from this screen to add the program descriptor in VCT.

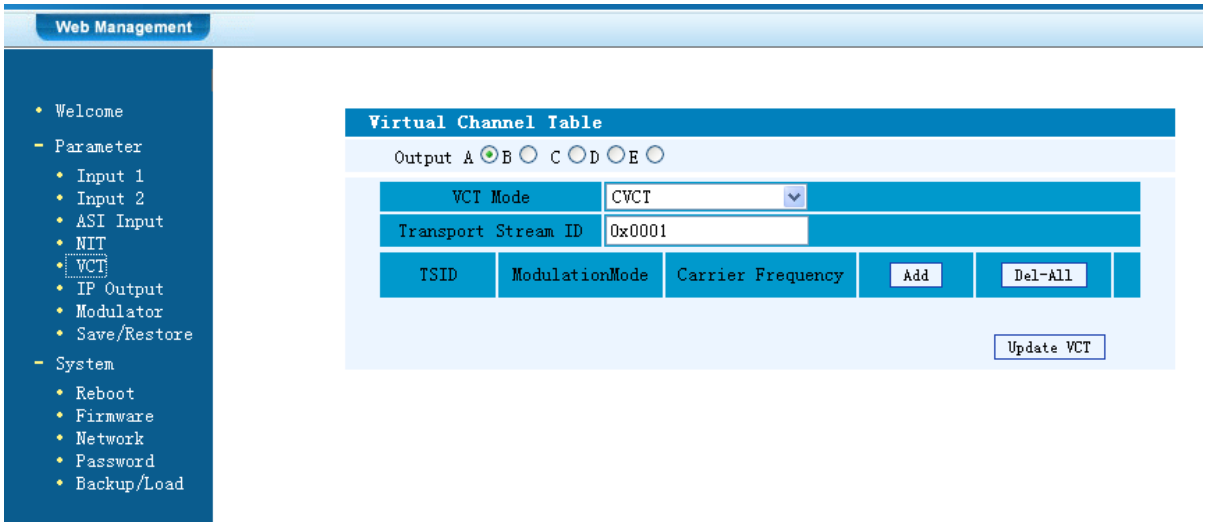
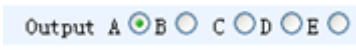


Figure-8



Select the carrier output channel for the inserted VCT. 

Click “Add” from this page, it will display the screen as Figure-9 where it requires to add Channel TSID and configure other parameters for the programs.

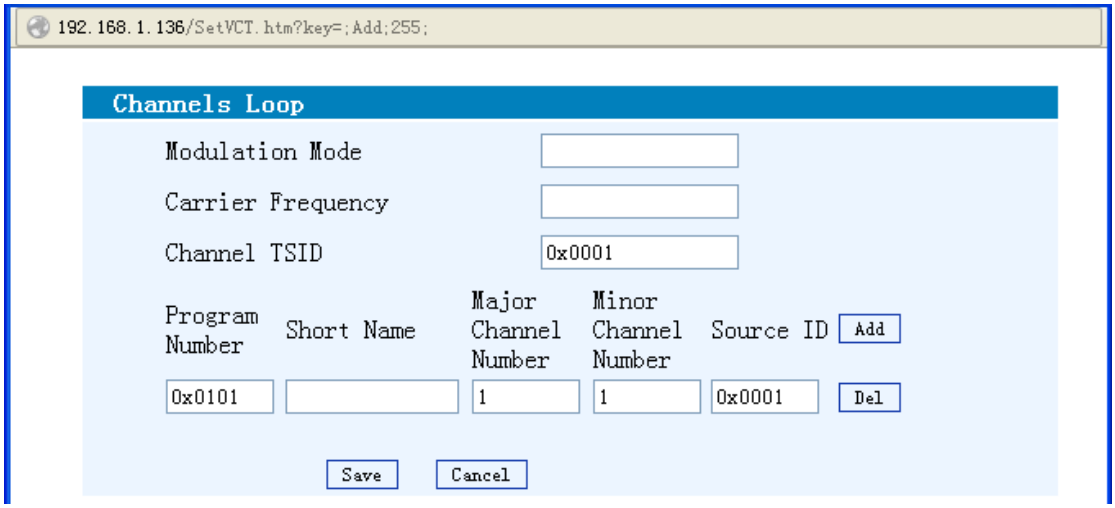
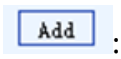
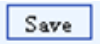


Figure-9



: Click “Add” to add boxes where to configure parameters in its respective fields. After setting all the data, users need to click “Save” 

to save the setting.

IP Output

Click “IP Output” from the left menu, it will display the screen as Figure-10 where to configure the 4 IP SPTS output and 1IP MPTS output.

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

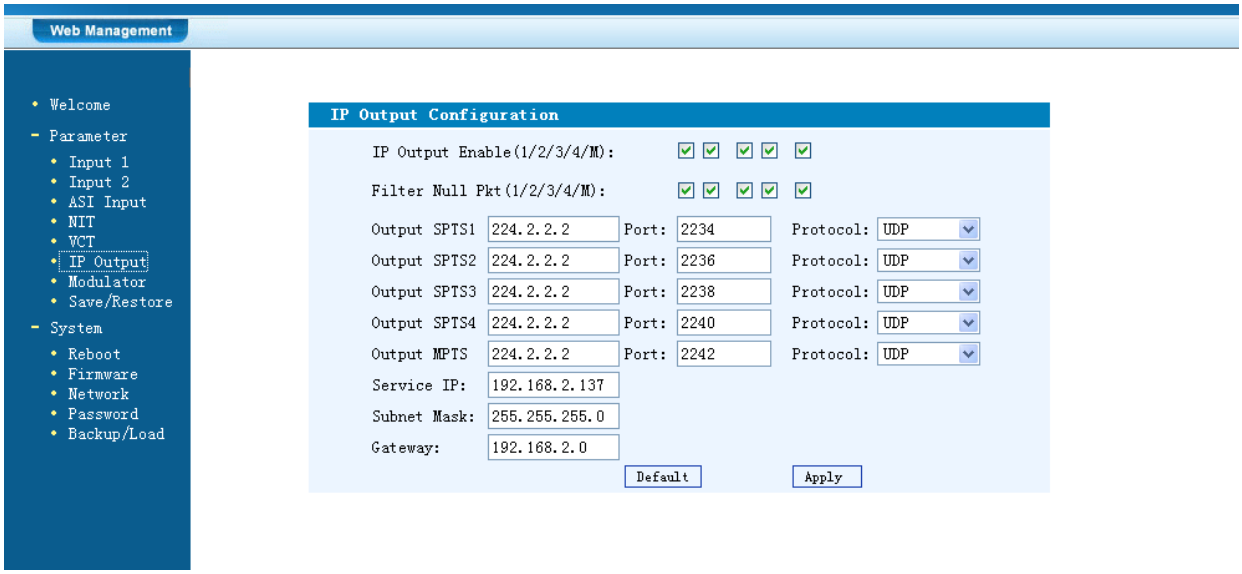


Figure-10

Modulator Setting

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

NOTE: Different modulate standard has different bandwidth. (see specifications in Chapter 1).

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

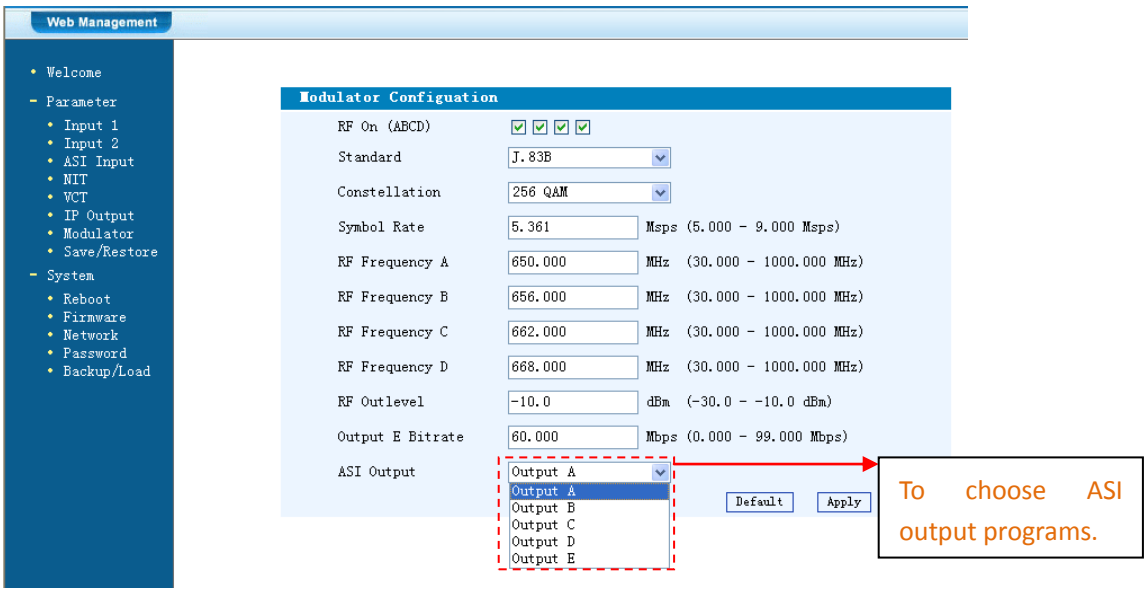


Figure-11

Save/Restore

Clicking “Save/Restore” from the menu, it will display the screen as Figure-12 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.

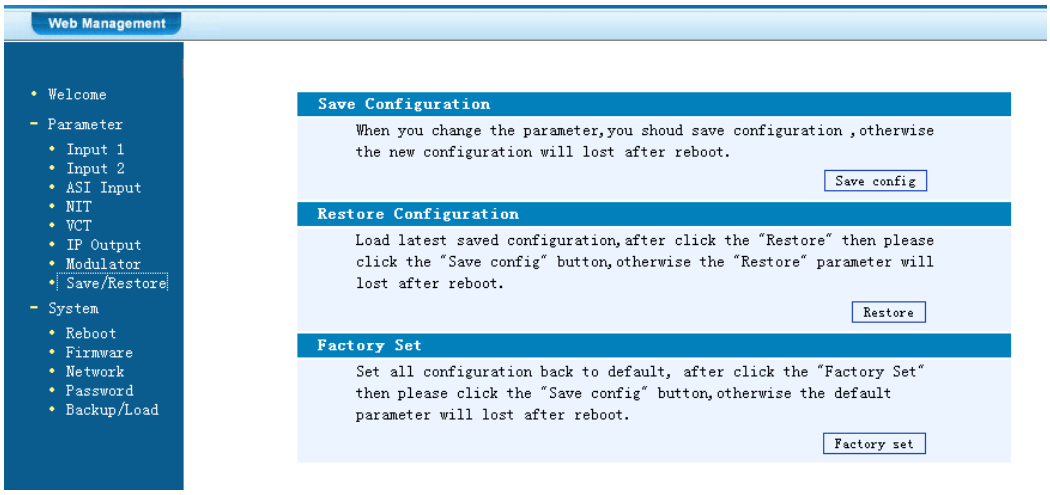


Figure-12

Restart the Device

Click “Reboot” from the menu, the screen will display as Figure-13. Here when clicking “Reboot” box, it will restart the device automatically.

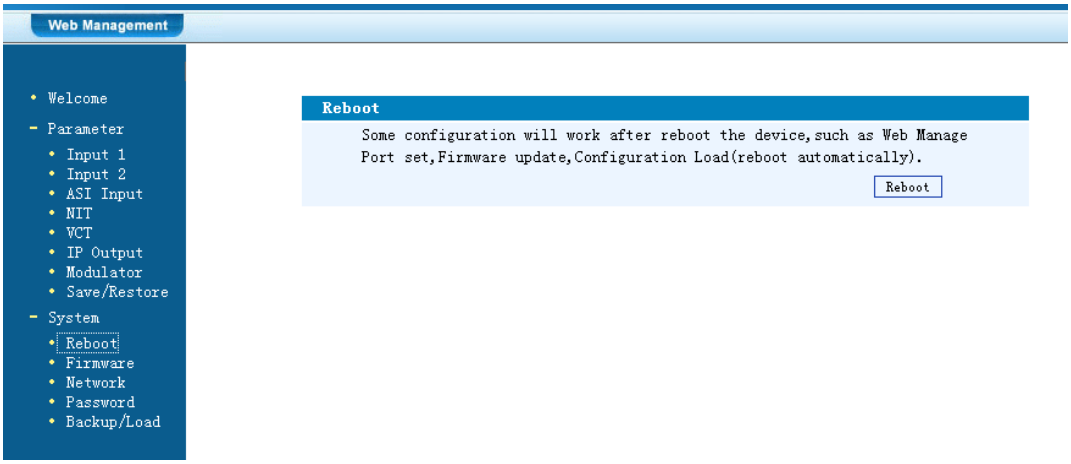


Figure-13

Update the Device

Click “Firmware” from the menu it will display the screen as Figure-14. 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.

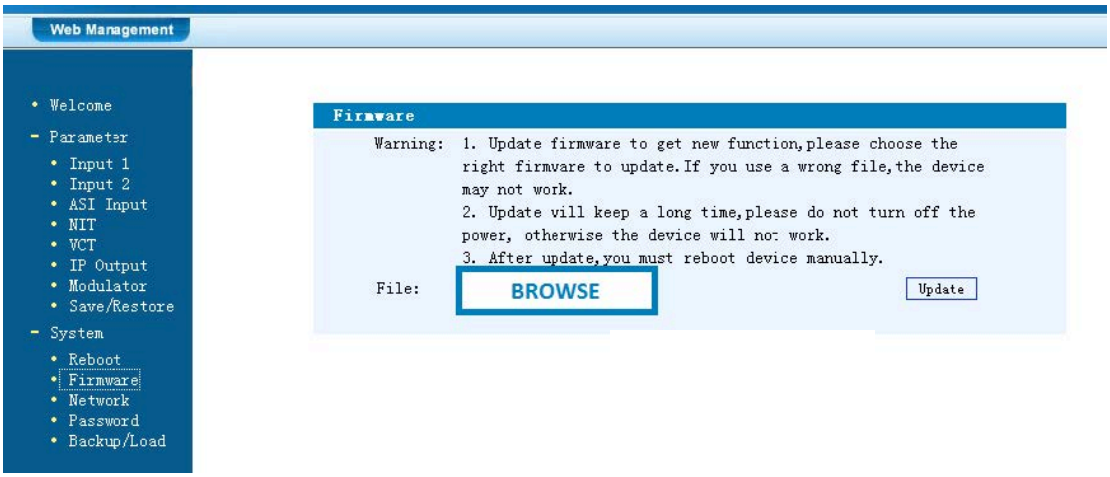


Figure-14

Network

When user clicks “Network”, it will display the screen as Figure-15. It displays the network information of the device. Here user can change the device network configuration as needed.

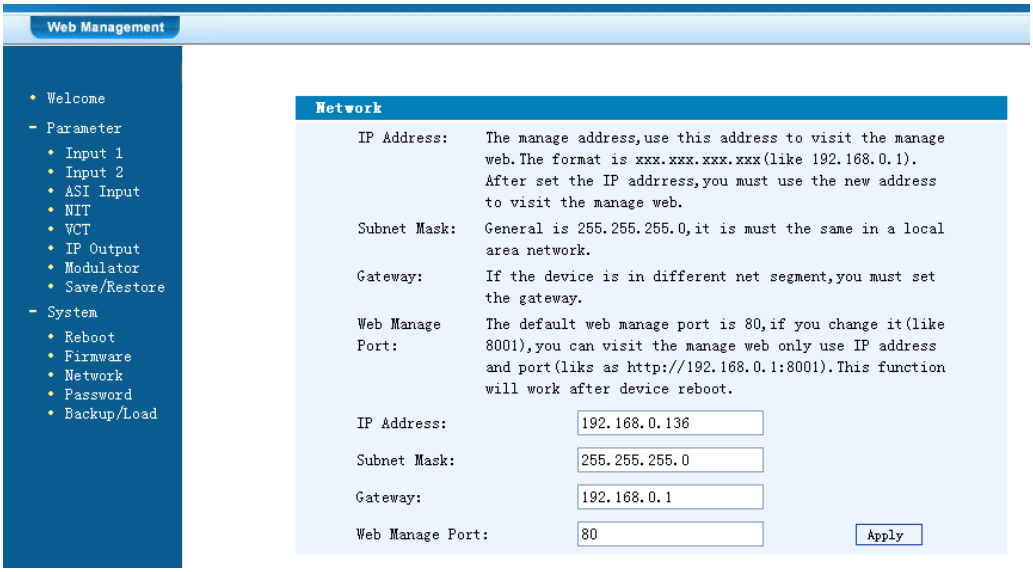


Figure-15

Change Password

When user clicks “Password”, it will display the password screen as Figure-16. 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.

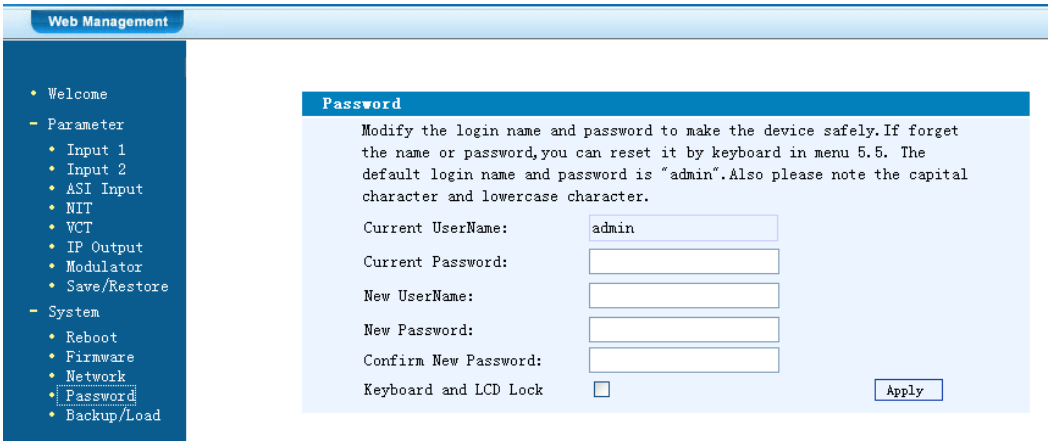
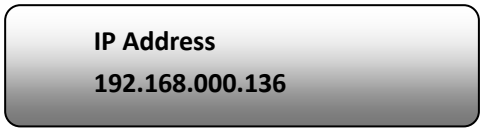


Figure-16

➢ 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.

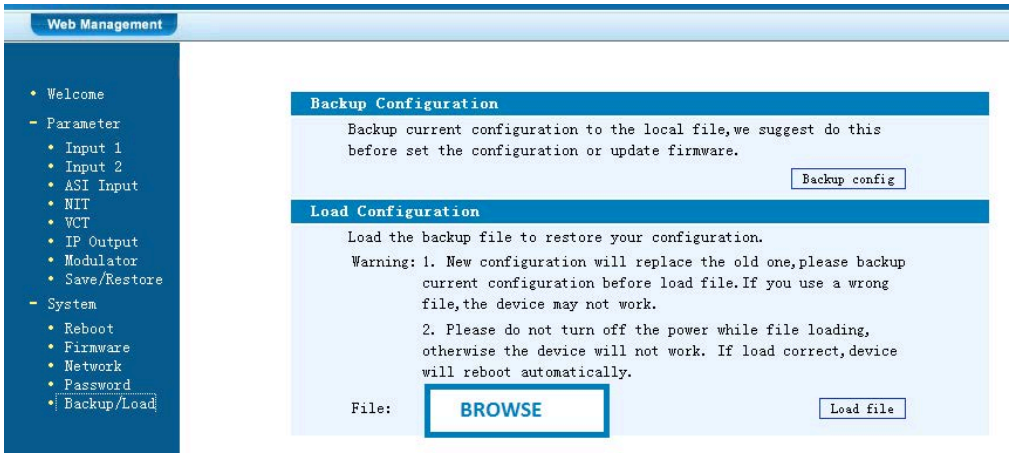


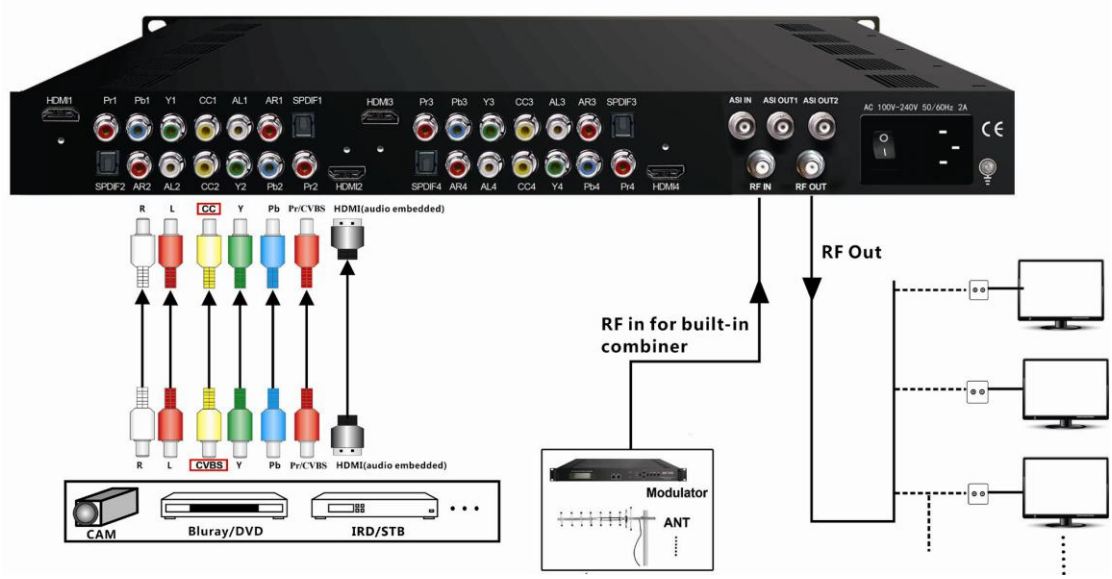
Figure-17

Chapter 5 Operation of Closed Caption (CC)

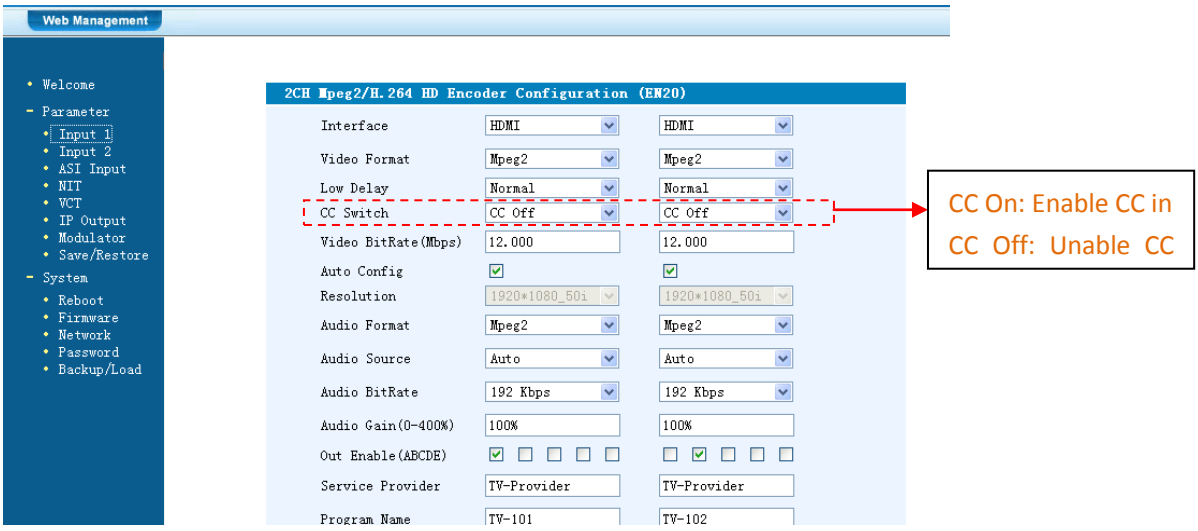
Closed Caption, hereinafter referred to as the CC.

CC is from CVBS source output from IRD or STB etc. Connecting the CVBS cable to the CC port at the rear panel (as shown in below image), CC can be mixed with A/V inputs to generate programs with CC.

CC wiring diagram (From CVBS input)



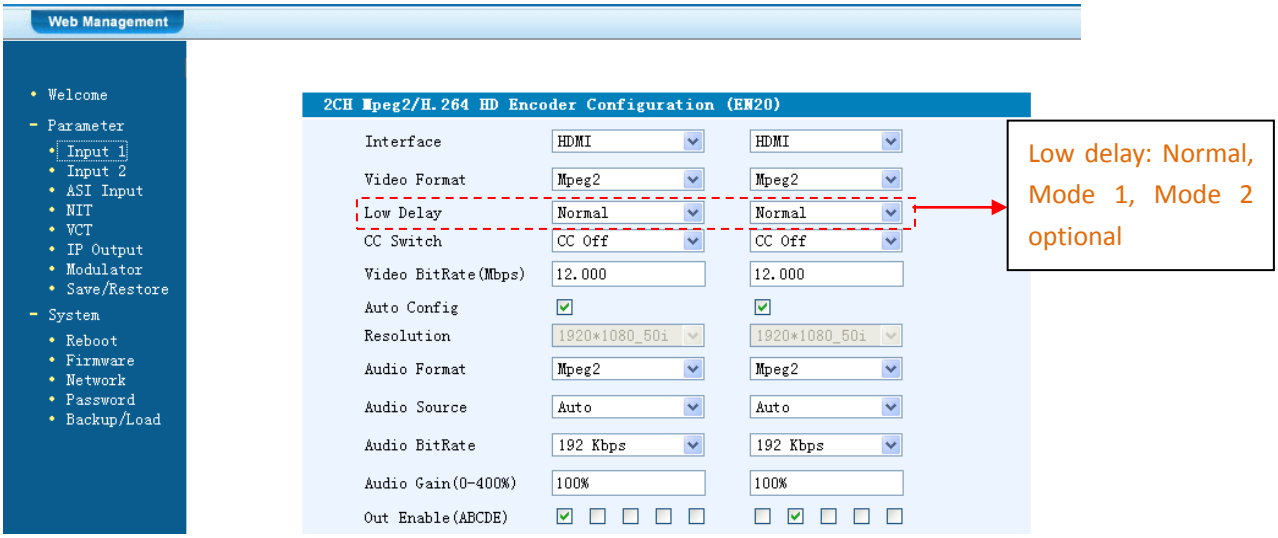
CC switch in Web based NMS



Chapter 6 Low Delay Setting

B-QAM-HDMI-IP-4CH can achieve a signal low delay from encoding to STB decoding side. User can enable the low delay function in the web-server NMS interface as shown below:

Click ‘Input 1’ or ‘Input 2’ to sent a low delay mode for each program:



There are 3 low delay modes:

1. **Normal**: to disable the low delay function.
2. **Mode 1/Mode 2**: to activate the low delay function.

The delay duration is based on the different combination of **Video Format**, **Video Bit-rate**, **Low delay Mode** and **the Resolution** of signal source, which combine together to have a comprehensive impact on the delay. Please refer to the below table for reference.

- **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.

Internal Test Report of Time Delay
The values cover the progress from Encoding → Decoding

Decoding Terminal	Encoding Details					Average Delay (ms)
	Single Source Interface	Bit Rate Mode	Resolution	Low Delay Mode	Encoding Type	
DVB-C HD STB	HDMI	VBR	1080i@50	Mode 1	mpeg2	300
					H.264	335
				Mode 2	mpeg2	407.5
					H.264	492.5
			720p@50	Mode 1	mpeg2	230
					H.264	285
				Mode 2	mpeg2	382.5
					H.264	395
DVB-C HD STB	YPbPr	VBR	1080i@50	Mode 1	mpeg2	282.5
					H.264	395
				Mode 2	mpeg2	397.5
					H.264	450
			720p@50	Mode 1	mpeg2	267.5
					H.264	255
				Mode 2	mpeg2	385
					H.264	422.5

Chapter 7 Troubleshooting

Prevention Measure

- Installing the device at the place in which environment temperature between 0 to 45 ℃
- 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

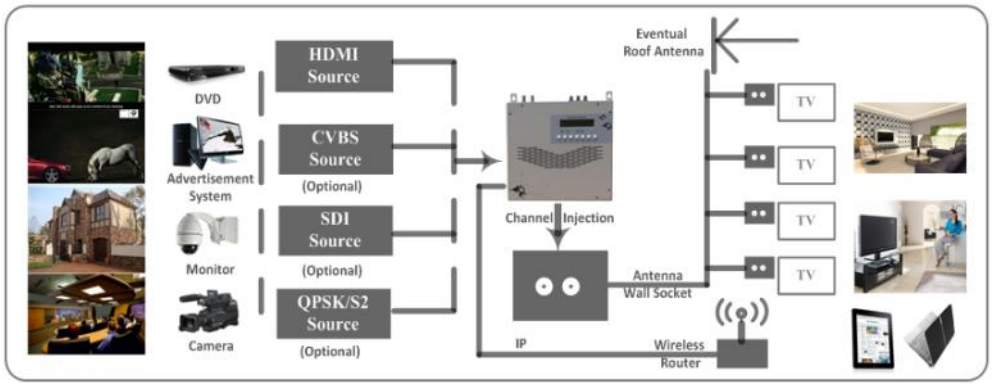
Chapter 8 Packing List

B-QAM-HDMI-IP-4CH Encoder Modulator	1PC
User's Manual	1PC
HDMI Cables	2PCS
CVBS Cables	2PCS
Power Cord	1PC

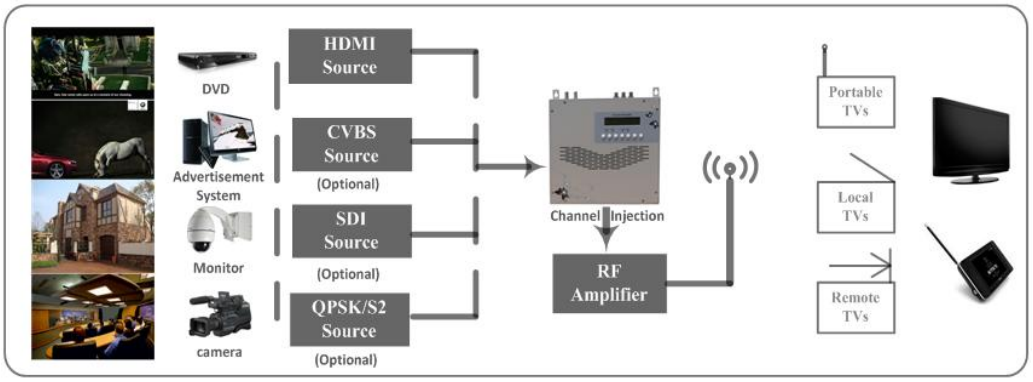
Chapter 9 Application

9.1 application example

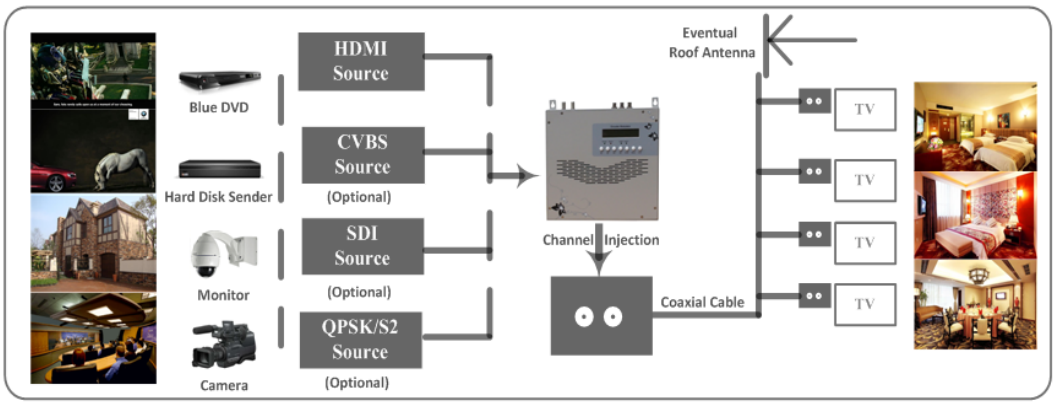
1). Residences and Private Homes Video content DVB-T/ISDB-T distribution



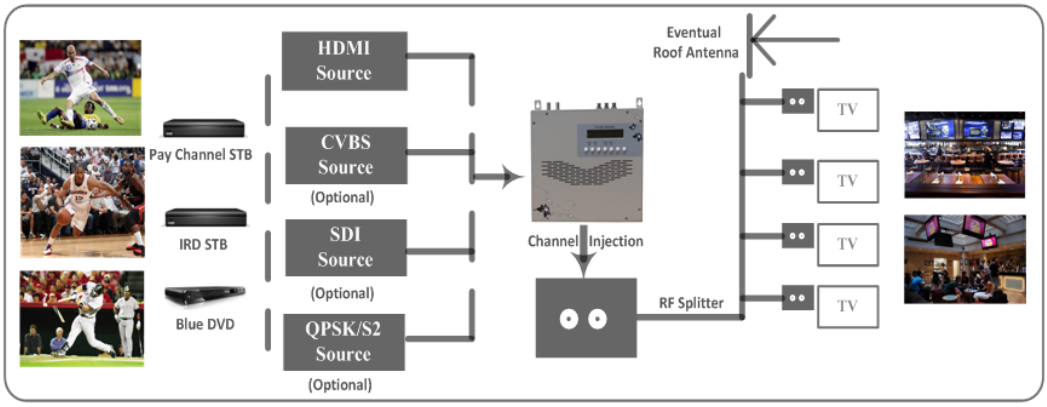
2) Outside Audio - Video contents ON - AIR DVB - T/ISDB-T distribution



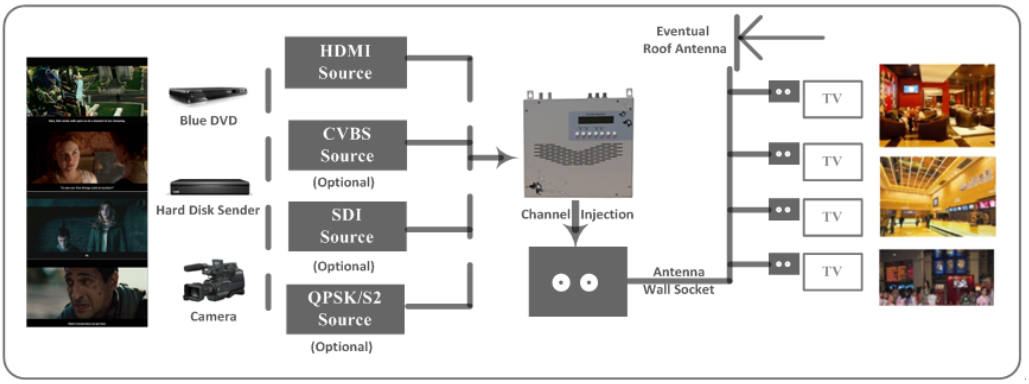
3) Hotel Audio - Video contents DVB - T/ISDB-T distribution



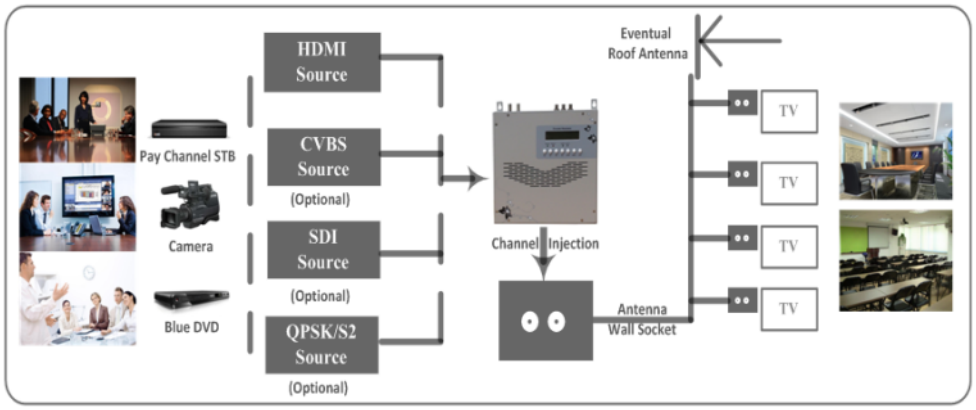
4) Bar Audio - Video contents distribution



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



7) Company Audio - Video contents distribution



Safety Instructions

Read before operating equipment.

1. Cleaning - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. Power Sources - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.
3. Outdoor Antenna Grounding - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
4. Lightning - Avoid installation or reconfiguration of wiring during lightning activity.
5. Power Lines - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.
6. Overloading - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
7. Object and Liquid Entry - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.
8. Servicing - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
9. Damage Requiring Service - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    - When the power supply cord or plug is damaged.
    - If liquid spills or objects fall into the product.
    - If the product is exposed to rain or water.
    - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
    - If the video product is dropped or the cabinet is damaged.
    - When the video product exhibits a distinct change in performance, this indicates a need for service.