UC-450E+ MPEG-4 HD/SD Encoder

User Manual

Version: 07302012-01

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Chapter 1 Introduction

1.1 Introduction

UC-450E+ MPEG-4 HD Encoder uses the advanced AVC/H.264 audio encoding algorithm, combined with Upcom advanced audio and video pre-processing technology. This unit can encode audio & video with high quality at low bit-rates. It has analog and digital video input interfaces (CVBS, YPbPr, SDI, and HDMI), and audio input interfaces (RCA, XLR, HDMI, AES and EUB). Its highly integrated and cost effective design gives users excellent digital video encoding solution, and makes it widely used in Satellite and Terrestrial digital TV Contribution and Broadcasting.

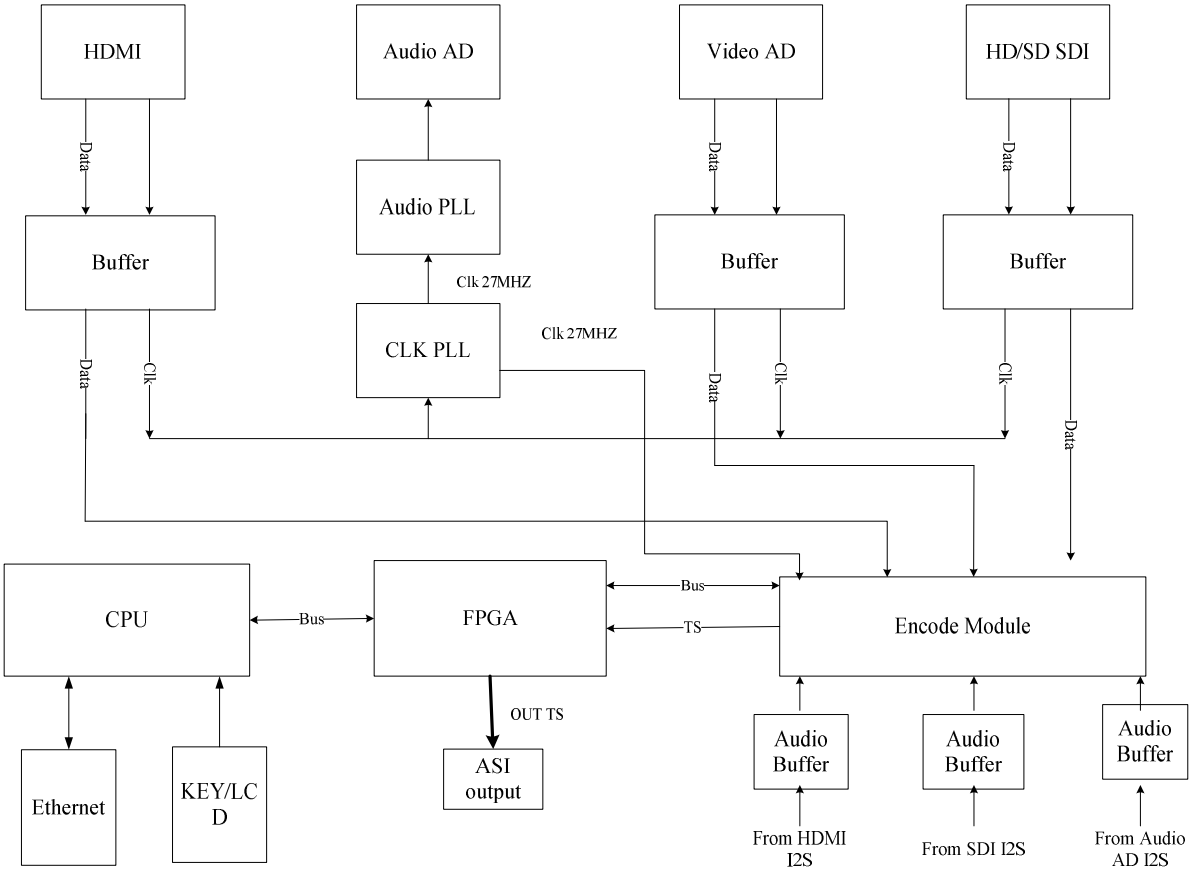
1.2 Features

- AVC/H.264 High Profile Level 4.0 video encoding support and advanced video pre processing algorithms.
- MPEG-1 Audio Layer II, and LC-AAC audio encoding algorithm ;
- LC-AAC audio format optional;
- UDP media transmission protocols & unicast/multicast output support
- CVBS, S-VIDEO, HD-SDI and YPbPr analog video input interfaces
- HDMI and SDI digital video input
- XLR, RCA, AES/EBU analog digital audio input
- PAL and NTSC SD video formats
- The resolution formats is 1080P, 1080I, 720P, etc.
- LCD/keyboard control method.
- NMS monitoring

1.3 Specifications

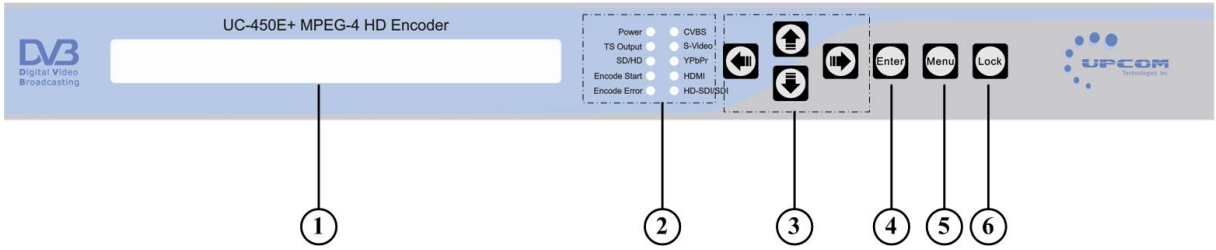
Video input		1 × Analog CVBS, BNC interface
		1 ×S-Video Analog YPbPr input, BNC interface
		1 × YPbPr video input, BNC interface
		1 x HD/SD-SDI, BNC interface
		1 x HDMI interface
Audio input		Analog stereo audio (balanced), XLR interface
		Analog stereo audio (unbalanced), BNC interface
		AES / EBU digital audio, XLR interface
		HD/SD-SDI embedded audio
		LC-AAC audio format optional
Video	Resolution	1920x1080_60p, 1920×1080_60i, 1920×1080_50i
		1280×720_60p, 1280×720_50p
		720×480_60i(NTSC), 720×576_50i(PAL)
	Encoding	AVC/H.264 High Profile Level 4.0 for HD AVC/H.264 High Profile Level 3.0 for SD
	Bit-rate	0.8Mbps~20Mbps
	Rate Control	CBR/VBR
	GOP Structure	IBBP
	Advanced Pretreatment	De-interlacing, noise reduction, sharpening
Audio	Encoding	MPEG-1 Layer 2, LC-AAC
	Sampling rate	48KHz
	Resolution	24-bit
	Bit-rate	64Kb/s~384Kb/s
Stream output		2×ASI outputs, BNC interface
		SPTS over UDP, 10/100Base-T Ethernet interface (UDP unicast / multicast)
System function		LCD/keyboard operating, NMS support Control interface
		Ethernet software upgrade
General	Dimensions (W × D × H)	482mm×455mm×44.5mm
	Approx weight	8 Kg
	Temperature range	0~45□(Operation), -20~80□(Storage)
	Power requirement	AC110V±10%, 50/60Hz AC 220V±10%,50/60Hz
	Power consumption	17.6W

1.4 Block Diagram



1.5 Display

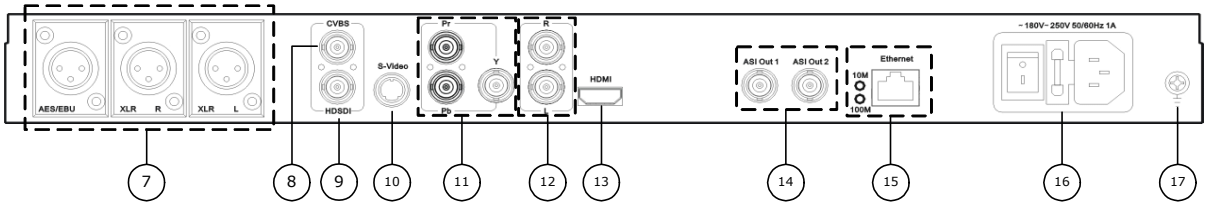
Front panel:



Indicator area: All the indicators will light up when the UC-450E+ MPEG-4 HD ENCODER is working in current mode. Under normal conditions, Power indicator, TS Output, Encode Start and CVBS will light up. But if the signal source is lost, the input interface indicator, such as the CVBS indicator, will start blinking.

1.	LCD display screen	
2.	Indicator LED	Power：Unit is working
		TS output：Output stream is TS
		SD/HD：SD/HD signal indicator
		Encode Start：The unit starts to encode
		Encode Error：The unit has encoding error
		CVBS ：CVBS input indicator
		S-VIDEO：S-VIDEO input indicator
		YPbPr：YPbPr input indicator
		HDMI：HDMI input indicator
		HD/SD-SDI：SDI input indicator
3.	Up/Down/Left/Right Arrow	
4.	Enter：Confirmation key	
5.	Menu：Menu key	
6.	Lock：Lock key	

Rear panel:



7.	Digital audio input interface: AES/EBU, XLR
8.	CVBS input interface
9.	HD/SD-SDI input interface
10.	S-VIDEO input interface
11.	YPbPr input interface
12.	Analog audio input interface
13.	HDMI input interface
14.	Two ASI output interfaces
15.	10M/100M Ethernet interface
16.	AC Power switch and input
17.	Ground

Chapter 2 Installation Guide

2.1 Product Checklist

After opening the package of the unit, check items according to the packing list. It should include the following items:

- UC-450E+ MPEG-4 HD Encoder
- User Manual
- Analog Audio/Video Composite Input Cables
- Power Cord

If any item is missing or not matching with the list above, please contact your supplier.

2.2 Installation Preparation

When installing the unit, please follow the steps below:

- Check for missing product or damaged product during transportation
- Set up the right environment for installation
- Install the Encoder
- Connect input and output signal cables
- Connect communication port (if necessary)

2.2.2 Requirements

Item	Requirement
Space Requirements	Recommended 1 Rack Unit Separation. Do not Install units without any vertical separation.
Floor	Electrical Isolation, Dust Free Grounding: $1X10^{7}$~$1X10^{10\Omega}$
Temperature	Operating Temperature: 0º to +45ºC, Storage Temperature: -25º to +55ºC.
Relative Humidity	20%~80% sustainable, 10%~90% short time
Pressure	86~105KPa
Power	85VAC to 265VAC 50/60Hz

2.3 AC Power

☞Caution:

Before connecting power cord to UC-450E+ MPEG-4 HD ENCODER, user should set the power switch to “OFF”.

2.4 Signal Connections

The signal connections include the input and output signal cables. The unit has five possible input choices: CVBS, S-VIDEO, YPbPr, HD/SD-SDI and HDMI. The output TS stream has ASI and IP interface and user can select the interface based on their needs.

AV Input Cable

ASI Output Cable

HDMI Cable

YPbPr Cables

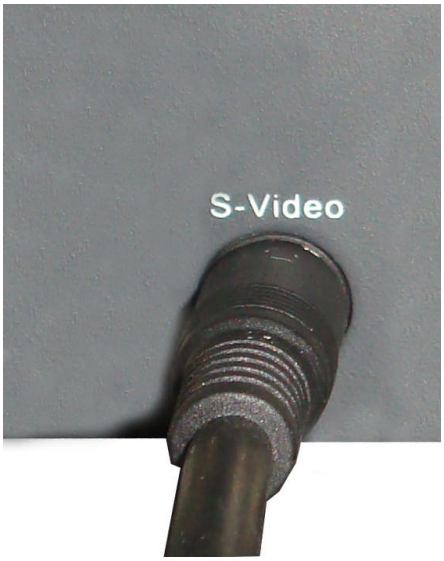
2.4.1 Unbalanced audio and CVBS video input

The encoder's Analog Composite Video input port and its connections are illustrated below:

Note: User must select the appropriate video mode in the Input Section of Unit menu. If not, the encoding video mode will not match to the input source format, and the unit will not work properly.

2.4.2 S-video input

The S-video input port is illustrated below:



2.4.3 HDMI Input

The HDMI input port is illustrated below:

Note: After selecting the HDMI input in the unit menu, it is unnecessary to manually set the resolution, for the unit will automatically identify the resolution. Currently, the unit cannot recognize 1080P, so if the resolution of the video input source is 1080P, the unit will not recognize the signal source, and might not work correctly.

2.4.4 HD/SD-SDI Input

The HD/SD-SDI input port is illustrated below:

Note: HD SDI and SD SDI use the same SDI input port, user can select corresponding mode through the menu on the LCD or NMS operation, and then the system will automatically detect the video format and display it on the LCD interface. The unit does not support 1080P currently, so if the input video resolution is 1080P, the unit will not encode.

2.4.5 YPbPr Input

The YPbPr input port is illustrated below:

Note: If the input video format does not match with the input video mode selected in the unit menu, the unit will not encode or will give an encoding error. If the Y input port is not connected, the unit might not detect the input signal; and also the Pr and Pb input ports must be connected to their corresponding ports; if not, the program color may be abnormal.

2.4.6 ASI Output Interface

The ASI output port is shown below:

Chapter 3 Operations

UC-450E+ MPEG-4 HD ENCODER's front panel is the user operations interface. The detailed operation is described below.

Keyboard Function Description:

LOCK: Locking the screen / cancelling the lock state, and entering the main menu after initialization of the unit. After pressing the lock key, the system will ask the user whether to save the present settings or not. If not, the LCD will display the current configuration.

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

ENTER: Selecting the parameters to be modified or confirming a change after modification.

LEFT/RIGHT: choosing and setting the parameters.

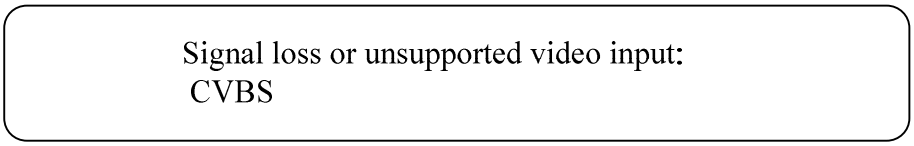
UP/DOWN: Modifying selected parameter or scrolling up/down when parameter is not selected.

3.1 Initialization

After switching on the encoder, the LCD interface will display the UPCOM name and model, and the current data rate at the first row while the video input and resolution will be at the second row as shown below:

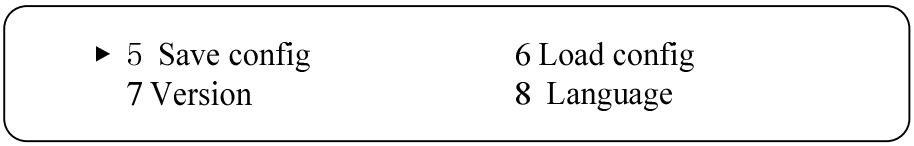
Alarm information will be shown as below when there is an input signal loss or the

video input is an unsupported signal.



3.2 General Settings

The LCD will display the following page after pressing the “Lock” key.



At all display, the current option selected is shown within brackets.

3.2.1 Audio Settings

3.2.1.1 Audio Input

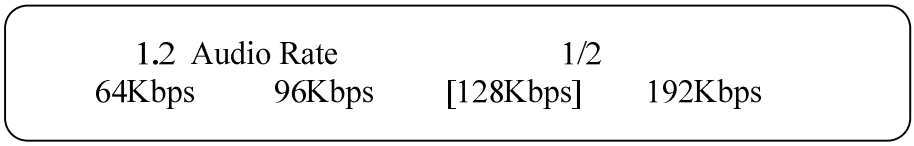
After entering the Audio Input submenu by pressing the ENTER key, user can choose one of the following three audio inputs; 1/1/ means the current page

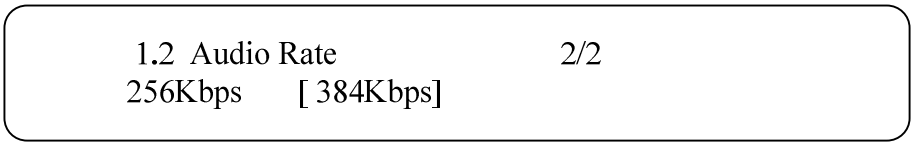
3.2.1.2 Audio Bit-rate

After entering the submenu by pressing the “Enter” key, user can choose one of of the following bit-rates; The LCD will display the following page.

"1/2" means the current page. The number on the upper right is the total effective output audio bit-rate.

By pressing the "Enter" key in this interface, the LCD will display the following page:





3.2.1.3 Audio Fs, Audio Format and Audio ES Mode

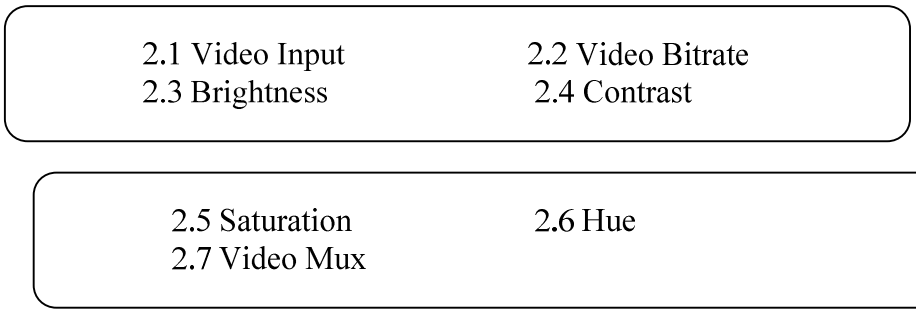
These three items are read-only and the user cannot modify them. So after entering the submenu, the LCD will display the following pages:

3.2.1.4 Audio Gain

The default value is 0db, and the submenu goes as shown below:

3.2.2 Video Settings

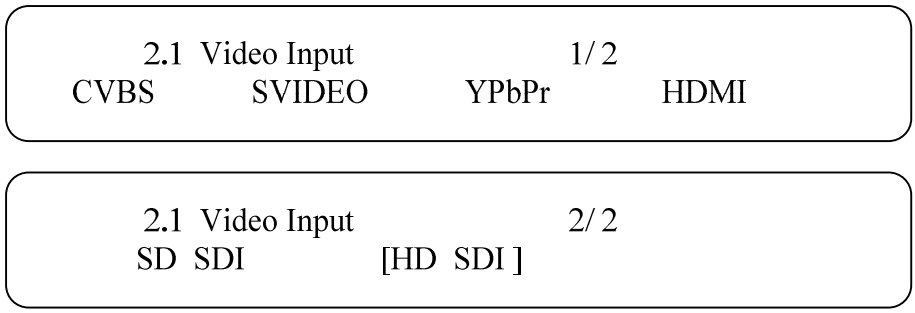
Unit displays the following submenu after the user enters the video setting by pressing the “Enter” key.



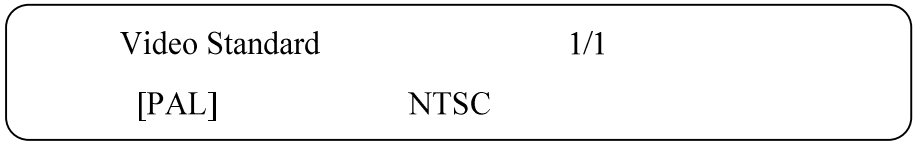
3.2.2.1 Video Input

There are six video input formats to select. After pressing enter key to the corresponding submenu, the LCD will display the following pages:

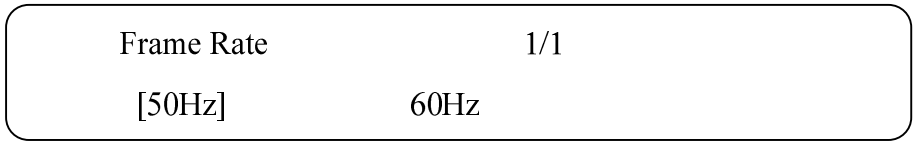
1/2 means the current page



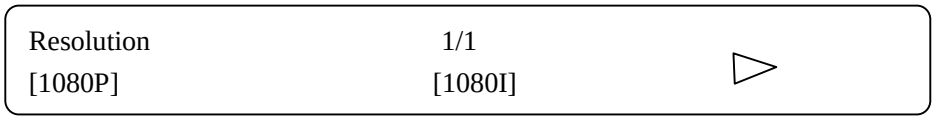
Under the CVBS and SVIDEO submenus, user can select the video standard by pressing enter key. The choice of Video Standards in CVBS and SVIDEO submenus is displayed below:



When users enter the YPbPr submenu by pressing the enter key, the LCD will then display the following page:

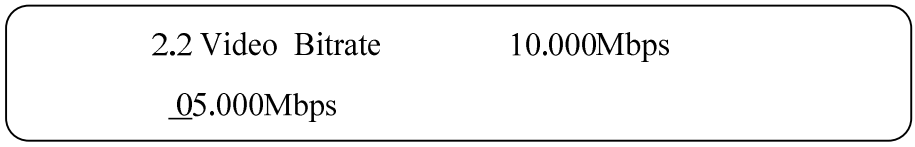


When the user selects any of the two choices of Frame Rate displayed above, they will be presented with another submenu to select Resolution as shown below:



3.2.2.2 Video Bit-rate

User can set the video bit rate (0.8Mbps to 30Mbps adjustable range) here. After setting, user can see the real-time rate change on the screen. The number on the upper right is the total effective video bit-rate



3.2.2.3 Brightness, Contrast, Saturation and Hue

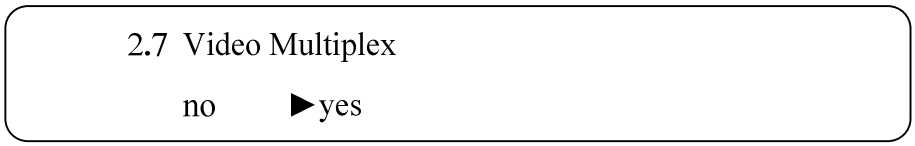
User can adjust the relevant parameters of input video with the submenus of Brightness, Contrast, Saturation and Hue.

The figure outside the parentheses is decimal while the inside is hexadecimal.

3.2.2.4 Video Mux

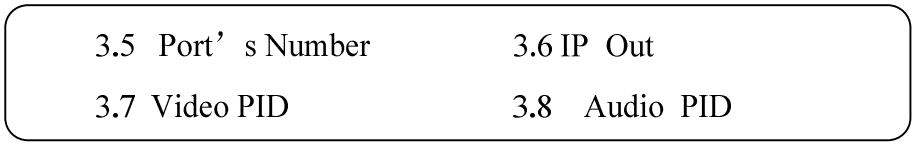
This submenu provides the capability for separately encoding Audio and transmitting Digital Audio Broadcast. The system will encode the AV signal synchronously when the user chooses **YES** and only encode audio when the user chooses **NO**.

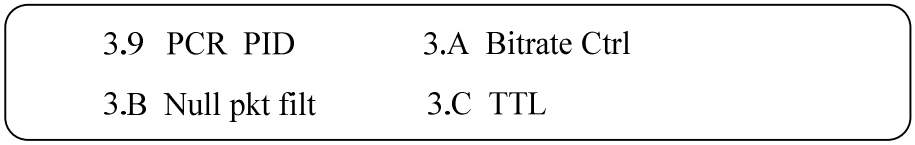
After user presses the enter key again, the interface will display the following page:



3.2.3 Output Setting

In this menu, user can set the relevant output parameters, and the LCD will display the following page after pressing the enter key.





3.2.3.1 Transport Stream ID Settings

User can set the Transport stream ID by using a combination of **LEFT/RIGHT** and **UP/DOWN** key after entering the edit state by pressing the **ENTER** key. After finishing modification, user can press **ENTER** for the new settings to take effect. The maximum number is **65535**

3.2.3.2 Provider Name and Program Name

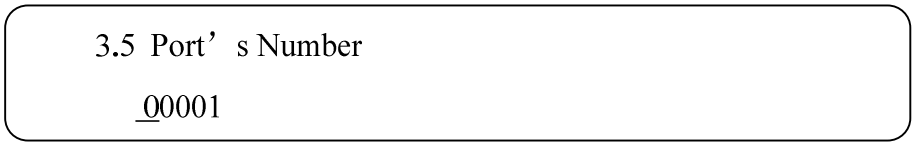
The provider name can only be modified via the NMS; user can only see this setting but cannot make any changes. When the user presses the enter key, the LCD will display the following pages:

3.2.3.3 Output Address Settings

In this interface, user can set the output address by pressing the enter key to enter the Output Address submenu. The LCD will display the following page:

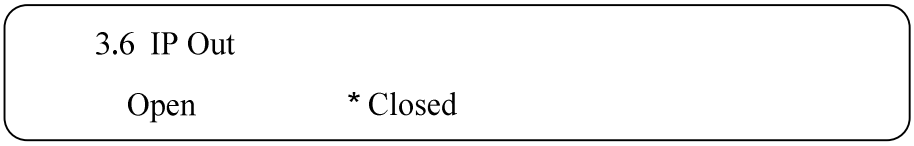
3.2.3.4 Port Number

In this interface, user can set the output IP port number. The maximum value is 65535. The LCD will display the following page after pressing the enter key.

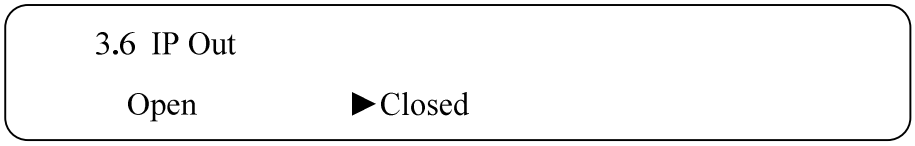


3.2.3.5 Enable or disable IP output

User can enable or disable the IP output function by setting the value to **OPEN** or **CLOSED** at this menu.



After user presses the enter key again, the interface will display the following page:



3.2.3.6 Video/Audio/PCR PID Settings

User can set these parameters by pressing the **Enter** key to enter these submenus. The LCD will display the following pages, and the maximum PID number cannot exceed 0x1fff.

3.2.3.7 Bitrate Control Setting

User can choose between CBR & VBR at this menu. CBR (Constant Bit-rate) means that the bit-rate will be a constant value. VBR (Variable Bit-rate) means that the bit-rate will change according to the video input variation.

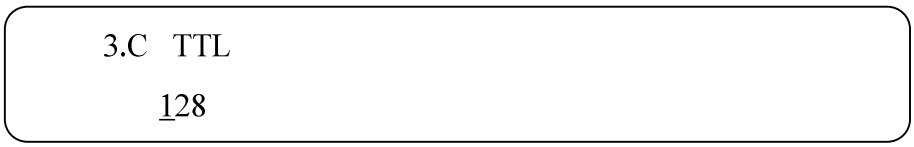
3.2.3.8 NULL PKT FILT

User can decide whether the unit filters the null packets in the IP output. For IPTV implementation, filtering null packets can save network bandwidth, but it will deteriorate PCR accuracy. Therefore, it is not recommended for DVB implementation.

The interface will display the following page after pressing enter key again:

3.2.3.9 Output IP TTL Setting

Time-to-live (TTL) is a value in an Internet Protocol (IP) packet that tells a network router whether or not the packet has been in the network too long and should be discarded. The value ranges from 0 to 255. User can set the number of networks, which the output IP packets can pass through before the IP packets are discarded by the router. The maximum value is 249.



3.2.3.10 Original Net ID

The original Net ID adjustment range is 0~65535.

3.2.4 Network Settings

User can set the relevant Network parameters in this menu. The LCD will display the following pages after the user presses the enter key.

The MAC address is read-only.

3.2.4.1 IP Address, Subnet Mask, Gateway and Alarm Address Settings

User can set the relevant parameters in these submenus; the LCD will display the following pages when user presses the enter key.

3.2.5 Save Configuration

User can choose yes to save the current parameters and no to not save the current parameters. The LCD will display the following page when user presses the enter key.

3.2.6 Loading Configuration Settings

User can restore the equipment default parameters, which have been loaded and saved via this menu.

3.2.6.1 Loading Saved configuration

User can restore the unit into the last saved configuration by choosing **yes**.

3.2.6.2 Restoring Default configuration

User can restore the unit into factory configuration by choosing **yes**.

3.2.7 Version

User can check the hardware and software version in this interface by pressing the **Enter** key.

3.2.8 Language Settings

User can set the desired language in this interface.

Chapter 4 NMS Operation

Network Management System Profile

Network management system is used for operating, controlling and managing the unit and setting the parameters, etc.

4.1 Installation

The software doesn't need special installation. Users can just copy "Network Management Software X.XXY.exe" to the specified directory (X.XX is the version number, Y represents language. For example: the version number of network management software 4.01E.exe is 4.01 and the language is English). When the network management software is running, it will generate two files shown below:

- Network management software X.XXY.log (It preserves the log file.)
- Info.Bin (It is the user configuration file.)

4.2 Software Operation

4.2.1 Login Interface

After executing the NMS software, user can enter the username and password at the pop-up "User sign In" window.

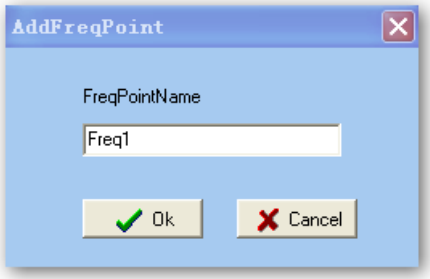
User can login to the NMS by clicking on **Confirm** after entering the user name and password. The software will then verify the username and password with the database record. If they are correct, the main interface will appear. Both the default user name and password is **admin**.

4.2.2 Main Interface

User can create a unit node tree in the left column by adding, modifying and deleting the unit. This software provides a powerful node operation function, and the user can edit various parameters in the unit tree for management and classification.

4.2.3 Adding Frequency Point

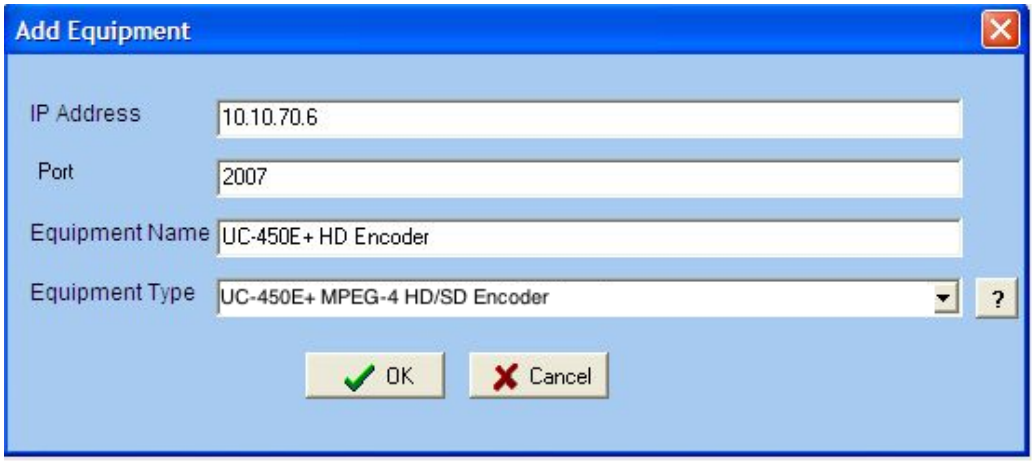
The Add Freq Point dialog box pops up when the user clicks the Add Freq Point item in the Edit pull down menu on the menu row. The unit will confirm the given frequency point when the user clicks **OK**.



4.2.4 Adding Equipment under Given Frequency Point

User should first choose the frequency point, and then the dialog box of Add Equipment will pop up when the user clicks “Add Equipment” item in the Edit pull down menu on the menu row.

4.2.5 Edit Equipment Interface

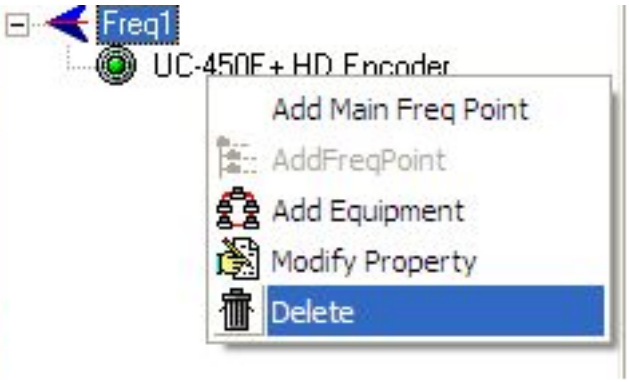


User should follow the steps shown below:

- Choose the connected equipment type in the drop down list of “Equipment Type”.
- Enter the Equipment Name
- Enter the unit IP Address
- Enter the unit Port Number

4.2.6 Delete Equipment

User can choose the equipment to be deleted in the left column, and then click the “delete” item in the drop down menu, which appears, by clicking the right mouse key.



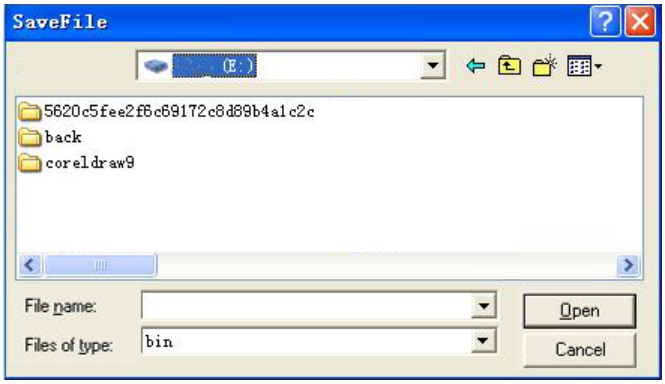
4.2.7 Save Configuration

After setting all the relevant parameters, user can click 

button on the toolbar to save the modifications to the unit's flash. User can also reload the saved parameters from unit's flash and refresh the unit parameters setting according to the loaded values by clicking 

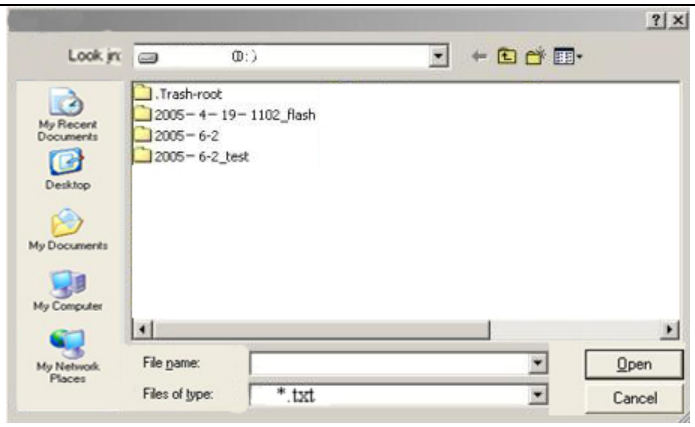
Alternatively, user can also click the 

button on the toolbar to popup the "save file" dialog box, which gives prompts to save all the unit's parameters as binary files in the computer's hard drive.



Similarly, user can choose to click the 

button on the toolbar to popup the read file dialog box, to read the stored binary file and set the unit's parameters according to the loaded binary files.



4.3 UC-450E+ MPEG-4 HD ENCODER Operation

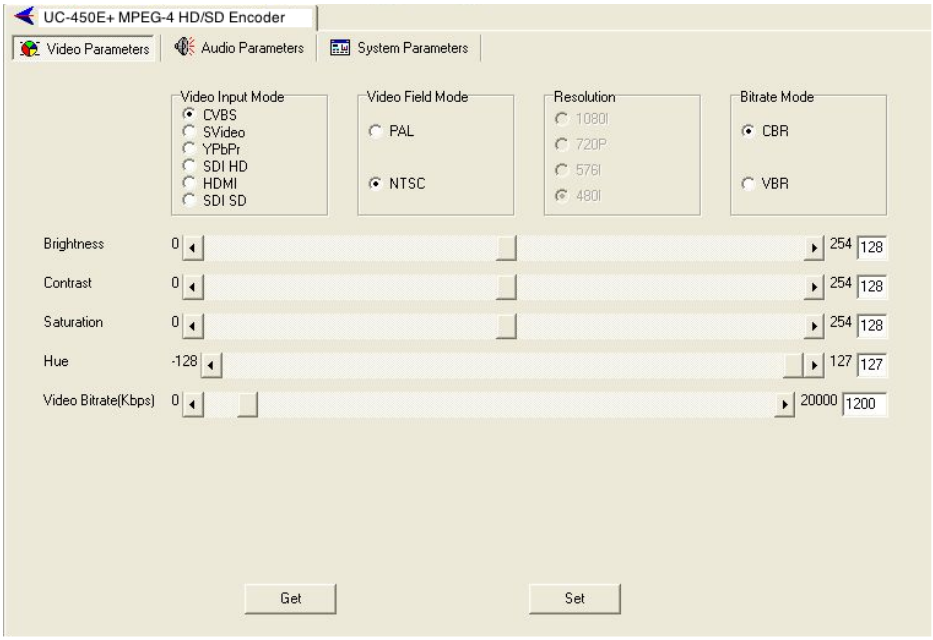
User can choose the UC-450E+ MPEG-4 HD ENCODER in the unit tree. The Encoder interface is composed of Video parameters, Audio parameters and the System parameters.

Set: Activating the selected parameters.

Get: Displaying the current parameters.

4.3.1 Video Parameters Setting

The grey button means that the value is read-only, and the user cannot make any changes.



4.3.1.1 Video Input Mode

User can set one of the six video input modes, but every input mode must have the appropriate resolution, otherwise, the unit might not recognize the signal source. User can also refer to detailed operations in **2.4**

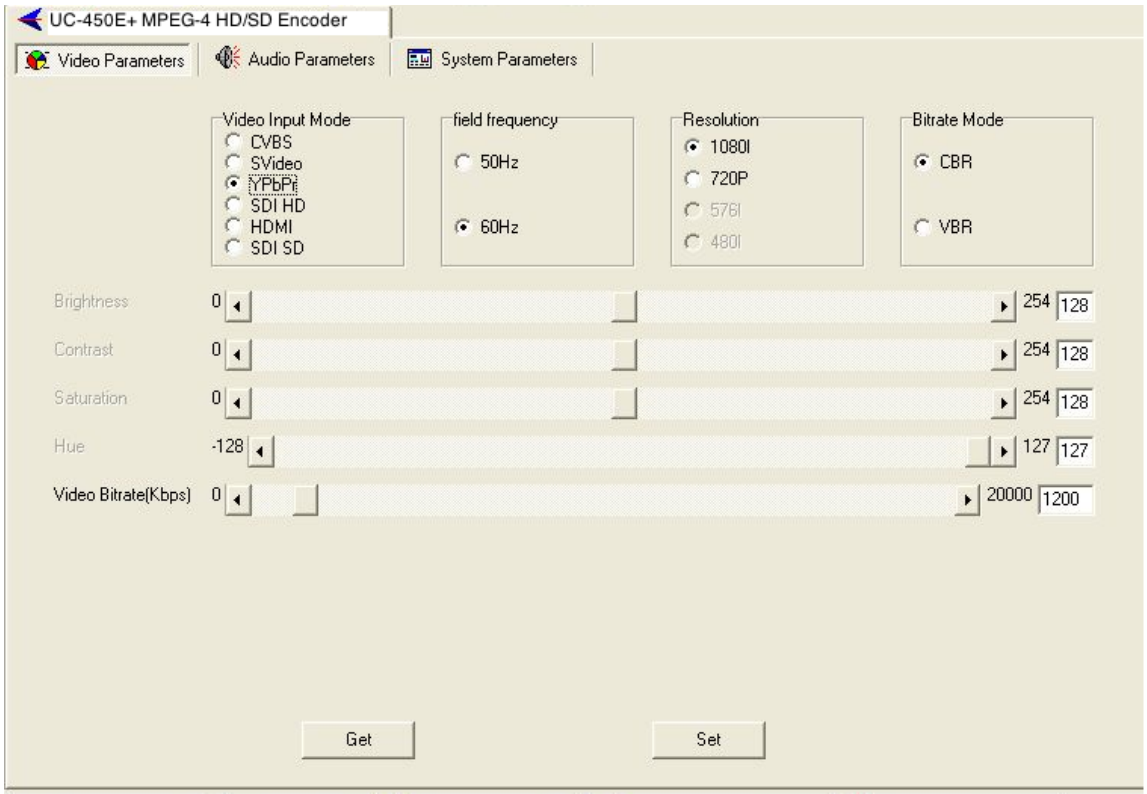
4.3.1.1.1 CVBS and S-Video Input Modes

Under these two input modes, the unit resolution cannot be modified, so user can just read the default settings. User can also select desired video field mode and bit-rate mode. The details are displayed in the above picture. The default video field of CVBS input mode is PAL.

The CVBS video input mode supports SD signal with PAL (720*576_50i) and NTSC (720*480_60i) format.

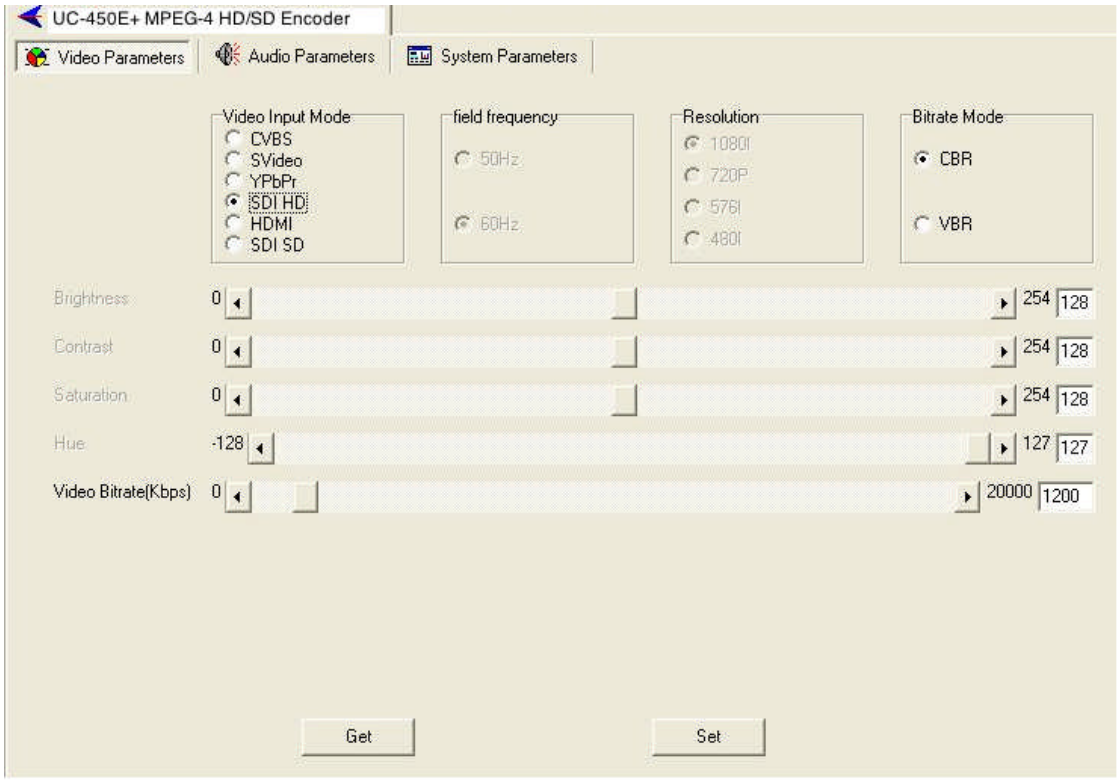
4.3.1.1.2 YPbPr Input Mode

YPbPr supports four kinds of HD formats (1280*720P_60/ 1280*720P_50, 1920*1080I_60/ 1920*1080I_50). In this interface, user can set the field frequency, resolution and bit-rate mode. The details are illustrated in the picture below:



4.3.1.1.3 HD/SD SDI and HDMI Input Mode

Under these three video input modes, user can just modify the bit-rate mode, but the field frequency and resolution are read-only. The detailed operation is illustrated in the picture below:



4.3.1.2 Brightness, Contrast, Saturation, and Hue Settings.

These four values can be modified if users select CVBS or S-Video video input mode, otherwise, they are read-only

4.3.1.3 Video Bit-rate

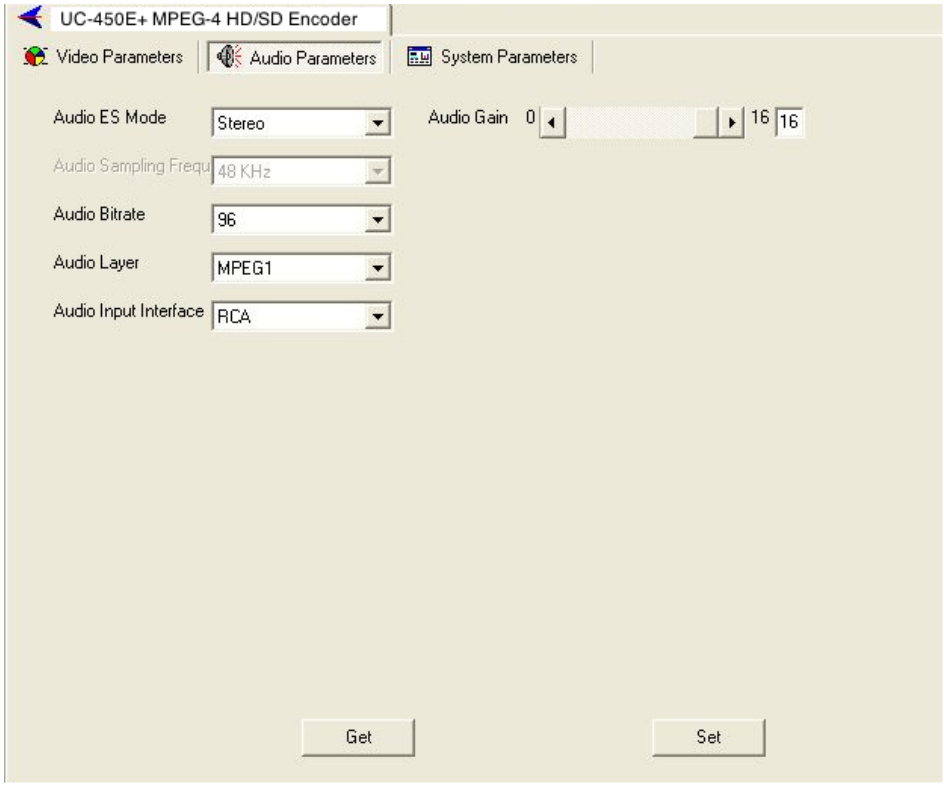
By moving the scrollbar, user can set the video bit-rate.

4.3.1.4 Bit-rate Mode

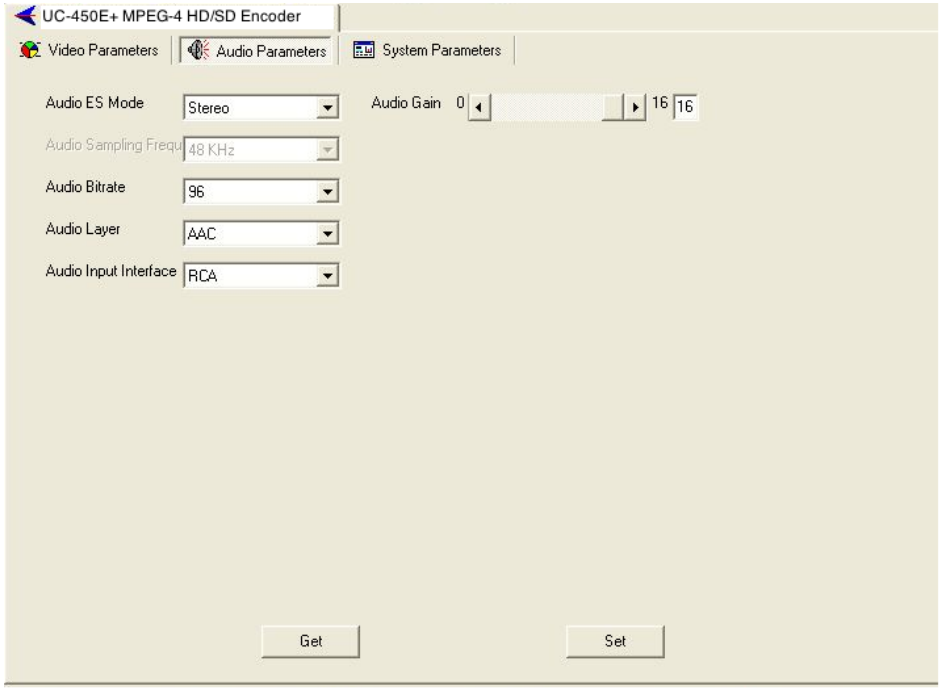
User can choose CBR & VBR at this menu. CBR (Constant Bit-rate) means that the bit-rate will be a constant value. VBR (Variable Bit-rate) means that the bit-rate will vary along with the video.

4.3.2 Audio Parameters Settings

The grey button means that the parameter is read-only.



When user chooses the LC-AAC option, the interface will be displayed as shown below:



4.3.2.1 Audio ES Mode

User can select Stereo or Single Channel

4.3.2.2 Audio Sampling Frequency

The grey button means that the audio sampling frequency is always 48 KHz, and it is the default setting which user cannot modify.

4.3.2.3 Audio Bit-rate setting

In this drop down list, user can select the audio bit-rate. User can refer to **3.2.1.2** for detailed explanation.

4.3.2.4 Audio Layer

User can select the unit audio Layer as Layer 1 or AAC.

4.3.2.5 Audio Input Interface

In this drop down list, user can select the audio input format, but the format must be in sync with the resolution, otherwise, the unit will not recognize the signal source.

4.3.2.6 Audio Gain

This indicates the audio gain function of the unit, and user can modify the parameter by moving the scroll bar. If the input interface is HDMI, the audio gain function is read-only.

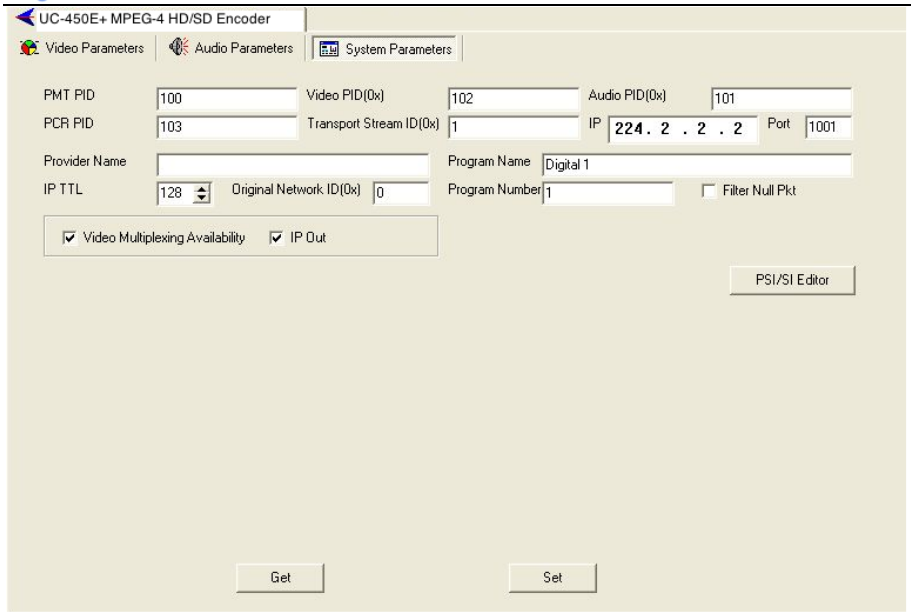
4.3.3 System Parameters Settings

User can click on **Get** to read the default settings from encoder, or enter the system information such as IP address and PMT/PCR/video/audio PID video format on this page, and then click on **Set** to save the settings. The provider name and program name can also be modified on this page.

PMT: The PMT (Program Map Table) identifies and indicates the locations of the streams that make up each service and the location of the Program Clock Reference fields for a service.

PCR: Program Clock Reference

PID: Packet Identifier



4.3.3.1 PMT PID

This field sets PMT PID. The value ranges from 0 to 0x1FFF.

4.3.3.2 Video PID

This field sets Video PID. The value ranges from 0 to 0 x1FFF.

4.3.3.3 Audio PID

This field sets Audio PID. The value ranges from 0 to 0 x1FFF.

4.3.3.4 PCR PID

This field sets PCR PID. The value ranges from 0 to 0 x1FFF.

4.3.3.5 Transport Stream ID

This is a 16-bit field, which identifies the TS from any other multiplex within the delivery system. The value ranges from 0 to 0xFFFF.

4.3.3.6 Output IP Address

This field indicates the destination of IP output.

4.3.3.7 IP Output Port

This field indicates the destination IP port.

4.3.3.8 Provider Name

This field sets the name of the program provider.

4.3.3.9 Program Name

This field sets the name of the program.

4.3.3.10 Program Number

This field sets the number of the programs.

4.3.3.11 IP TTL

Time-to-live (TTL) is a value in an Internet Protocol (IP) packet that tells a network router whether or not the packet has been in the network for too long and should be discarded. The value ranges from 0 to 255.

4.3.3.12 Original Network ID

This 16-bit field identifies the network ID of the originating delivery system. The value ranges from 0 to 0xFFFF.

4.3.3.13 PSI/SI Editor

This button will trigger the PSI/SI Editor for advanced usage. For more details, please refer to the manual of PSI/SI.

4.3.3.15 Video Multiplexing Availability

This checkbox indicates that user can open the video multiplexing function. For detailed operation, please refer to **3.2.2.4.**

4.3.3.16 IP Out

User can decide whether to open the IP out function or not. For detailed operation, please refer to 3.2.3.5.

Chapter 5 Troubleshooting

To guarantee the product's quality, reliability and stability, all UPCOM products pass through testing and inspection before products are shipped out of the factory. The testing and inspection process covers all the Visual, Electronic and Mechanical criteria.

To prevent potential hazards, please follow the operational conditions.

Preventive Measures

- Install the unit at a place with environment temperature between 0 to 45 °C
- Make sure there is good ventilation for the rear panel and other openings.
- Check that the input AC Voltage is the working range and the connection is correct before switching on the unit.
- Check whether all the signal cables have been properly connected.
- Do not frequently switch on or switch off the unit. The interval between every switching on or switching off must be greater than 10 seconds.