# HDbridge 2840i

RF Modulator / IP Streamer

**User Manual**

Updated February 2026

**Document symbol conventions:**

Indicates an important piece of information affecting the operation of the unit. Retain this information.

Indicates a point of caution. Failure to heed this information may cause a hazard of some form to the operator or others in the field of operation.

Indicates a point regarding the electrical safety of the box. Failure to abide by the information presented may result in an electrical shock hazard to the operator or others in the field of operation.

Indicates a point affecting the RF performance of the box. Failure to heed or abide by the information presented may result in emissions or susceptibility that can affect the unit or nearby equipment. Performance conforming to the regulatory limit may be compromised or affected.

**About ZeeVee:** (Acquired by Kramer in August 2024)
ZeeVee is the leading manufacturer of high-quality encoder/modulator/decoder products for video distribution over any type of transmission media; be it RF coax, fiber, or copper ethernet.

Established in 2007, ZeeVee has been manufacturing industry-leading products while operating the company responsibly in compliance with the strictest levels of regulatory and environmental requirements. The standards by which we govern our corporate conduct are far higher than that required by law.

Our mission is to completely fulfill the toughest customer application requirements with the highest quality products we can produce. After the sale, we strive to support the customer with award-winning support and service. Our goal is that no customer shall ever be dissatisfied. It is both our mission and our passion.

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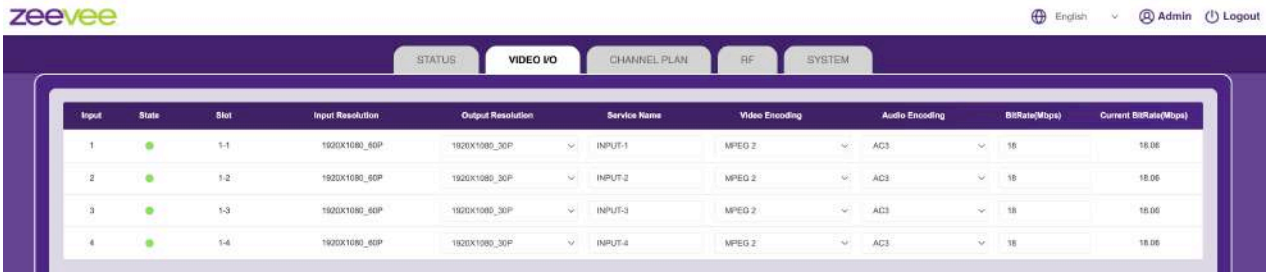
## CONTENTS

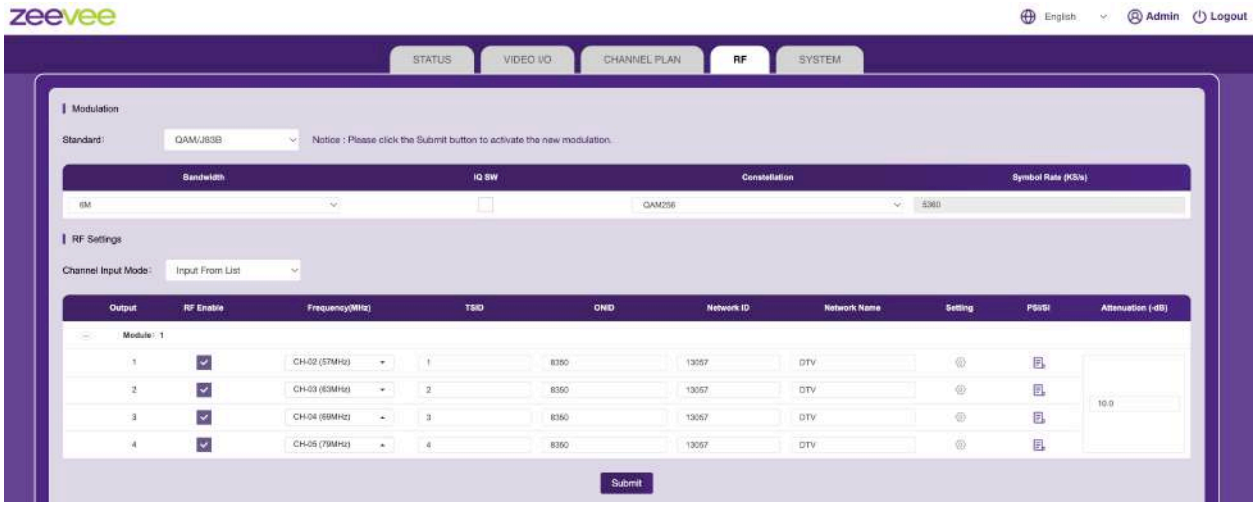
# Quick Start for QAM modulation

1. Connect the 12V/5A power supply to the HDb2840i unit and power on the unit.
2. Connect appropriate ethernet cable between PC/Laptop and the MGMT port on the front of the HDb2840i unit.
3. From a browser such as Chrome; connect to HDb2840i graphical user interface. The default IP address is 192.168.1.30 with Subnet mask of 255.255.255.0
4. Log into the system. Default username is “admin”, default password is “admin”
5. Connect between 1 and 4 HDMI sources to the HDb2840i (The status tab of the user interface will indicate ports with active HDMI signal connected)

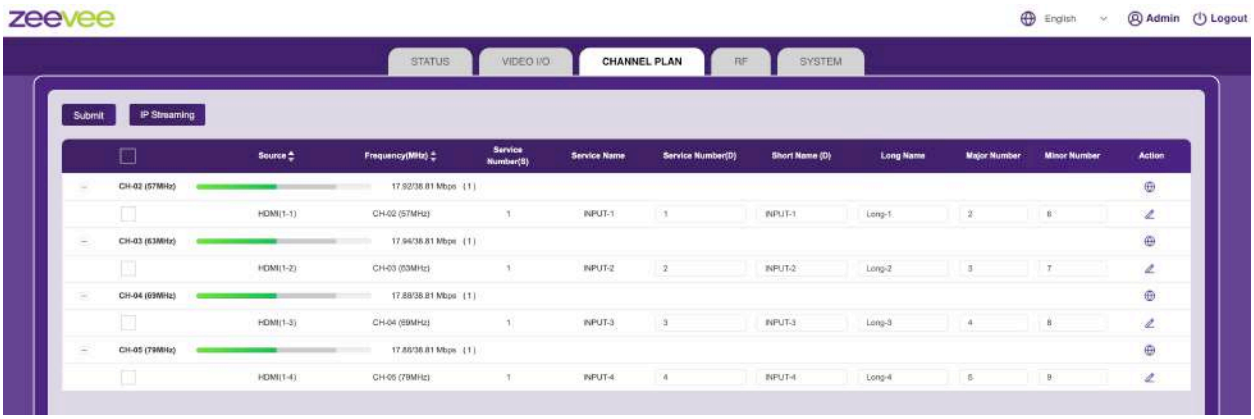

6. Navigate to the Video I/O tab. Here you will select the Output Resolution, Video Encoding format and Audio Encoding format for the stream.



7. Navigate to the RF tab. Here you will confirm the Standard is set to QAM/J83B in the top left. You will also select the RF Channel Numbers with associated frequencies. Selections are made in groups of four. Module 1. Selecting “CH-02 (57MHz)” for Module 1 input 1 will automatically fill in CH-03, CH-04 and CH-05 for inputs 2, 3 and 4. Be sure to hit the submit button when selections are completed.




8. Navigate to the Channel Plan tab. For each of the channels, assign a Short Name, Major Number and Minor Number. Note, these are virtual tuner numbers, not RF frequencies. This information will be discovered by most QAM Tuners. Be sure to click the box below the Submit button to select all the channels and hit the Submit button. Note: Do not assign multiple channels with the same major and minor numbers.




9. After a short pause, the HDb2840i will output modulated output from the RF output port on the rear of the unit. Default output power is 45 dBmV. (This can be attenuated down if needed)
10. See the remainder of this manual for additional details.

# System Description

Kramer/ZeeVee products convert your video and audio source to a digital cable channel and broadcast it over coax to all your HDTVs and set-top boxes. This guide walks you through basic and more enhanced setup for the HDbridge 2840i modulator / IP streamer.

# HDbridge 2840i Features

- Distributes and switches HD AV signals over Coax
- Supports 4 HDMI inputs with resolutions up to 1920 x 1080@60Hz (Input formats up to 4:4:4; encoded output 4:2:0)
- Supports both progressive and interlaced inputs (1080p and 1080i)
- Supports both encrypted and unencrypted HDMI input. (HDCP)
- Supports outputs over Coax and/or IP Streaming at resolutions up to 1920 x 1080@30Hz
- Supports RF modulation in QAM/J83B, DVB/T, DVB/C formats
- QAM support for IRC, HRC or STD
- Supports UDP multicast and unicast streaming. (**Note:** Unicast only supported to a single destination)
- Supports MPEG2 or H.264 compression (RF and UDP output must use same compression)
- Supports AC3, AAC and MPEG1-L2 audio formats
- Management and Video Network ports

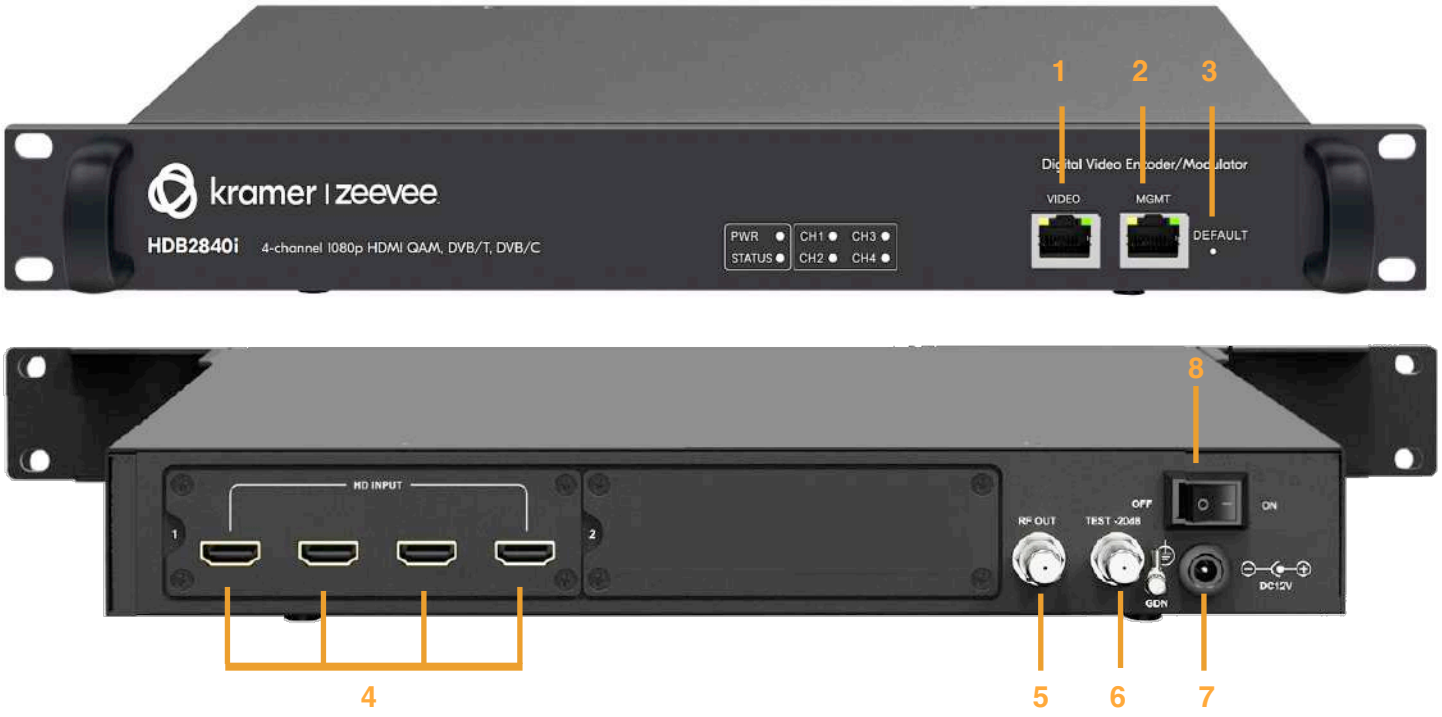
# Package Contents

1 x HDb2840i Modulator
1 x Power Supply with cord (12V/5A)
2 x Rack Mount Ears and 6 x Screws

**Recommended Kramer Accessories (Not included)**

| Model | Description | Length |
|---|---|---|
| **C-HM/HM-3** | Premium High–Speed HDMI Cable | 3 feet |
| **C-HM/HM-6** | Premium High–Speed HDMI Cable | 6 feet |
| **C-HM/HM-10** | Premium High–Speed HDMI Cable | 10 feet |

# Front and Back Panels




| | | |
|---|---|---|
| 1 | Video IP Port | 1G port used for IP Streaming only |
| 2 | Management IP Port | 100Mb port used to configure the unit<br>Default IP Address: 192.168.1.30<br>Subnet Mask: 255.255.255.0 |
| 3 | Factory Default button | Recessed button to return unit to factory default settings. (Use a pin or other item to press) |
| 4 | HDMI Inputs | Four HDMI inputs supporting up to 1920 x 1080@60Hz<br>Supports both encrypted and unencrypted inputs. |
| 5 | Coax Output | Primary Coax Output. Configured for QAM, DVB/T or DVB/C format. Output power can be set between +45 to +25 dBmV using the web interface. |
| 6 | Test Coax Output | Test Coax Output. Default +25 dBmV output |
| 7 | Power Input | 12V/5A input. Use provided power supply |
| 8 | Power Switch | Power on/off switch |

# RF Mapping - QAM

The Cable TV Channels vs RF Frequency (MHz) Map shows how the RF channels are paired and matched with RF frequency. You will have to refer to this map when configuring RF numbers and virtual channels.

**Important Notes**

- RF numbers are applied in groups of 4 with the HDb2840i. So you select RF Channel 2 for the first input, the next 3 inputs will automatically populate with RF 3, RF 4 and RF 5.
- The RF numbers are not always paired in numerical sequence. Example RF 6 is followed by RF 95.
- Channels can be set directly adjacent to any other well formed channel and not cause interference. No channel spacing is required.

**Cable TV Channels vs RF Frequency (MHz) Map**

| RF Ch. | Band (MHz) | RF Ch. | Band (MHz) | RF Ch. | Band (MHz) | RF Ch. | Band (MHz) | RF Ch. | Band (MHz) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 54-60 | 27 | 240-246 | 57 | 420-426 | 87 | 600-606 | 122 | 780-786 |
| 3 | 60-66 | 28 | 246-252 | 58 | 426-432 | 88 | 606-612 | 123 | 786-792 |
| 4 | 66-72 | 29 | 252-258 | 59 | 432-438 | 89 | 612-618 | 124 | 792-798 |
| 5 | 76-82 | 30 | 258-264 | 60 | 438-444 | 90 | 618-624 | 125 | 798-804 |
| 6 | 82-88 | 31 | 264-270 | 61 | 444-450 | 91 | 624-630 | 126 | 804-810 |
| 95 | 90-96 | 32 | 270-276 | 62 | 450-456 | 92 | 630-636 | 127 | 810-816 |
| 96 | 96-102 | 33 | 276-282 | 63 | 456-462 | 93 | 636-642 | 128 | 816-822 |
| 97 | 102-108 | 34 | 282-288 | 64 | 462-468 | 94 | 642-648 | 129 | 822-828 |
| 98 | 108-114 | 35 | 288-294 | 65 | 468-474 | 100 | 648-654 | 130 | 828-834 |
| 99 | 114-120 | 36 | 294-300 | 66 | 474-480 | 101 | 654-660 | 131 | 834-840 |
| 14 | 120-126 | 37 | 300-306 | 67 | 480-486 | 102 | 660-666 | 132 | 840-846 |
| 15 | 126-132 | 38 | 306-312 | 68 | 486-492 | 103 | 666-672 | 133 | 846-852 |
| 16 | 132-138 | 39 | 312-318 | 69 | 492-498 | 104 | 672-678 | 134 | 852-858 |
| 17 | 138-144 | 40 | 318-324 | 70 | 498-504 | 105 | 678-684 | 135 | 858-864 |
| 18 | 144-150 | 41 | 324-330 | 71 | 504-510 | 106 | 684-690 | | |
| 19 | 150-156 | 42 | 330-336 | 72 | 510-516 | 107 | 690-696 | | |
| 20 | 156-162 | 43 | 336-342 | 73 | 516-522 | 108 | 696-702 | | |
| 21 | 162-168 | 44 | 342-348 | 74 | 522-528 | 109 | 702-708 | | |
| 22 | 168-174 | 45 | 348-354 | 75 | 528-534 | 110 | 708-714 | | |
| 7 | 174-180 | 46 | 354-360 | 76 | 534-540 | 111 | 714-720 | | |
| 8 | 180-186 | 47 | 360-366 | 77 | 540-546 | 112 | 720-726 | | |
| 9 | 186-192 | 48 | 366-372 | 78 | 546-552 | 113 | 726-732 | | |
| 10 | 192-198 | 49 | 372-378 | 79 | 552-558 | 114 | 732-738 | | |
| 11 | 198-204 | 50 | 378-384 | 80 | 558-564 | 115 | 738-744 | | |
| 12 | 204-210 | 51 | 384-390 | 81 | 564-570 | 116 | 744-750 | | |
| 13 | 210-216 | 52 | 390-396 | 82 | 570-576 | 117 | 750-756 | | |
| 23 | 216-222 | 53 | 396-402 | 83 | 576-582 | 118 | 756-762 | | |
| 24 | 222-228 | 54 | 402-408 | 84 | 582-588 | 119 | 762-768 | | |
| 25 | 228-234 | 55 | 408-414 | 85 | 588-594 | 120 | 768-774 | | |
| 26 | 234-240 | 56 | 414-420 | 86 | 594-600 | 121 | 774-780 | | |

HRC Frequencies = Standard Frequencies minus 1.25 MHz

Except for:

Channel 5, Video = 78.0 MHz

Channel 6, Video = 84.0 MHz

IRC Frequencies = Same as Standard Frequencies

Except for:

Channel 5, Video = 79.25 MHz

Channel 6, Video = 85.25 MHz

The highlighted areas in the frequency map show the RF numbers that can be paired together but are not numerically sequential.

# RF Mapping - DVB/T

The Cable TV Channels vs RF Frequency (MHz) Map shows how the RF channels are paired and matched with RF frequency. You will have to refer to this map when configuring RF numbers and virtual channels.

**Important Notes**

- RF numbers are applied in groups of 4 with the HDb2840i. So you select RF Channel 21 for the first input, the next 3 inputs will automatically populate with RF 22, RF 23 and RF 24.
- Channels can be set directly adjacent to any other well formed channel and not cause interference. No channel spacing is required.

**CCIR Table vs Frequency Map**

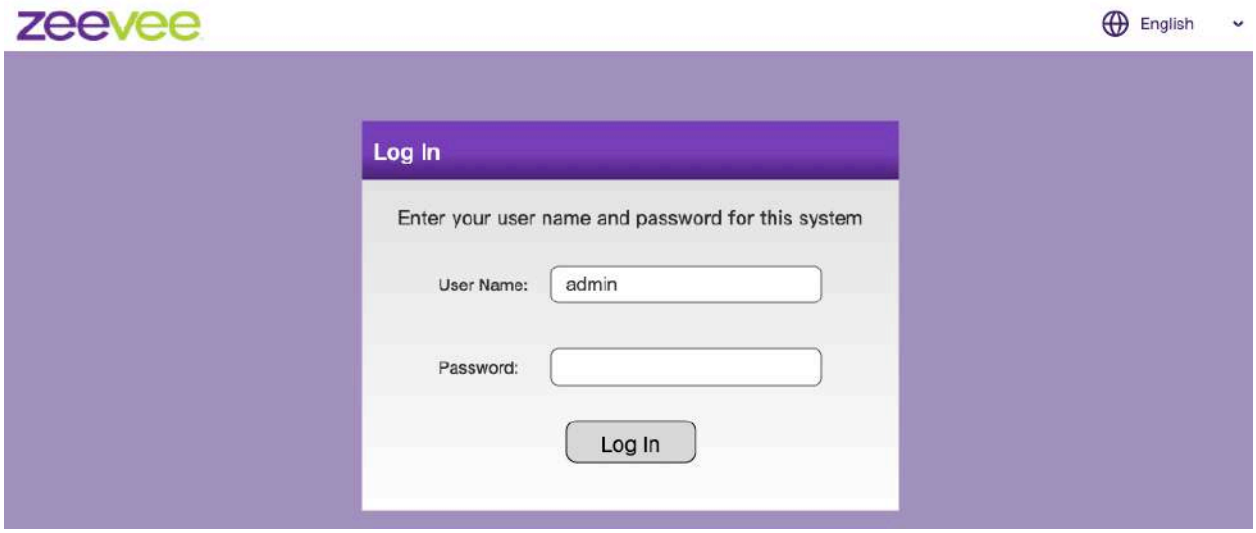
| RF Channel | Band (MHz) | RF Channel | Band (MHz) | RF Channel | Band (MHz) |
|---|---|---|---|---|---|
| 21 | 470-478 | 41 | 630-638 | 61 | 790-798 |
| 22 | 478-486 | 42 | 638-646 | 62 | 798-806 |
| 23 | 486-494 | 43 | 646-654 | 63 | 806-814 |
| 24 | 494-502 | 44 | 654-662 | 64 | 814-822 |
| 25 | 502-510 | 45 | 662-670 | 65 | 822-830 |
| 26 | 510-518 | 46 | 670-678 | 66 | 830-838 |
| 27 | 518-526 | 47 | 678-686 | 67 | 838-846 |
| 28 | 526-534 | 48 | 686-694 | 68 | 846-854 |
| 29 | 534-542 | 49 | 694-702 | 69 | 854-862 |
| 30 | 542-550 | 50 | 702-710 | | |
| 31 | 550-558 | 51 | 710-718 | | |
| 32 | 558-566 | 52 | 718-726 | | |
| 33 | 566-574 | 53 | 726-734 | | |
| 34 | 574-582 | 54 | 734-742 | | |
| 35 | 582-590 | 55 | 742-750 | | |
| 36 | 590-598 | 56 | 750-758 | | |
| 37 | 598-606 | 57 | 758-766 | | |
| 38 | 606-614 | 58 | 766-774 | | |
| 39 | 614-622 | 59 | 774-782 | | |
| 40 | 622-630 | 60 | 782-790 | | |

# Web Browser Interface

The HDB2840i can be accessed directly via a web browser interface. Note that this feature is password protected.

To access the web browser interface you will need to enter the IP address of the HDb2840i into the browser address bar. Note that the MGMT port on the HDb2840i must be plugged into the network switch or directly to the PC used to configure the unit. The HDb2840i only supports a static IP address. The default address is 192.168.1.30 with subnet of 255.255.255.0

The HDb2840i will require you to login. The default login/password are admin / admin.




## Status Tab


The status tab will provide basic information about the HDb2840i. Serial Number, Manufacturer ID, Software Version, Temperature, Rear Panel Info, Cooling Fans and Front Panel.

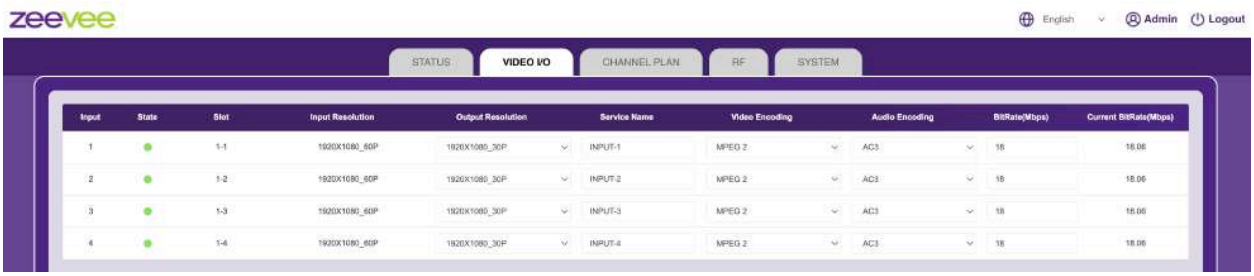
**Rear Panel:**
This shows the input status of the 4 HDMI inputs. Inputs shown in Gray do not have an active HDMI input. Units with active HDMI inputs appear Green.

**Cooling Fans:**
This shows a visualization of the 4 cooling fans. Blue fans indicate active operation.

**Front Panel:**
This shows the status of the 2 Ethernet ports. The MGMT port is used to access and configure the HDb2840i. The Video port is used for Multicast Streaming to the network. Note that the Video port does not need to be connected if the unit is only used for RF Modulation.

The MGMT port can be disconnected if desired after the HDb2840i is fully configured.

# Video I/O Tab

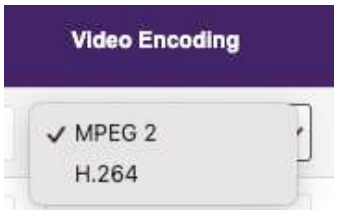



**Input Resolution**
This column will show you the input resolution of the connected HDMI source for each of the 4 inputs. (This field is not editable)

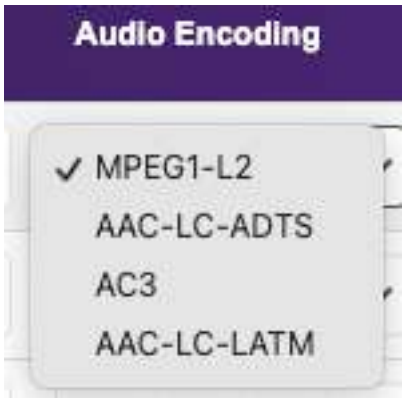
**Output Resolution**
This column will allow you to select the output resolution for the specific input. Options depend on the input of the original source. 1920x1080_30P is the maximum output resolution supported.

**Service Name**
This column reflects the current value of the 'Short Name (D)' field embedded in the output stream.

**Video Encoding**
This field allows you to select the video encoding format of the output streams. (Both RF and IP streaming). Options are MPEG-2 and H.264



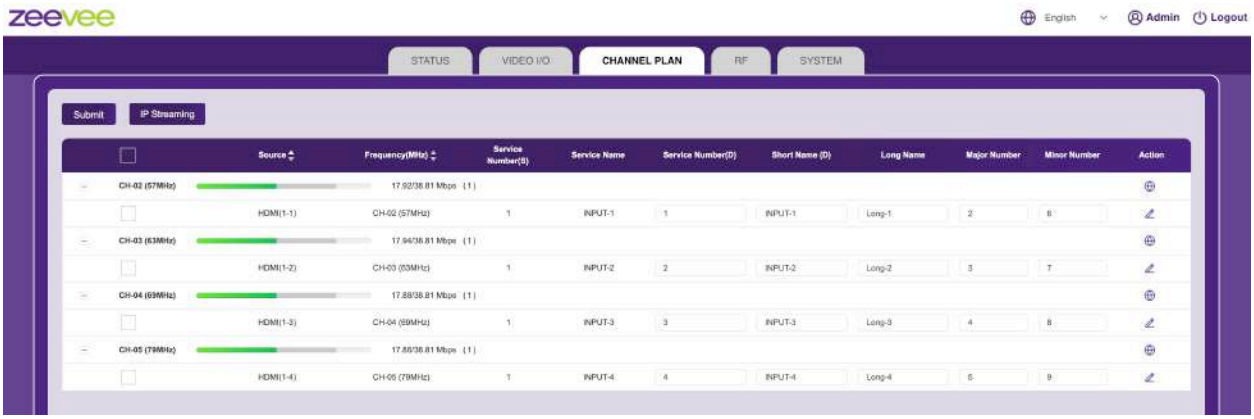
**Audio Encoding**
This field allows you to select the audio encoding format of the output streams. (Both RF and IP streaming). Options are MPEG1-L2, AAC-LC-ADTS, AC3, AAC-LC-LATM. Note that not all RF Tuners will support all audio formats. You may need to experiment with Audio formats to find ones supported by your tuner hardware. AC3 is the default.




**BitRate (Mbps)**
This field allows you to set a target bitrate for the output stream. Suggested target bitrate depends on the Video Encoding selected. MPEG 2 target range is from 8-20 Mbps, H.264 target range is from 5-20 Mbps.

**Current BitRate (Mbps)**
This field tells you the current output bitrate for the specific output stream.

# Channel Plan Tab (QAM output)




The Channel Plan tab is both informational and configurable. Not all options impact the output of the modulated stream. The Channel Plan tab has a different look for QAM vs DVB-T/C operation. Above image is for QAM output. (QAM or DVB-T/C output selected on the RF Tab)

Informational Columns include the following:

**QAM channel number** and frequency corresponding to the chart on page 5 of this manual. Channels are centered on the frequency range. Example: Channel 2 on the chart is listed as 54-60 MHz, In the image above; Channel 2 is set at 57 MHz.

**Source**
This column identifies the HDMI input assigned to the QAM channel number/frequency. The bar will turn green when actively outputting a signal.

**Frequency**
This column repeats channel number/frequency info and shows current output in Mbps

**Service Number(S)**
Informational only column. Not editable

**Service Name**
Informational only column. This column reflects the current value of the 'Short Name (D)' field embedded in the output stream.

The following fields are editable.

**Service Number (D)**
Unique identifier for selected output.

**Short Name (D)**

Name of the given channel. This gets embedded in the output stream and most QAM tuners should discover this information and present it as the channel name, depending on tuner implementation.

**Long Name**
Additional channel information. Most QAM tuners display only the Short Name. The Long Name is optional metadata and may not be shown on all tuners.

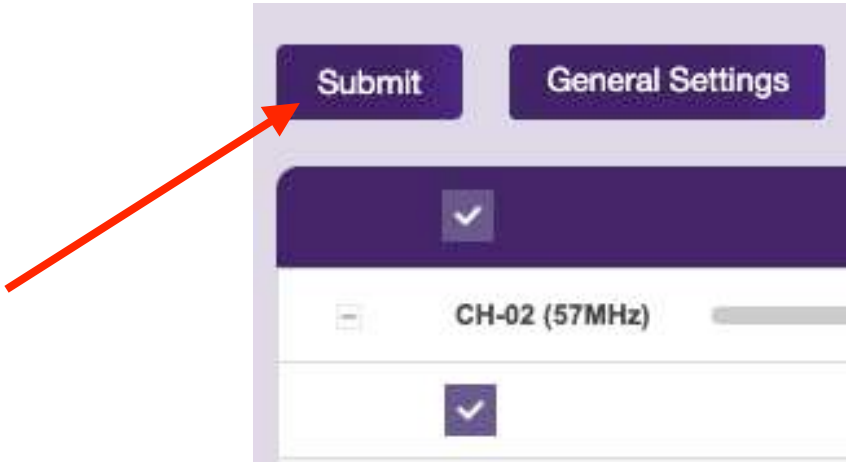
**Major Number**
User selectable channel number for the given output stream. Can be any number from 0 to 1023 and must be unique. (Cannot have multiple channels with the same Major Number) Most QAM tuners should discover this information and present as the channel number along with the associated Minor Number.

***Note:*** The Major Number does not need to match up to the associated QAM channel number. It can be anything you want in the valid 0-1023 range.

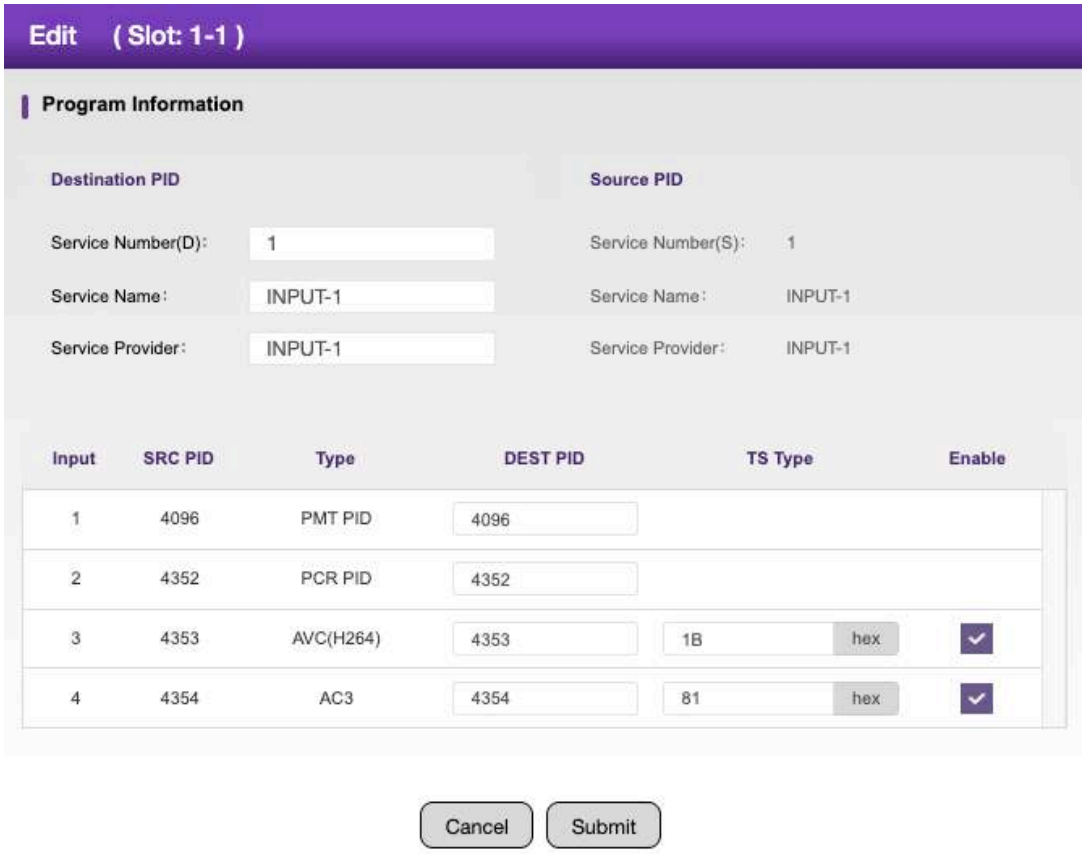
**Minor Number**
User selectable channel number for the given output stream. Can be any number from 0 to 1023. Most QAM tuners should discover this information and present as the channel number along with the associated Major Number.

Example: For the default settings, the first channel will be discovered by most QAM Tuners as "Input -1" Channel 1-0

**Important Note:** When you modify the Names or Numbers you must Submit the changes. Click the box in the individual channel and hit the Submit button near the top left. You can all select all the channels at the same time via the square box just under the Submit button.

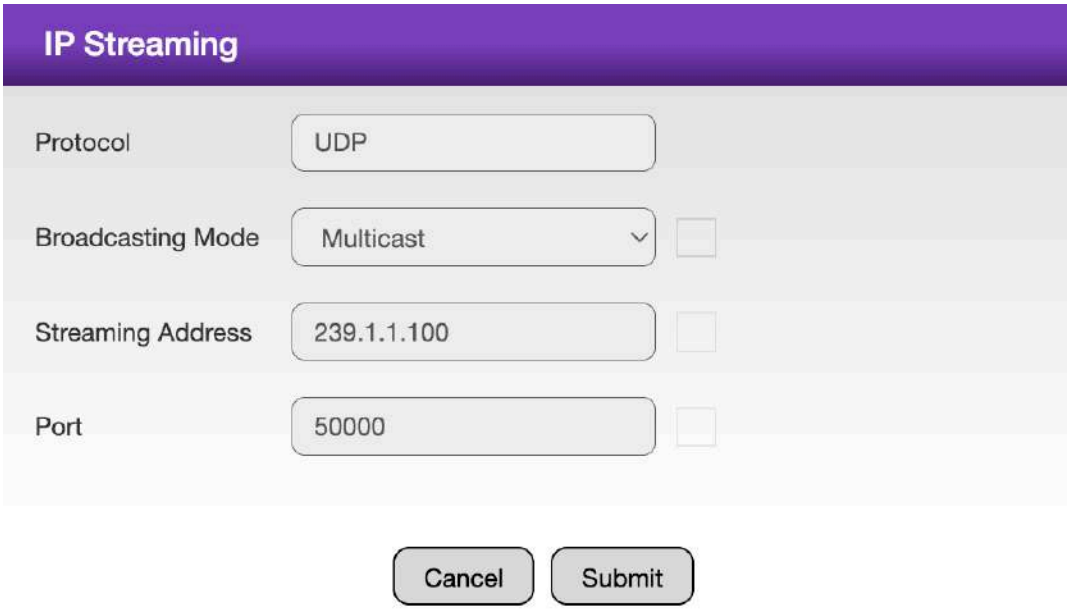



**Action**
The small globe looking button will allow you to set multicast or unicast address for UDP streaming. The starting address for all 4 channels is set via the IP Streaming button.
The pencil button will allow you to view and edit settings associated with the selected stream. It is not recommended to edit the DEST PID fields or TS Type fields. This can cause QAM tuners to not correctly discover the channel stream.


Edit ( Slot: 1-1 )
Program Information
Destination PID
Source PID
Service Number(D): 1
Service Number(S): 1
Service Name: INPUT-1
Service Name: INPUT-1
Service Provider: INPUT-1
Service Provider: INPUT-1
Input SRC PID Type DEST PID TS Type Enable
1 4096 PMT PID 4096
2 4352 PCR PID 4352
3 4353 AVC(H264) 4353 1B hex
4 4354 AC3 4354 81 hex
Cancel
Submit

**IP Streaming**

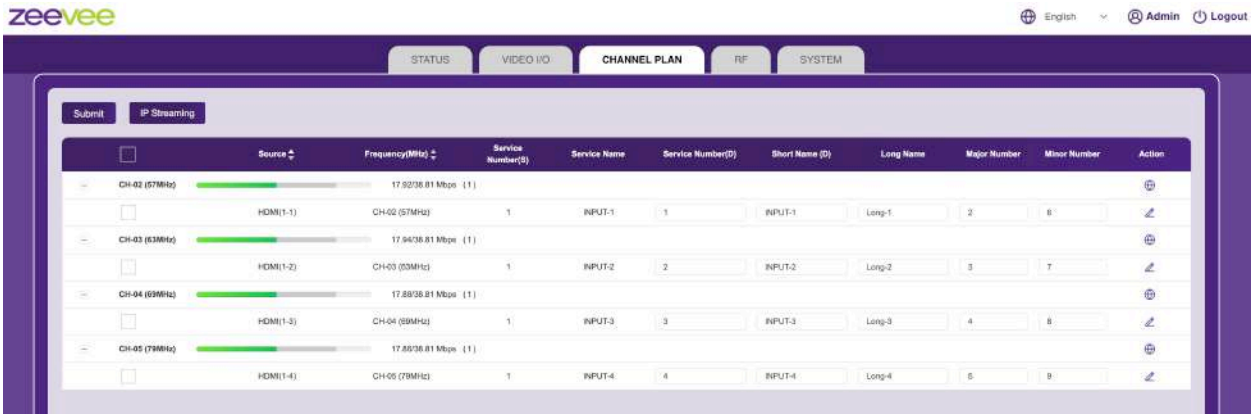
This button will allow you to set the default starting address for UDP streaming. In this example the first channel is set to multicast address of 239.1.1.100. The second channel would be 239.1.1.101, the next channel would be 239.1.1.102 and so on.




Note that each UDP stream needs a unique multicast address. The Port can be the same for all of the streams if desired. UDP multicast is the primary intended mode for multi-receiver deployments. Unicast streaming is supported for point-to-point use cases.

**Important Unicast Note:** Unicast streaming is only supported to a single destination. You cannot send unicast streams to more than one destination.

# Channel Plan Tab (DVB-T, DVB-C)




The Channel Plan tab is both informational and configurable. Not all options impact the output of the modulated stream. The Channel Plan tab has a different look for QAM vs DVB-T/C operation. Above image is for DVB-T output. (QAM or DVB-T/C output selected on the RF Tab)

Informational Columns include the following:

**DVB-T channel number** and frequency corresponding to the chart on page 6 of this manual. Channels are centered on the frequency range. Example: Channel 21 on the chart is listed as 470-478 MHz, In the image above; Channel 21 is set at 474 MHz.

**Source**
This column identifies the HDMI input assigned to the QAM channel number/frequency. The bar will turn green when actively outputting a signal.

**Frequency**
This column repeats channel number/frequency info and shows current output in Mbps

**Service Number(S)**
Informational only column. Not editable

**Service Name**
Informational only column. This column reflects the current value of the ‘Short Name (D)’ field embedded in the output stream.

The following fields are editable.

**Service Number (D)**
Unique identifier for selected output.

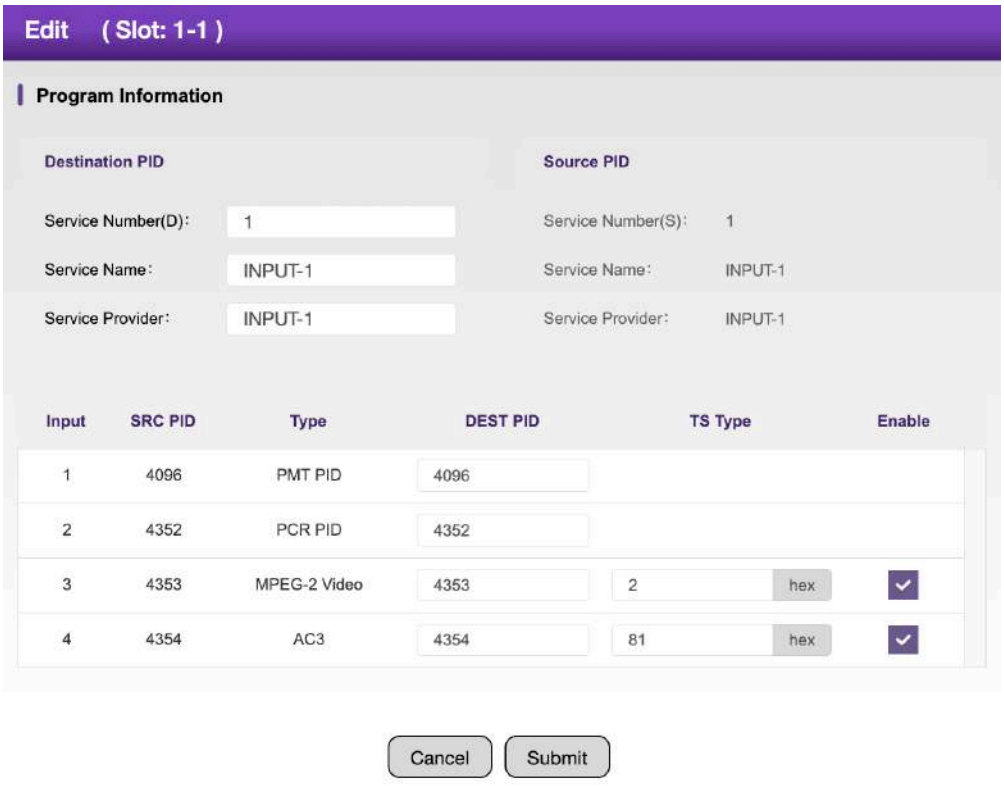
**Short Name (D)**

Name of the given channel. This gets embedded in the output stream and most DVB-T and DVB-C tuners should discover this information and present it as the channel name, depending on tuner implementation.

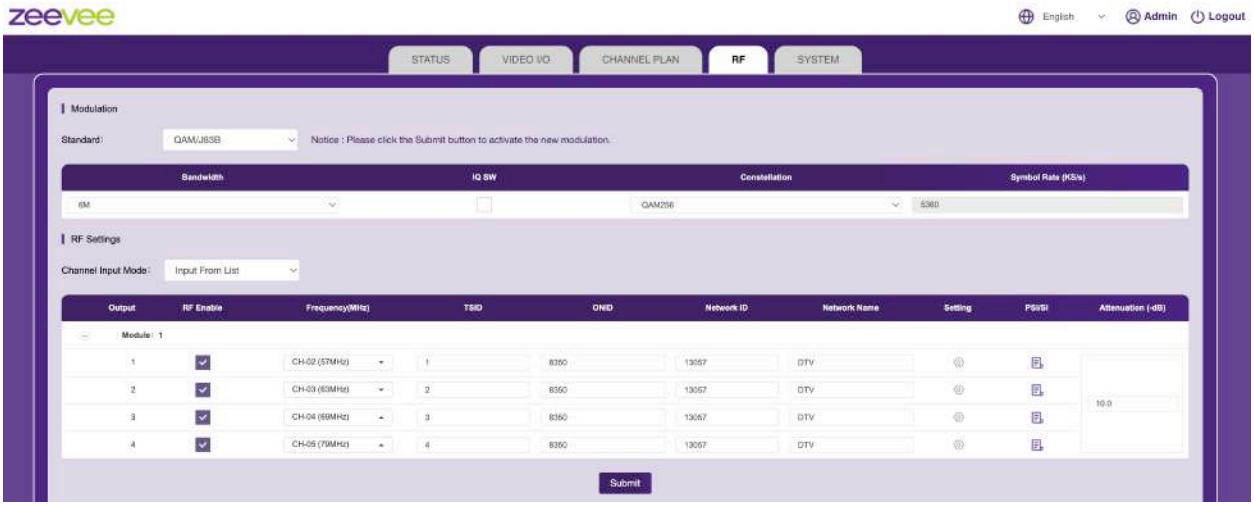
**LCN (D)**
Logical Channel Number used by DVB-T and DVB-C receivers to determine channel ordering. When supported by the tuner, this value controls how channels are numbered and displayed after a scan.

**Action**
The small globe looking button will allow you to set multicast or unicast address for UDP streaming. The starting address for all 4 channels is set via the General Settings button.

The pencil button will allow you to view and edit settings associated with the selected stream. It is not recommended to edit the DEST PID fields or TS Type fields. This can cause DVB-T and DVB-C tuners to not correctly discover the channel stream.



# RF Tab




The RF Tab is where you will select modulation type (QAM, DVB-T or DVB-C) as well as settings associated with that modulation.

## Modulation

**Standard**
Here you select from QAM/J83B, DVB-T or DVB-C

**Bandwidth**
Allows you to select the bandwidth associated with each channel. Default for QAM is 6 MHz.


**IQ SW**
Enables software-based inversion of the modulator's I/Q spectrum to ensure compatibility with downstream RF systems and headend equipment that expect a specific spectral orientation. As a general rule, leave this unchecked (default setting).

**Constellation (QAM64 vs QAM256)**
Selects the QAM modulation density used for RF output.
QAM64 offers higher robustness and tolerance to noise, while QAM256 provides higher data capacity but requires better signal quality for reliable reception.

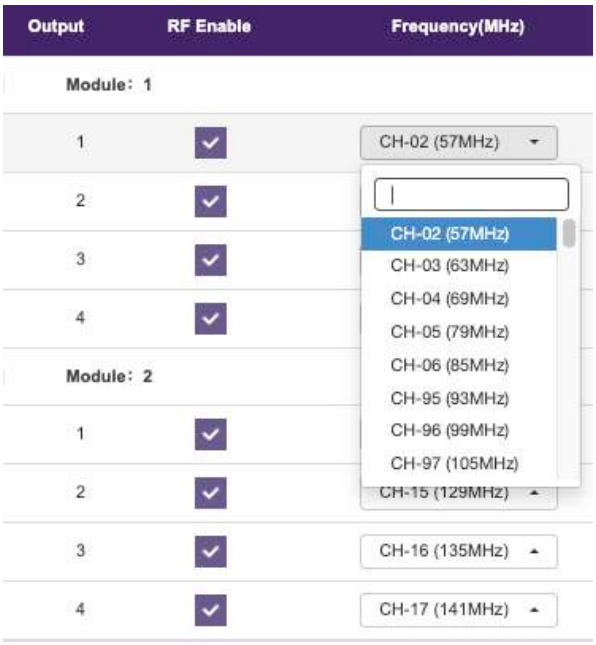
**Note:** Most North American QAM tuners are designed for QAM256 but will also support QAM64

**Symbol Rate**
The symbol rate defines how many symbols per second are transmitted on the RF channel and directly affects the data capacity of the signal. The symbol rate is fixed by the selected modulation standard and automatically applied to ensure compatibility with standard cable and TV tuners.

## RF Settings

This is where you will select the RF Channel / Frequency for the 8 inputs. This is broken into Module 1 with inputs 1-4. Each channel can be individually enabled or disabled here.

For Module 1, Select the channel / frequency for input number 1 from the drop down list. Inputs 2, 3 and 4 will automatically fill with consecutive channels / frequencies. Changing the first channel in the group will automatically update the next three channels to consecutive RF channels.




**TSID**
The TSID (Transport Stream ID) uniquely identifies a transport stream within a cable or broadcast network. Tuners use the TSID to distinguish between multiple transport streams, especially in systems with many RF channels. If editing this field, make sure each channel TSID is unique. **Important Note:** If using multiple HDb2880i units or HDb2840i units you must ensure unique TSID numbers for all combined channels. Example of two HDb2880i units. This will result in 16 channels and 16 unique TSID numbers. *Duplicate TSID values across combined systems may result in tuner discovery issues.*

**ONID (Original Network ID)**
ONID identifies the original broadcast or cable network that generated the transport stream. It is primarily used in DVB systems for network identification and service organization.

**Network ID**
The Network ID identifies the cable or broadcast network that the channel belongs to. It is used by tuners to group channels from the same source and ensure correct channel discovery during scans.

**Network Name**
A human-readable name associated with the network. This name may be displayed by compatible tuners during channel scans or in network information menus.

**PSI/SI**
PSI/SI data is metadata embedded in the transport stream that tells receivers how to identify, organize, and display channels, including program numbers, channel names, and service details. It allows TVs and set-top boxes to correctly discover and present services during channel scans.  (This is informational only)

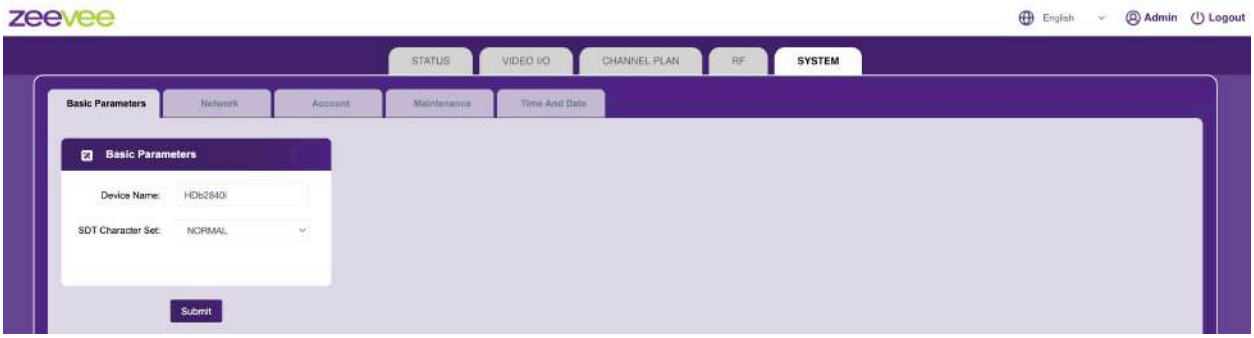
**Attenuation (-dB)**
This allows the user to lower the output strength of the RF signal.  This is done for the entire Module 1.  The range is from 0-20 in 0.5 dB increments.

# System Tab

The System Tab is used for settings not related to modulation or streaming.  Items include the unit name, Network settings, Account information, Maintenance and Time/Date.

## Basic Parameters

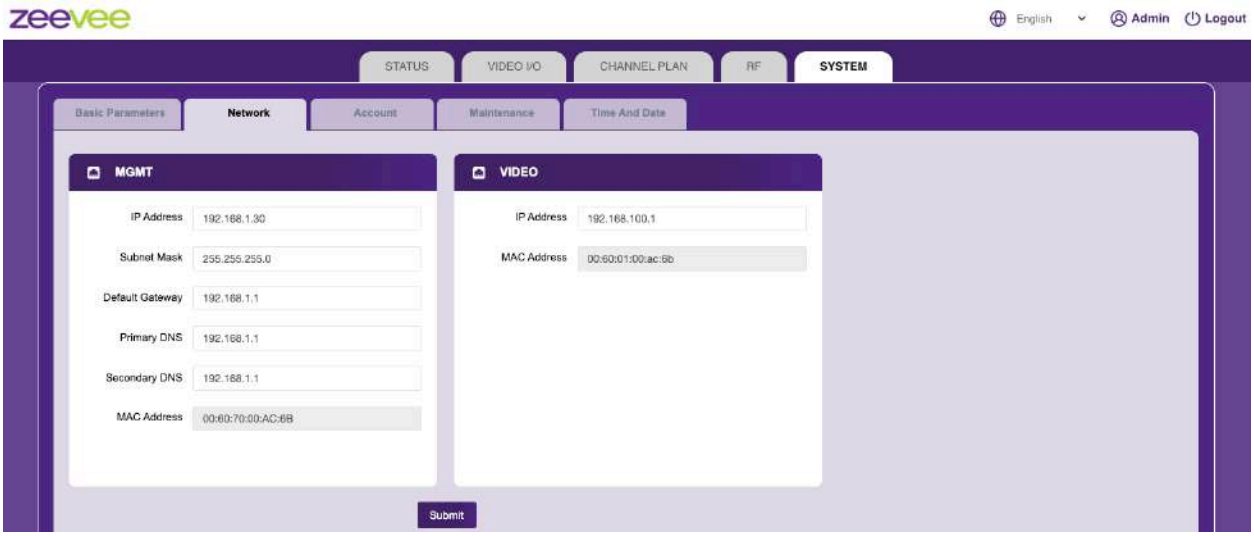
Shows you the unit name that can be changed if desired and the character set.




## Network

This tab allows you to change the IP address of the Management Port (MGMT) and the Video Port.

**Note:** The MGMT is the only port that you can ping.  You cannot ping or access the Video port IP address.  The Video port IP address is embedded in the UDP stream and is not intended for management or diagnostic access.

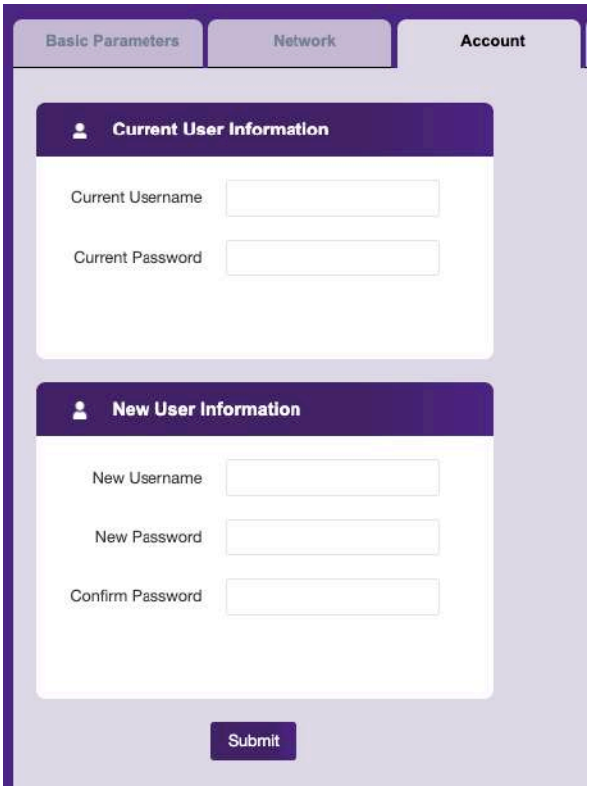



**Important Note:** If using more than one Kramer modulator unit you must change the IP address of the MGMT port for multiple units to exist on the same network. The default address is 192.168.1.30 with subnet mask of 255.255.255.0 for all Kramer modulator products.

Changing the Video port IP address is recommended but not required.

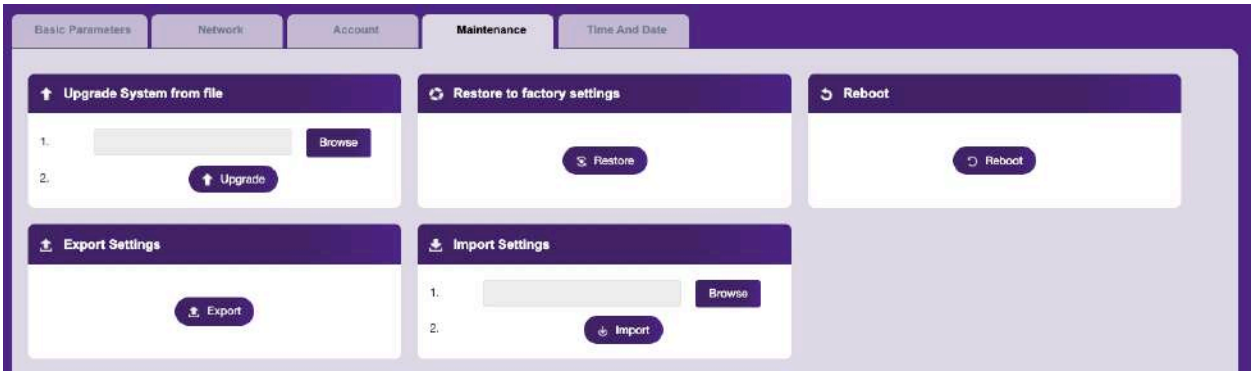
## Account

This tab allows you to change both the Username and Password of the unit if desired.  Note that if you forget either credential you will need to hard factory reset the unit to gain access again.




## Maintenance

This tab allows you to update system firmware, factory reset the unit, reboot the unit, export and import settings.



**Upgrade System from file**
This is where you would install new firmware if available. Click the Browse button and point to the firmware update file. Then press Upgrade. This process may take several minutes to complete. Do not power the unit off during this process.

**Restore to factory settings**
This will return the unit to original factory settings. Recommended after updating firmware to ensure all new firmware features are implemented.

**Reboot**
This will reboot the unit

**Export Settings**
This will create a text file with all of the current configuration settings. The file will be in the download folder of most PCs. The file name is “kramer.dat”

**Import Settings**
Used to restore settings that were saved with the Export Settings feature. Click the Browse button and point to the kramer.dat file. Then press Import.

# Device Technical Specifications

## HDb2840i Specifications

| General | | |
|---|---|---|
| Power Supply: 12V/5A<br>Power Use: 36W max | Cooling: Four internal cooling fans,<br>Side inlet, Side exhaust | Temperature/Humidity: Operating<br>+32°F to +113°F (0°C to +45°C) /<br>10% to 80%, non-condensing |
| Compliance:<br>FCC Part 15 Subpart B (Class A),<br>EN/IEC 62368-1, CE , RCM | Dimensions: (Not including brackets)<br>1.73 in. (H) x 12.5 in. (W) x 9.50 in. (D)<br>44 mm (H) x 317 mm (W) x 241 mm (D) | Enclosure Type: Metal<br>Unit Weight: 5.3 lbs. (2.40 kg)<br>Shipping Weight: 7.8 lbs. (3.55 kg) |
| Mounting: Rack ears shipped<br>attached, 1RU high | Carton Dimensions (individual):<br>4.1 in. (H) x 18.5 in. (W) x 12.2 in. (D)<br>104 mm (H) x 470 mm (W) x 311 mm (D) | Warranty: 3 Years |

| Input | |
|---|---|
| HDMI x4 | Resolutions Supported:<br>1920 x 1080 @60p 1920 x 1080 @60i<br>1920 x 1080 @50p 1920 x 1080 @50i<br>1920 x 1080 @30p 1920 x 1080 @25p<br>1920 x 1080 @24p 1280 x 720 @60p<br>1280 x 720 @50p |

| Video Encoder | | |
|---|---|---|
| Encoder Video Profile: MPEG2 or<br>H.264 | Traffic Shaping:<br>Variable Bit Rate | Video Encoding Data Rates: Variable<br>MPEG2: 8 - 20 Mbps per channel<br>H.264: 5 - 20 Mbps per channel |
| Average Encoding Data Rate: 18<br>Mbps per channel (MPEG2) | Audio Sample Rate 32 / 44.1 / 48 kHz<br>Color Profile: 4:2:0 | |
| Encoder Audio Profile:<br>MPEG 1 Layer 2, AAC, AC3 | Video, Audio PID:<br>Programmable starting value | Program Information: Programmable<br>program name, EIT |
| GOP Size: 16 | | |

| Modulator / Upverter | | |
|---|---|---|
| QAM Cable Standard:<br>HRC, IRC or STD | QAM Frequency Range: Single,<br>frequency agile QAM RF CATV<br>channels 2-135<br>• 2kHz resolution<br>• ± 30 ppm accuracy<br>• ± 35 ppm stability | Modulation Types:<br>QAM 64/256 (ITU-T J83 Annex B)<br>DVB-T and DVB-C also supported.<br>(Selectable) |
| DVB-T Frequency Range:<br>174–230 MHz (VHF),<br>470-862 MHz(UHF)<br>7/8 MHz channel bandwidths | DVB-C Frequency Range: 110-862 MHz,<br>8 MHz channel bandwidths | |

| Modulator / Upverter | | |
|---|---|---|
| Output Power: +45 dBmV typical | Output Level Adjust:<br>25 - 45 dBmV in 0.5 dB steps<br>(Adjustment is for groups of 4 signals) | MER: 34- 36 dB typical<br>MER: ≥33 dB minimum<br>I/Q Amplitude Imbalance: < 1% typical |
| **IP Streaming** | | |
| UDP | MPEG2 or H.264 (Must be same as RF modulation selection) | Audio: MPEG1-L2, AAC, AC3 |
| **Simple Setup** | | |
| Network Interface | 10/100 Mbps Ethernet via RJ45 connection<br>Set IP static address (Default 192.168.1.30 / 24)<br>Browser-based interface for quick and easy configuration<br>Easy firmware updates<br>All settings are persistent | |

# General Safety and Care Instructions

## Safety

**<u>WARNING:</u> When using electronic products, basic precautions should always be followed, including:**

- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with in accordance with cleaning instructions included in this manual.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions for spacing and clearance to allow proper airflow.
- Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the grounding-type plug. A grounding type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Power cord must be accessible to allow for the removal of the power from the unit.
- Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where cords exit from the apparatus.
- Unplug this apparatus during lightning storms.
- Unplug this apparatus when unused for long periods of time.
- Only use attachments/accessories supplied or specified by the manufacturer.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or excessive moisture, does not operate normally, or has been dropped.

**<u>WARNING:</u> To reduce the risk of fire or electric shock do not operate this apparatus in a position where it is exposed to dripping or splashing liquids, rain, moisture, or excessively high humidity. Objects containing liquid shall not be placed in proximity to the unit such that they present a risk of spillage onto the apparatus.**

**Shock and Fire Hazard:**
The unit's metal case, power supply, and grounding terminals and lugs are essential in containing radio energy as well as safeguarding the user from any risk of electrical shock. The metal shell of the unit protects the internal circuitry from environmentally induced over stress conditions and is an integral part of the compliant system.

**WARNING: Do not open the box or in any way expose the internal circuitry.**

**WARNING: There are no user-serviceable parts inside the unit. Opening or damaging the HDb2840i unit in any way voids the warranty and immediately nullifies any assertion of regulatory compliance made by Kramer. Any required service shall be performed by trained and qualified service personnel authorized by Kramer.**

# Important Siting and Application Considerations

## HDb2840i Equipment Type and Uses

**HDb2840i Intended Uses**

- Equipment is intended for the distribution of Audio Visual Information in and around a facility.
- Equipment does not generate video information itself, but accepts and distributes video information from industry-standard devices which generate such audio visual information.

**WARNING: The installer should test and validate a complete setup with the actual devices before deploying to a final production installation.**

# Installation Environment

The general area where the HDb2840i unit is to be installed shall be clean and free of obstructions or clutter.

## Mounting Options

- Unit should be mounted horizontally
- Unit may be mounted in standard 17 inch AV racks
- In all cases, insure that the units are rigidly held in place and will not be subject to impact and there is no possibility of toppling.
- Do not stack any other equipment or devices on top of the unit weighing more than 3Kg and only if sufficient bracing is provided to protect against toppling.

**<u>WARNING:</u> Failure to adhere to these recommendation could result in unsafe operation, damage to the equipment, or injury to the operators.**

## Ventilation

Ambient environmental temperature and humidity shall not exceed that specified in the Detailed Specifications portion of this document.

Ambient temperature in this case refers to the temperature of air entering the device through the ventilation grille.  Care should be taken to not enclose the device or deploy in a fashion where airflow loops or local “hot spots” can cause the inlet air to rise above the specified limit for normal operation.

In general 25mm (≈ 1inch) of clearance should be provided around the ventilation openings unless an external air mover insures that the inlet temperature is at or below the specified limit.

If the equipment is mounted in an enclosed cabinet, it is the job of the installer to insure that within the cabinet or enclosure the HDb2840i equipment does not experience local temperatures in excess of that specified in the Detailed Specifications portion of this document.

## Water and moisture

Never expose the HDb2840i unit to direct rain, moisture, or excessively high humidity.

Never use the device near water - e.g. near a bathtub, basin, pool, sink, or in a wet basement.

## AC Mains Connection

The HDb2840i units are powered through an external AC/DC converter unit.

- Do not substitute the supplied AC/DC power supply unit with another component. The overall system compliance is dependent on each of the provided elements being present and operational.

**<u>INFORMATION:</u> The introduction of a foreign, non-Kramer element nullifies any claim of regulatory compliance asserted by Kramer.**

The AC/DC power supply shall be powered from the appropriately rated AC mains voltage which allows for a wide range of input, generally from 100VAC through 240VAC.

Only use a power cord with an appropriately rated protective earth connection. The protective earth connection is essential to the overall safety of the system.

**<u>WARNING:</u> Bypassing or omitting the protective earth connection increases the risk of electrical shock and radio emissions**

Install the equipment in such a manner as the IEC power cord ingress in to the AC/DC adapter is accessible as this is the boundary of the AC mains system and the point at which the HDb2840i equipment is disconnected from the AC mains power if needed.

The equipment should be installed as near as is practicable to an AC outlet.

- Do not substitute or extend the DC cable from the AC/DC unit.

The HDb2840i system is intended and rated for continuous operation

Should the HDb2840i equipment be unused for an extended period of time it should be disconnected from the AC mains at the AC inlet to the external AC/DC converter in order to protect the equipment from transient over-voltage conditions.

# FCC Compliance Statement

The HDb2840i family of devices has been tested and found to comply with the limits for Class A Digital Devices pursuant to Part 15 of the FCC Rules. Operation is subject to the following conditions: 1) these devices may not cause harmful interference, and 2) these devices must accept any interference received including interference that may cause undesired operation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed or 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 to correct the interference by one or more of the following measures:

1. reorient or relocate the receiving antenna
2. increase the separation between the equipment and the receiver
3. connect the equipment to an outlet on a circuit different from that to which the receiver is connected
4. consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

***In order to insure compliance with the referenced FCC regulations, only deploy the equipment with provided or approved accessories in the manner indicated in this and other pertinent manuals.***

***Use only approved and properly shielded cables of good quality.***

Address any inquiries to:

**Kramer, Incorporated**
6 Route 173
West Clinton, NJ 08809
www.kramer.com

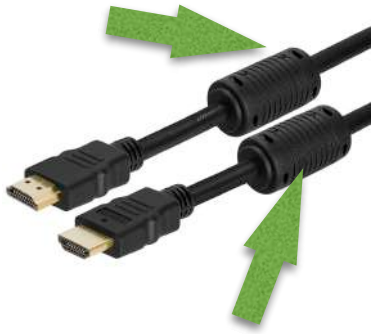
# EMC Information

The HDb2840i devices should be mounted and operated in accordance with the guidelines specified in this guide to maintain the integrity of the expected EMC characteristics.

The supplied Power Supply (AC/DC Conversion unit) should be used. Any other AC/DC supply has not been tested or verified to perform at the levels indicated in this manual.

Media cables are not provided and the HDb2840i devices are generally fairly tolerant of different types and manufacture styles.

- Media cables should be of good quality and rated for the performance levels of the interface to which they are connected.
- HDMI cables shall be of the type incorporating integral Ferrite cores in order to achieve rated compliance levels and the cleanest electromagnetic environment in the vicinity of the unit.



## Electromagnetic Emissions

| Test | Compliance Level | Notes |
|---|---|---|
| RF emissions: CISPR 11 | Group 1 | HDb2840i emissions are very low and not expected to cause unintentional interference. |
| RF emissions: CISPR 11 | Class A | Commercial equipment for use in commercial environments. |
| Harmonic emissions: IEC 61000-3-2 | Class D | Suitable for use in all commercial and domestic low-voltage environments. |
| Voltage fluctuations/ flicker emissions: IEC 61000-3-3 | Compliant | |

# Appendix 1: Recommended 1G Switches for Multicast Streaming

The following 1Gbit switches are recommended for use with the HDb2840i. Please note this is not an all-inclusive list. There are many other switches available that will function with the HDb2840i. Higher-speed switches may be used provided they properly support IGMP snooping and multicast control.

| Manufacturer | Model # |
|---|---|
| Arista | 720 Series |
| Aruba | CX 6200 Series |
| Aruba | CX 6300 Series |
| Cisco | 3650 Series |
| Cisco | 9300 Series |
| CommScope/Ruckus | ICX7150 Series |
| CommScope/Ruckus | ICX7550 Series |
| Extreme | X460 Series |
| Extreme | X670 Series |
| Juniper | EX 4100 Series |
| Juniper | EX 4400 Series |
| Juniper | EX 4600 Series |
| Luxul | AMS Series |
| Netgear | M4250 Series |
| Netgear | M4300 Series |
| Niveo | NGSM Series |

**Notes:** It is recommended to update all switches to latest firmware and then factory default the unit.

# Appendix 2: Switch Configuration Options

Some Switches will work directly out of the box with zero configuration required. Nearly all switches however will provide the user some ability to customize the configuration. The list below includes various switch configuration options that Kramer has encountered. Look for these or similar options when configuring your switch.

1. Enable IGMP Snooping
    a. Must be enabled
2. Enable IGMP Snooping on VLAN used by HDb2840i
    a. Must be enabled when all ports default to VLAN1
3. Filter/Drop unregistered Multicast traffic
    a. If not applied, the behavior of the switch will be to broadcast multicast packets if the switch has no known destination for that packet.
    b. Must be enabled if found
4. Unregistered Multicast Flooding
    a. Must be disabled if found
5. Filter Unregistered Multicast (different wording than number 4 above)
    a. Must be enabled if found
6. Enable IGMP Query
7. Enable IGMP Query on VLAN used by HDb2840i
8. Exclude Mrouter Interface for Netgear switches
9. Validate IGMP IP Header
    a. Must be disabled if found
10. Set IGMP Version to IGMP V2
    a. Must be set if found
11. Enable FASTLEAVE on port X
    a. Should be enabled, if found
12. Enable FASTLEAVE for VLAN used by HDb2840i
    a. Should be enabled if found

# Troubleshooting

| | |
|---|---|
| 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. |
| Image Breakup | Image or video break up is often caused by an issue in the RF/coax network. You may have chosen a channel number that is not completely vacant.<br><br>If you are combining with other modulators, be sure the RF# selected on the unit does not conflict with any other channels, keep in mind that some analog modulators may spill over to adjacent channels and cause unexpected interference.<br><br>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.<br><br>There may also be an RF power balance issue. Verify that the RF 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.<br><br>Some TVs will also show video issues if the signal strength is too high. Try lowering the RF power on the unit to ensure you are not overdriving the HDTV tuner. |
| No audio | Ensure the TV/Tuner supports the selected audio format. Try changing to a different audio format. |
| Audio present but no video | Verify the TV supports the selected video format and resolution.<br>Try lowering output resolution (for example 1080i instead of 1080p).<br>Confirm MPEG-2 vs H.264 capability on the tuner. |
| Weak or no signal on some TV’s but not others | Some tuners are more sensitive than others. Verify RF output level and coax losses.<br><br>Check for excessive splitters, long coax runs, or poor-quality connectors.<br><br>Try increasing RF output level slightly or reducing splitter count as a test. |
| Only some channels found during scan | Ensure all channels are enabled in the RF tab.<br>Confirm channels are assigned unique RF frequencies.<br>Perform a “full/initial” scan, not “add channels” mode on the TV.<br>Delete old channel maps on the TV and rescan.<br>Change Constellation to a lower value (QAM256 to QAM64) and rescan. |
| Wrong channel names or numbers | Verify Short Name (D) / LCN (D) / Major/Minor fields are set correctly.<br>Some TVs cache metadata. Clear the channel list and rescan. |
| Unit not reachable in web browser | Confirm PC is on same subnet as management port.<br>Try default IP 192.168.1.30 after factory reset.<br>Verify you are plugged into the MGMT port, not the Video port. |

| | |
|---|---|
| No output after firmware update | Perform a factory reset from the Maintenance tab.<br>Re-enter the channel plan and RF settings.<br>Verify modulation standard (QAM vs DVB-T vs DVB-C) is correctly selected. |
| No channels found on scan with ZvSync-EU (DVB-T) | In the RF tab select the IQ SW button. Be sure to Submit this change. Then do a new channel scan with the ZvSync-EU unit. |

# Disclaimers

Kramer has striven to ensure that this document is accurate and represents the described products fully. Although, Kramer assumes no responsibility for errors found, should any be found, please contact zv_support@kramerav.com and corrections will be issued as appropriate.

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