

H-2ADHD-QAM-IPLL

2 HDMI/YPbPr HD/SD IPTV

Encoder + RF Modulator

QAM, ATSC, DVB-T, ISDB-T



THOR BROADCAST LOS ANGELES CA 1-800-521-8467



A Note From Thor About This Manual

Intended Audience

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

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Chapter 1 Introduction

1.1 Product Overview

The Thor Broadcast H-2ADHD-QAM-IPLL is our new all-in-one devices that integrates 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, the H-2ADHD 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, CCTV cameras, Blu-ray players, and OTA antennas etc. Its output signals are to be received by TVs, STB and etc with the same corresponding standard. Thor Encoder/Moudlator's are readily used in public places such as metro, market hall, theatre, hotels, restaurants, stadiums, private TV headends for advertising, monitoring, and any other visual displays necessary.

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
- Supports DD AC3 (2.0/5.1/7.1) pass-through
- Supports 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 outputs to mirror MPTS or one carrier programs
- IP(2*SPTS & 1*MPTS) out
- Support CC (Closed Caption) EIA608
- Supports 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	1
Video (HDMI)	
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	HDMI*2
	1920*1080_60P, 1920*1080_50P
Decolution	(For MPEG 4 AVC/H.264 only),
Resolution	1920*1080_60i, 1920*1080_50i,
	1280*720_60p, 1280*720_50P
Low Delay	Normal, Mode 1, Mode 2, Manual
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*2/SPDIF*2
Sample rate	48KHz
Bit rate	64/96/128/ 192/256/320kbps
Video (CVBS/YPt	pPr)
Encoding	MPEG2; MPEG4 AVC/H.264
Interface	CVBS/YPbPr*2(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	2*Stereo/4*mono/2*SPDIF
Sample rate	48KHz
Bit rate	64/96/128/ 192/256/320kbps
DVB-C Modulato	r Section

Standard	J.83A ([DVB-C), J.	83B, J.83C	
MER	≥43dB			
RF frequency	36~960	MHz, 1K	Hz step	
RF output level	-30~ -1)dbm (77	7∼97 dbµV), 0.10	db step
Symbol rate	5.000~9	9.000Msp	os adjustable	
RF Out	4*DVB-C adja	icent car	riers combined o	output
	J.83A		J.83B	J.83C
Constellation	16/32/64/1	28/	64/256	64/ 256
	256 QAM		QAM	QAM
Bandwidth	8M		6M	6M
ATSC Modulato	r Section			
Standard	ATSC A	/53		
Constellation	8 VSB			
RF output level	-30~ -1	0dbm (7	7~97 dbµV), 0.1	db step
MER	≥42dB			
RF frequency	36~960	MHz, 1K	Hzstep	
RF Out	4*ATSC	adjacen	t carriers combi	ned output
System				
Local interface	LCE) + contro	ol buttons	
Remote manage	ement We	b NMS		
Stream Out	2 se	eparate A	SI out (BNC type	e, 100M);
	IP (2* SPTS8	a1*MPTS) over U	JDP/RTP out
	(RJ-	45, 100N	1)	
NMS interface	RJ4	5, 100M		
Language	Eng	lish		
General				
Power supply		AC 10	0V~240V	
Dimensions		333*2	32*44mm	
Weight		2.5 kg		
Operation ten	nperature	0~45°	С	



1.4 Appearance and Description



Rear Panel Illustration



YPbPr input port(Pr for CVBS input)
 SPDIF port
 L/R Audio input (Stereo or Mono)
 CC input port for CC only

⑤HDMI input port⑥Power Switch⑦ Power supply Slot





Cover/Above View Illustration



- $\textcircled{1} \operatorname{LCD} \operatorname{Window}$
- Indicator
- (3) Control Buttons





1.5 Principle Chart





Chapter 2 Installation Guide

Please use caution when operating this device in order to abstain from any possible injury during installation. For this reason, please read all details listed below and make and use caution before proceeding to operate and use this electronic equipment.

2.1 General Precautions

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

2.2 Power precautions

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

2.3 Device's Installation Flow Chart Illustrated as following



2.4 Environment Requirement

Item	Requirement
Machine Hall Space	When user installs machine on rack, the distance between 2 rows of machine frames should be 1.2~1.5m and the distance against wall should be no less than 0.8m.



Machine Hall Floor	Electric Isolation, Dust Free Volume resistivity of ground anti-static material: $1 \times 10^7 \sim 1 \times 10^{10} \Omega$, Grounding current limiting resistance: $1 M \Omega$ (Electric bearing should be greater than 450Kg/m^2)
Environment Temperature	5~40°C(sustainable) · 0~45°C(short time) · installing air-conditioning is recommended
Relative Humidity	20%~80% sustainable 10%~90% short time
Pressure	86~105KPa
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

- It is important to keep this device grounded to ensure all of the modules function correctly. Correctly grounding the device will also help prevent any electrical interference, lightening. Etc. Also it helps reject minor interference that may disrupt the devices ability to function smoothly. General rule of them, make sure the device is grounded when installing anywhere.
- ./ Always use copper wire. When applied correctly the ground must be wrapped well to ensure maximum conduction so it can reduce any high frequencies. The copper ground wire should also be as short and thick as possible
- ./ Installer must make sure that the two ends of the ground are well conducted and have appropriate anti-rust properties.
- ./ It is prohibited to use any other device as part of the grounding electric circuit.
- ./ The area of the conduction between the ground wire and device's frame should be no less than 25 m^2 .



Chapter 3 Operation

The front panel of the H-2ADHD 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







3.1 Initial Status

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





- DVB-C/ATSC: indicates the current modulation standard of this device.
- Enc1/Enc2: indicates the two Encoding channel
- X.XX Mbps: indicates the encoding bit rate of each encoding channel respectively.

3.2 General setting for Main Menu

By pressing the "Lock" key on the front panel, 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:

.2.1 Input Set

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

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6666			*****	************	Ł
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144444	444444444	6444444	4444444	444444444444444444444444444444444444444	6
666666			22 22 22 22 22 22 22 22		а.

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



.2.1.1 Encoder Parameters

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.



The current option



NOTE: These explanations are applied in this entire manual.

1) When user enters 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

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.

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4	14	14	d.	<i>d</i> .	4 4	1	-11	4	d i	d a	6.2	6 al	1	-14	d	đ	di.	di.	d.	di i	d i	6.4	6.4	d	1	d.	d 4	14	1.4	d	4	di.	d 1	6 a	14	di i	U.
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Low Delay

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.

Ċ	7		4	1.1		А.	4.4	1.4	d.	4.4	1.1	1	.4	4	4.4	1.4			d	4	4	4.4		1.1		d		4	4	4	4		1	4	_{eff}	4	>
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đ	H	4	4	14	ń	4	14	6	đ,	11	H	ń,	4	4	44	14	4	4	đ,	d,	4	64	1	14	đ	đ,	đ	Ą	đ	ł,	ŝ	đ	đ,	ģ	4	ć,	51
2	4	4	-6-	н	-6	-	14	4	4	94	-9	4	4	<u>-</u>	64	н	-	-	#	6	4	44	н	-2	÷	#	4	4	4	4	#	4	÷	4	4	6	r

DTS Delay/GOP B Frame/GOP P Frame

These items are programmable when the "Low Delay" mode is set "Manual".

NANANANANANANANANANANANANANANANANANANA		The second s		A A A A A A A A A A A A A A A A A A A	82 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	A A A A A A A A A A A A A A A A A A A	D 2	T 0	Cin	5)		e	a a a a a a a a a a a a a a a a a a a	y a a a a a a a a a a a a a a a a a a a		BRARRARA	MARARARA 	R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.R.	88 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8			PARERARA	********		PARARA RANA	Non a contraction
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1 CAMBBRADES		A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A		TABABABABA	IL B B B B B B B B B B B B B B B B B B B	С 2	(a a a a a a a a a a a a a a a a				ARABE CAR	n	BERREN OR	DA D.					P. P				NANABARAN VI

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 (\leq 3), P frame (\leq 6) and DTS (1-500) can be customized manually.

Audio Format

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.

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4 4 4 4	
4444	Audio Format 141 AU3
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<i><i>aaaaaaaa</i></i>	
aaaaaaaaaa	
Sagagaga	

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)

aaaaaaa	*******	******		
	Dialog	Norma		4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	Dialog		U	
********	*********	*********		
******	44441044	******	********	*****
*****	****	*******		
<u>X444444</u>	44444444	44444444	14444444	<u> </u>



Audio Source

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.

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d	d	al	4			2	1	đ	đ	ń.	đ	d,	d	6	d,	đ	4	4	đ	đ	di,	d	đ	đ	al	đ	d	đ	đ	4	4	4	d,	*	đ	di,	4	đ	đ	al	di,	d,	4
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2	2	8	5	2	2	2	2	2	1	1	c	1	2	۸	5	1	1	2	2	2	10	2	8	2	8	2	5	2	2	2	8	2	2	2	2	10	2	8	2	2	8	5	1
3	2	2	2	2	2	2	5	2	2	Ξ.	t.	1	7	3	I,	3	t	c	Ľ	2	2	2	2	2	2	2	5	2	5	2	2	2	2	2	2	2	2	2	2	2	21	5	
2	7	2	2	2	2	1	2	2	2	С.	7	а.	2	1	2	2	3	17	7	2	2	2	7	1	3	7	2	2	2	2	2	7	2	7	2	2	7	2	7	2	1	2	2
ü	2	2	2	2	2	2	2	2	2	2	2	2	2	21	2	2	3	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	J
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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.

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1	(d	į d	đ				2	đ,	đ,	Δ	4	1	16	N	11	n	14	-	4	ŧ	r	3	ŧ	F	d,	di,	d,	d	4	6.	ĕ.	4	ń,	Δ	4	6	r	٧r	3	¢	d, i	di 1	4
14	14	14	1	-	-	8	24	d	đ	4	v	u	1	4	13	-	14	-	,	ч	4	u		9		di	4	4	ß	м,	в.	d,	2	4	ы	2	v	4	-	Q	4.	đ,	4
14	14	14	1	57	16	å	d,	đ	ß	d	d	4	1.4	14	14	t d	1 11	1.4	14	4	4	4	16	đ	đ	đ	đ.	Æ	16	4	4	d,	di.	4	di.	di.	đ.	4	đ	d i	d,	di i	4
4	14	l d	d	d	di.	d	d.	d	4	el.	4	н	l d	2	14	L.	1		14	14	d	4	al	đ	đ	d	d.	d.	4	d.	d.	d	4.	4	4	d.	d	d.	d.	d,	d,	d i	4
4	í a	í á	1.11	á	d.	ú.	ú.	ú	4	1	1	1	£ 4	r	1	4	ĸ	ľ	n	r	١C	di.	ú	á	d	ú.	d.	á.	di.	á.	ú.	á.	á.	á.	ú.	á.	ń	4	á.	d i	á.	á,	4
4	í d	i d	d	å	á.	å.	d.	đ.	A	1	ь	2	έd	2	1	Т	- 2		•	Μ	16	d.	di	đ.	d	đ.	đ.	å.	đ.	di.	ŵ.	đ.	á.	á.	đ.	ŵ.	é.	d.	đ.	d,	á.	é,	d.
4	í d	í d	1	á	d.	đ.	d.	đ.	á	4	1	1	i a	í a	1.4	í d	1.1	l d	14	7.4	d	đ	16	d	d	d.	d.	á.	đ.	d.	d.	d.	á.	á.	đ.	di.	d.	d.	đ.	d,	á.	á,	d.
N	L.	14	d	4	d.	à	d.	d	1	1	1	1	1.4	14	1	1.1	1.0	1	1	6	1	4	1	d	d	d	d.	d.	d.	d.	â.	d.	d.	d.	d.	d.	d.	di.	d.	d.	d.	i,	ŀ.
- 2			- 11	-	44		77	77	-	-	-	-	1		-		- 20	-	- 2	- 22	- 22	-	- 22	-	-	-	20		-	-	π.				-	-		77	-	<i>a</i> ,	27	π.	ĸŝ.

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.

i a	t a	i a	N	d.	d,	d,	đ	d	đ	d	d	đ	al.	đ	đ	đ	đ	đ	đ	d	đ	đ	đ	đ	đ	đ	đ	đ	đ	đ	d	d	d	đ	d	đ	đ	đ	đ	d.	d.	à
1.4	t a	1.4			4	4	đ	đ	4	28	al	đ	4	•41	af	11	-	, all	d	-1	đ	4	d	đ	d	đ	đ	dĺ	đ	d	d	đ	al	đ	al	d	d	đĺ	đ	di.	di.	d
ł.a	ŝ a	1 4			Þ	2	4	d,	A	4	4	e	14	£	ы	4	4	4	a	H	а	4	48	d	4	di,	4	al.	4	di	4	di,	di.	4	48	4	đ	d	4	d.	di.	d
l a	t a	1.4		/	8	2	đ	đ	di	v	u	5	4	17	2	2	-	5	4	u	d.	4	đ	đ	d	d	đ	đ	đ	đ	d	đ	đ	đ	đ	đ	đ	d	đ	4	d.	d
1.4	6.4	12	1	1	4	d	4	4	d	-1	di	4	-11	-11	a	-11	4	4	4	4	4	-1	18	4	4	d	-11	4	4	4	đ	4	di	4	-11	-11	a	d	4	4	4	2
1	t a	1.4	1 1	d.	d.	d.	d	a	ä	é	4	2	al.	d	d	d	d	d	d	d	d	a	d.	d	d	d	d	d	d	d	d	d	d	d	18	d	d	d	d	d.	d.	4
1.4	í a	1 21	i ai	di.	al.	d.	đ	đ	ъ	6	и	1	ыf	al	af	al	al	đ	đ	đ	aí	al	al	đ	al	aí	af	af	đ	al	d	đ	aí	đ	af	đ	al	đĺ	af	af.	4	4
1.4	í a	l at	i ai	16	ai.	ä.	d.	4	ų,	<u>.</u>	~	-	at	đ	-d	18	a	16	đ	a	al	4	al	4	ai	đ	16	al.	a	al.	al	al.	20	a	ai	d	al	đ	al.	ai.	а.	d
14	6.4	1 4	14	di.	đ	d	đ	đ	đ	18	di	d	15	d	đ	d	đ	d	d	d	di	4	d	d	d	d	d	đ	đ	d	d	d	di	đ	d	d	d	d	d	4	di.	d
Li	£.d	1.0	1.1	d	d	d.	d	1	d	1	d	d	d	d	d	d	1	d	d	1	d	1	1	d	ä	d	1	d.	d	d	d	1	d	1	1	d	11	d	d	d.	i.	l

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 II <u>0</u> 101		
PMI PID <u>0</u> 100		
Video PI <u>0</u> 101	Ď	



ACRIBIPID		<u>;;;</u>		
<u>0</u> 103		<u>.</u>		

2.2 Modulator Setting

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

		in die	a da da da da da da da da	10. 10. 10. 10. 10. 10. 10. 10.
1 > 1/10	dulator Ivr	NC al al al al al	, ha ha ha ha ha ha h	h. h. h. h. h. h. h. h.
	udiator ryp	in the last of the last of	, he he he he he he he	IL IL IL IL IL IL IL IL
		a la la la la la la la la la	a da da da da da da da da	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1

n an an Con	itia Param	in the local sector of the local	, he he he he he he he	In the late late late late late
	ing i aiani		A & A & A & A A	*****
		in the local sector of the	. In the Inc. Inc. Inc. Inc. Inc. Inc. Inc. Inc.	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
			AAAAAA.	4 4 4 4 4 4 4 4
<u></u>			A	1 1 1 1 1 1 1 1

2.2.1 Modulator Type

DVB-C and ATSC Modulating in one device. 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.

N 15116	a da da da da seria d	d d d d d d d d d	a de las de las de las de las de	****
1 > 10VB-0		al al al al al al al al		
	••••••••	******		
ATOO				*******
(d d d d d d A A A A A				h h h h h h h h h h h h
		******		**********

2.2.2 Config Param

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

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 5Msps to 9Msps 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)

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 decides 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.



2.4 Network

Network contains "NMS Interface" and "Data Interface".

	14	h l	4	di.	ch 2	1 1	11	4	đŝ	16.1	64	6 1	14	1	sti.	di.	4.	d 1	íλ.
	14	1.1	d	<i>á</i> .	di s	14	1	.4	sti	11.	64	6 11	1 21	di di	14	ste	1	d i	6 A
NMS Intertace	1.1	1.4	1	й.	d i	1.4	1	21	d	1.	1.1	14	1.1	11	1	d.	1	11	c.
	1.4	1.1	A	d.	ŵ.s	1.1	1	18	ú	4	6.4	1.1	1.4	d	1	18	16	11	14
	1.1	1.1	1	11	d i	1.1	1	10	A.	1	1.1	1.1	1.1	.4	1	Al.	1	11	e k
	1.1	1.1	d.	1	d i	1.1	1	1	λĺ.	1	67	6.1	1.1	al.	1	÷.	1	21	a R
l lota Intortaco	1.4	1	d.	<i>ú</i> .	ŵ.s	1.18	1	1	ú	41	4.4	1.1	1.4	1	4	zł.	16.	4.	d la
Data michae	1.1	1.1	16	di.	di a	1.1	10	24	d	16.	6.4	6.1	14	16	16	di	1	11	i k
	1.1	1.1	d	di.	di s	1.1	A	1	xî.	16	4.4	6.1	1.1	di.	1	xê.	16	11	44
	-	-10	-			1	-	-	-	-		1	-	-	÷	-	-	-	2

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

P 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.





P Address 192.168.075.106	
Default Gateway 000.000.000	

G		a.	M	đ	đ	đ	A	đ	đ	đ	,si	đ	đ	đ	đ	,ti	1	1	.1	1.1	đ	đ	16	đ	,si	đ	đ	đ	đ	đ	.d	đ	đ	.11	đ	,ii	đ	đ	đ	.si	2
1	1.1	1		1	-16	st.	16	.11	1	-1	A	4	4	28	4	,tå	.4	1	1	1.4	14	\$	10	.11	л	4	16	4	A	4	al.	4	4	.1	1	18	4	21	4	.1	\$
1	14	14			>	ji.	16	18	4	4	đ	H	٦	r	n	6	a	Q	k	.4	14	\$	10	.1	А	4	16	đ,	A	đ,	A.	4	4	.1	đ,	16	4	A	4	A	4
1	L.	1	1	1	2	£.	16	18	1	-	ų	y	J	15	5	5		ų	1	-18	16	2	10	1	sł.	4	đ,	4	sh.	\$ł	si.	A	\$	A	\$	10	sh.	A	4	A	2
11	1.1	LA.	10	Я	A	Ŕ	d	л	,sl	4	лĺ	A	đ	A	A	,tá	1	18	.11	1.4	16	A	.11	Л	,sl	A	đ	A	А	лł	al.	л	A	đ	A	1	л	,sl	18	,sl	1
1	14	1.1	18	4	4	si,	16	.11	14	-	£	16	r.	-15	e	v	-	4	-	1.4		4	-	r.	•.4	t	٠.	1	æ	×.	al.	4	4	.4	đ,	18	18	28	4	A	4
4	Lai	Ul	.11	A	м	Аl	A	л	л	/	5)ť	3	di.	1		3	١đ	D	ы	/	2	D	1	ji j	ŧ	Л	d	н	J	м	лî	A	м	A	A	л	л	4	,sl	.4
1	1	1.1	18	\$	1	Ŕ	16	18	J.	A	л	18	20	10	10	78	1	.4	1	54	A	2	10	10	л	A	16	2	10.	11	,sf	A	\$	A	Ŕ	16	18	ᆆ	4	A	2
1	1.1	1.1	.11	16	A	ží.	16	前	21	16	zi	煎	16	<i>th</i>	湔	4	.18	18	1	1.4	16	1	10	.ti	.1	.4	<i>th</i>	煎	đ.	лí	.zł	.18	A.	A	<i>M</i>	16	頑	zi	A.	zi	1

2.5 Configuration Setting

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

Save Config	Factory Reset
Postoro Confige	
Restore configa	

2.6 Version

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

SW Version	HD Version
X <u>.</u> X.X	



Chapter 4 WEB NMS operation

Using the LCD digital display and front buttons for setting configuration is always an option if you are close by, conveniently you can alter the same settings through a computer by connecting the device to the web NMS Port. Always make sure that the computer's IP address is different from the Units IP address; otherwise, it will cause an IP conflict. Below is an explanation of how you can adjust settings through a web portal

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.

E.G. the PC IP address is 192.168.99.252, we then change the device IP to 192.168.99.xxx (xxx can be 0 to 255 except 252 to avoid IP conflict).

Use 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.

Welcome
Username
Password
sign
Copyright @2014

Figure-1



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.

	Status II System	nput MUX Modu User can cl interface to	ator Output TS co ick any item here o check informati	nfig System - e to enter the cor on or set the par	responding rameters.	Reboot
	Uptime:	02:40:47 up 2:40), load 0.16, 0.13, 0.10			
	Uname:	Linux bamboo 3.	13.0-xilinx #215 SMP PRE	EEMPT Tue Dec 16 20:11	1:39 CST 2014 armv7l	Click this button to
	Memory:	376744/246736				restart the device.
	SW Versio	n: 1.2.1				
	Inputs					
	# Int	erface	TS Lock	Bitrate (Mbps)	It displays	the signal erface and
	1 End	coder 1		9.84	displays	real-time
	2 En	coder 2		9.84	encoding I	bit rate of
	3 AS Outputs			26.75	channel.	ing input
	# Inte	rface	TS Overflow	Bitrate (Act/Max	Mbps)	
	1 RF 1		•	0.026/38.014		
A carrier output	2 RF 2		•	0.03/38.014	TS indicator—Gre	en light
	3 RF 3			0.024/38.014	which otherwise	turns to
	4 RF 4		-	16.175/38.014	red.	
	5 MPT	s	•	19.222/49.999		
IP output	6 SPT	S 1	-	0.022/21.999		
	7 SPT	S 2		16.058/17		

Figure-2

Input

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





E n co d er Pa ram

Clicking "Encoder Param" it displays the information of the Video and Audio encoding parameters as

	Input Param						
	 Here you can 	configure the encoder param.					
	CHAN 1 CHAN 2 (CHAN 2) Encoder Param Encoder	Encoder ch selection a	iannel irea.				
	Norm: 1920x1080 59. Bitrate: 13.391 Mbps Rom Version: 0.95	Interface Video Format CC Switch Video BitRate(Kbps)	HDMI H.264 On 14000	>] →	CC ((throu Chap	closed caption) can be input ugh "CC" port. Refer to the oter 5 for detailed information
		Low Delay DTS Delay GOP Bframe GOP Pframe Resolution	Mode 1 1 0 14 auto	<u>v</u>	(1-500) (<=3) (<=6)	- - -	These items are settable when the "Low Delay" mode is set "Manual".
ser ca ormal nly set udio fe	n set Dialog ization here. It is table when the ormat is AC3.	Audio Format Dialog Normalization Audio Source Audio BitRate Audio Gain(0-400%)	Mpeg2 -31 Analog 320 Kbps 100	× ×	(-31 ~ -	1)dB	
					4.1		Get Apply



"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.



Encoderout Param

Clicking "Encoder out Param", User can set the encoded program output parameters.

Input Param				
 Here you can configure th 	e encoder param.			
CHAN 1 CHAN 2				
(CHAN 2)				
	_		С	lick this box to enable or
Encoder Param Encoder Out Paran	1			
	Out Enable(ABCDE)		di	sable the program output
Norm: 1920x1080 59.94	Service Provider		th	rough 4 carriers (A, B, C,
Rom Version: 0.95	Program Name			
	Service ID	2	ar	Id D) of MP15 (E).
	PMT PID	7005		
	Video PID	7006		
	Audio PID	7002	->	Edit program info here
	PCR PID	7006		
	LCN	2		
	Major Channel Number	2		
	Minor Channel Number	2		
	Source ID	2		
	Short Name	BBBB1		
				Col Analy
				Get Apply



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.







Refresh Expand Collapse Maximize 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.

Parse 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 *Edt* it triggers a dialog box (Figure 6) where users can input new information.

Program Number	768	Program Name	CCTV-1	
PMT PID	32	PCR PID	33	
LCN	0	Source ID	1	
Major Channel Number	1	Minor Channel Number	1	
Short Name	fff			
Program Info				
13818-2 Video 34	13	818-3 Audio 35		

Figure-6



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

Modulator Setting

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 M o d u latin g

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.

Modulator	
 Here you can configure the dvb-c modulator param. 	
Channel 1 Channel 2 Channel 3 Channel 4	arrier select
Standard	
J.83A(DVBC)	v
Constellation	
128 QAM	×
Symbol Rate (Ksbs)	
6875	
RF Frequency (KHz)	
650000	
RF Level (-30 ~ -10 dBm)	
-30	
RF ON	

Figure-7

After setting all the parameters, click "Apply" 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.



Status	Input	MUX	Modulator	Output	TS Config	System -	Reboot
Modulat	or	e inclusion	the word lat				
. nere	you can	comgun	e the modulati	n param.			
RF 1	RF 2	RF 3	RF 4		<u> </u>	Output carrier select	
RF Frequency	(KHz)						
650000							
RF Level (-30 -	10 dB	m)					
-30							
RF ON							
							Get Apply

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.

	Status	Input	MUX	Modulato	r Output	TS Config	System -				Reboot
	Output	Param	neters	1							
	 Here 	Can	configur	e the SPTS	and MPTS IF	output.					
	Outpu	t Setting	IS [DATA IP Sel	ttings /	ASI Out Select					
SP	TS										
#	Enable		Null F	kt Filter	Outp	ut IP		Dst port	Src port		
1	RTP	¥	OF	-	192	168.4.222		3001	5001	Apply	
2	RTP	*	OF	t l	192	168.4.222		3002	5002	Apply	
MP	TS										
#	Enable	N	ull Pkt	Filter (Output IP		Dst port	Src port	Bitrate (Kbps)		
1	UDP	~	ON	~	224.2.2.2		2001	4001	50000	Apply	

Figure-8

Data IP Setting

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



Status Input MUX Modulator	Output TS Config	System - Reboot
Output Parameters		
 Here you can configure the SPTS and 	MPTS IP output.	
Output Settings DATA IP Settings	ASI Out Select	
IP Addr Submask Gateway Mac Addr	192.168.4.111 255.255.255.0 192.168.2.0 20 20 12 34	56 78
		Get Set

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.

Status Input MUX Modulato	or Output TS Config	System -	Reboot
Output Parameters Here you can configure the SPTS 	and MPTS IP output.		
Output Settings DATA IP Settings	ASI Out Select		
ASI Out ASI Out	1 put RF1 ✓ Get 2 put RF4 ✓ Get	Apply Apply	Copy a stream from one carrier or MPTS to output through ASI.
	Figure-10		

TS Config

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



Status rnpul MUX MOdulator Outpu	ut · System • <mark>Reboo</mark> t
TS Param	
Here u can anfigure the @flcooer param	
	MPTS select
Stream	
olioan	
TSID	
UNIC	
NIT	1
Network 10	
Network Name	
network 1	
Version Mode	
AutomatiC	
Version Number	
22 LCN Mode	
European	
country Code	
0	
ChannelList IC	
0	
ChannelList Name	
Private Nata	
0	
NITInse	
х <i>г</i> ст	
VCI	
Modulation Mode	
VCT Inseri	
	Get Apply

Figure-11



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.



Figure-12

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.

Sta	itus	Input	MUX	Modulator	Output	TS Config	System -		Reboot
Netw	/ Ork IP Add as 192 Subm Gatew	dr - The r 2.168.0.1 ask - Ge vay - If th	manege I). After meral is le device	address,use ti set the IP add 255.255.255.25	his address rress,you m ,it is must t net segmer	to visit the main nust use the ne the same in a lo nt,you must set	nege web. The format is » w address to visit the ma ocal area network. the gateway.	ooc.xooc.xooc.kooc(like inege web.	
				IP Addr Subma Default	: sk: Gateway:	192.168.75.10 255.255.255.0 0.0.0.0	0		
								Get	Set

Figure-13



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.

Status	Input	MUX	Modulator	Output	TS Config	System -	,	Reboot	
Passwo	rd								
 Modify the login name and password to make the device safely. If forget the name or password, you can reset it by keyboard in menu 4.2. The default login name and password is "admin". Also please note the capital character and lowercase character. 									
	Curr	ent User	Name:		admin				
	Cum	ent Pass	word:						
	New	UserNar	ne:						
	New	Passwoi	rd:						
	Conf	firm New	Password:						
								Set	

Figure-14

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.

Status	Input	MUX	Modulator	Output	TS Config	System -	Reboot	
Upgrad	е							
 Update firmware(software and hardware) to get new function,please choose the right firmware to update.If you use a wrong file,the device may not work. Update will keep a long time,please do not turn off the power, otherwise the device will not work. After update,you must power off and reboot device manually. 								
				Click to op	pen the file Brow	rser	Browse Button	
Debug								

Figure-15



Chapter 5 Operation of Closed Caption (CC)

Closed Caption, hereinafter referred to as the CC. This unit has analog CC 608 only.

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

CHAN 1 CHAN 2					
(CHAN 2)					
Encoder Param Encoder O	ut Param				
	Interface	HDMI	~		
Norm: 1920x1080 59.94 Bitrate: 17 182 Mbps	Video Format	H.264	~		
Rom Version: 0.95	CC Switch	<u>On</u>	~		CC switch On: Enable CC in
	Video BitRate(Kbps)	14000			CC switch Off: Unable CC
	Low Delay	Mode 1	~		
	DTS Delay	1		(1-500)	
	GOP Bframe	0		(<=3)	
	GOP Pframe	14		(<=6)	
	Decolution	auto	~		



Chapter 6 Low Delay Setting

The H-2ADHD has a low delay option 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:

CHAN 1 CHAN 2					
(CHAN 2)					
Encoder Param Encoder Out	Param				
	Interface	HDMI	*		
Norm: 1920x1080 59.94	Video Format	H.264	*		
Rom Version: 0.95	CC Switch	On	*		Low delay: Normal,
	Video BitRate(Kbps)	14000			Mode 1, Mode 2,
	Low Delay	Mode 1	~		Manual optional
	DTS Delay	1		(1-500)	
	GOP Bframe	0		(<=3)	DTS Delay, GOP B
		_14		(≤=6)	frame, GOP P frame
	Resolution	auto	*		are settable when
	Audio Format	Mpeg2	*		choose Low Delay
	Dialog Normalization	-31		(-31 ~ -1)dB	Mode: Manual.

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

$\label{eq:linear} Internal \, \mbox{Test Report of Time Delay} \\ The values \, cover \, the progress \, from \, \mbox{Encoding} \rightarrow \mbox{Decoding} \\$

		E	ncoding Detai	ls		
Decoding Terminal	Single Source	Bit Rate Mode	Resolution	Low Delay	Encoding Type	(ms)



	Interface			Mode		
				Mode 1	mpeg2	300 335
			1080i@50	Mada 2	mpeg2	407.5
DVB-C HD STB	номі	VBR		Mode 2	H.264	492.5
	TIDIWI	VDIX		Mode 1	mpeg2	230
			720n@50	Mode 1	H.264	285
			7200 800	Mode 2	mpeg2	382.5
				Mode 2	H.264	395
						-
			1080i@50	Mode 1	mpeg2	282.5
				mode i	H.264	395
				Mode 2	mpeg2	397.5
DVB-C HD STB	YPhPr			NOUE 2	H.264	450
		VDIX		Mode 1	mpeg2	267.5
			720n@50	Wouc 1	H.264	255
			720p@00	Mode 2	mpeg2	385
				Mode 2	H.264	422.5
				Mode 1	mpeg2	450
DVB-C HD STB	CVBS	VBR	576i@50	incae i	H.264	570
			0/010000	Mode 2	mpeg2	510
					H.264	620

		Ei	ncoding Detai	ils		
Decoding Terminal	Single Source Interface	Bit Rate Mode	Resolution	Low Delay Mode	Encoding Type	Average Delay (ms)
				Mode 1	mpeg2	300
			1080i@50	WOUC 1	H.264	335
			10001@00	Mode 2	mpeg2	407.5
ATSC HD STB	НОМІ	VBR			H.264	492.5
	1 Divin	VBIX		Mode 1	mpeg2	230
			720n@50	WOUC 1	H.264	285
			1200 800	Mode 2	mpeg2	382.5
				modo E	H.264	395
		i .	1		-	
	YPbPr	VBR	1080i@50	Mode 1	mpeg2	282.5
					H.264	395
				Mode 2	mpeg2	397.5
ATSC HD STB					H.264	450
			720p@50	Mode 1		207.0
					<u>п.204</u>	200
				Mode 2	H 264	422 5
					11.204	122.0
					mpeg2	470
			570.050	Mode 1	H 264	515
			5761@50		mpeg2	540
	C)/DC			Mode 2	H.264	570
AISC-I TU SIB	UVDO	VDR		Mode 1	mpeg2	460
			180:@60	wode 1	H.264	500
			4001@00	Mode 2	mpeg2	510
				wode z	H.264	550



Chapter 7 Troubleshooting

THOR's ISO9001 quality assurance system has been approved by the CQC organization. We guarantee the products' quality, reliability and stability. All THOR products haven passed all testing and manual inspections before they are shipped out. The testing and inspection scheme already covers all the Optical, Electronic and Mechanical criteria which have been published by THOR. To prevent a potential hazard, please strictly follow the operation conditions.

Prevention Measures

- Installing the device in a place where the environmental temperature is between 0 to 45 °C
- Making sure the unit has plenty of ventilation for the heat-sink on the rear panel; and other heat-sink bores if necessary
- Checking the AC input within the power supply and ensure it is working, the connection is correctly installed before switching on device
- Checking the RF output levels to stay within a tolerable range, if it is necessary
- Checking all signal cables have been properly connected
- Frequently switching on/off device is prohibited; the interval between every switching on/off must be greater than 10 seconds.

Conditions needed to unplug power cord

- Power cord or socket damage.
- Any liquid that got into the device.
- Any stuff that could cause a circuit short
- Device in damp environment
- Device has suffered from physical damage; i.e. it fell off a rack.
- Longtime idle.
- After switching on and restoring to factory setting, device still won't work properly.
- Maintenance needed on device



ATSC - US Television Channels (MHz)										
Channel	MHz Center Frequency	Channel	MHz Center Frequency	Channel	MHz Center Frequency					
2	57	27	551	52	701					
3	63	28	557	53	707					
4	69	29	863	54	713					
5	79	30	569	55	719					
6	85	31	575	56	725					
7	177	32	581	57	731					
8	183	33	587	58	737					
9	189	34	593	59	743					
10	195	35	599	60	749					
11	201	36	605	61	755					
12	207	37	611	62	761					
13	213	38	617	63	767					
14	473	39	623	64	773					
15	479	40	629	65	779					
16	485	41	635	66	785					
17	491	42	641	67	791					
18	497	43	647	68	797					
19	503	44	653	69	803					
20	509	45	659							
21	515	46	665							
22	521	47	671							
23	527	48	677							
24	533	49	683							
25	539	50	689							
26	545	51	695							

ATSC Off-Air US Television Channels Center Frequency (MHz) Chart





CATV QAM Channel Center Frequency - 54 MHz to 860 MHz (J.83B)

EIA CH.	MHz Center Frequency	EIA CH.	MHz Center Frequency	EIA CH.	MHz Center Frequency
2	57	42	333	87	603
3	63	43	339	88	609
4	69	44	345	89	615
5	79	45	351	90	621
6	85	46	357	91	627
95	93	47	363	92	633
96	99	48	369	93	639
97	105	49	375	94	645
98	111	50	381	100	651
99	117	51	387	101	657
14	123	52	393	102	663
15	129	53	399	103	669
16	135	54	405	104	675
17	141	55	411	105	681
18	147	56	417	106	687
19	153	57	423	107	693
20	159	58	429	108	699
21	165	59	435	109	705
22	171	60	441	110	711
7	177	61	447	111	717
8	183	62	453	112	723
9	189	63	459	113	729
10	195	64	465	114	735
11	201	65	471	115	741
12	207	66	477	116	747
13	213	67	483	117	753
23	219	68	489	118	759
24	225	69	495	119	765
25	231	70	501	120	771
26	237	71	507	121	777
27	243	72	513	122	783
28	249	73	519	123	789
29	255	74	525	124	795
30	261	75	531	125	801
31	267	76	537	126	807
32	273	77	543	127	813
33	279	78	549	128	819
34	285	79	555	129	825
35	291	80	561	130	831
36	297	81	567	131	837
37	303	82	573	132	843
38	309	83	579	133	849
39	315	84	585	134	855
40	321	85	591	135	861
41	327	86	597		

QAM 256 / Symbol Rate 5.361Msps , QAM 64 / Symbol Rate 5.057Msps

Link to the 4 ch HDMI /YPbPR encoder Modulator

<u>4 Channel HDMI /YpBpr IP Encoder / QAM Modulator 1080p</u>







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