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

User Manual

B-QAM-HDMI-IP-2CH
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.

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Chapter 1 Introduction

1.1 Product Overview

B-QAM-HDMI-IP-2CH series products are QuestTel’s all-in-one devices which integrate encoding (MPEG-2, MPEG-4/AVC H.264) and modulation to convert HDMI/YPbPr /CVBS (Pr in) signals etc to digital RF output. To meet customers’ various requirements, B-QAM-HDMI-IP-2CH is also equipped with 1 ASI input, and output with 2 ASI ports and 1 IP port.

The signals source could be from satellite receivers, closed-circuit television cameras, Blue-ray players, and antenna etc. Its output signals are to be received by TVs, STB and etc with corresponding standard.

QuestTel's B-QAM-HDMI-IP-2CH 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, hospital… It’s a good choice to offer HD channels and more.

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
- 2* 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 mirror 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

<table>
<thead>
<tr>
<th>Encoding Section</th>
<th>Video (HDMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding</td>
<td>MPEG2; MPEG4 AVC/H.264</td>
</tr>
<tr>
<td>Interface</td>
<td>HDMI*2</td>
</tr>
<tr>
<td>Resolution</td>
<td>1920<em>1080_60P, 1920</em>1080_50P (For MPEG 4 AVC/H.264 only), 1920<em>1080_60i, 1920</em>1080_50i, 1280<em>720_60p, 1280</em>720_50P</td>
</tr>
<tr>
<td>Low Delay</td>
<td>Normal, Mode 1, Mode 2, Manual</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>4:3; 16:9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audio (HDMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding</td>
</tr>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>Sample rate</td>
</tr>
<tr>
<td>Bit rate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Video (CVBS/YPbPr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding</td>
</tr>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>Resolution</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audio (L/R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encoding</td>
</tr>
<tr>
<td>Interface</td>
</tr>
<tr>
<td>Sample rate</td>
</tr>
<tr>
<td>Bit rate</td>
</tr>
</tbody>
</table>

1.4 Appearance and Description

Front Panel Illustration
① RF in port  
② RF out port  
③ NMS port  
④ Data Port  
⑤ ASI Output port 1&2  
⑥ ASI input port

Rear Panel Illustration

① YPbPr input port (Pr for CVBS input)  
② SPDIF port  
③ L/R Audio input (Stereo or Mono)  
④ CC input port for CC only  
⑤ HDMI input port  
⑥ Power Switch  
⑦ Power supply Slot

Cover Illustration

① LCD Window  
② Indicator  
③ Control Buttons
1.5 Principle Chart

- **ASI In**: Input
- **RF In**: Radio Frequency Input
- **RF**: Radio Frequency
- **DVB-C&ATSC**: Digital Video Broadcasting - Common Interface & Advanced Television Systems Committee
- **ASI Output**: Advanced Systems Interface Output
- **IP Output**: Internet Protocol Output
- **Carrier A/B/C/D**: Different carriers for modulation
- **Modulating**: Modulation process
- **MPEG-2/4 HD/SD**: Motion Picture Experts Group - Part 2/4 High Definition/Standard Definition
- **Encoding**: Encoding process
- **CVBS (Pr in)/HDMI/YPbPr**: Composite Video, Component Video for Pr, HDMI, YPbPr inputs
- **CVBS**: Composite Video
- **CC only**: Closed Captioning only
- **Built-in Combiner**: Built-in combiner for RF output
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

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Hall Space</td>
<td>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</td>
</tr>
<tr>
<td>Machine Hall Floor</td>
<td>Electric Isolation, Dust Free</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td></td>
<td>Volume resistivity of ground anti-static material: $1 \times 10^7$~$1 \times 10^{10} \Omega$, Grounding current limiting resistance: $1 \Omega$ (Floor bearing should be greater than 450Kg/m²)</td>
</tr>
<tr>
<td>Environment Temperature</td>
<td>5<del>40°C (sustainable), 0</del>45°C (short time), installing air-conditioning is recommended</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>20%~80% sustainable  10%~90% short time</td>
</tr>
<tr>
<td>Pressure</td>
<td>86~105KPa</td>
</tr>
<tr>
<td>Door &amp; Window</td>
<td>Installing rubber strip for sealing door-gaps and dual level glasses for window</td>
</tr>
<tr>
<td>Wall</td>
<td>It can be covered with wallpaper, or brightness less paint.</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>Fire alarm system and extinguisher</td>
</tr>
<tr>
<td>Power</td>
<td>Requiring device power, air-conditioning power and lighting power are independent to each other. Device power requires AC $110V \pm 10%$, 50/60Hz or AC $220V \pm 10%$, 50/60Hz. Please carefully check before running.</td>
</tr>
</tbody>
</table>

### 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 $\text{m}^2$. 
Chapter 3 Operation

The front panel of B-QAM-HDMI-IP-2CH 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

```
Switch On
  Initializing
  General Working Status
  1 Input Set
    Encoder 1
    Encoder Prg
      Encoder Para
        Interface
          Video Format
          Low Delay
          CC Switch
          Video Bitrate
          GOP B Frame
          GOP P Frame
          Audio Format
          Dialog Normaliz
          Audio Source
          Audio Bitrate
          Audio Gain
        Service ID
          PMI PID
          Video PID
          Audio PID
          PCR PID

(Same content with Encoder 1)
```
### 2 Modulator

**Modulator Type**
- DVB-C
- ATSC

**Config Para**
- Standard
- Constellation
- Symbol Rate
- RF Out Level
- RF Frequency 1
- RF Frequency 2
- RF Frequency 3
- RF Frequency 4
- RF On 1
- RF On 2
- RF On 3
- RF On 4

*(For DVB-C only)*

*(For DVB-C and ATSC)*

### 3 IP Output

**MPTS**
- Output Enable
- Filter Null PKT
- Dest IP Address
- Destination Port
- Source Port
- Out Bitrate

**SPTS 1**

**SPTS 2**

*(Same content with MPTS)*

### 4 Network

**NMS Interface**
- IP Address
- Subnet
- Gateway

**Data Interface**
- IP Address
- Subnet
- 5.1.3 Gateway
- Gateway

### 5 Config Setting

- Save Config
- Restore Config
- Factory Set

### 6 Version

- SW Version
- HW Version

### 3.1 Initial Status

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

- Start up...
- Start OK...
- DVB-C/ATSC
  - Enc1 x.xxMbps
  - Enc2 x.xxMbps
- **DVB-C/ATSC**: to indicate the current modulation standard of this device.
- **Enc1/Enc2**: to indicate the two Encoding channel
- **X.XX Mbps**: to indicate the encoding bit rate of each encoding channel 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:

![Main Menu](image)

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

#### 3.2.1 Input Set

Under this submenu, the LCD will show “Encoder 1” and “Encoder 2”.

“Encoder 1” and “Encoder 2” respectively represent the two encoding channel. User could enter submenus to set the Encoder parameters.

![Input Set Submenu](image)

#### 3.2.1.1 Encoder Parm

- **Interface**

  Connect the signal source to the corresponding input channel and select the interface from the options provided in the submenu (YPbPr, HDMI, and CVBS optional). Press Enter key to confirm and the system will automatically search the signal source.
NOTE: Below explanations are applied in this entire manual.

1) When user enter this submenu, the LCD displays only one option which is the device’s current option when user presses ENTER again to enter the operation interface.

2) Press UP/DOWN buttons to specify the item, and then press Enter key to confirm

- **Video Format**

B-QAM-HDMI-IP-2CH supports both MPEG2 and MPEG4 AVC/H.264 formats. Move the triangle mark with UP/DOWN keys to specify the intended format and press ENTER to confirm.

- **Low Delay**

User can select a latency mode (Normal, Mode 1, Mode 2, and Manual optional) for the content. Move the triangle mark to specify a mode and press ENTER to confirm.

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 **Chapter 5** attached for detailed information.

- **CC**

CC (closed caption) can be input through “CC” port and it can be enable and disabled in this menu. Please refer to the **Chapter 5** attached for detailed information.
➢ **Video Bitrate**
Move the underline with LEFT/RIGHT keys and modify the value of frequency with UP/DOWN keys, and press ENTER key to save the settings.

![Video Bit Rate](image)

**09.000 Mbps**

➢ **DTS Delay/GOP B Frame/GOP P Frame**
These items are programmable when the “Low Delay” mode is set “Manual”.

![DTS Delay](image)

**200**

![GOP B Frame](image)

**2**

![GOP P Frame](image)

**2**

Mode 1: B frame=0, P frame=14, DTS=1
Mode 2: B frame=0, P frame=14, DTS=1
Manual: Under this mode, B frame (≤ 3), P frame (≤ 6) and DTS (1-500) can be customized manually.

➢ **Audio Format**
Users can choose the equipment video format among MPEG-1 Layer 2, MPEG-2 AAC, MPEG-4 AAC, AC3, AC3 Pass HDMI and AC3 Pass SPDIF in this interface. The LCD will display the following interfaces after users pressing the enter key.

![Audio Format](image)


➢ **Dialog Normal**
“Dialog Normal” refers to dialog normalization based on Dolby Digital AC3 audio coding. It can be customized when the audio format above is set “AC3”. (Range: -31~-10 dB)

![Dialog Normal](image)

**-10**
➢ Audio Source

B-QAM-HDMI-IP-2CH Audio Source supports Analog, HDMI, SPDIF and Auto (automatically identify audio source). Move the triangle mark with UP/DOWN keys to specify the intended format and press ENTER to confirm.

![Audio Source](image)

➢ Audio Bit Rate

User can set the input audio bit-rate by pressing the enter key to enter the main editing interface. And there are: 64Kb/s~320Kb/s. After the modification, users can press enter key again to take the modification into effect.

![Audio Bitrate](image)

➢ Audio Gain

Move the underline with LEFT/RIGHT keys and modify the Audio Gain (0-400% adjustable) with UP/DOWN keys, then press ENTER key to save the settings.

![Audio Gain](image)

2.1.2 Encoder Prg

➢ Service ID/PMT PID /Video PID /Audio PID/PCR PID Settings

Users can set those parameters by pressing ENTER to enter these submenus. The LCD will display the following pages, and the maximum PID number cannot exceed 0x1fff.

![Service ID](image)

![PMI PID](image)

![Video PID](image)

![Audio PID](image)
2.2 Modulator Setting

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

2.2.1 Modulator Type

B-QAM-HDMI-IP-2CH is with DVB-C and ATSC Modulating in one device and no need to upgrade new software. User can move the triangle mark with UP/DOWN keys to specify the intended Modulator Type and press ENTER to confirm, and then reboot the device to activate the modulator type.

2.2.2 Config Param

This device (DVB-C&ATSC Modulating) is with 4 carrier outputs. User can enter Config Param to set the modulating parameters.

- **Standard** (For DVB-C Modulating only)
  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 UP and DOWN key to choose.

- **Constellation** (For DVB-C Modulating only)
  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 UP/DOWN key to choose and repressing “ENTER” for confirm.

➢ Symbol Rate (For DVB-C Modulating only)
The symbol rate range of both J.83A (DVB-C) & J.83C is 5Mps to 9Mps and J.83B is fixed and cannot be changed.

➢ RF level (For DVB-C and ATSC Modulating)
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.

➢ RF Frequency 1/2/3/4 (For DVB-C and ATSC Modulating)
B-QAM-HDMI-IP-2CH (DVB-C Modulating) is with 4 carrier outputs. The RF output frequency range is from 36 to 960MHz 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 On 1/2/3/4 (For DVB-C and ATSC Modulating)
This interface is to decide whether to enable the RF (4 carriers) output or not.
OFF: to disable programs to output through carrier.
ON: to enable programs to output through carrier.
2.3 IP Output

“IP output” is for configuring the 1 MPTS and 2 SPTS output respectively.

![Diagram of IP output options]

- MPTS SPTS1/2
- Output Enable [1] OFF
- Filter Null PKT [1] OFF
- Dest IP Address 224.002.002.002
- Destination Port 02001
- Source Port 04001
- Output Bitrate(kb) 50000

2.4 Network

Network contains “NMS Interface” and “Data Interface”.

![Diagram of network options]

- NMS Interface
- Data Interface

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

- IP Address 192.168.002.136
- Submask 255.255.255.000
- Gateway 192.168.002.000

“Data Interface” is for configuring the 2 SPTS and 1 MPTS output. SPTS is for carrying the 2
encoded programs respectively, while MPTS is for carrying the muxed programs.

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Submask</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.075.106</td>
<td>255.255.255.000</td>
</tr>
</tbody>
</table>

**Default Gateway**

| Default Gateway | 000.000.000.000 |

2.5 Configuration Setting

It contains 3 submenus where users can save/load configurations.

<table>
<thead>
<tr>
<th>Save Config</th>
<th>Factory Reset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore Config</td>
<td></td>
</tr>
</tbody>
</table>

2.6 Version

User can check the software version and hardware version of this equipment under this submenu.

<table>
<thead>
<tr>
<th>SW Version</th>
<th>HD Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>X.X.X</td>
<td>X.X</td>
</tr>
</tbody>
</table>
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-2CH’s IP address; otherwise, it would cause IP conflict.

4.1 login

The default IP of this device is 192.168.2.136. 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](image-url)
4.2 Operation

System

When we confirm the login, it displays the SYSTEM INFORMATION interface as Figure-2 where user can view the system information.

![System Information Interface](image)

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

Click this button to restart the device.

It displays the signal source interface and displays real-time encoding bit rate of corresponding input channel.

TS indicator—Green light indicates the TS is normal, which otherwise turns to red.

Input

From the menu on top side of the webpage, clicking “Input”, it displays the information of the encoding channel as below.

Encoder Param
Clicking “Encoder Param” it displays the information of the Video and Audio encoding parameters as Figure-3. User can set the Video and Audio parameters.

Figure-3

“Low Delay”: Normal: not to enable the low delay mode.

- Mode 1: B frame=0, P frame=14, DTS=1
- Mode 2: B frame=2, P frame=4, DTS=1
- Manual: Under this mode, B frame ($\leq 3$), P frame ($\leq 6$) and DTS (1-500) can be customized manually.

**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 Chapter 5 attached for detailed information.

**Encoder out Param**

Clicking “Encoder out Param”, User can set the encoded program output parameters.
Mux

Click “Mux”, it will display ASI input program information as Figure-5. User can parse and multiplex out programs through 4 carriers or MPTS in this interface.
Click those buttons to refresh/expand/collapse/Maximize the ASI input programs or RF, MPTS out programs.

Select one input program first and click this button to transfer the selected program to the right box to output.

Similarly, user can cancel the multiplexed programs from the right box.

Click this button to parse the program list in each input channel.

**Program Modification:**

The multiplexed program information can be modified by clicking the program in the ‘output’ area. For example, first select the target a program in the ‘output’ area, then clicking it triggers a dialog box (Figure 6) where users can input new information.

![Figure-6](image_url)

Input new data and click ‘Apply’ button at last to confirm the modification.

**Modulator Setting**

The B-QAM-HDMI-IP-2CH supports DVB-C and ATSC Modulating in one device and no need to upgrade new software. User can use front buttons to set the intended Modulator Type. Please refer to Chapter 3 (2.2.1 Modulator Setting) for detailed information.

**DVB-C Modulating**

When user chooses DVB-C as Modulator Type, enter in “Modulator” and it will display the Modulator Configuration screen as Figure-7 where can set DVB-C modulation parameters.
After setting all the parameters, click “Apply” to save the Modulator Configuration.

**ATSC Modulating**

When user chooses ATSC as Modulator Type, enter in “Modulator” and it will display the Modulator Configuration screen as below where to set ATSC modulation parameters.

**Output Parameters**

Click “Output” from the top menu, it is for configuring the IP and ASI output respectively.

**Output Setting**

Enter in “Output Setting” and it will display the screen as Figure-8 where user can set the 1 MPTS and 2 SPTS parameters separately.
Data IP Setting

Data IP Setting is for setting the Data parameters for the device. (Figure-9)

ASI Out Select

Clicking “ASI Output select” from the menu, it will display the interface as Figure-10 where to choose TS to output from ASI.
TS Config

Enter this interface to configure the TS ID, Original Network ID, NIT and VCT for the 4 carriers and ASI MPTS output.
Figure-11

4 carriers and MPTS select
System→Save load

Clicking “Save load” 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.

System→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.
System→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 “Set” to save the configuration.

System→Firmware

Click “Firmware” from the menu it will display the screen as Figure-15. 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.
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

CC switch in Web based NMS

CC switch On: Enable CC in CC switch Off: Unable CC
Chapter 6 Low Delay Setting

B-QAM-HDMI-IP-2CH 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 “Encoder Param” of “Channel 1” or “Channel 2” to set a low delay mode for each channel:

There are 4 low delay modes:

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

<table>
<thead>
<tr>
<th>Decoding Terminal</th>
<th>Single Source</th>
<th>Bit Rate Mode</th>
<th>Resolution</th>
<th>Low Delay</th>
<th>Encoding Type</th>
<th>Average Delay (ms)</th>
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<tr>
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**Internal Test Report of Time Delay**

The values cover the progress from Encoding → Decoding
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<th>Interface</th>
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<th>Interface</th>
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<th>Single Source Interface</th>
<th>Bit Rate Mode</th>
<th>Resolution</th>
<th>Low Delay Mode</th>
<th>Encoding Type</th>
<th>Average Delay (ms)</th>
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Chapter 7 Troubleshooting

Prevention Measure

- Installing the device at the place in which environment temperature between 0 to 45 °C
- Making sure good ventilation for the heat-sink on the rear panel and other heat-sink bores if necessary
- Checking the input AC within the power supply working range and the connection is correct before switching on device
- Checking the RF output level varies within tolerant range if it is necessary
- Checking all signal cables have been properly connected
- Frequently switching on/off device is prohibited; the interval between every switching on/off must greater than 10 seconds.

Conditions need to unplug power cord

- Power cord or socket damaged.
- Any liquid flowed into device.
- Any stuff causes circuit short
- Device in damp environment
- Device was suffered from physical damage
- Longtime idle.
- After switching on and restoring to factory setting, device still cannot work properly.
- Maintenance needed
# Chapter 8 Television Frequency/Channels

## Air Channels

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<th>Frequency</th>
<th>Ch.</th>
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The weak ability of error-correcting and anti-interference in this area: 6.03
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.

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