



CHANNEL VISION™

Intelligent Entertainment • Infrastructure • Security Solutions



HDM100



HDM200R

User's Manual HDMI Modulator

ATSC 8VSB/QAM 65/256

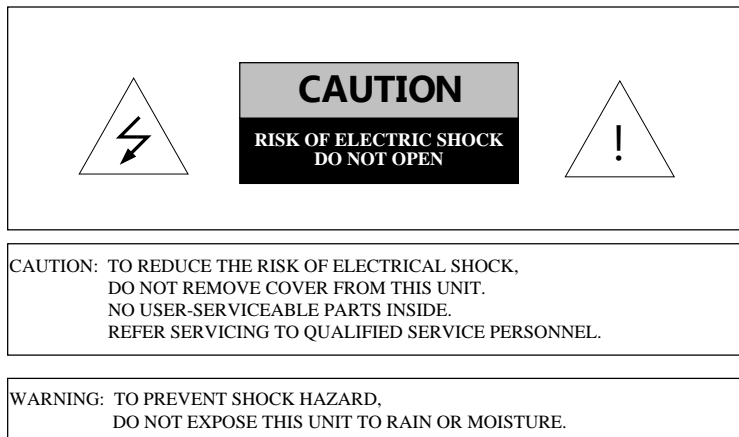
Model No : HDM100 / HDM200R

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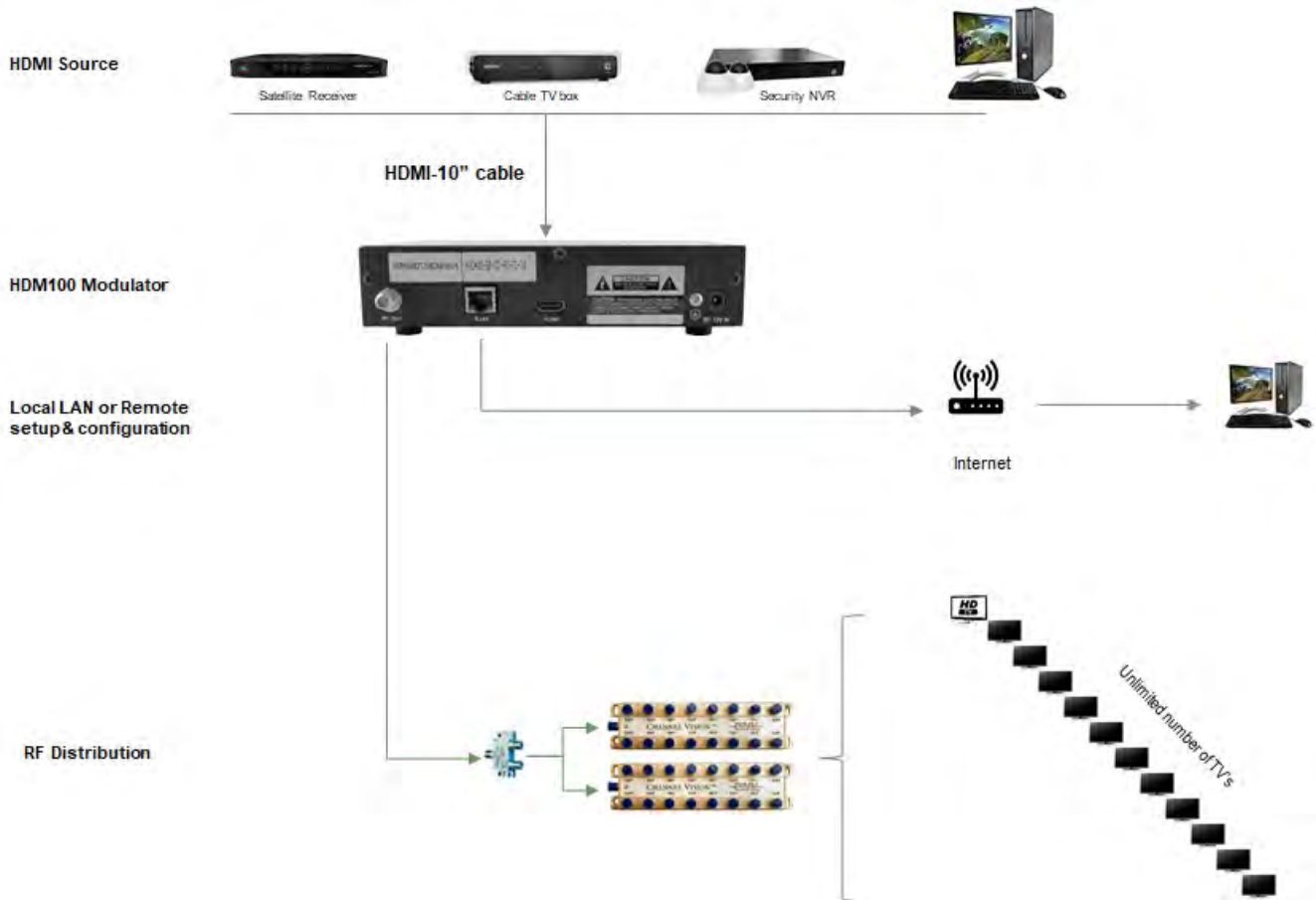
1. Safety Instructions & Precautions

- Do not operate the HD modulator in high-humidity areas or expose it to water or moisture. Objects filled with liquid should be placed on the device.
- Disconnect the product from the wall outlet prior to cleaning. Use a light, damp cloth (no solvents) to dust or clean the product.
- Do not block or cover slots and openings in the HD modulator. These are provided for ventilation and protection from overheating. Never place the HD modulator near or over a radiator or heat register. Do not place the HD modulator in an enclosure such as a cabinet without proper ventilation.
- We strongly recommend using the enclosed ground wire connecting to the ground cable of your house/building to avoid voltage spikes or ground fault.
- Never insert objects of any kind into the HD modulator through openings, as the objects may touch dangerous voltage points or short out parts. This also could cause fire or electrical shock.
- When replacement parts are required, ensure that the service technician uses replacement parts specified by the manufacturer. Unauthorized substitutions may damage the HD modulator or cause electrical shock or fire and will void the warranty.
- Upon completion of any service or repair to the HD modulator, ask the service technician to perform safety checks to ensure that the HD modulator is in proper operating condition.



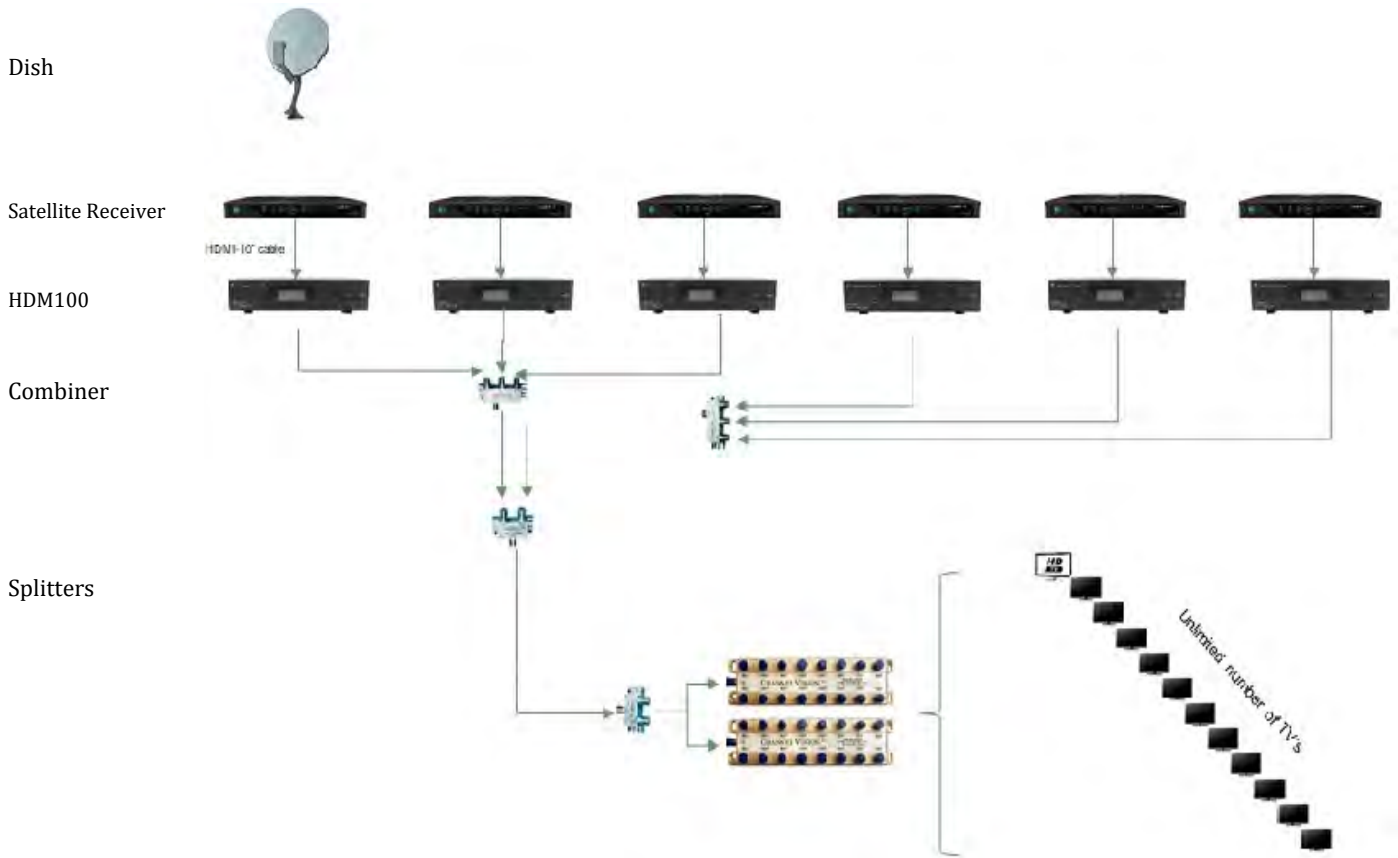
2. Operation Guide

2-1. Connection Diagram



- A. Connect the power supply.
- B. Connect the video/audio source to the modulator using an HDMI cable.
HDMI can reach HD resolution 1080p.
- C. Connect the RF Output to the RF network, STB or the TV set directly.
* According to your headend system, set the output power attenuation on the modulator properly.
- D. For safety purposes, use the ground wire enclosed with the modulator to connect to your ground cable.
- D. Configure the modulator from a computer through the RJ-45 port.

HDMI Modulation with Satellite Receivers

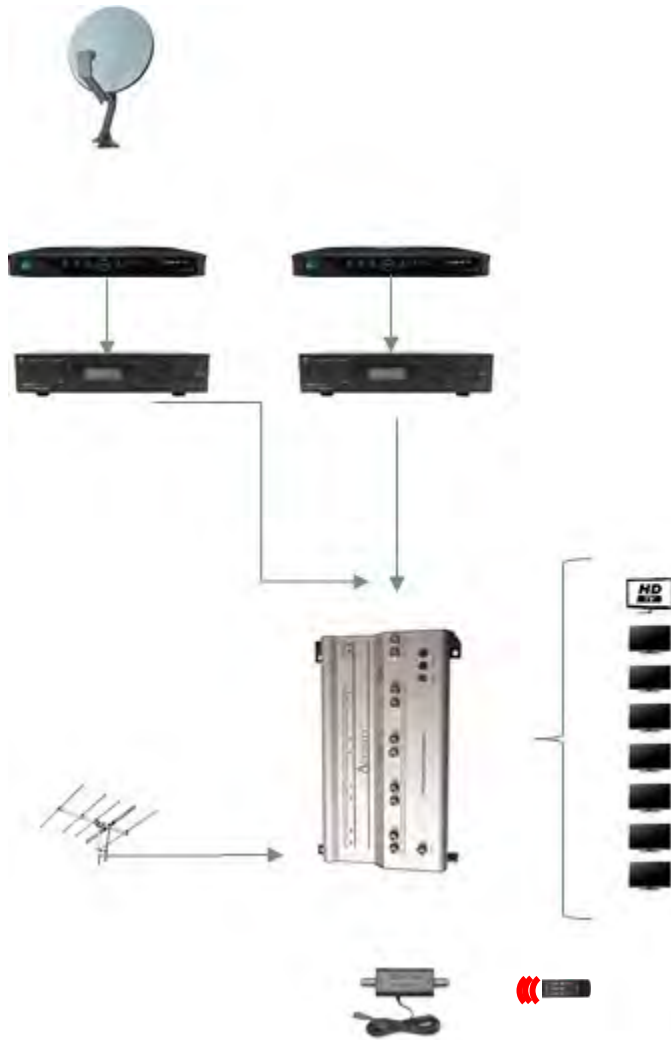


- Satellite Receiver is set on dedicated channel IE: ESPN receiver 1, FOX on receiver 2 etc...
- Combine 6 HDMI Modulators together on different modulated channels
- 32 TV's receive the modulated satellite tv channel with 1080P picture quality
- 1 RG6 coax to each TV

Equipment list:

- 1ea. Satellite Dish
- 6ea. Satellite TV Receiver box
- 6ea. HDMI-10 cables
- 6ea. HDM100 modulator
- 2ea. HS-3 splitter/combiner
- 2ea. HS-2 splitter / combiner
- 2ea. HS-16 splitter / combiner
- unlimited 1080P tv's
- RG6U Quad Coaxial Cable

HDMI Modulation with Satellite Receiver using IR Channel Control and Antenna Design

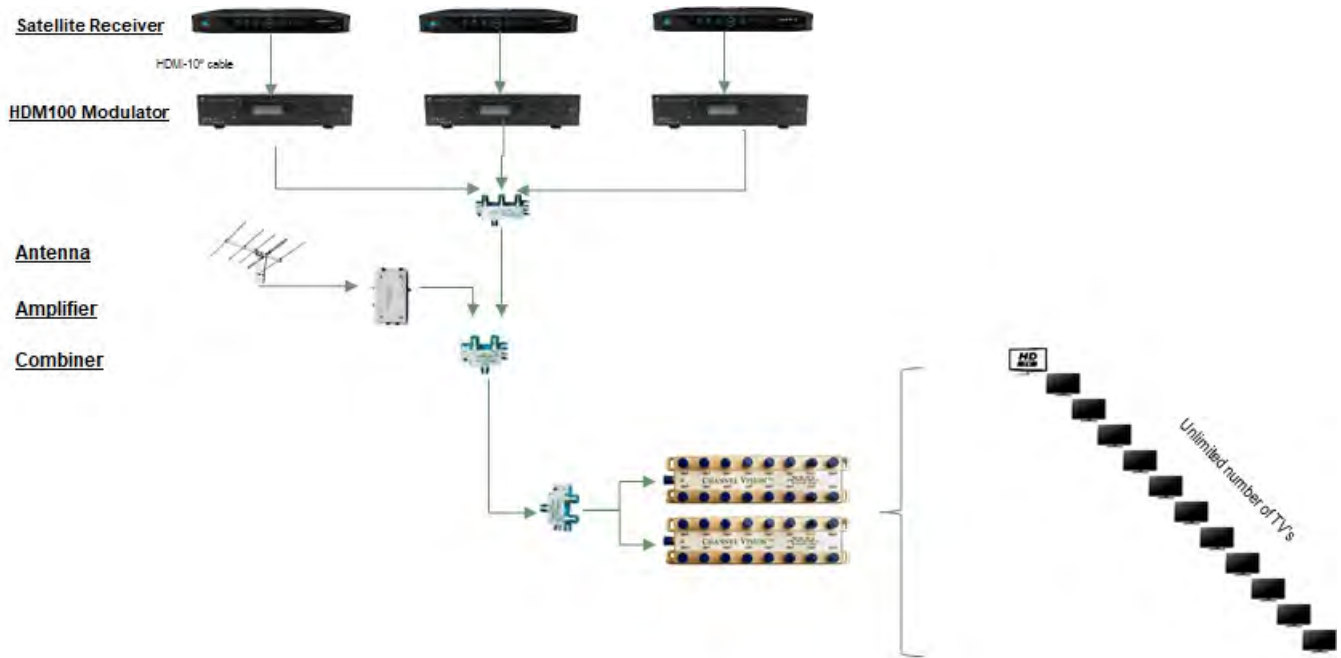


- View & Control Satellite Receiver box
- Modulate 1080P Picture Quality to all TV's
- Antenna viewing on all TV's
- Control Receiver box from all TV's
(using Direct TV remote & 2 receiver ir codes)

Equipment list:

- 1ea. Satellite Dish
- 2ea. Satellite TV Receiver box
- 2ea. HDMI-10 cables
- 1ea. IR-3002 ir flasher
- 2ea. HDM100 modulator
- 1ea. P0328 amplified splitter/combiner
- 8ea. IR-4101 receiver over coax
- 1ea. Antenna
- 8ea. 1080P tv's
- RG6U Quad Coaxial Cable IR-4101

HDMI Modulator with Satellite Receivers and Antenna/Cable TV



- Satellite Receiver is set on dedicated channel IE: ESPN receiver 1, FOX on receiver 2 etc...
- Combine 3 HDMI Modulators together on different modulated channels
- Antenna with amp to balance signal strength
- 32 TV's receive the modulated satellite tv channel with 1080P picture quality & all antenna channels
- 1 RG6 coax to each TV

Equipment list:

1ea. Satellite Dish

3ea. Satellite TV Receiver box

3ea. HDMI-10 cables

3ea. HDM100 modulator

1ea. HS-3 hybrid splitter / combiner

1ea. Antenna

1ea. C-0317/CVT-15WB amplifier

2ea. HS-2 splitter / combiner

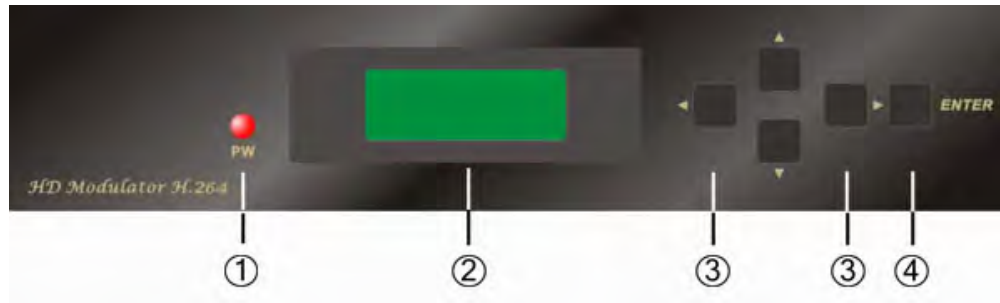
2ea. HS-16 splitter

*Unlimited number of 1080P tv's

RG6U Quad Coaxial Cable

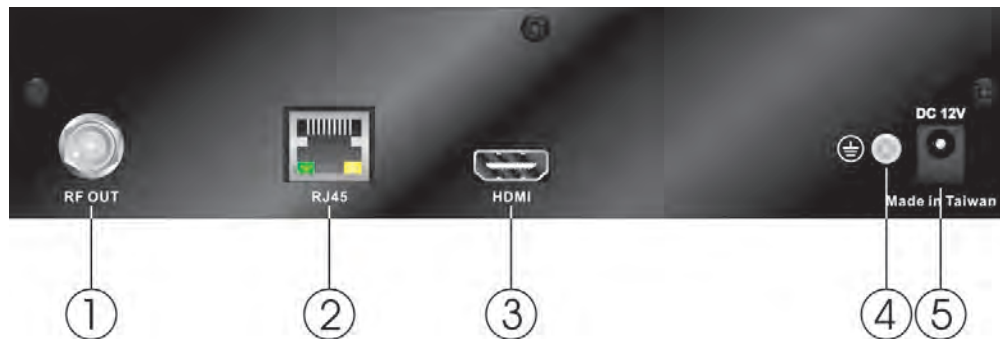
*contact Channel Vision for rf design

2-2. Front Panel



1. Power LED Indicator
2. LCD Display
3. Up / Down / Left / Right
4. Enter

2-3. Rear Panel



1. RF OUT : 75 ohm F type connector for RF output
2. RJ 45 : LAN port for remote configuration and system management setup
3. HDMI : Digital A/V input
4. Joint screw for ground wire (included)
5. DC 12V IN : 12VDC power supply input

2-4. Functions of Operating Button: Locked to prevent unintended changes to the programming.

INSTALLER CODE: Push and hold ENTER and RIGHT ARROW buttons at the same time for 5 seconds. see following instructions of buttons on the front panel to operate in each setting category.

“Enter” :

- Enter a category to configure settings
- Confirm selected item or numbers. (Please press ENTER after each setting to make it effective; the setting will be marked a “ * ”)

“Up” / “Down” :

- Edit numbers
- Select different options in a category

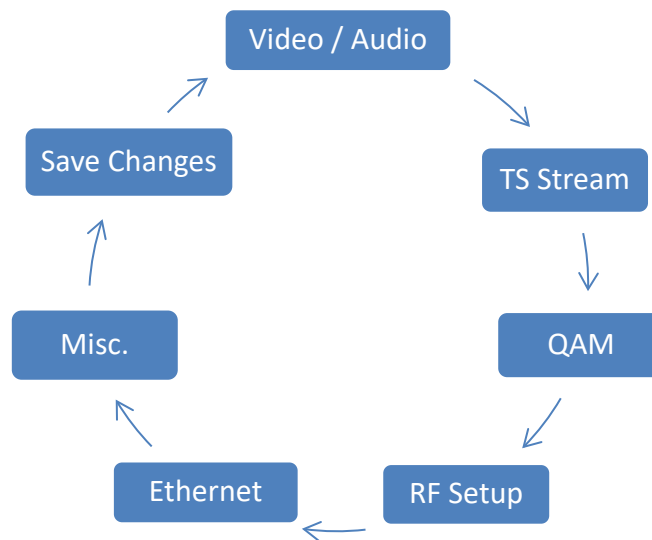
“Left” / “Right” :

- Left button also works as “EXIT”
- Move to digit places to set numbers
- Select different options in a category

3. System Configurations

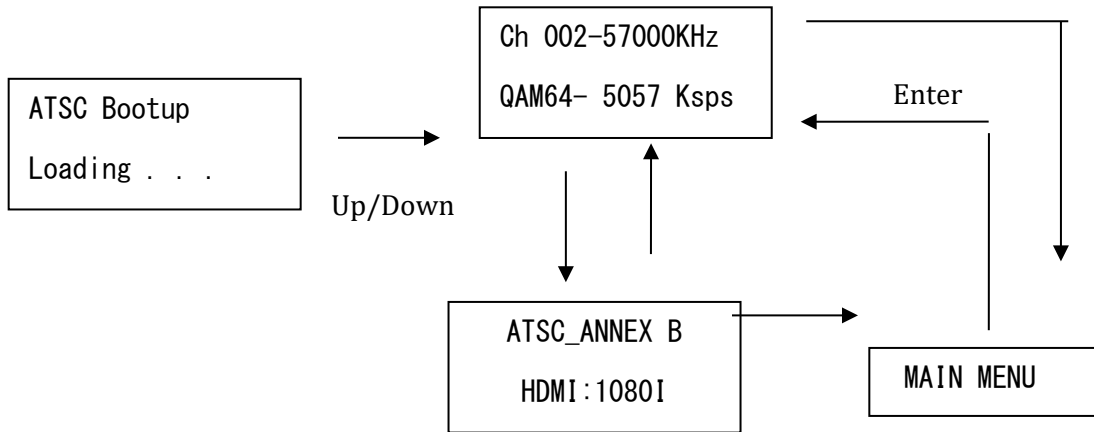
Configuration can be processed through control panel (front panel) or web.

3-1. Structure of System Menu



3-2. Configuration through Control Panel

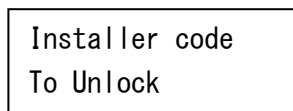
3-2-1. Initial display



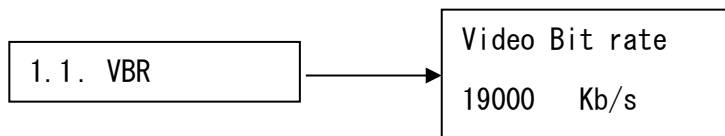
- Ch 002-57000KHz : RF output channel / frequency. If the RF is set to Frequency mode, it shows “DVBC 057000 KHz”
- ATSC 8VSB: current setting indicator Vestigial sideband signal/Antenna TV
- QAM 64 : QAM (Quadrature Amplitude Modulation with 64 point signal constellation (default)
- 5057 Ksps : Output symbol rate
- HDMI : Input Resolution
- 1080I : Input resolution (auto adjust to source)

3-2-2. Unlock Unit

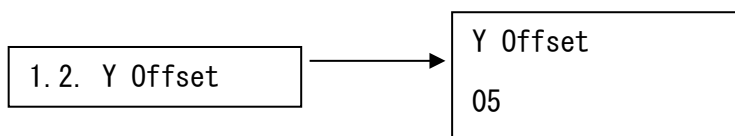
- Press and hold “Right” and “Enter” for about 5 seconds to unlock.

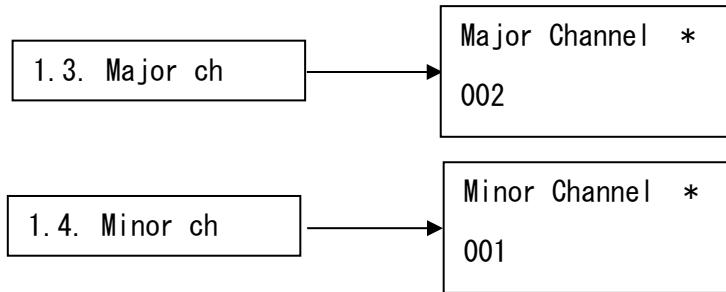


3-2-3. Video /Audio - Video /Audio Input Configuration



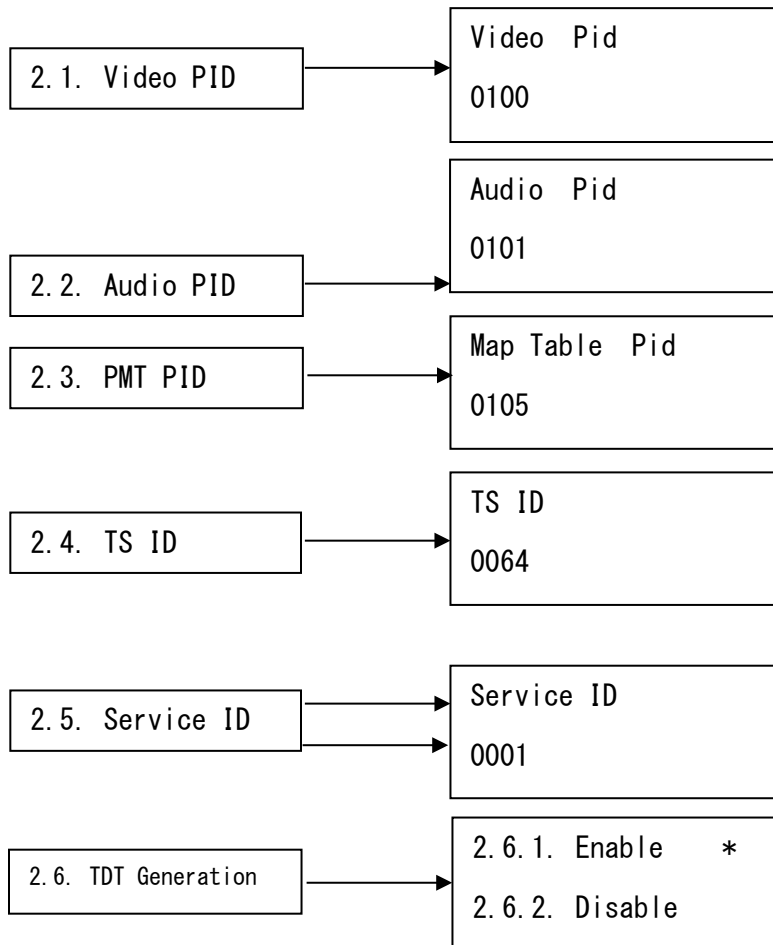
- VBR range: 15000~19000 kb/s: (19000 default)

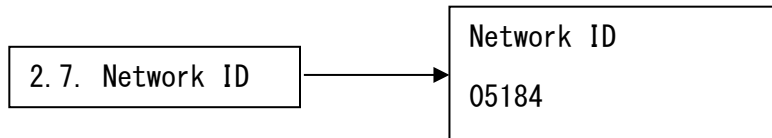




- Y-offset: vertical adjustment of picture
- Major / Minor ch : Virtual channel setting will give you the digital tv channel.
 - Major=2 Minor=1 Digital channel will show up as 2-1
- Bitrate is adjustable in steps from 8-18 Mbps for **MPEG2**, 5-10 for **H.264 HD**, 2-4. Default and recommended rate will be 19000 Kbps

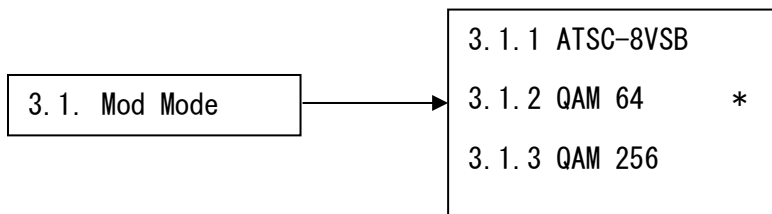
3-2-4. TS Stream– stream editing





- The value of Video PID /Audio PID /PCR PID/ PMT PID should be unique to each other.
- You can set service / provider name through web configuration
- Transport Stream is a media format or a container. It may contain multiple streams of audio & video content working together in the transport stream. Transport streams are designed with synchronization and recovery in mind for lossy distribution found in antenna or ATSC broadcasting in order to continue a media stream without loss in transmission. When an over-the-air ATSC signal is captured to a file, this is referred to as Transport Stream format.

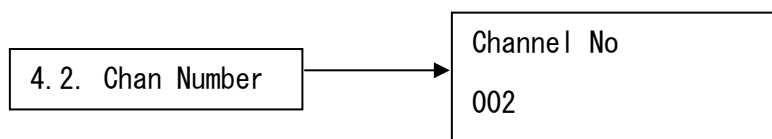
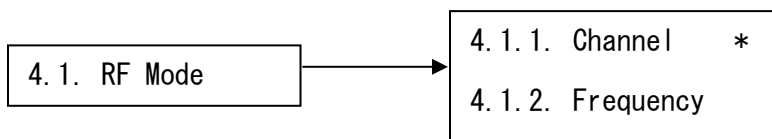
3-2-5. QAM - constellation setup



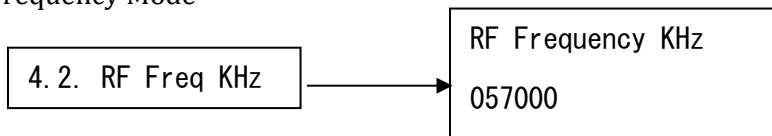
QAM = QAM (Quadrature Amplitude Modulation with 64-point signal. Depending on the quality of the incoming signal, 64 is recommended unless all tv's are new. With poor delivery systems from some cable operators, 256 will be pixelated. 64 is recommended for overall compatibility.

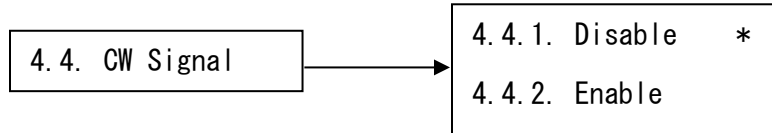
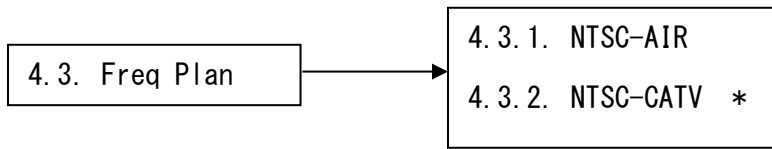
3-2-6. RF Setup

Channel Mode

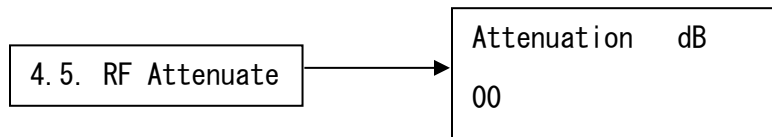


Frequency Mode



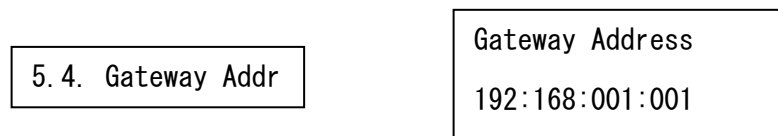
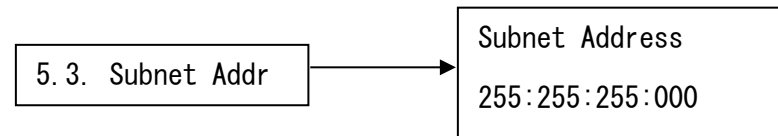
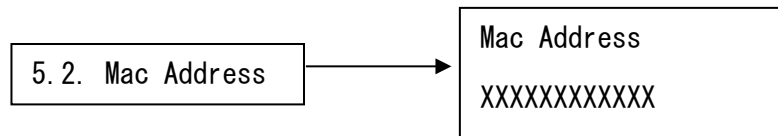
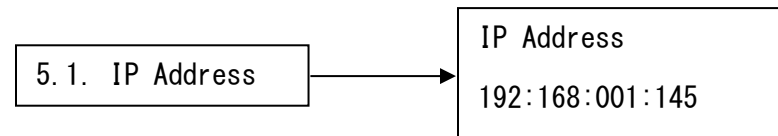


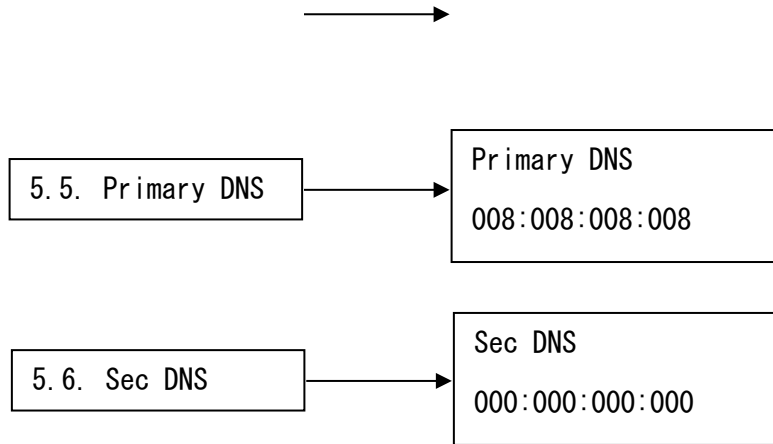
- CW Signal: this will always remain in “Disable”. This option is only for testing purposes at the factory. The modulator can’t work if enable this function.



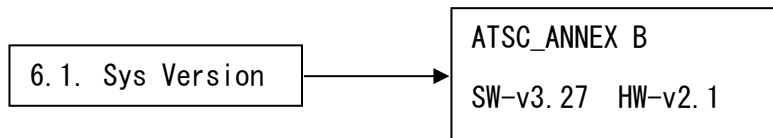
- Set RF output attenuation accordingly if the dB power is too high. FCC specification is 15.5dBmV maximum at the TV set. Too much power will cause pixilation problems.
- Attenuation Range: 0~31dB
- Digital and analog tv optimum signal is 10dBmV

3-2-7. Ethernet – For Web Configuration: make note of

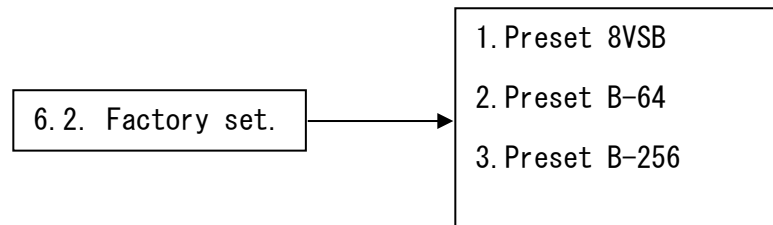




3-2-8. Misc. – For system configuration (Please refer to Chapter 3-3-7 for Time/Date setting)

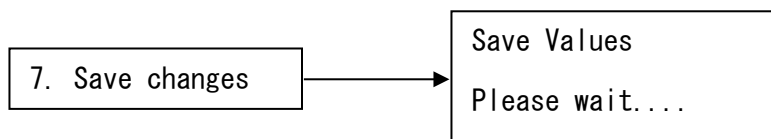


- SW: Software version; HW: Hardware version



- Options of factory default setting :
8VSB (ATSC) / B-64 (Annex B, 64QAM) / B-256 (Annex B, 256QAM)
- Factory default is B-64

3-2-9. Save Changes



- Display will return to the upper menu after saving the changes.
- ★ **Any change of the configuration will not take effect after restarting the system if it is not saved, all the settings will be reset to the factory defaults.**

★ All the saved values will be stored in the memory until next value saved. (none volatile memory)

3-3. Configure through web

Set an IP address of the modulator from the front panel if you don't want to use the default IP address. Connect the modulator to the computer through RJ45 cable.

Enter the IP address of the modulator (Default address: 192.168.1.145) Internet Explorer browser



★ Press <Update> after changing settings in each category. Go to SAFE page to save the configurations.

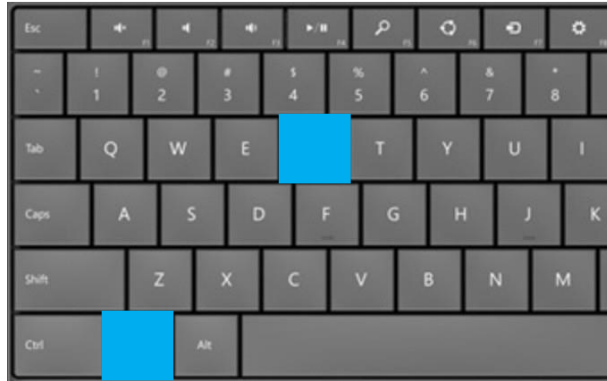
Configure network settings with existing network

- Locate your computer network configuration address information on the following page 1-2 & 1-3.
- Enter this information into the front panel.
- Log in through IE (Internet Explorer) shown in 3-3.

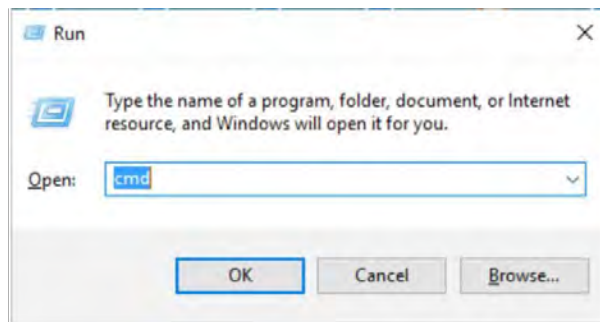
1-2

Verify your computer's LAN settings via Command Prompt

The easiest way to open Command Prompt on a Windows machine is to press Win+R on your keyboard. Hold the Windows key down and then press R.



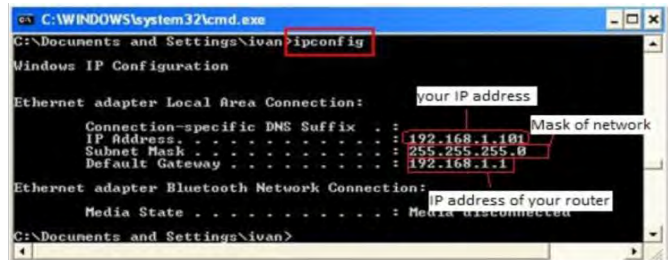
In the Run window, type "cmd" then hit OK. This will open Command Prompt



1-3

In the Command Prompt window, type in "ipconfig" and press enter to find your computer's IP address, subnet mask, and default gateway (your router's IP address).

Make sure to take note of your IP address, your network mask and default gateway so you can reference them later.



3-3-1. Video-Input Configuration

The screenshot shows a configuration window titled "Video". It contains four input fields and one button:

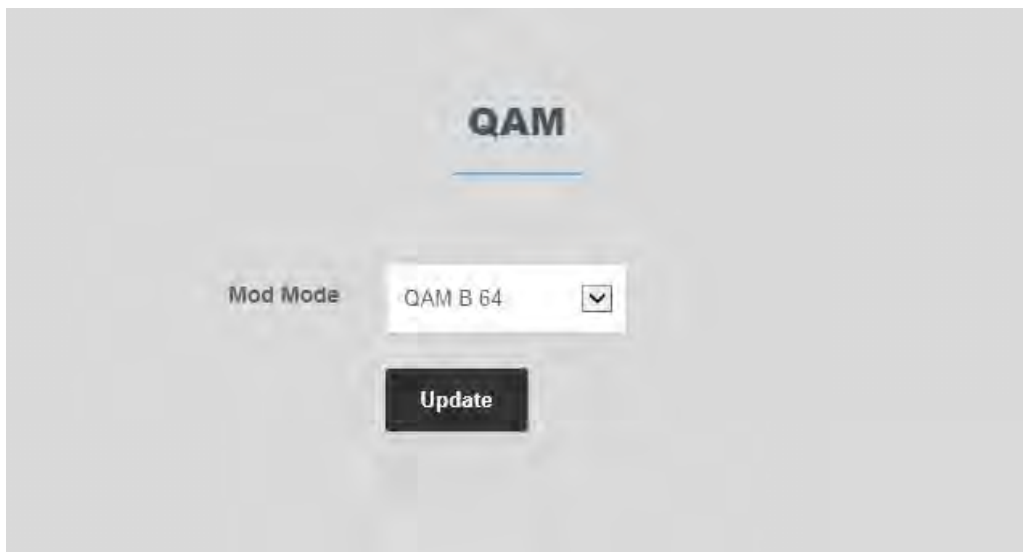
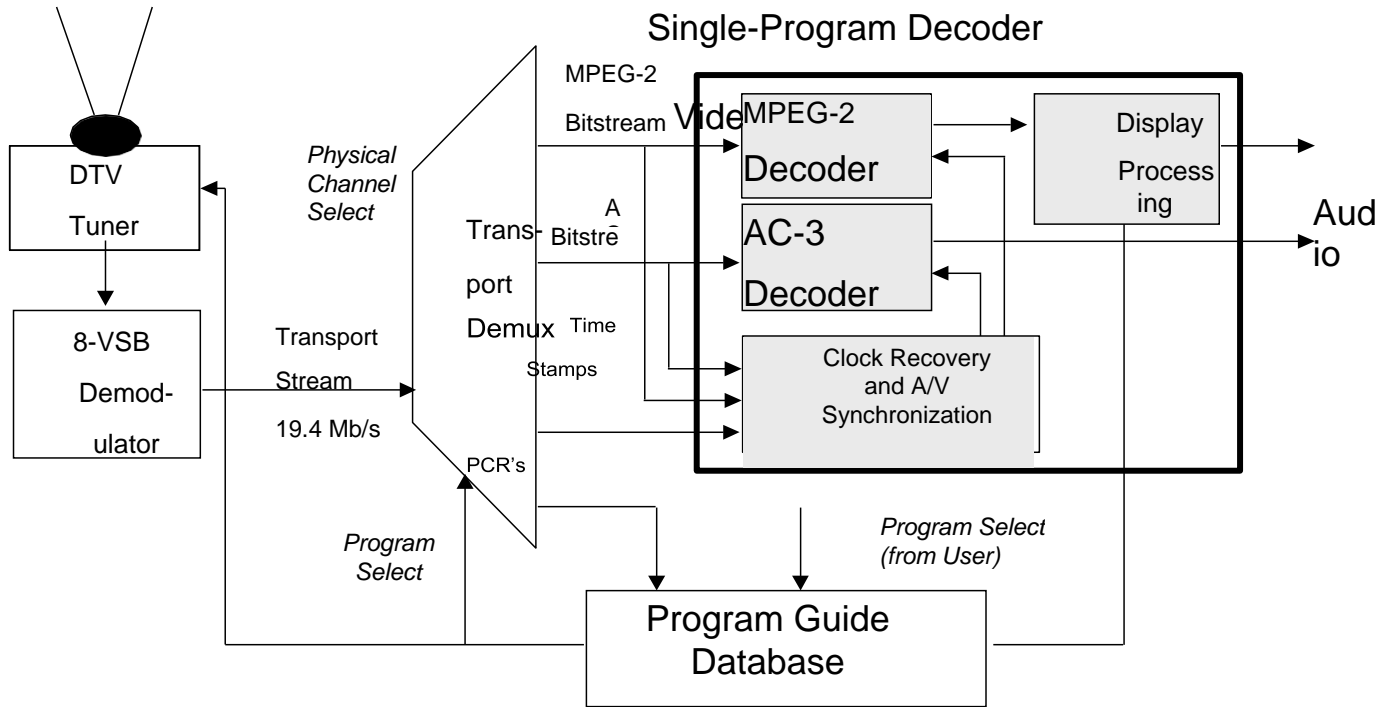
- Video BitRate**: 19000 Kbps
- Y-Offset**: 5
- Major Channel**: 2
- Minor Channel**: 1

At the bottom center is a dark button labeled "Update".

- Major / Minor ch : Virtual channel setting will give you the digital tv channel.
 - Major=5 Minor=2 Digital channel will show up as 5-2 (both must be different)
- Bitrate is adjustable in steps from 8-18 Mbps for **MPEG2**, 5-10 for **H.264** HD, 2-4. Default and recommended rate will be 19000 Kbps

3-3-2. QAM - Constellation setup

An example of the ATSC major and minor numbers used for a station in the United States or Canada would be to typically have its main programming airing on say channel 8 (the "major channel") with analog on 8.0 and digital on 8.1 (the first two "minor channels") with other entertainment channels being below 8.99 on channels 8.2, 8.3, and up and any additional informational data channels ranging from 8.100 to 8.999. The channels can also be displayed using a hyphen (such as 8-1) or a space; however, on a common seven segment display.



QAM = QAM (Quadrature Amplitude Modulation with 64-point signal. Depending on the quality of the incoming signal, 64 is recommended unless all tv's are new. With poor delivery systems from some cable operators, 256 will be pixelated. 64 is recommended for overall compatibility.

3-3-3. RF - Output Configuration

Channel Mode

The screenshot shows a configuration panel titled "RF" with the following settings:

- RF Mode:** Channel (dropdown menu)
- RF Frequency Plan:** NTSC_CATV (dropdown menu)
- RF Attenuation:** 0 dB (input field)
- RF Channel Number:** 2 (input field)
- CW Signal:** Disabled (dropdown menu)

An "Update" button is located at the bottom of the configuration area.

Frequency Mode

Set frequency by Channel on the RF frequency setting (CATV or Antenna)

RF

RF Mode: Frequency

RF Frequency Plan: NTSC_CATV

RF Attenuation: 0 dB

RF Frequency: 57000 KHz

CW Signal: Disabled

Update

- LEAVE “CW Signal” in “Disable”. This option is only for testing purposes at the factory. The modulator will NOT WORK if CW Signal is enabled.
- RF Attenuation Range: 0~31dB
 - This should balance with the signals the modulator is combined with
- Set RF output attenuation accordingly if the dB power is too high. FCC specification is 15.5dBmV maximum at the TV set. Too much power will cause pixilation problems.
- Attenuation Range: 0~31dB
- Digital and analog tv optimum signal is 10dBmV

3-3-4. TS Stream– stream editing

Ts Stream

Transport Stream ID	<input type="text" value="64"/>	(1-65535)	Service ID	<input type="text" value="1"/>
Video PID	<input type="text" value="100"/>		Audio PID	<input type="text" value="101"/>
PMT PID	<input type="text" value="105"/>		Network ID	<input type="text" value="5184"/>
Service Name	<input type="text" value="D TV-1"/>		Provider Name	<input type="text" value="Prov-1"/>
TDT Generation	<input type="text" value="Enable"/>		Select Time	<input type="text" value="Select"/>

Update

- The value of Video PID /Audio PID /PCR PID/ PMT PID should be unique to each other.
- The software will synchronize time when the network connects to the internet. You can also choose “Computer Time” to synchronize time by computer, the time /date will show on the page.

3-3-5. Ethernet- For Web Configuration

Ethernet

MAC Address 00:04:A3:00:00:00

Enable/Disable Editing

IP Address 192.168.1.145

Gateway 192.168.1.210

Subnet Mask 255.255.255.0

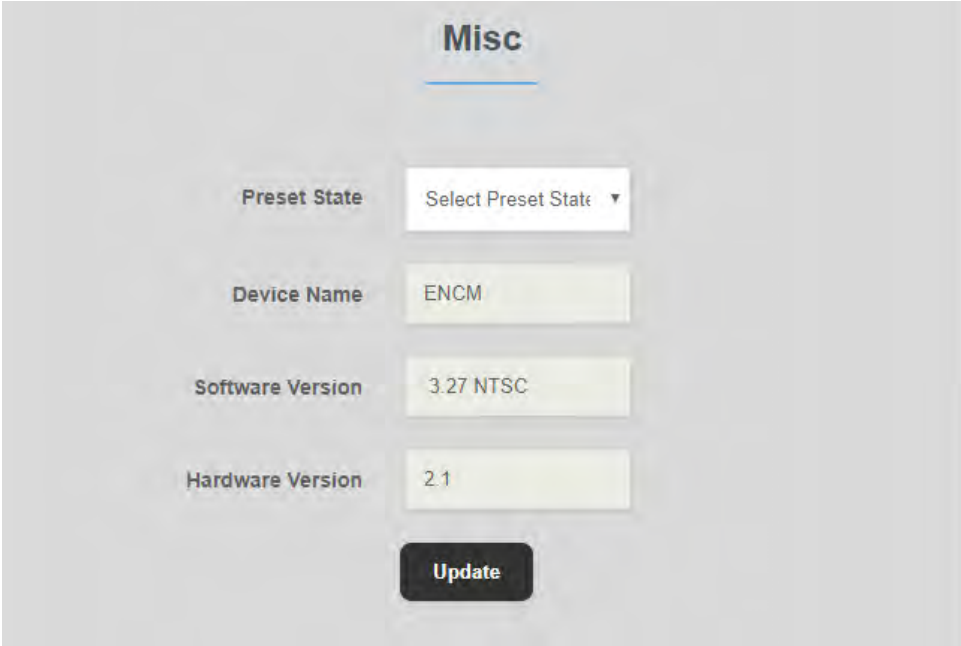
Primary DNS 168.95.1.1

Secondary DNS 0.0.0.0

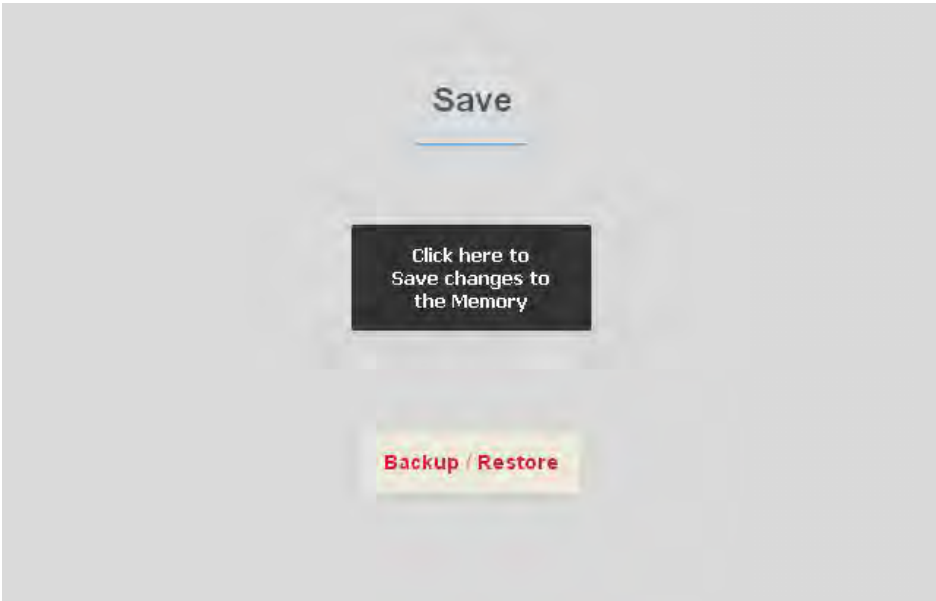
Update

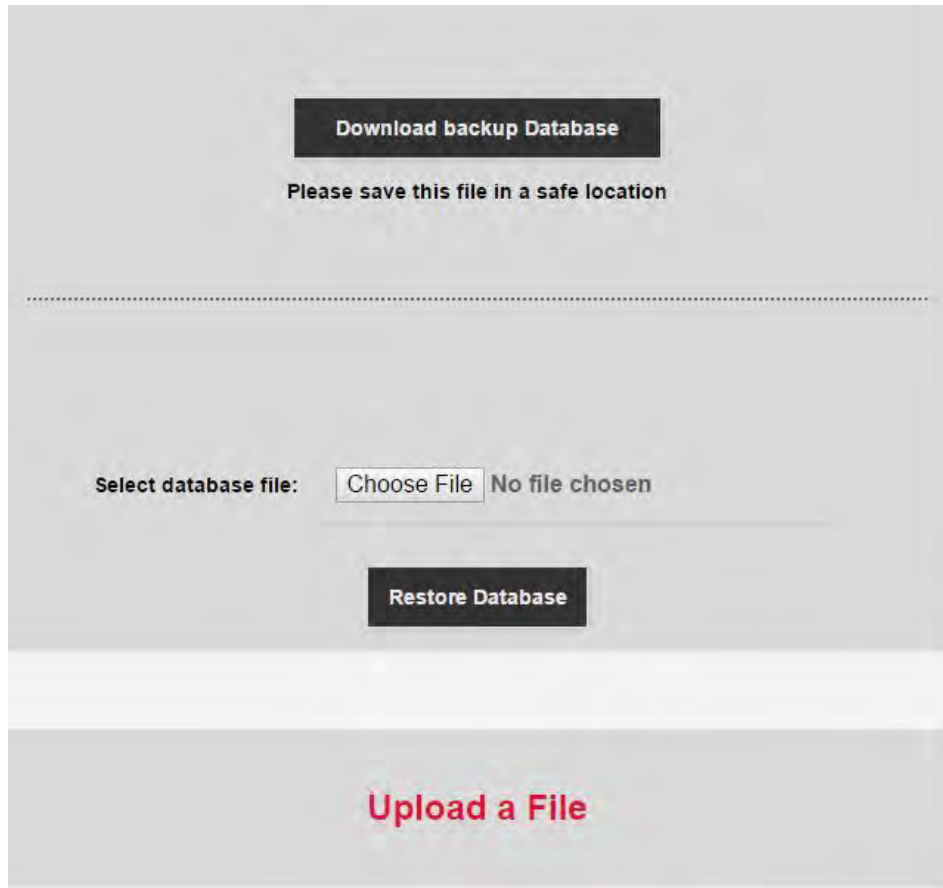
- Settings are locked. Un-Check <Enable/Disable Editing> to change any of the network settings.
- Setup must match router Gateway, Subnet and Primary DNS settings
- IP address must be unique: to verify you can use free software by a 3rd party: www.angryip.org/

3-3-6. Misc- For system configuration



3-3-7. Save – To save changes of configuration





3-3-8. Copy – To copy your exiting data, please take the following steps:

1. Go to “Save” tab in browser.
2. Click “Backup / Restore”.
3. Click “Download backup Database” button. Setting will be exported into a configuration file.

3-3-9. Restore – To restore your saved data, please take the following steps:

1. Go to “Save” tab in browser.
2. Click “Backup / Restore”.
3. Click “Choose File” to select the configuration file.
4. Click “Restore Database”.

3-3-10. Preset Values

The following table shows only differences between presets. Items not shown in the table are the same as default.

8VSB	B-64 (Default)
Frequency plan: NTSC-AIR	Frequency plan: NTSC-CATV
Modulation mode: ATSC-8VSB	Modulation mode: QAM_B_64
B-256	
Frequency plan: NTSC-CATV	
Modulation mode: QAM_B_256	

4. Troubleshooting

1. Vertical lines in picture with motion **ANS:** change Video source to 720P or 1080P

2. Unable to find modulated channel **ANS:** Confirm CABLE or Antenna is set on TV & HDM1
ANS: Scan TV channels
ANS: Confirm CW Signal is disabled

3. **No picture or channel found at TV** Verify the HDTV has a QAM (digital cable) tuner.
Verify that you have performed a full channel scan on the HDTV with “cable mode” selected. Lower the power on the unit, then verify that the modulator is not conflicting with any other channel by connecting the unit directly to the HDTV w/o cable

4. **Image Breakup** **SOL.** Video break up is often caused by an issue in the RF signal. You may have chosen a channel number that is not open or has a signal from another product or Attenuator is too high
SOL. If you are combining with other modulators, be sure the channel number selected on the modulator does not conflict with any other channels, keep in mind that some analog modulators may need 2 channel spacing causing interference. Change major and minor channel ex: 2 and 5

IMAGE BREAKUP continued:

SOL. If you are combining with a cable service, keep in mind that they sometimes have extra signals that a TV will not display and can cause interference.

Test by unplugging cable tv.

SOL. There may also be an RF power balance issue. Verify that the RF db power of the unit is balanced with signals from other modulators and from the cable company. As a test, try removing all other signals (cable, other modulators, etc.) and see if you still see similar issues.

SOL. Some TVs will also show video issues if the signal strength is too high. Try lowering the RF power with Attenuation setting to ensure you are not overdriving the HDTV tuner.

SOL. Change PID video & audio setting, rescan channel

5. BEST Practices:

Outdoor Antenna Grounding - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded to provide protection against voltage surges and built-up static charges. Refer to Section 810 of the National Electrical Code, ANSI/NFPA No. 70, for 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

6. Basic Input and RF Settings

Video Input Sets the video resolution for the HDMI input resolution automatically. You may want to change the cable box/satellite receiver and TV to match 1080p or 1080i.

Video Format Sets the video resolution for the HDMI input automatically. Each time either the channel source or broadcast changes, the HDM100/200 will adjust to match that resolution.

Set all sources to 1080P or 1080i

***Channel number**

The channel number you set the modulator on will correspond with the analog channel. Although this is a digital modulator sending a digital channel on the analog channel carrier.

Set open unused analog channel number

*Set Major channel i.e.: 2

*Set Minor channel i.e.: 21

Attenuation dB decreases the power of the RF output, in dBmV

0 – 30 dBmV

***QAM** Many displays are set to tune 256 QAM although universally displays tune in channels set to 64 QAM.

Antenna Channels North America NTSC

CHANNEL	BW MHz	VIDEO	CHROMA	AUDIO
VHF				
2	54-60	55.25	58.83	59.75
3	60-66	61.25	64.83	65.75
4	66-72	67.25	70.83	71.75
5	76-82	77.25	80.83	81.75
6	82-88	83.25	86.83	87.75
VHF				
7	174-180	175.25	178.83	179.75
8	180-186	181.25	184.83	185.75
9	186-192	187.25	190.83	191.75
10	192-198	193.25	196.83	197.75
11	198-204	199.25	202.83	203.75
12	204-210	205.25	208.83	209.75
13	210-216	211.25	214.83	215.75
UHF				
14	470-476	471.25	474.83	475.75
15	476-482	477.25	480.83	481.75
16	482-488	483.25	486.83	487.75
17	488-494	489.25	492.83	493.75
18	494-500	495.25	498.83	499.75
19	500-506	501.25	504.83	505.75
20	506-512	507.25	510.83	511.75
21	512-518	513.25	516.83	517.75
22	518-524	519.25	522.83	523.75
23	524-530	525.25	528.83	529.75
24	530-536	531.25	534.83	535.75
25	536-542	537.25	540.83	541.75
26	542-548	543.25	546.83	547.75
27	548-554	549.25	552.83	553.75
28	554-560	555.25	558.83	559.75
29	560-566	561.25	564.83	565.75
30	566-572	567.25	570.83	571.75
31	572-578	573.25	576.83	577.75
32	578-584	579.25	582.83	583.75
33	584-590	585.25	588.83	589.75
34	590-596	591.25	594.83	595.75
35	596-602	597.25	600.83	601.75
36	602-608	603.25	606.83	607.75
37	608-614	609.25	612.83	613.75
38	614-620	615.25	618.83	619.75
39	620-626	621.25	624.83	625.75
40	626-632	627.25	630.83	631.75
41	632-638	633.25	636.83	637.75
42	638-644	639.25	642.83	643.75
43	644-650	645.25	648.83	649.75
44	650-656	651.25	654.83	655.75
45	656-662	657.25	660.83	661.75
46	662-668	663.25	666.83	667.75
47	668-674	669.25	672.83	673.75
48	674-680	675.25	678.83	679.75
49	680-686	681.25	684.83	685.75
50	686-692	687.25	690.83	691.75
51	692-698	693.25	696.83	697.75
52	698-704	699.25	702.83	703.75
53	704-710	705.25	708.83	709.75
54	710-716	711.25	714.83	715.75
55	716-722	717.25	720.83	721.75
56	722-728	723.25	726.83	727.75
57	728-734	729.25	732.83	733.75
58	734-740	735.25	738.83	739.75
59	740-746	741.25	744.83	745.75
60	746-752	747.25	750.83	751.75

QAM Cable Channel center frequency chart

Channel	Freq MHz	Channel	Freq MHz	Channel	Freq MHz	Channel	Freq MHz
2	57	38	309	79	555	125	801
3	63	39	315	80	561	126	807
4	69	40	321	81	567	127	813
5	79	41	327	82	573	128	819
6	85	42	333	83	579	129	825
95	93	43	339	84	585	130	831
96	99	44	345	85	591	131	837
97	105	45	351	86	597	132	843
98	111	46	357	87	603	133	849
99	117	47	363	88	609	134	855
14	123	48	369	89	615	135	861
15	129	49	375	90	621	136	867
16	135	50	381	91	627	137	873
17	141	51	387	92	633	138	879
18	147	52	393	93	639	139	885
19	153	53	399	94	645	140	891
20	159	54	405	100	651	141	897
21	165	55	411	101	657	142	903
22	171	56	417	102	663	143	909
7	177	57	423	103	669	144	915
8	183	58	429	104	675	145	921
9	189	59	435	105	681	146	927
10	195	60	441	106	687	147	933
11	201	61	447	107	693	148	939
12	207	62	453	108	699	149	945
13	213	63	459	109	705	150	951
23	219	64	465	110	711	151	957
24	225	65	471	111	717	152	963
25	231	66	477	112	723	153	969
26	237	67	483	113	729	154	975
27	243	68	489	114	735	155	981
28	249	69	495	115	741	156	987
29	255	70	501	116	747	157	993
30	261	71	507	117	753	158	999
31	267	72	513	118	759		
32	273	73	519	119	765		
33	279	74	525	120	771		
34	285	75	531	121	777		
35	291	76	537	122	783		
36	297	77	543	123	789		
37	303	78	549	124	795		

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7. SPECIFICATIONS

Video Input

HDMI	:	HDMI 1.4a, HDCP 1.4
HDMI / Stereo		MPEG Audio AC3 Dolby
Video Encoding Data Rates		MPEG-2 HD/SD Profile 2: ISO13818-2 MP@HL 1080p@30fps, 1920x1080 full HD resolution
Modulation Type	:	Cable QAM/Air 8VSB
Constellation		8VSB 64QAM/256QAM for Cable QAM
Bandwidth	:	6 MHz
Output Power	:	+95 dBuV (RF cable) 35dBmV +90 dBuV (RF terrestrial) 30dBmV 30dBmv adjustment
Cable Standard	:	NTSC
Frequency Range		47 - 860 MHz
Frequency Stability	:	± 5KHZ
MER	:	35 dB typical
Spurious	:	55 dB typical
Symbol Rate	:	5057Mbps for 64QAM ; 5360Mbps for 256QAM
Phase Noise	:	1k ≥ 70 dBc/Hz; 10k ≥ 80 dBc/Hz; 100k ≥ 90 dBc/Hz
Connector	:	F type female, 75 Ohms

Control/Setup

Network interface	:	10M Ethernet via RJ45 connection
Power Supply	:	100-240V AC, 50/60Hz, DC 12V/2Amp



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be located or operating in conjunction with any other antenna or transmitter.

234 Fischer Ave.
Costa Mesa, CA 92626
United States

(714) 424 6500
techsupport@channelvision.com
www.channelvision.com

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