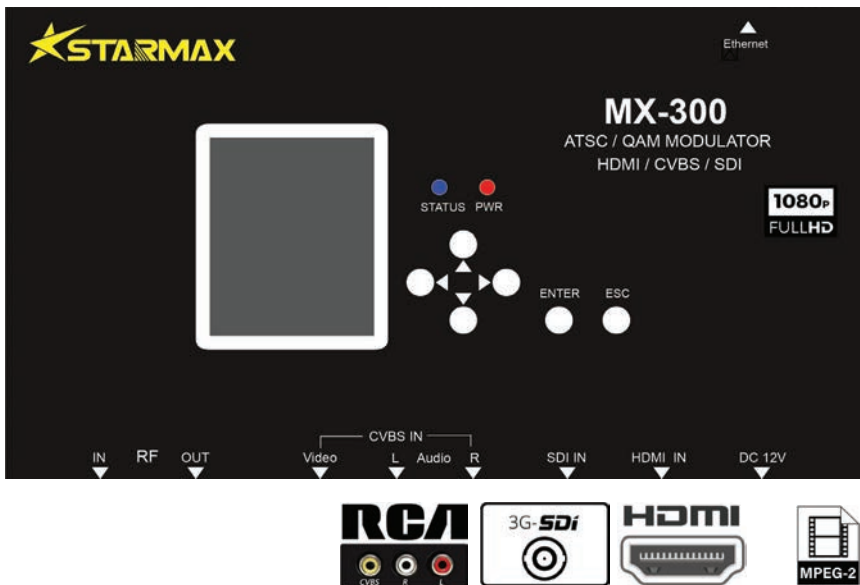




# MX-100R / MX-200 / MX-300

ATSC/J.83B QAM High-Definition Modulator

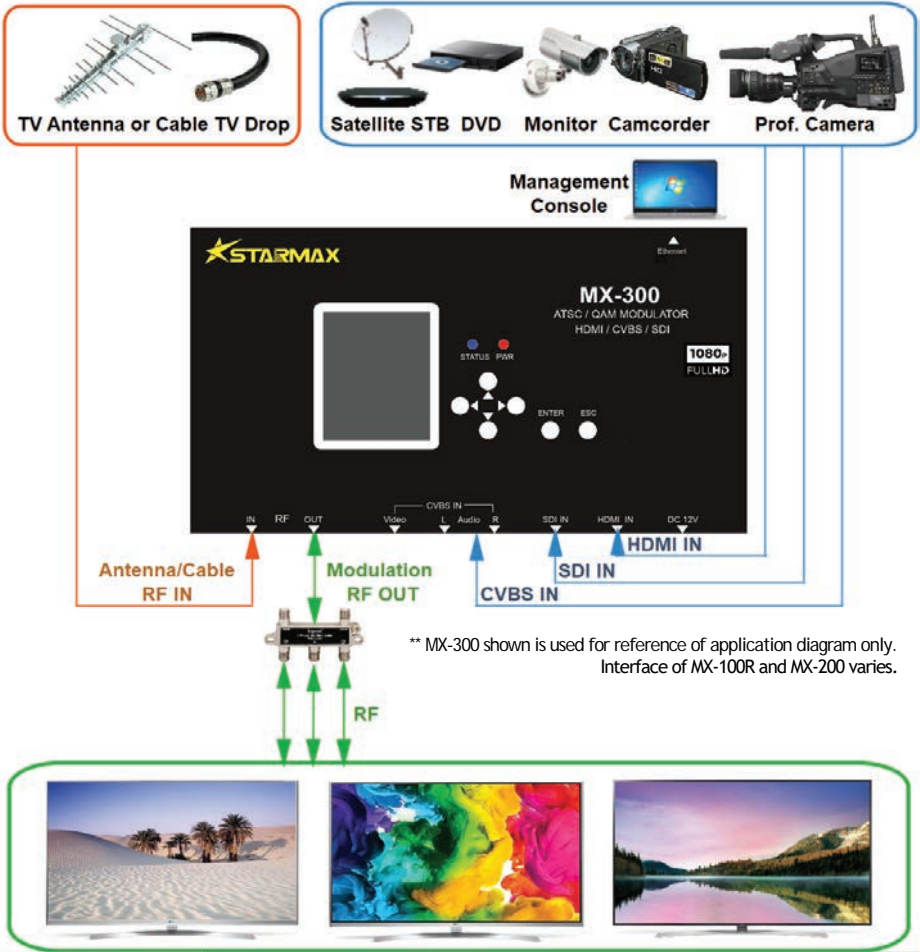


## User Guide



# Introduction

## ■ Various Video Input for Modulation Output



### ■ Input

- HDMI
- CVBS (RCA A/V) (MX-200 & MX-300)
- 3G-SDI (MX-300 only)
- RF 75Ω F in ATSC (8VSB) or J.83B QAM

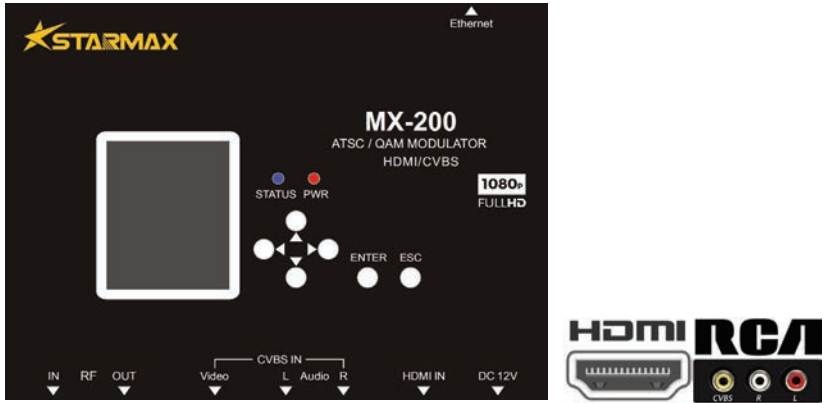
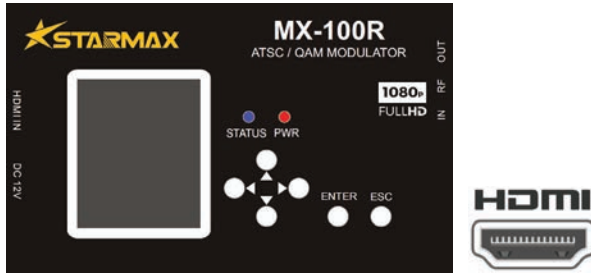
### ■ Output

- RF 75Ω F in ATSC (8VSB) or J.83B QAM

MX-100, MX-200, or MX-300 is a single channel High-Definition (HD) modulator to deliver various video/audio digital/analog sources over coaxial cable. HD video output resolution supported can be up to 1080p@60fps with adjustable output power level from 70 to 100 dBμV in 1 dB step. Output frequency range is 50 MHz to 900 MHz in 6 MHz, 7 MHz or 8 MHz channel bandwidth depending on the modulation technique.

The operation of modulators is intuitive by using on-panel keypad and 2" color LCD screen or Web based configuration pages.

# Overview



## ■ Operation Panel

- 2" color LCD
- Keypad
  - **ESC** Return or escape to upper level menu and cancel the current operation
  - **◀▶▶▶▶▶** Arrow keys to traverse between menu items or increase / decrease selected parameter value
  - **ENTER** Confirm the selection
- LEDs
  - PWR solid red Power is up
  - STATUS solid blue Unit is on-air

## ■ Installation Requirement

- Available video/audio source from Cable TV, antenna, HDMI, CVBS or SDI device
- Available TV set
- Available electrical power socket

## ■ TV Standards

- Cable TV (North America) J. 83B QAM
- Over-the-Air TV (North America) ATSC (8VSB), ATSC 3.0
- Cable TV (Europe, South America) DVB-C (J. 83A/C)
- Over-the-Air TV (Europe, Colombia) DVB-T
- Over-the-Air (South America) ISDB-T(b)

## ■ Peripheral Interface

### Front/Side Panel

- RF OUT Modulated RF output, 75Ω F
- RF IN Antenna or Cable RF Input, 75Ω F
- Video IN CVBS AV Input (MX-200 & MX-300)
- Audio Left/Right IN
- HDMI IN HDMI Input
- SDI IN 3G SDI Input (MX-300 only)
- DC 12V DC Power Input

### Back Panel (for software upgrade and Web configuration)

- 1000Base-T Gigabit Ethernet, RJ-45 (MX-200 & MX-300)
- Mini USB 1 USB for software upgrade (MX-100R only)
- Mini USB 2 USB for configuration (MX-100R only)

## ■ Package Content

- MX-100R or MX-200 or MX-300 modulator with mounting brackets and screws
- Mini USB-male / A-male cable (MX-100R only)
- AC/DC power adapter
- User Guide

# LCD Configuration Menu

## General Operation

press ◀▶ keys to move the cursor or cycle through selectable options.  
press ▲▼ keys to traverse menu items or increase/decrease parameter value.  
press ENTER key to confirm current action or go to the next level of menu.  
press ESC key to return to the previous state.  
Press ESC key for 5 seconds triggers the **Factory Reset**.

## ■ Settings

### ◆ Source

press ◀▶ keys to select source of input.  
MX-100R *HDMI* only  
MX-200 *HDMI* or *HDMI/Audio* or *CVBS*  
MX-300 *HDMI* or *CVBS* or *SDI*

### ◆ Standard

press ◀▶ keys to select RF output in *ATSC* or *J.83B QAM* technique.

### ◆ RF Out Frequency

*To select output frequency from the existing channel plan:*

press ▶ key to show channel plan. Current channel selected and its corresponding frequency is shown in 'CHxx xxxM' format. press ▲▼ keys to go up or down the channel plan. press ENTER to select channel frequency from channel plan.

*To manually enter output frequency between 50MHz and 900MHz:*

press ENTER to edit the output frequency manually. press ◀▶ keys to move the cursor to numerical field, and press ▲▼ keys to increase/decrease its value.

press ENTER to edit major/minor channel number between 1 and 1023.

press ◀▶ keys to move the cursor to numerical field, and press ▲▼ keys to increase/decrease its value.

### ◆ Major Ch(annel)

### ◆ Minor Ch(annel)

### ◆ Prog(ram) Name

press ENTER to show soft keypad, press ◀▶▲▼ to move cursor to position and press ENTER to select alphanumeric character. Maximum 15 characters allowed.

### ◆ Audio (Format)

press ◀▶ keys to select output audio format in AC3, AAC or MPEG-1 L2.

### ◆ Network

press ENTER to go to *IP Settings* page.

### ◆ Advanced

press ENTER to go to *Advanced* settings page.

### ◆ Theme

press ◀▶ keys to select color theme of user interface in red, blue, green or black.

## ■ IP Settings (MX-200 and MX-300 only)

### ◆ IP Addr(ess)

press ENTER to edit IP address, Subnet Mask and (Default) Gateway.

### ◆ Subnet

press ◀▶ to move cursor between fields and press ▲▼ keys to increase/decrease numerical values in xxx.xxx.xxx.xxx format.

### ◆ Gateway

## ■ Advanced Settings

### ◆ Bitrate

Encoding bit rate between 200 and 2000 kbps.

### ◆ FHD Output

press ◀▶ keys to select full HD output in *Interlace* or *Auto* mode.

### ◆ Latency

press ◀▶ keys to select output latency in 100ms, 500ms or 1000ms.

### ◆ RF Atten(uation)

press ◀▶ keys to select output attenuation between 0dB and 30dB.  
Default output level is 40dBmV (100dBuV).

### ◆ PMT PID

Program Map Table (PMT) Packet ID (PID) between 32 and 8190.

### ◆ Video PID

Video Packet ID (PID) between 32 and 8190.

### ◆ Audio PID

Audio Packet ID (PID) between 32 and 8190.

### ◆ PCR PID

Program Clock Reference Packet ID (PID) between 32 and 8190.

### ◆ TS ID

Transport Stream ID between 1 and 65535.

### ◆ Service ID

Service Stream ID between 1 and 65535.

### ◆ Network ID

Network ID between 1 and 65535.

### ◆ ON ID

Organization Network ID between 1 and 65535.

### ◆ Service Provider

press ENTER to show soft keypad to edit Service Provider name and Network name. press ◀▶▲▼ keys to move cursor to position and press ENTER to select alphanumeric character. Maximum 15 characters allowed.

### ◆ Network Name

### ◆ Login Password

press ◀▶ keys to enable or disable login password. press ▲▼ keys to edit 4-digit numerical password if login password is enabled.

### ◆ Factory Reset

press ENTER to confirm factory reset to restore all default settings.

# Modulation Attributes

- ATSC or J.83B QAM
  - ◆ Modulation Standard ATSC (8VSB) or J.83B QAM
  - ◆ Frequency Range 50 MHz to 860 MHz
  - ◆ Channel Bandwidth 6 MHz
  - ◆ Technique ATSC 8VSB  
J.83B 64QAM, 256QAM
- ◆ MER ≥35 dB

## Specifications Note: Specifications are subject to change without notice.

<b>Output Frequency</b>	50 to 900 MHz, 1 kHz Step		
<b>Output Level</b>	70 to 100 dBμV, 1 dB Step		
<b>Encoding</b>	MPEG-2; 5 to 15 Mb/s compression rate		
<b>Interface</b>	MX-100R - HDMI x 1, 75Ω F x 2, Mini USB x 2 MX-200 - HDMI x 1, RCA AV x 1, 75Ω F x 2, 1000Base-T RJ-45 x 1 MX-300 - HDMI x 1, RCA AV x 1, 3G-SDI x 1, 75Ω F x 2, 1000Base-T RJ-45 x 1		
<b>Video</b>	<b>CVBS (Optional)</b>		
	<b>Resolution</b>	576i PAL	480i NTSC
	<b>HDMI</b>		
		<b>Input</b>	<b>Output</b>
	<b>Resolution</b>	1920 x 1080_60p	1920 x 1080_30p
		1920 x 1080_50p	1920 x 1080_25p
		1920 x 1080_60i	1920 x 1080_30i
		1920 x 1080_50i	1920 x 1080_25i
		1280 x 720_60p	1280 x 720_30p
	<b>CVBS (PAL, NTSC)</b>	1280 x 720_50p	1280 x 720_25p
<b>Aspect Ratio</b> 16:9, 4:3			
<b>Bit Rate</b>	2 to 20Mbps		
<b>Audio</b>	<b>Encoding</b>	MPEG-1 Layer 2, AAC, AC3	
	<b>Sampling Rate</b>	48 kHz	
	<b>Bit Rate</b>	64, 96, 128, 192, 256, 320 kbps	
<b>General</b>			
<b>Power Supply</b>	12 VDC, 1A		
<b>Dimensions without Brackets</b>	MX-100R - 5.03" x 3.03" x 1.10" (128 x 77 x 28 mm) MX-200 - 5.98" x 4.33" x 1.26" (152 x 115 x 32 mm) MX-300 - 7.09" x 4.06" x 1.34" (180 x 103 x 34 mm)		
<b>Weight</b>	MX-100R - 0.55 lb (250g) MX-200 - 0.88 lb (400g) MX-300 - 1.01 lbs (460g)		
<b>Temperature</b>	0 to 50 °C (Operation) -20 to 80 °C (Storage)		

### ■ Video Quality

Video quality is optimized by determining the size and the speed to transmit MPEG packets to the TV. The packet latency and delay variation are adjusted automatically by the Modulator to reach the best video quality and performance on the TV.

### ■ Audio Codec

Audio encoding is automatically selected by the Modulator to reach the best quality according to modulation standard.

AC3 2.1 Dolby Digital Audio coding applies to ATSC (8VSB) broadcasting in North America.

MPEG MPEG-1 Layer 2 audio coding applies to DVB-T broadcasting in Europe and South America.

AAC Advanced Audio Coding for MPEG-4 applies to ISDB-T broadcasting in South America and certain ATSC (8VSB) broadcasting in North America.

Note: In order to display video normally on TV

- Signal accepted by the TV must comply with standard MPEG-2 encoding
- The video content is not protected under High-Bandwidth Digital Content Protection (HDCP) agreement

# Before Installation

## ■ Combining (Cable) TV Signals from Service Provider (e.g. Comcast)

- In order to combine the existing TV broadcasting channels from Service Provider, it's necessary to select an output frequency and output channel for Modulator output. The channel information of local over-the-air broadcasting or local Cable TV service can normally be found online or from the channel listing provided by Service Provider.
- For business installers, a spectrum analyzer up to 1 GHz can be helpful to make the installation easier and faster although it's not mandatory.
- If the Modulator output is going to feed a Digital Cable Converter box or a set-top box, some Service Providers offer a dedicated channel (and frequency) for modulated video and some Service Providers may need a specific PID to be configured by the Modulator for MPEG streams to be recognized by the set-top box. Refer to the section of [MPEG Transport Stream Parameters](#) for PID setup.
- If the output power level of the Modulator is too high, it may oversaturate the TV signals delivered by Service Providers. It's necessary to lower the output power level or use an attenuator to reduce oversaturation.

## ■ Choose Output Frequency for Modulator Output

- Modulated output frequency can be any existing channel frequency available from local [Channel Plan](#).
- Depending on the modulation technique of over-the-air broadcasting TV or Cable TV used in the area, refer to the corresponding appendix for [Channel Plan](#) information.
- Select an unused or an unimportant channel from the [Channel Plan](#) as output frequency of Modulator output.
- If Modulator output frequency is unsure
  - ◇ Pick a frequency between channel gap, make sure it's 6 MHz or 8 MHz away from the previous and the next channels.
  - ◇ Use the recommended frequency indicated on the corresponding [Channel Plan](#) appendix.
  - ◇ Use the default frequency selected by the Modulator.
- Modulated output frequency and channel number can be configured from the LCD menu or Web configuration page.
- Follow the instructions of this Start Guide to set up output frequency and channel number to watch Modulator output video on TV.
- If TV needs to learn the Modulator output channel by auto/manual channel rescan. Refer to the User Guide of TV to practice the rescan for channel detection of Modulator output.

# ATSC or J.83B QAM Modulation Output

If TV signal is originally coming from an outdoor antenna, an indoor antenna or Cable TV drop, follow the steps below to combine with the HDMI (available on MX-100R, MX-200 and MX-300), or CVBS (available on MX-200 and MX-300) or SDI (available on MX-300 only) video input.

If TV signal coming from an outdoor antenna, an indoor antenna or Cable TV drop is NOT required, leave the RF IN port open and jump to step ④ below.

The Modulator with default settings can work as a plug-and-play device if it's unsure about how to configure the output frequency of Modulator output.

To customize the setting, refer to the section [Choose Output Frequency for Modulator Output](#) to configure output frequency and channel number for HDMI/CVBS/SDI video and audio.

- ① Power on the Modulator with power adapter included in the package.
- ② Disconnect the end of coaxial cable connected to the RF/Antenna IN port of the TV.
- ③ Connect the end of the coaxial cable removed from step ② to the RF IN port of the Modulator.
- ④ Select the input source from *HDMI*, *HDMI/Audio* (MX-200 and MX-300), *CVBS* (MX-200 and MX-300), or *SDI* (MX-300 only).  
Select the modulation Standard in ATSC or J.83B QAM technique. All TVs sold in North America supports ATSC standard while some new TVs support both ATSC and J.83B QAM standards.
- ⑤ If *HDMI* input source is selected, connect the HDMI IN port of the Modulator to the HDMI output port of video source like DVD player, Satellite TV Set-Top Box, Video Streamer, Security Monitor ... etc.  
If *HDMI/Audio* input source is selected, connect the HDMI IN port of the Modulator to the HDMI output port of video source and the Audio L/R RCA jacks to the audio source.  
If *CVBS* input source is selected, connect the RCA jacks (Video and Audio L/R) to the video source.  
If *SDI* input source is selected, connect the SDI IN port to the video source.  
It's recommended to set the video resolution of video player or source at 1080p/i or 720p.
- ⑥ Go through the LCD menu screen or Web configuration pages to configure settings described in the section [LCD Configuration Menu](#).
- ⑦ Connect the RF OUT port of the Modulator to the RF/Antenna IN port of the TV with a coaxial cable.
- ⑧ Turn on the TV. Refer to the user guide of the TV to rescan all channels available.
- ⑨ Change the TV channel to the channel discovered after rescan. The video/audio of selected input device (HDMI, CVBS or SDI) is displayed.  
If HDMI or SDI input source is selected but not connected, the STARMAX logo might be displayed on TV if the TV can accept video without audio content.  
If CVBS input source is selected but not connected, blue screen is displayed on TV.

Setting	
Source	HDMI
Standard	ATSC
RF Freq	473000K
Major Ch	1
Minor Ch	1
Short Name	CH1
Aud Format	MPEG
Network	...
Advanced	...
Theme	1

Setting	
Source	HDMI
Standard	J.83B
RF Freq	473000K
MOD	QAM64
Major Ch	1
Minor Ch	1
Short Name	CH1
Aud Format	MPEG
Network	...
Advanced	...



# MPEG Transport Stream Parameters

It's not recommended to change MPEG Transport Stream (TS) parameters unless MPEG PID structure is well known or Service Provider requires to configure specific Packet Identifier (PID) to describe the payload data for set-top box initialization.

Refer to Wikipedia for more information about MPEG Transport Stream structure.

[https://en.wikipedia.org/wiki/MPEG\\_transport\\_stream](https://en.wikipedia.org/wiki/MPEG_transport_stream)

[https://en.wikipedia.org/wiki/Program-specific\\_information](https://en.wikipedia.org/wiki/Program-specific_information)

- ◆ NID Network ID contained in Network Information Table (NIT).
- ◆ ONID Organization Network ID contained in Network Information Table (NIT).
- ◆ TSID Transport Stream ID contained in Service Description Table (SDT).
- ◆ SID Service ID contained in Service Description Table (SDT) to identify transport stream.
- ◆ PMT PID Program Map Table (PMT) PID contains the directory listing of all program map tables in the transport stream, including the program number and the list of elementary streams.
- ◆ Video PID Video content stream PID contained in MPEG transport stream for demultiplexer to locate by sorting the incoming packets.
- ◆ Audio PID Audio content stream PID contained in MPEG transport stream for demultiplexer to locate by sorting the incoming packets.
- ◆ Service Provider Name of the broadcaster responsible for the service availability or authority contained in Service Description Table (SDT).
- ◆ Network Name Name of the network contained in Network Information Table (NIT).

Advanced	
Provider	Encoder
TSID	1
ONID	1
NID	1
Service ID	474
Min BR	5000Kbps
Max BR	19000Kbps
FHD Output	Auto
RF Atten	0dB
PMT PID	32

Advanced	
Video PID	48
PCR PID	49
Audio PID	50
Login PSW	Disabled
Default	RESET

# Installing Multiple Modulators

In case multiple units of MX-100R, MX-200 and MX-300 modulators are installed on the same coax network/wiring to connect to the same TVs, pay attention to the following items to avoid conflicts or interference among Modulators.

- Set up and connect the Modulator to coax network or TV set one at a time.
- Make sure the following parameters between Modulators are different
  - ① RF Output frequency refer to the section [Choose Output Frequency for Modulator Output](#) to configure different output frequencies for different Modulators.
  - ② Program name default program name MX-100R, MX-200 and MX-300 is *HD1*, the program naming convention can be *HDn*, where *n* indicates the Modulator count, to avoid confusion.
  - ③ Major channel number and minor channel number can be different among Modulators.
- A combiner or a multiplexer is needed to mix the output signals from multiple Modulators if multiple TVs are connected to the coax network to share the output signal of Modulators.
- If MX-100R, MX-200 or MX-300 is used together with other brands' modulators, harmony settings of RF output (power) level and output frequency must be identified.
- Make a note on each Modulator with RF output level and output frequency for quick reference and easy trouble shooting whenever needed.
- If more than 20 TVs are connected to share the Modulator output signal, it might be necessary to use active combiner or amplifier to ensure sufficient power to reach individual TV at the far end. The receiving power of each TV should be higher than 15dBmV (75dBμV) or the signal can be instable.
- Depending on the quality and aged damage, splitters, combiners and coaxial cable itself can introduce high attenuation or insertion loss to the coax wiring. Power loss budget calculation might be necessary along the delivery path to ensure the best performance of the Modulator.

# Web Configuration / Remote Control (MX-200 and MX-300 Only)

- ① Connect the Ethernet (RJ-45) port on the back panel of the Modulator to the Ethernet port of a PC with an Ethernet cable. Power on the Modulator.
- ② Configure the IP address of the PC to be static IPv4 192.168.0.100.
- ③ Launch a Web browser on PC and type <http://192.168.0.168>. The default login password is 'admin'. The default IP address of the Modulator is 192.168.0.168. The current IP address of the Modulator can be found from LCD menu *Network* -> *IP Settings*.  
The login user name and password can be changed from *Login Settings* on Web interface.
- ④ On the Web configuration pages of the Modulator, all settings from LCD menu are available for remote access through Web interface.

There are 5 sections on Web configuration page - General, Stream, Network, Update and System Info.

The screenshot displays the STARMAX web configuration interface. At the top, there are tabs for 'COMMONLY USED SETTINGS' and 'SYSTEM INFO', and a 'Log Out' link. A left sidebar contains navigation options: 'General', 'Stream', 'Network', and 'Update'. The main content area is divided into three sections:

- General:** Includes dropdowns for Source (HDMI), Standard (ATSC), and Modulation (8VSB). It also features input fields for RF Out Freq (MHz) set to 473, RF Attenuation (dB) set to 0, Prog Name (HDI), RF Channel (14.873MHz), Major Channel (1), and Minor Channel (1).
- Stream:** Divided into 'Transport Stream' and 'Encoder'. Transport Stream settings include PMT PID (32), Video PID (48), Audio PID (49), PCR PID (50), TS ID (1), and Service ID (1). Encoder settings include Bitrate (Kbps) (19000), Audio (AC3), PHD Output (Interface), and Latency (500).
- Network:** Includes input fields for IP Address (192.168.0.168), Subnet Mask (255.255.255.0), Default Gateway (192.168.0.1), and MAC Address (00:80:E1:73:51:51).

At the bottom of the configuration area are 'Save' and 'Reset' buttons.

## System Info

The System Info section displays the following information in a table-like format:

Version	4.20.51
Modulator Type	2.2
Core Version	2.3.5.21
Video Encoder	MPEG2
Video Format	1280x720p60

At the bottom of this section are 'Reload' and 'History Default' buttons.

# Software Update

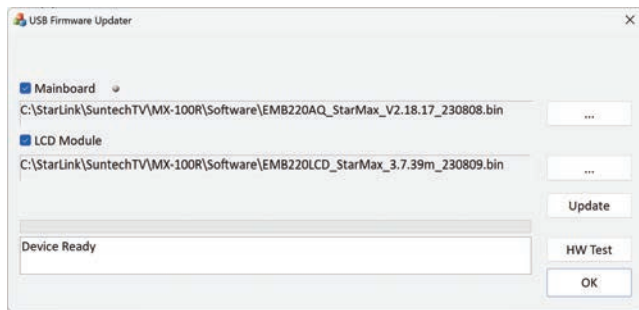
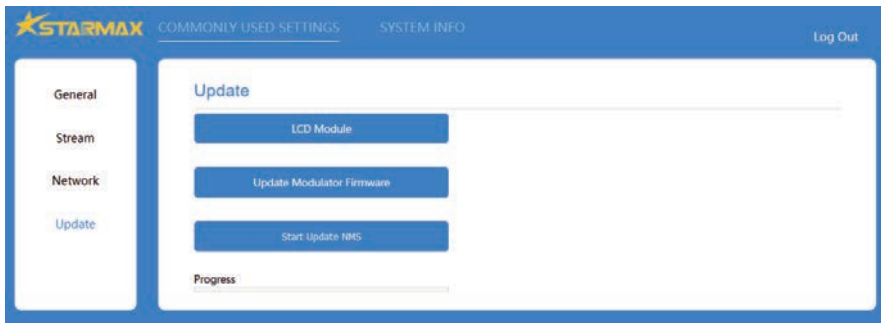
Software Update can be accessed through the serial USB port #1 on MX-100R and the Ethernet (RJ-45) port on MX-200/MX-300. Windows based utility tool is available for software update of MX-100R. Refer to the [Web Configuration](#) section for connecting Ethernet port of MX-200/MX-300 to a PC.

It's not recommended to update software through a router, which may cause the update to fail due to possible packet loss or drop.

It may take a while for the Modulator to restart after software update, do NOT turn off the Modulator during the software update is in progress.

After software update, if the Web page doesn't get refreshed automatically, do NOT turn off the Modulator but refresh the page manually, or open another Web browser to reconnect.

In case the software update doesn't run through successfully, push the ESC button for 5 seconds before refreshing the page.



MX-200/MX-300 Software Update

MX-100R Software Update

## ■ LCD Module Update

LCD Module update applies to the graphical user interface of configuration menu shown on LCD. Select the file with *xxx.bin* extension for LCD Module update.

## ■ Modulator Firmware Update (MX-200 and MX-300 only)

Modulator Firmware update applies to the modulation functions running on the encoder chip. Select the file with *xxx.vimage* extension for Modulator Firmware update.

## ■ Main MCU or NMS Update

MCU or NMS update applies to the processor functions running on the controller chip. Select the file with *xxx.bin* extension for MCU or NMS update.

# ATSC (8VSB) Channel Plan - North America

Channel Bandwidth: 6 MHz 8VSB

- Suggested settings for output channel
  - Frequency 473.000 MHz
  - Channel Number 66.1
  - Channel Name HD1

Channel Plan is for reference only. It may vary across countries, areas or cities. Refer to the LCD menu screen of the Modulator to load country-wise Channel Plan if available.

- Mexico ATSC channels are channel 14 to channel 69.

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
VHF		UHF	
2	57	42	641
3	63	43	647
4	69	44	653
5	79	45	659
6	85	46	665
VHF High Band III		47	671
7	177	48	677
8	183	49	683
9	189	50	689
10	195	51	692
11	201	52	701
12	207	53	707
13	213	54	713
UHF		55	719
14	473	56	725
15	479	57	731
16	485	58	737
17	491	59	743
18	497	60	749
19	503	61	755
20	509	62	761
21	515	63	767
22	521	64	773
23	527	65	779
24	533	66	785
25	539	67	791
26	545	68	797
27	551	69	803
28	557	70	809
29	563	71	815
30	569	72	821
31	575	73	827
32	581	74	833
33	587	75	839
34	593	76	845
35	599	77	851
36	605	78	857
37	611	79	863
38	617	80	869
39	623	81	875
40	629	82	881
41	635	83	887

# J.83B QAM Channel Plan - North America

Channel Bandwidth: 6 MHz QAM

- Suggested settings for output channel  
 Frequency 783.000 MHz (# 122)  
 Channel Name HD1

Channel Plan is for reference only. It may vary across countries, areas or cities. Refer to the LCD menu screen of the Modulator to load country-wise Channel Plan if available.

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
<b>Low</b>		<b>Super</b>		<b>Hyper</b>		<b>Jumbo</b>	
2	57	28	249	62	453	112	723
3	63	29	255	63	459	113	729
4	69	30	261	64	465	114	735
1	75	31	267	<b>Ultra</b>		115	741
5	79.00 / 81.00	32	273	65	471	116	747
6	85.00 / 87.00	33	279	66	477	117	753
<b>Mid</b>		34	285	67	483	118	759
95	93	35	291	68	489	119	765
96	99	36	297	69	495	120	771
97	105	<b>Hyper</b>		70	501	121	777
98	111	37	303	71	507	122	783
99	117	38	309	72	513	123	789
14	123	39	315	73	519	124	795
15	129	40	321	74	525	125	801
16	135	41	327	75	531	126	807
17	141	42	333	76	537	127	813
18	147	43	339	77	543	128	819
19	153	44	345	78	549	129	825
20	159	45	351	79	555	130	831
21	165	46	357	80	561	131	837
22	171	47	363	81	567	132	843
<b>High</b>		48	369	82	573	133	849
7	177	49	375	83	579	134	855
8	183	50	381	84	585	135	861
9	189	51	387	85	591	136	867
10	195	52	393	86	597	137	873
11	201	53	399	87	603	138	879
12	207	54	405	88	609	139	885
13	213	55	411	89	615	140	891
<b>Super</b>		56	417	90	621	141	897
23	219	57	423	91	627	142	903
24	225	58	429	92	633	143	909
25	231	59	435	93	639	144	915
26	237	60	441	94	645	145	921
27	243	61	447	<b>Jumbo</b>		146	927
				100	651	147	933
				101	657	148	939
				102	663	149	945
				103	669	150	951
				104	675	151	957
				105	681	152	963
				106	687	153	969
				107	693	154	975
				108	699	155	981
				109	705	156	987
				110	711	157	993
				111	717	158	999

# DVB-T Channel Plan - Europe, Colombia & Asia

Channel Bandwidth: 7 MHz or 8 MHz QAM, QPSK

- Suggested settings for output channel  
 Frequency 474.000 MHz (CH-21)  
 Channel Name HD1

Channel Plan is for reference only. It may vary across countries, areas or cities. Refer to the LCD menu screen of the Modulator to load country-wise Channel Plan if available.

- UK DVB-T channels start from CH-21.
- New Zealand DVB-T channels start from CH-26.
- Australia DVB-T channels - 7 MHz bandwidth.

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
CH-05	177.5*	CH-42	642	CH-06	177.5	CH-45	648.5
CH-06	184.5*	CH-43	650	CH-07	184.5	CH-46	655.5
CH-07	191.5*	CH-44	658	CH-08	191.5	CH-47	662.5
CH-08	198.5*	CH-45	666	CH-09	198.5	CH-48	669.5
CH-09	205.5*	CH-46	674	CH-09A	205.5	CH-49	676.5
CH-10	212.5*	CH-47	682	CH-10	212.5	CH-50	683.5
CH-11	219.5*	CH-48	690	CH-11	219.5	CH-51	690.5
CH-12	226.5*	CH-49	698	CH-12	226.5	CH-52	697.5
CH-21	474	CH-50	706	CH-28	529.5	CH-53	704.5
CH-22	482	CH-51	714	CH-29	536.5	CH-54	711.5
CH-23	490	CH-52	722	CH-30	543.5	CH-55	718.5
CH-24	498	CH-53	730	CH-31	550.5	CH-56	725.5
CH-25	506	CH-54	738	CH-32	557.5	CH-57	732.5
CH-26	514	CH-55	746	CH-33	564.5	CH-58	739.5
CH-27	522	CH-56	754	CH-34	571.5	CH-59	746.5
CH-28	530	CH-57	762	CH-35	578.5	CH-60	753.5
CH-29	538	CH-58	770	CH-36	585.5	CH-61	760.5
CH-30	546	CH-59	778	CH-37	592.5	CH-62	767.5
CH-31	554	CH-60	786	CH-38	599.5	CH-63	774.5
CH-32	562	CH-61	794	CH-39	606.5	CH-64	781.5
CH-33	570	CH-62	802	CH-40	613.5	CH-65	788.5
CH-34	578	CH-63	810	CH-41	620.5	CH-66	795.5
CH-35	586	CH-64	818	CH-42	627.5	CH-67	802.5
CH-36	594	CH-65	826	CH-43	634.5	CH-68	809.5
CH-37	602	CH-66	834	CH-44	641.5	CH-69	816.5
CH-38	610	CH-67	842				
CH-39	618	CH-68	850				
CH-40	626	CH-69	858				
CH-41	634						

Note: \* indicates channels with 7 MHz bandwidth.

# ISDB-T(b) Channel Plan - South America

Channel Bandwidth: 6 MHz QAM, DQPSK, QPSK

- Suggested settings for output channel  
Frequency 473.143 MHz (CH-14)  
Channel Name HD1

Channel Plan is for reference only. It may vary across countries, areas or cities. Refer to the LCD menu screen of the Modulator to load country-wise Channel Plan if available.

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
CH-07	177.143	CH-39	623.143
CH-08	183.143	CH-40	629.143
CH-09	189.143	CH-41	635.143
CH-10	195.143	CH-42	641.143
CH-11	201.143	CH-43	647.143
CH-12	207.143	CH-44	653.143
CH-13	213.143	CH-45	659.143
CH-14	473.143	CH-46	665.143
CH-15	479.143	CH-47	671.143
CH-16	485.143	CH-48	677.143
CH-17	491.143	CH-49	683.143
CH-18	497.143	CH-50	689.143
CH-19	503.143	CH-51	695.143
CH-20	509.143	CH-52	701.143
CH-21	515.143	CH-53	707.143
CH-22	521.143	CH-54	713.143
CH-23	527.143	CH-55	719.143
CH-24	533.143	CH-56	725.143
CH-25	539.143	CH-57	731.143
CH-26	545.143	CH-58	737.143
CH-27	551.143	CH-59	743.143
CH-28	557.143	CH-60	749.143
CH-29	563.143	CH-61	755.143
CH-30	569.143	CH-62	761.143
CH-31	575.143	CH-63	767.143
CH-32	581.143	CH-64	773.143
CH-33	587.143	CH-65	779.143
CH-34	593.143	CH-66	785.143
CH-35	599.143	CH-67	791.143
CH-36	605.143	CH-68	797.143
CH-37	611.143	CH-69	803.143
CH-38	617.143		



# DVB-C (J.83A/C QAM) Channel Plan

Channel Bandwidth: 8 MHz QAM

- Suggested settings for output channel  
Frequency 778.000 MHz (# 88)  
Channel Name HD1

Channel Plan is for reference only. It may vary across countries, areas or cities. Refer to the LCD menu screen of the Modulator to load country-wise Channel Plan if available.

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	52.5	34	339	67	610
2	60.5	35	347	68	618
3	68.5	36	355	69	626
4	80	37	363	70	634
5	88	38	371	71	642
13	115	39	379	72	650
14	123	40	387	73	658
15	131	41	395	74	666
16	139	42	403	75	674
17	147	43	411	76	682
18	155	44	419	77	690
19	163	45	427	78	698
6	171	46	435	79	706
7	179	47	443	80	714
8	187	48	451	81	722
9	195	49	459	82	730
10	203	50	474	83	738
11	211	51	482	84	746
12	219	52	490	85	754
20	227	53	498	86	762
21	235	54	506	87	770
22	243	55	514	88	778
23	251	56	522	89	786
24	259	57	530	90	794
25	267	58	538	91	802
26	275	59	546	92	810
27	283	60	554	93	818
28	291	61	562	94	826
29	299	62	570	95	834
30	307	63	578	96	842
31	315	64	586	97	850
32	323	65	594	98	858
33	331	66	602	99	866

# Notes

## ■ Warranty

The MX-100R, MX-200 and MX-300 modulators have one-year Limited Hardware Warranty and 90-day free software updates after purchase. This Limited Warranty Statement gives the customer specific legal rights. The customer may also have other rights which vary from State to State in the United States, from province to province in Canada, and from country to country elsewhere in the world. To the extent that this Limited Warranty Statement shall be deemed modified to be consistent with such local law. Under such local law, certain disclaimers and limitations of this Warranty Statement may not apply to the customer.

## ■ Important Safety Instructions

Basic safety precautions should always be followed to reduce the risk of fire, electrical shock, and personal injury, including the following:

- Do not use this product near water – for example, near a bathtub, kitchen sink, laundry tub, or swimming pool, or in a wet basement; only clean with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus including amplifiers that produce heat.
- Do not remove the cover of the modulator, cover the modulator with thick or heavy objects.
- Use only the power cord indicated in this manual if applicable.

## ■ Coaxial Cable

If applicable, the coaxial cable screen shield needs to be connected to the Earth at the building entrance per ANSI/NFPA70, the National Electrical Code (NEC), in particular Section 820.93, "Grounding of Outer Conductive Shield of a Coaxial Cable," or in accordance with local regulation.

## ■ FCC Class B Equipment

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by implementing one or more of the following measures:

- Reorient or relocate the device
- Increase the separation between the device and receiver
- Connect the device to an outlet on a circuit different from that to which the receiver is connected (applicable only to power line products)
- Consult the dealer or an experienced radio or television technician for help

## ■ Declaration of Conformity for Products Marked with the FCC logo - USA Only

This device complies with Part 15 of the FCC Rules license-exempt RSS standard(s). Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation of the device

Where applicable, the Most Technology Service Co., Ltd. performed above specification conformity test and issued certificate # TMC180315106E-2 in accordance with local regulation.

## ■ Declaration of CE and RoHS Conformity

Objects: MX-100R, MX-200, MX-300

This declaration of conformity is issued under the sole responsibility of the manufacturer for products of HDMI RF modulators that support single channel or multi-channel DVB-T, ISDB-T, DVB-C (J.83B/A/C), and ATSC standards. The object(s) of the declaration described above are in conformity with the relevant Community harmonization legislation:

- Low Voltage Directive (2014/35/EU)
- Electromagnetic Compatibility Directive (2014/30/EU)
- Radio Equipment Directive (2014/53/EU)

And their amendments.

References to the relevant harmonized standards, including the date of the standard, used in relation to which the conformity is declared:

- ETSI EN 55032:2015
- ESTI EN 55020:2007+A11:2011
- ESTI EN 61000-3-2:2014
- ESTI EN 61000-3-3:2013
- IEC 62321:2013

Where applicable, the Most Technology Service Co., Ltd. performed above specification conformity test and issued certificate # TMC180315106E-1/TMC180315160-C and TMC171222103E-1/TMC171222103-C in accordance with local regulation.

# Trouble Shooting

- ◆ **The video and the audio from video source are not synchronized on TV**  
Unplug and plug the input port(s) on the Modulator to restore.
- ◆ **My Modulator output video cannot be viewed on TV but other channels can be**
  - If output channel can be scanned from TV without HDMI/CVBS/SDI source connected, check the User Guide of input device to ensure high resolution video signal is configured correctly for modulation.
  - If nothing is displayed on TV with or without HDMI source device connected, check all connections and settings are correct according to the instructions on this Start Guide.
  - If a HDMI switch or a hub is used, some of them don't pass through Extended Display Identification Data (EDID) to tell the video resolution. Connect the HDMI device directly to the Modulator or TV without a switch.
  - If the HDMI source is from a PC/DVI device (e.g. laptop computer), the Modulator doesn't support it. A converter box to convert the DVI video to standard 3D video in 720p or 1080p is required.
- ◆ **Video with fast motion doesn't play well or shows ghosting on TV**  
This might be caused by interlacing issue with 1080i resolution on sports or action video.
- ◆ **How to get the best video quality on TV with the Modulator**
  - Change the resolution of video source to 1080p or 720p (progressive). If TV doesn't support 1080p, change the resolution of video source to 720p and enable interlacing.
  - If QAM modulation technique is available from the Modulator, change it to 256QAM.
- ◆ **How do I know my TV supports ATSC (8VSB) or J.83B standard**  
Most recent models of TV set sold in the US within the last three years can support both ATSC (8VSB) and J.83B standards but if it's unsure, the broadcasting standard of the TV can be realized by checking the wiring:
  - If the coaxial cable connected to the TV is an outdoor/indoor antenna drop, the TV supports ATSC (8VSB).
  - If the coaxial cable connected to the TV is a Cable TV drop (e.g. from Comcast), the TV supports J.83B.
- ◆ **Some or most channels are instable or cannot be viewed on TV**  
The input signal can be too strong for the TV tuner. Increase the RF output attenuation to be higher than 0dB but less than 30dB.
- ◆ **Audio from HDMI source is skipping or stuttering on TV**  
If HDMI source device has Compressed Audio or Dolby Digital Sound enabled, try to set it to traditional Pulse-Code Modulation (PCM) Stereo or Uncompressed Audio output. Double compression of audio signal may cause audio skipping on TV.
- ◆ **How do I replace an old modulator with MX-100R, MX-200 or MX-300**  
Refer to the settings of the old modulator and duplicate them, such as Output Frequency, Output Power Level, Channel Number, Channel Name ... etc. on MX-100R, MX-200 or MX-300 as much as possible before replacing the old modulator.
- ◆ **The Modulator output video stretches or shrinks on TV**  
MX-100R, MX-200 and MX-300 process input video without alteration in color and aspect ratio. Check the settings of aspect ratio on video input device and TV to adjust and fix.
- ◆ **The Modulator output video on TV is flickering**  
Some old TVs expects the MPEG Transport Stream (TS) Video PID value different from PCR PID. Check the TS Settings of MX-100R, MX-200 or MX-300 and change the PCR PID value to be different from Video PID value.



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