IXG CloudBridge
Internet Exchange Gateway Server

User Manual

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TABLE OF CONTENTS

1. INTRODUCTION 1
2. GETTING STARTED 3
3. SPECIFICATIONS 5
3.1. INPUTS & OUTPUTS 5
3.2. HARDWARE 5
3.3. NETWORK INTERFACE 5
3.4. NETWORK MANAGEMENT 5
3.5. MONITORING 5
3.6. ELECTRICAL 5
3.7. CHASSIS 5
4. SETUP GUIDE 7
4.1. INITIAL SETUP USING DVA PORT AND USB PORTS 7
4.2. LICENSING 9
4.2.1. Upgrading License Using Webeasy 9
4.3. SETUP COMMUNICATION BETWEEN TX SIDE AND RX SIDE 11
4.3.1. Side 1 (TX) 11
4.3.2. Side 2 (RX) 16
4.4. TROUBLESHOOTING 21
4.4.1. No Signal communication between TX side and source 21
4.4.2. No Signal communication between RX side and Destination 23
4.4.3. TX Side Not Streaming with RX Side or Stream Not Received by RX Side 24
4.4.4. Data Loss on RX Side 25
4.4.5. Web page not responding 27
5. WEBEASY REFERENCE CONTROLS 29
5.1. SYSTEM 29
5.1.1. Information 29
5.1.2. License Control 29
5.1.3. Configuration Management 30
5.1.4. Control 30
5.2. IP INPUT 30
5.2.1. Access Port Control 31
5.2.2. Access Port Monitor 31
5.3. INTERNET 32
5.3.1. Internet Port Control 32
5.3.2. Internet Port Monitor 33

5.3.3. Buffer Control 33
5.3.4. Internet 33

5.4. INTERNET INPUT IP STREAM 34

5.4.1. Stream Control 35
5.4.2. Network 35
5.4.3. ARQ 35
5.4.4. ServerMode 36
5.4.5. Monitoring 36
5.4.6. Network Status 36
5.4.7. ARQ Status 36

5.5. INTERNET OUTPUT IP STREAM 37

5.5.1. Stream Control 38
5.5.2. FEC 38
5.5.3. Stream Status 38
5.5.4. Receive Status 38
5.5.5. Transmit Status 38

5.6. NOTIFY 39

5.6.1. Trap 39
5.6.2. Output Notify 39
5.6.3. Input Notify 39

5.7. TRAPS 40

5.8. TOP MENU BAR 40

5.8.1. Refresh 40
5.8.2. Apply 40
5.8.3. Dynamic Apply 40
5.8.4. Upgrade 40

6. FEC 43

Figures

Figure 1-1 : IXG CloudBridge Server Network Management 1
Figure 1-2 : Block Diagram (Typical Configuration) 2
Figure 2-1 : IXG CloudBridge Server Rear Panel 3
Figure 4-1 : Cloudbridge Server Login 7
Figure 4-2 : Menu Screen 8
Figure 4-3 : Network Setup 8
Figure 4-4 : WebEASY® - System Tab\License Upgrade 10
Figure 4-5 : WebEASY® - License Upload 10
Figure 4-6 : WebEASY® - IP Input Tab 12
Figure 4-7 : WebEASY® - TX Side Webpage 13
Figure 4-8 : WebEASY® - RX Side Webpage 14
Figure 4-9 : WebEASY® - TX Side Webpage 15
Figure 4-10 : WebEASY® - RX Side Webpage 16
Figure 4-11 : WebEASY® - IP Input 17
Figure 4-12 : WebEASY® - TX SIDE 18
Figure 4-13 : WebEASY® - RX SIDE 19
Figure 4-14 : WebEASY® - RX Side Webpage 20
Figure 4-15 : WebEASY® - TX Side Webpage 21
Figure 4-16 : WebEASY® - IP Input 22
Figure 4-17 : WebEASY® - IP Input 23
Figure 4-18 : WebEASY® - Internet Output IP Stream 24
Figure 4-19 : WebEASY® - Internet Input IP Stream 25
Figure 4-20 : WebEASY® - Internet Input IP Stream 26
Figure 4-21 : WebEASY® - Internet Input IP Stream (Continue) 27
Figure 5-1 : WebEASY® - System Tab 29
Figure 5-2 : WebEASY® - IP Input Tab 30
Figure 5-3 : WebEASY® - Internet Tab 32
Figure 5-4 : WebEASY® - Internet Input IP Stream 34
Figure 5-5 : WebEASY® - Internet Output IP Stream 37
Figure 5-6 : WebEASY® - Notify 39
Figure 5-7 : WebEASY® - Top Menu bar\Refresh 40
Figure 5-8 : WebEASY® - Top Menu Bar\Apply 40
Figure 5-9 : WebEASY® - Top Menu Bar\Dynamic Apply 40
Figure 5-10 : WebEASY® - Top Menu Bar\Upgrade 40
Figure 5-11 : WebEASY® - Firmware Upgrade 41
Figure 5-12 : WebEASY® - Browse Firmware Files 42
Figure 6-1 : WebEASY® - TX Side 43
Figure 6-2 : WebEASY® - RX Side 44
Figure 6-3 : WebEASY® - TX Side 44
Figure 6-4 : WebEASY® - RX Side 44

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Apr 2017

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1. INTRODUCTION

With the improved speed and reliability of IP networks the IXG CloudBridge Server provides an ideal option for delivering high-quality contribution video over unmanaged IP networks. The IXG CloudBridge Server features a unique Forward Error Correction mechanism (+FEC option) that allows for a seamless error free delivery of audio and video streams over any network that has not been optimized for media transport.

The IXG CloudBridge Server is VistaLINK® capable, offering remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP) giving the flexibility to manage operations, including signal monitoring and module configuration from SNMP capable control systems (VistaLINK® PRO NMS).

The IXG CloudBridge brings flexibility, performance, and feasibility in a single module.

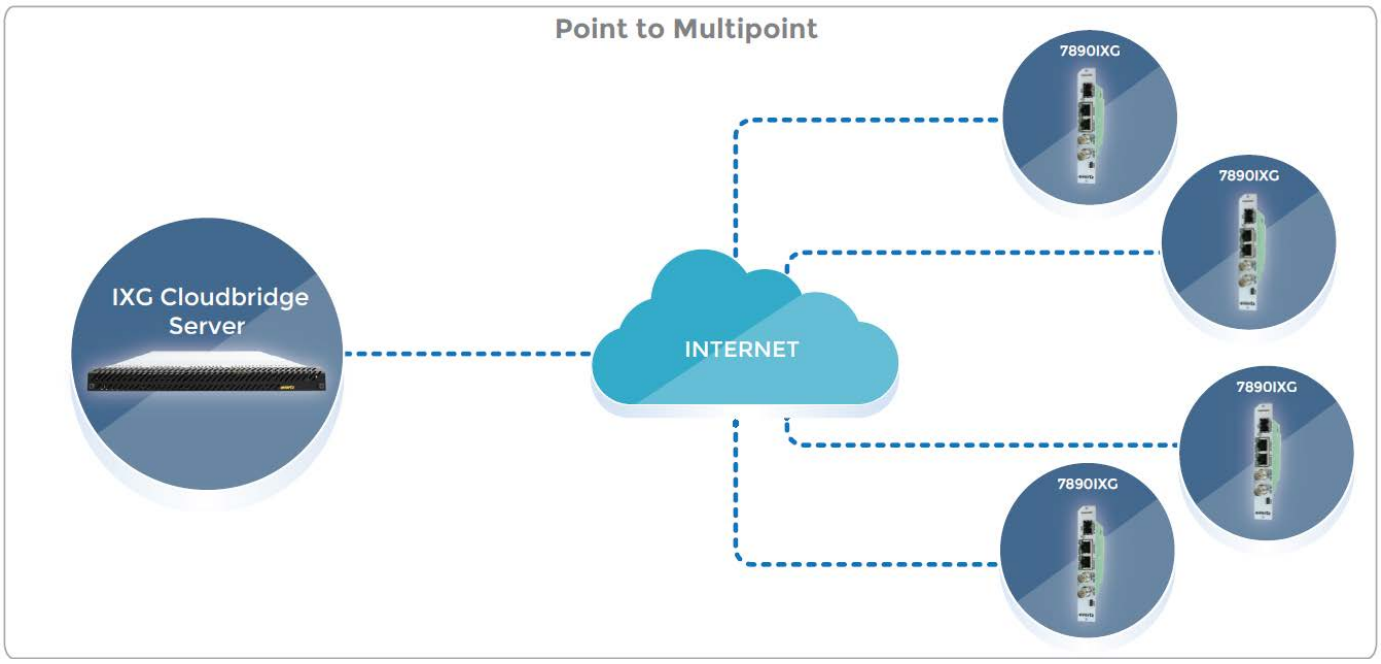

Figure 1-1 : IXG CloudBridge Server Network Management

Features & Benefits

- Broadcast Quality Transport Over unmanaged IP networks
- Advanced rate control for maximum link utilization
- Stream secured using high-strength encryption (+AES128 option for encryption)
- Fast media services launch
- Supports IP and ASI transport streams
- VistaLINK® capable for remote monitoring, control and configuration capabilities via SNMP
- Redundant power supply chassis

- Hot-swappable module without need for re-cabling in event of failure
- Portable or rack mounted frame assemblies
- High density approach offers 15 modules within 3RU applications
- Low cost media contribution over unmanaged IP networks
- Low cost redundancy option for primary dedicated media delivery links
- Fast deployment of ad-hoc media services

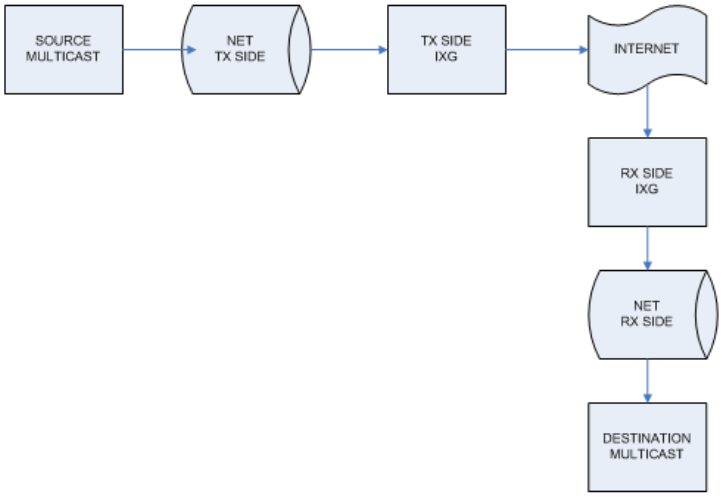

Figure 1-2 : Block Diagram (Typical Configuration)

2. GETTING STARTED

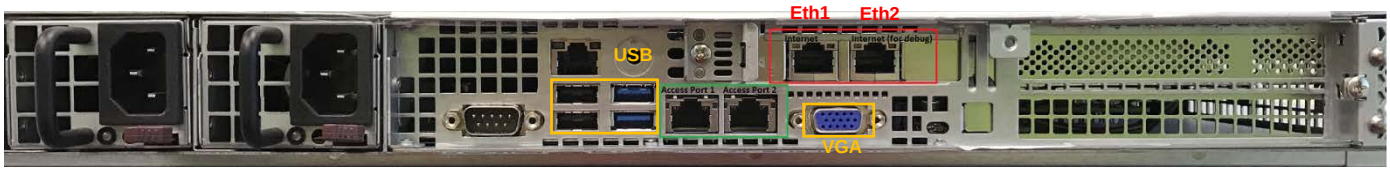

Figure 2-1 : IXG CloudBridge Server Rear Panel

Internet Ports: Ethernet port 1 used for transferring and receiving data through unmanaged networks. For example, the Internet Ethernet port 2 is used for debugging which goes into the same network

Access ports: Ethernet Access 1 and 2 ports are used to interface the transport stream onto the unmanaged network. For example these ports will interface with an encoder and/or decoder for access to and from the internet.

VGA & USB ports: These ports allow the user to directly access the module serially by connecting directly to monitor through VGA cable, keyboard and a mouse. These ports allow the user for initial setup (such as setting up IPs).

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3. SPECIFICATIONS

3.1. INPUTS & OUTPUTS

4xRJ45 10/100/1000 GigE I/O for MPEG-2 TS over IP

3.2. HARDWARE

Memory	16GB
Hard drive	2xHDD raided
Ethernet	4xIntel 1GBe Ethernet ports

3.3. NETWORK INTERFACE

Standard	Ethernet 10/100 base-T
	IEEE 802.3U standard for 100Mb/s
Connector	RJ-45

3.4. NETWORK MANAGEMENT

Control	HTTP web browser
	True SNMP with VistaLINK®

3.5. MONITORING

Signal Detection	Signal Presence Detection
Error Notification	HTTP web browser status page
	SNMP Trap notification

3.6. ELECTRICAL

AC Input	100-246V, 50-60Hz
Power	500W

3.7. CHASSIS

Form Factor	IU Rackmount

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4. SETUP GUIDE

This section will outline initial network management setup and transmission of the IXG CloudBridge Server. Basic setup of a single transmit to a single receiver is outlined.

4.1. INITIAL SETUP USING DVA PORT AND USB PORTS

- Power up the server.
- Connect VGA port to the monitor through VGA cable and connect a keyboard and a mouse in USB ports. This will allow the user to initially setup the card.
- This will take you to the login page and will allow you to access the initial settings of the server.

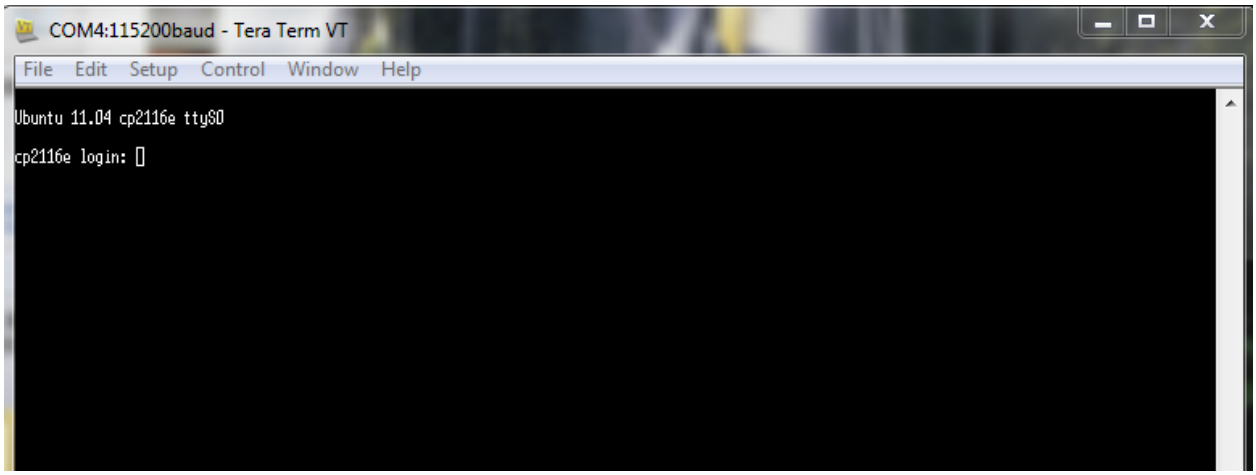

Figure 4-1 : Cloudbridge Server Login

- Login and password is "*customer*".
- Type 1 to go to network setup, 2 for SNMP setup, and 3 for engineering debug tool and press enter. For example if you want to change the IP address of the card, type 1 and press enter.

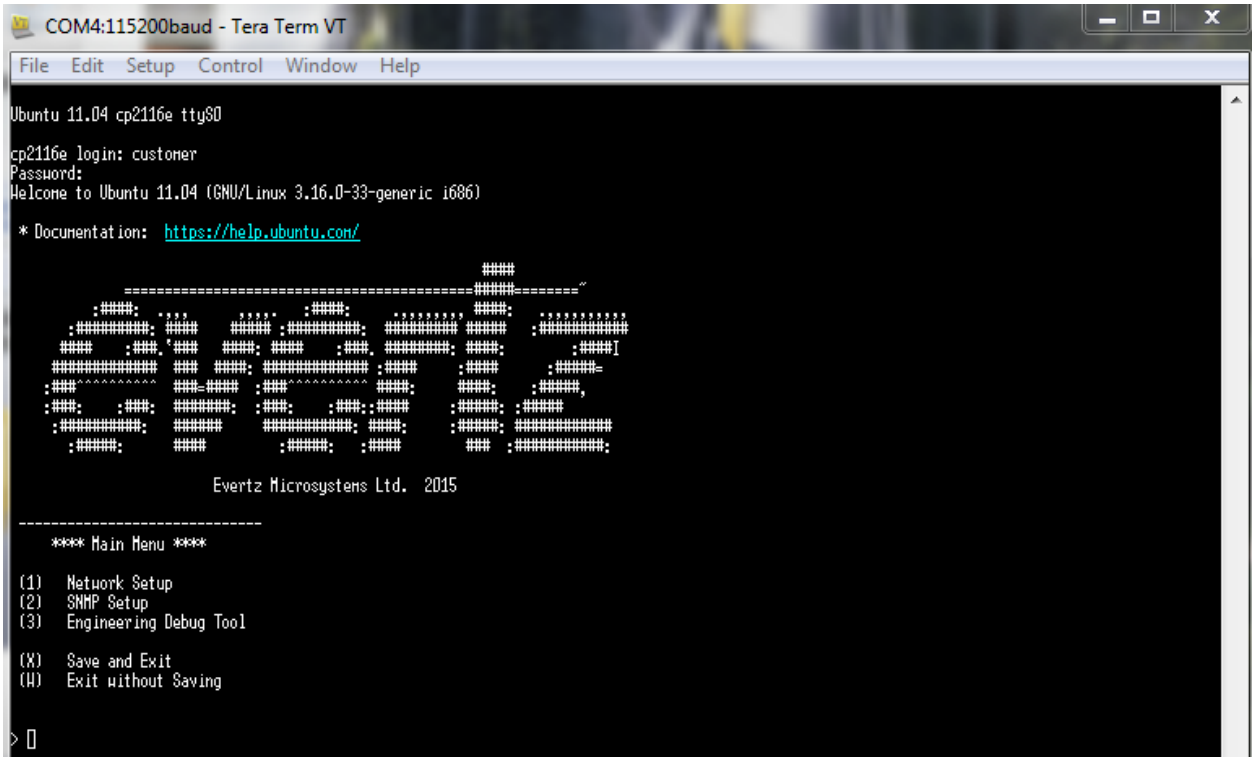

Figure 4-2 : Menu Screen

Figure 4-3 : Network Setup

- To change the IP address type 1 and hit enter. To change the netmask, gateway, or broadcast type the corresponding number and hit enter. After selecting an option type the desired address and press enter. To save the new settings type 'x' and hit enter.
- For changing the SNMP setup and engineering debug tool, follow the same steps as network setup.

4.2. LICENSING

Note: Licenses should be preloaded from the factory, however, if additional licenses are required, please contact the factory for assistance (not having accurate license files cause unexpected input and output availability).

Make sure the license installed was ordered correctly. If not, the user will need to upgrade the license file. Upgrading the license can be done from Web-Easy.

4.2.1. Upgrading License Using Webeasy

To upgrade the license from Web-Easy, enter the IP address of the IXG CloudBridge Server in the web browser then enter the login and password (default is set to customer, customer).

After entering into the webpage, click on system tab on the left and then click on Browse under License control tab (Figure 4-4).

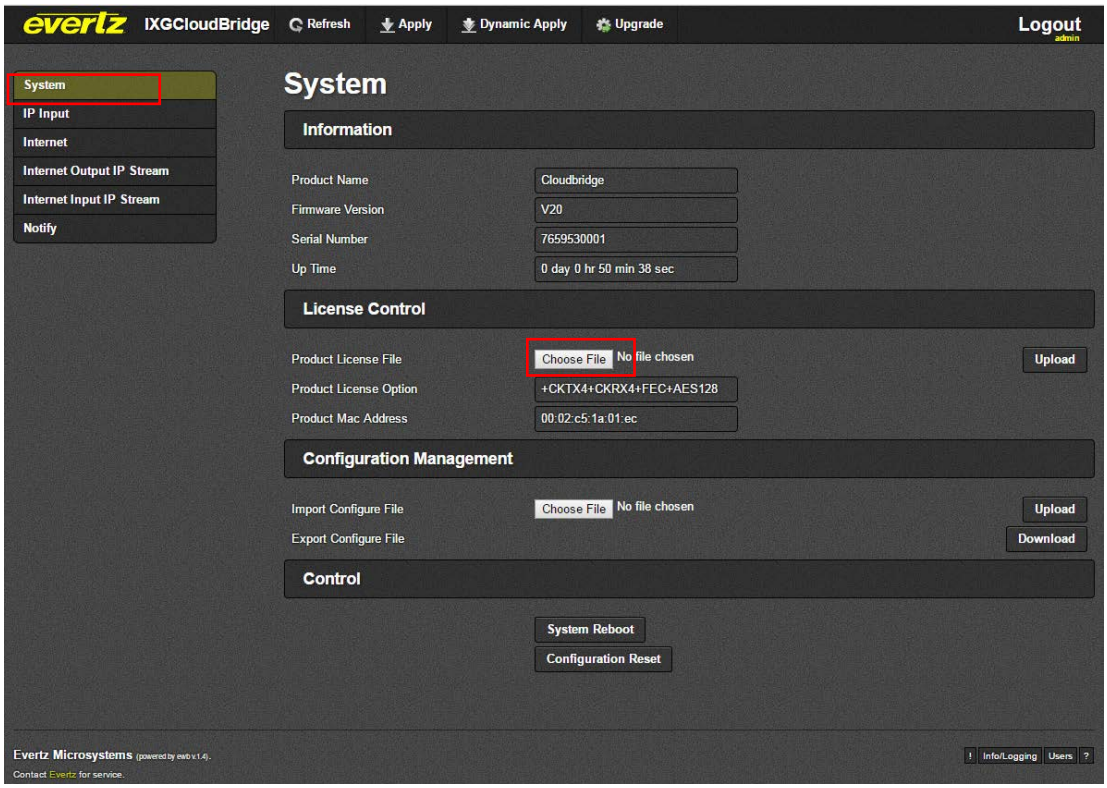

Figure 4-4 : WebEASY® - System Tab\License Upgrade

Locate and select the license file (.IXG extension) and click open.

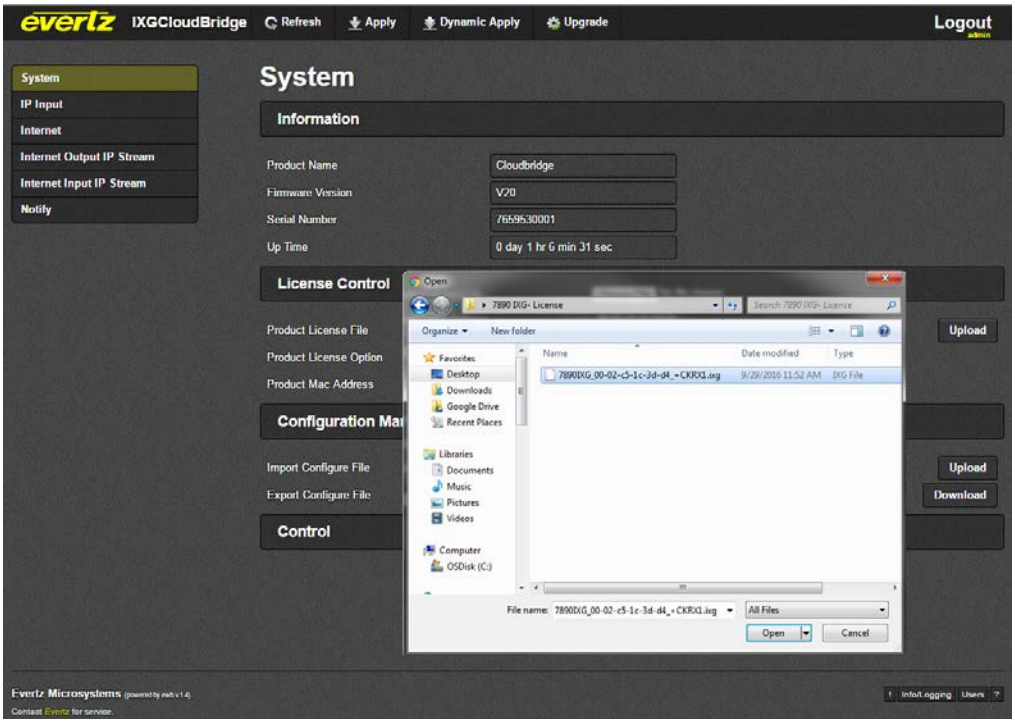

Figure 4-5 : WebEASY® - License Upload

Click upload and license will be upgraded.

4.3. SETUP COMMUNICATION BETWEEN TX SIDE AND RX SIDE

The IXG CloudBridge Server is a powerful module which gives users the capability to transport video streams over lossy networks such as internet.
This section outlines the basic procedure to configure a transmitting and receiving IXG CloudBridge Server to pass video over a network. Each IXG module has the ability to do multiple transmit and receive videos based on what type of license is installed. Setup of each transmit and receive port is identical to that outlined in this setup guide.

To start passing data between the ports, IP address configuration is required. Follow these steps to set up communication between Side 1 (TX) and Side 2 (RX).

4.3.1. Side 1 (TX)

1) Go to the webpage and click on the IP input tab to check port link status (port link status shows the connection between the video source and access port of the card). “Up” status means it is connected the network that is hosting the source video. Please verify the connection from the IXG CloudBridge Server to the source network if the port status is “down.”

2) Check the link speed and data rate. This will confirm the communication between the card and the source.

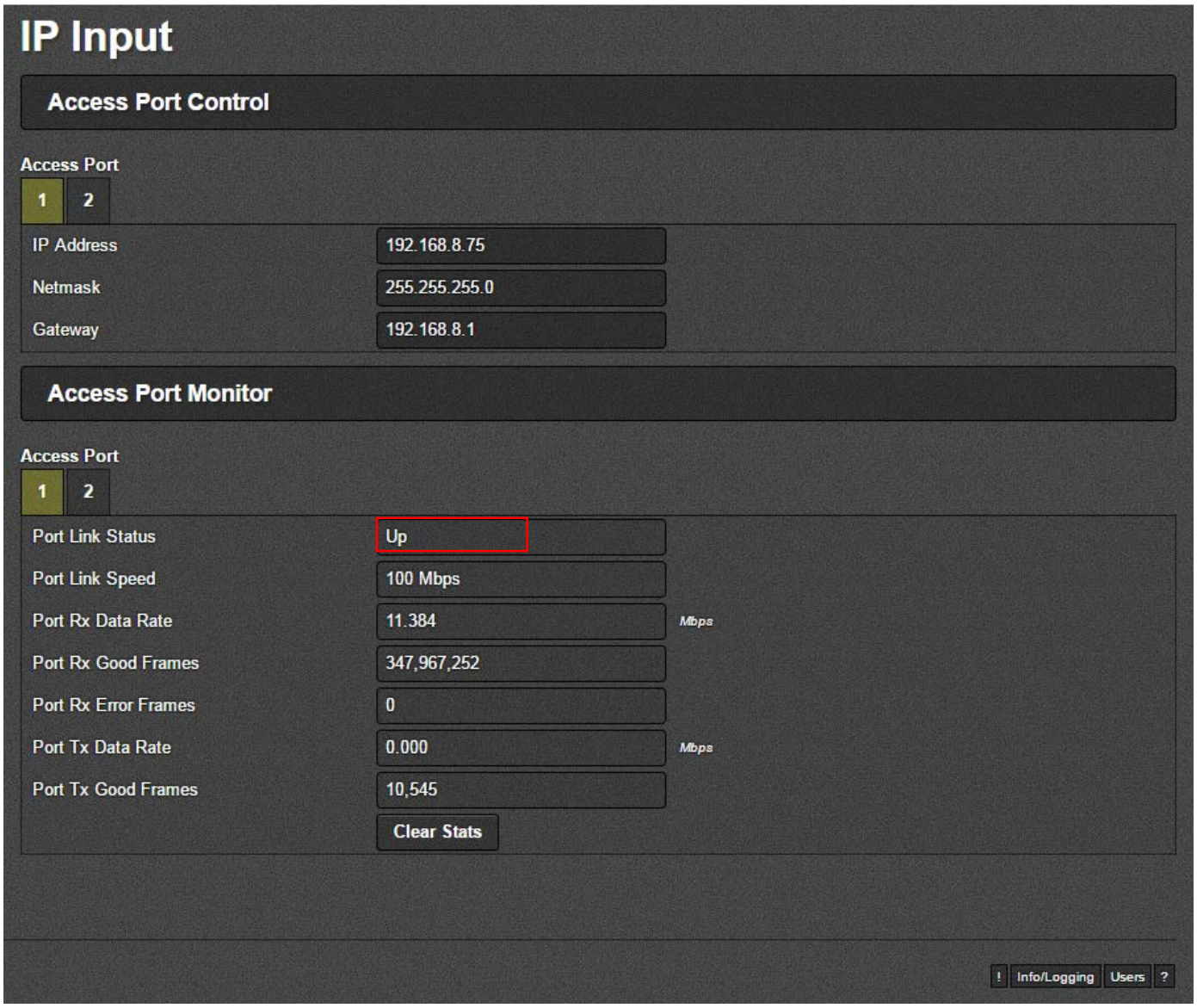

Figure 4-6 : WebEASY® - IP Input Tab

After checking the access port link on the Transmitter side (TX side), verify the IP configuration of internet port on both TX side and Receiver side (RX side). “Destination IP” on the TX side under Stream Control under Internet output IP stream should match the “source IP” of the RX side under Internet tab (for example if the RX side is directly connected to the Internet, then this IP is the public internet IP of the TX side).

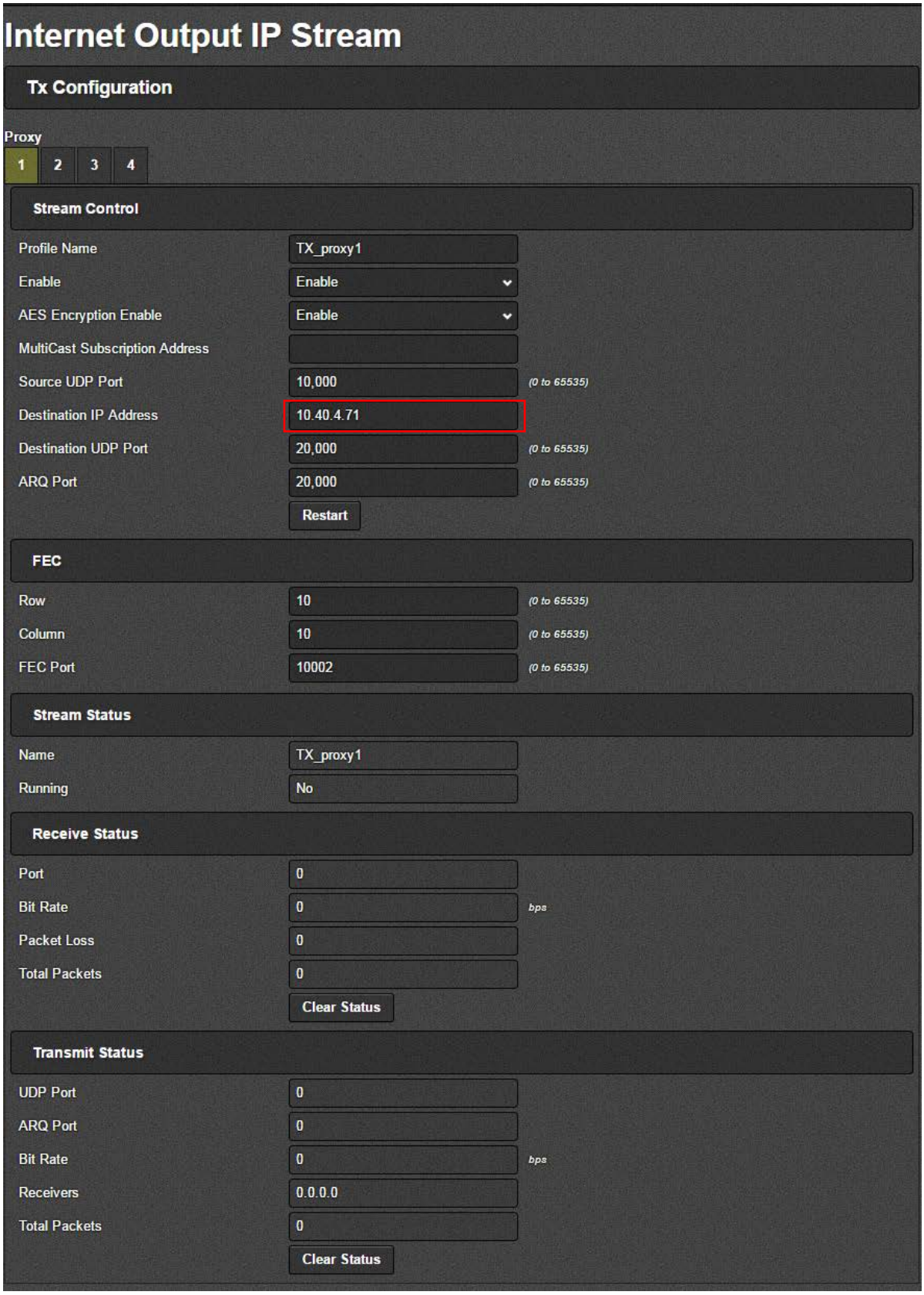

Figure 4-7 : WebEASY® - TX Side Webpage

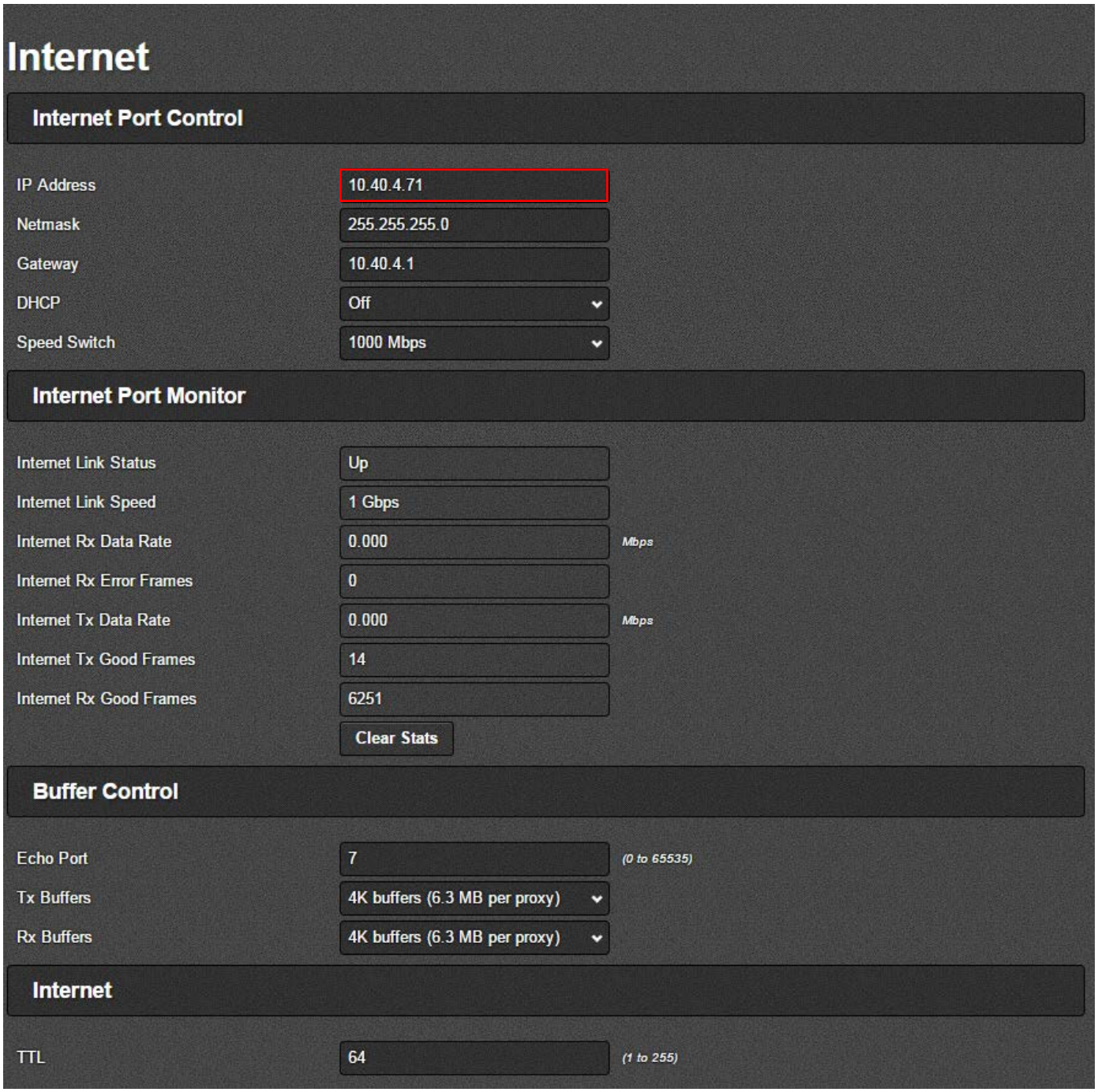

Figure 4-8 : WebEASY® - RX Side Webpage

1) Also check for Destination UDP port and ARQ port on TX side should match with the source UDP port and ARQ port on the RX side.

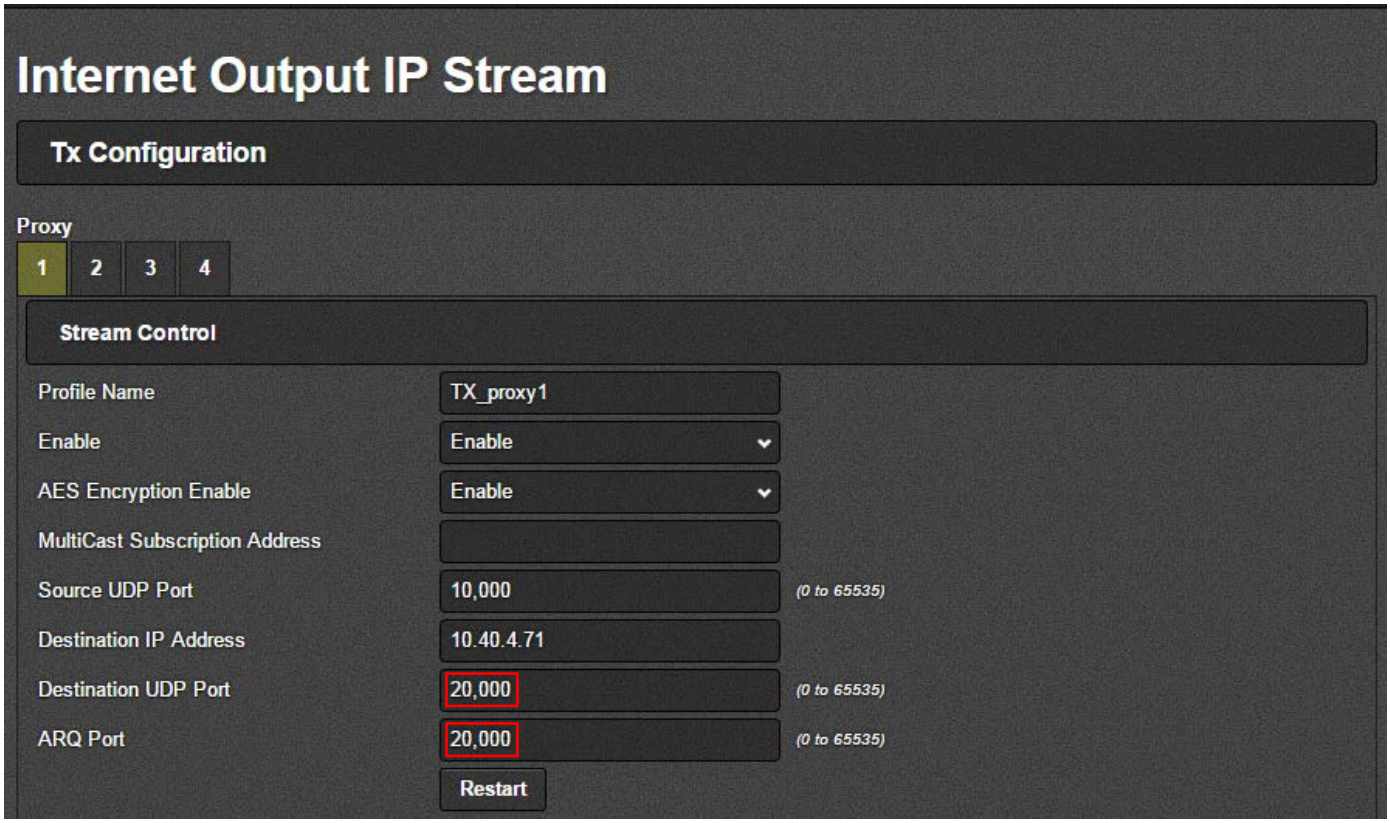

Figure 4-9 : WebEASY® - TX Side Webpage

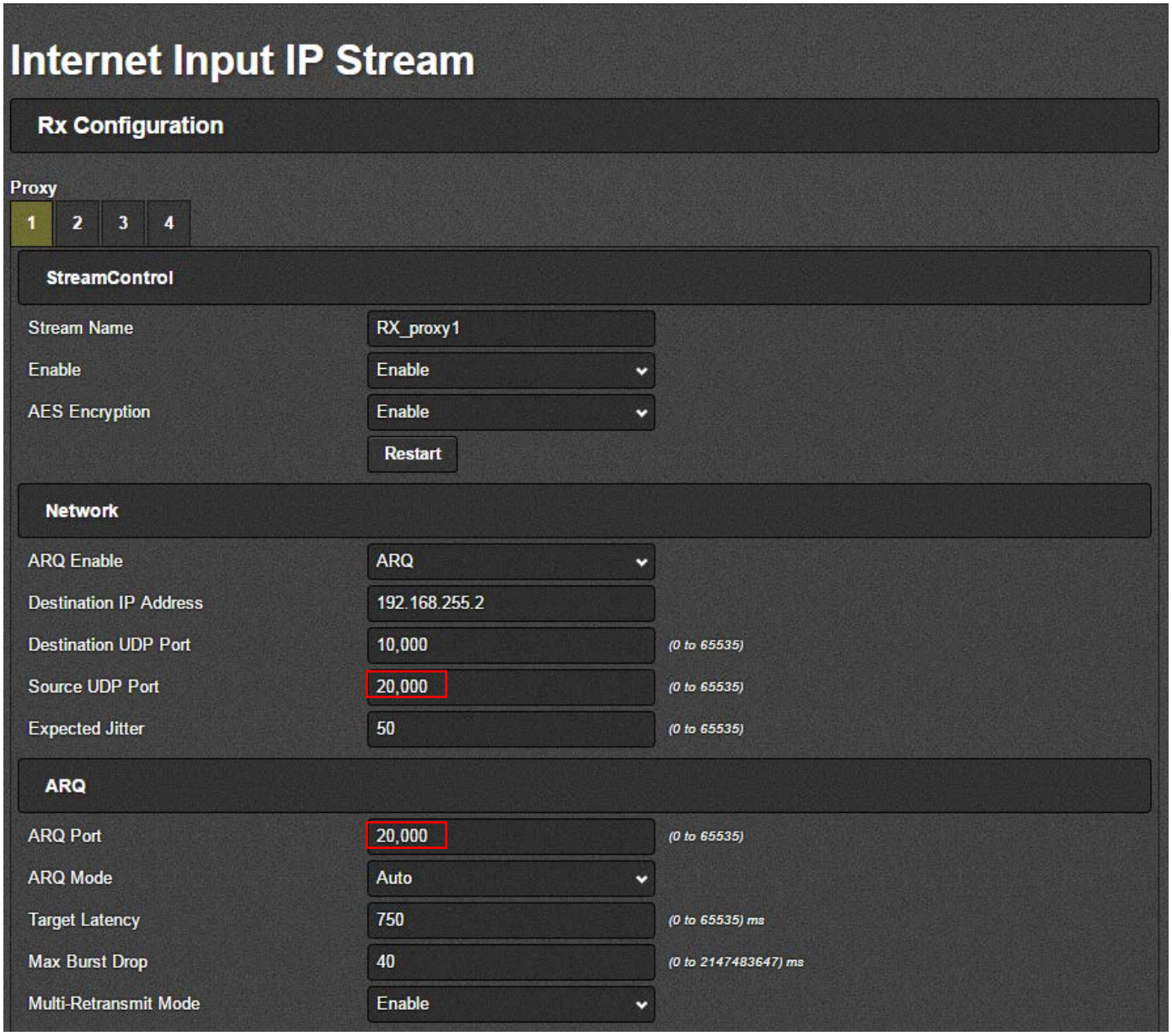

Figure 4-10 : WebEASY® - RX Side Webpage

2) To send specific data to the RX SIDE over the internet, enter the IP address of the source data in "Multicast subscription address" under stream control section under Internet output IP stream tab on the TX Side webpage.

4.3.2. Side 2 (RX)

1) Go to the webpage and click on IP input tab and check port link status (port link status shows the connection between the source and access port of the card). "Up" status means it is connected to the destination network. Please verify the connection from the IXG to the destination network if the port status is "down."

2) Also check the link speed and data rate. This will confirm the communication between the card and the destination.

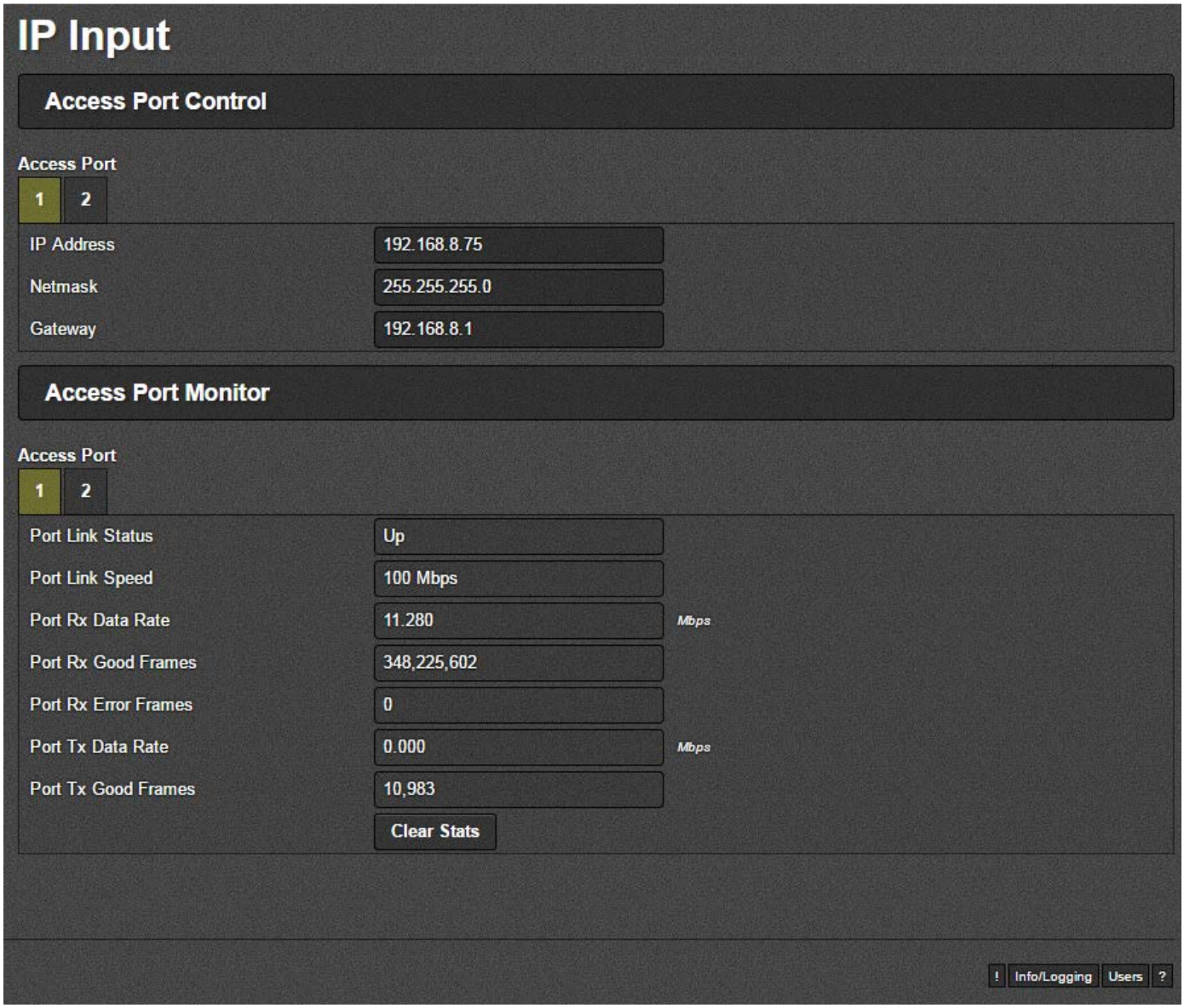

Figure 4-11 : WebEASY® - IP Input

3) After checking the access port link on the RX side, verify the IP configuration of the internet ports on both the TX and RX sides. The “Destination IP” on the TX side (under the Internet Output IP stream tab) must match the “Source IP” of the RX side (under the Internet tab). For example: if the TX side is directly connected to the Internet, then this IP is the public internet IP of the RX side.

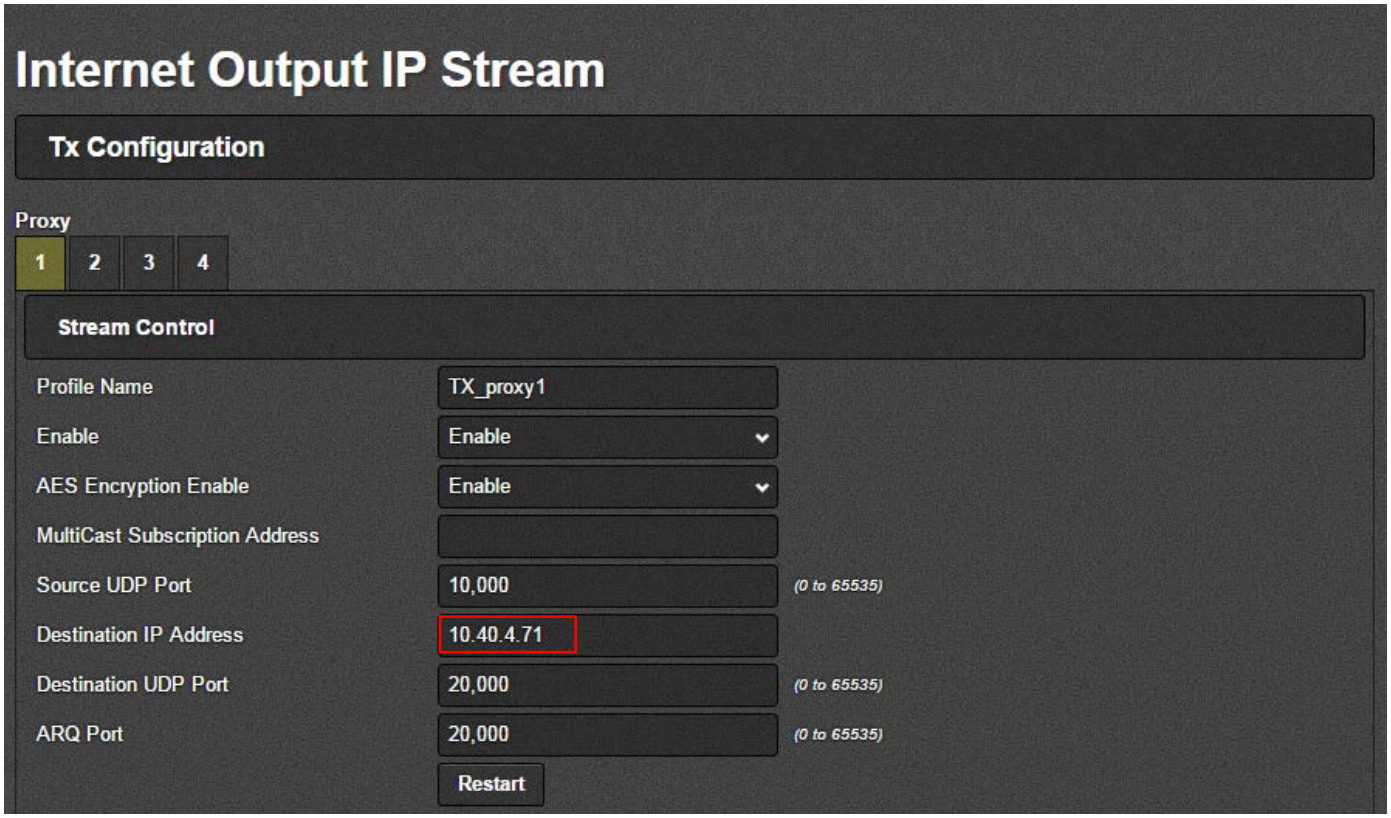

Figure 4-12 : WebEASY® - TX SIDE

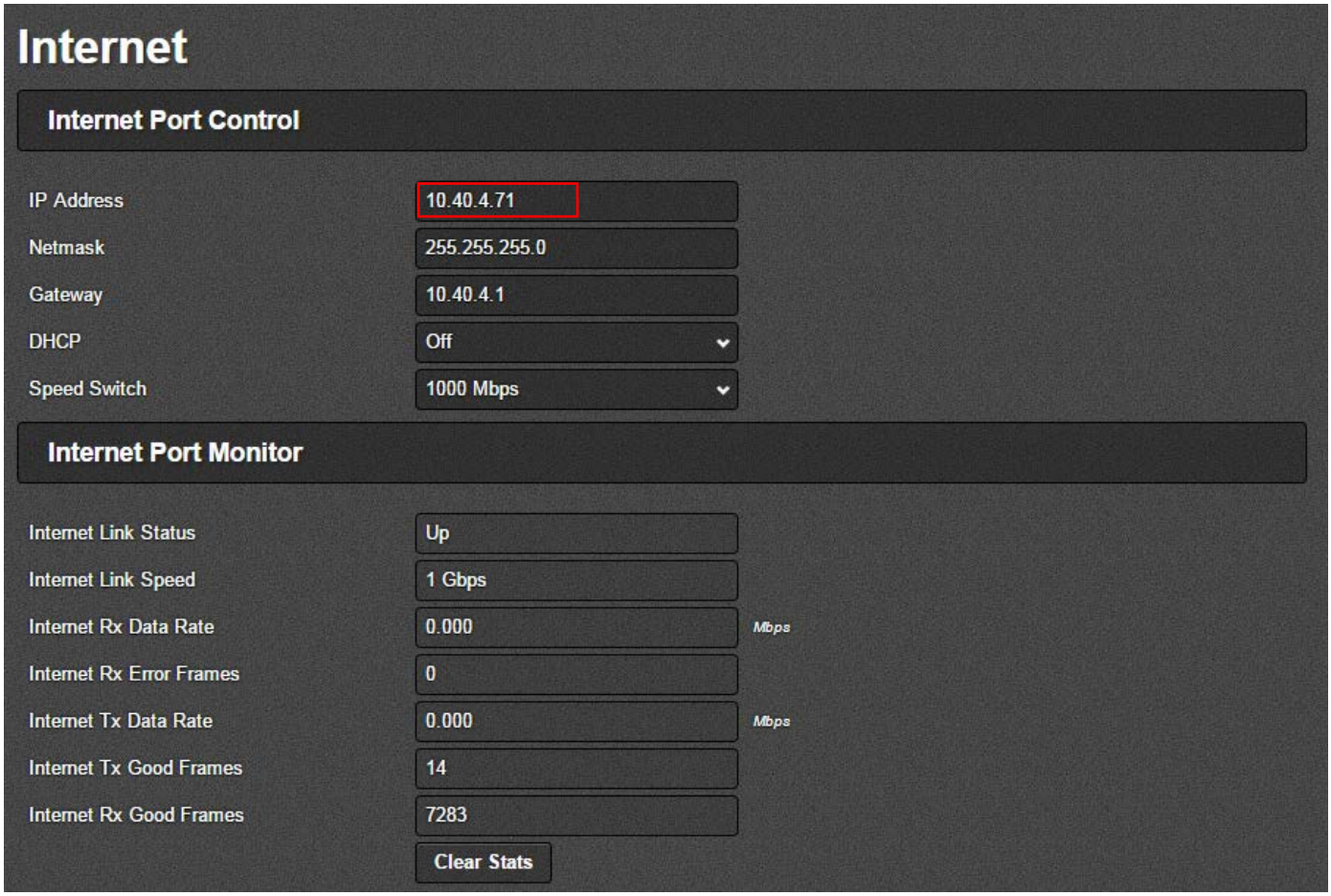

Figure 4-13 : WebEASY® - RX SIDE

4) The Source UDP and ARQ ports on the RX side should match with the destination UDP and ARQ ports on the TX side.

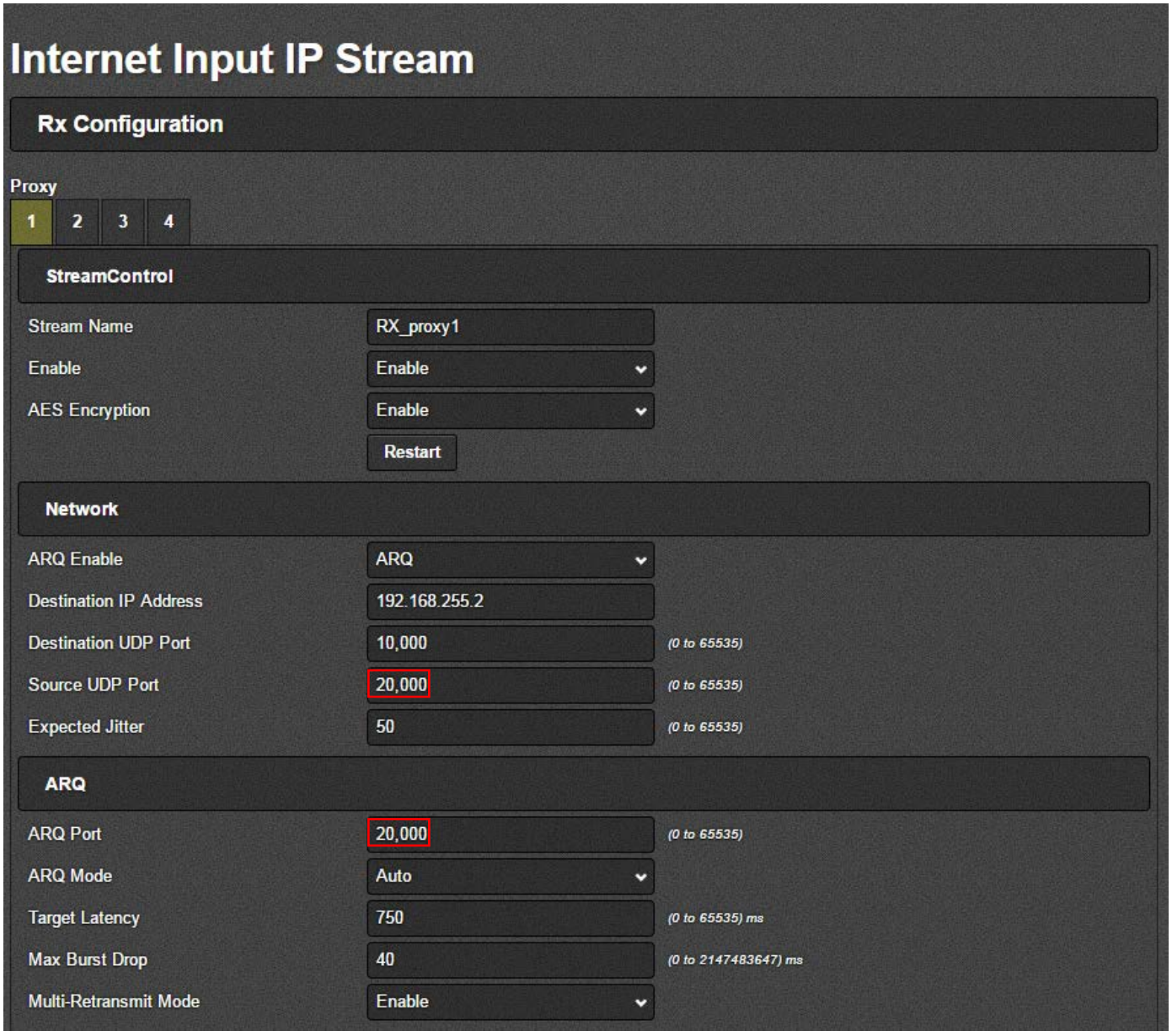

Figure 4-14 : WebEASY® - RX Side Webpage

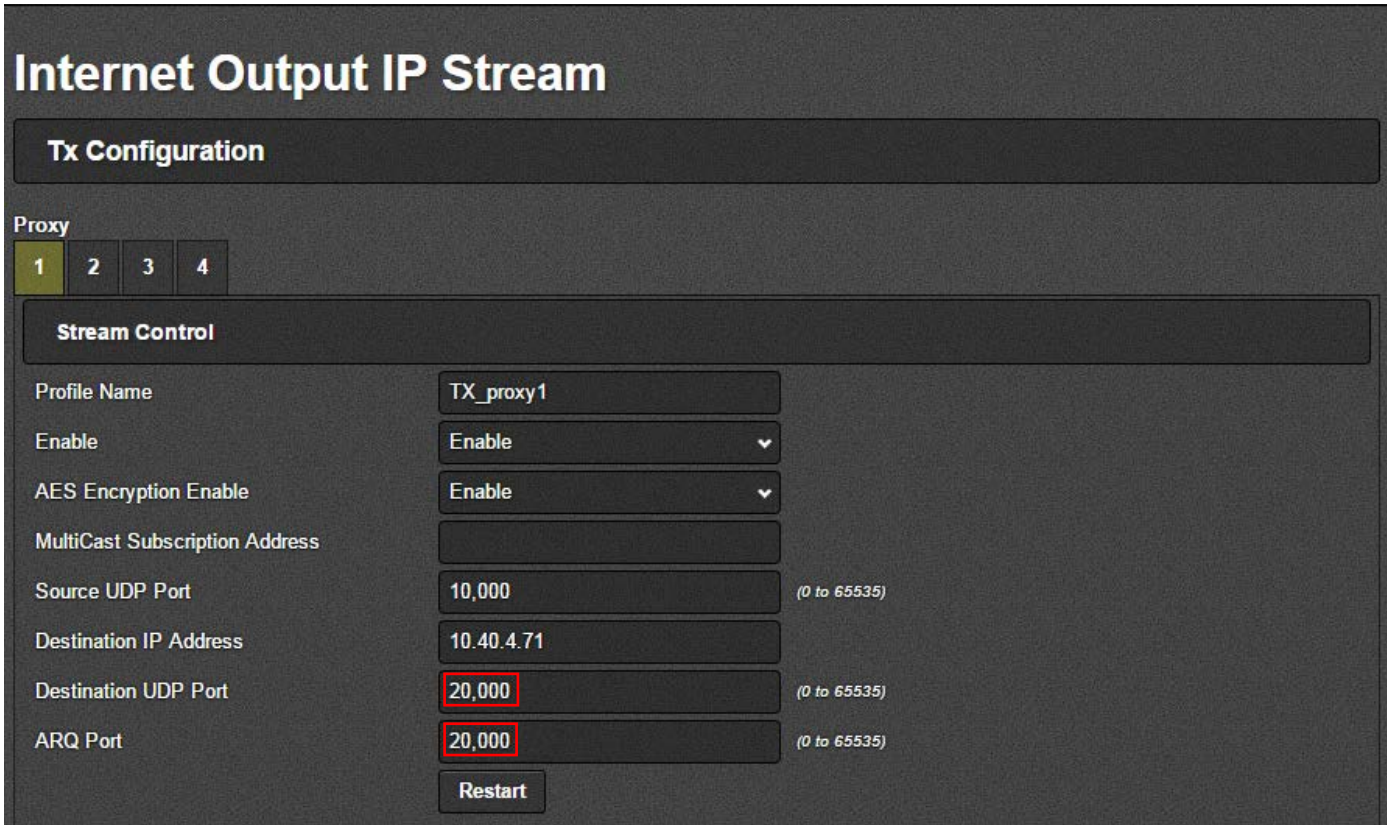

Figure 4-15 : WebEASY® - TX Side Webpage

4.4. TROUBLESHOOTING

After following the set up procedure, if the user does not see a signal on the receiver side troubleshooting is required. Basic troubleshooting is outlined, for in depth troubleshooting please contact Evertz service.

4.4.1. No Signal communication between TX side and source

Signal Communication between the TX side and source can be confirmed by going to the IP Input Tab on the webpage and looking under Access Port Monitor. Check the link Up/Down status. It must be “Up”, if the link is “Down” please verify source connectivity.

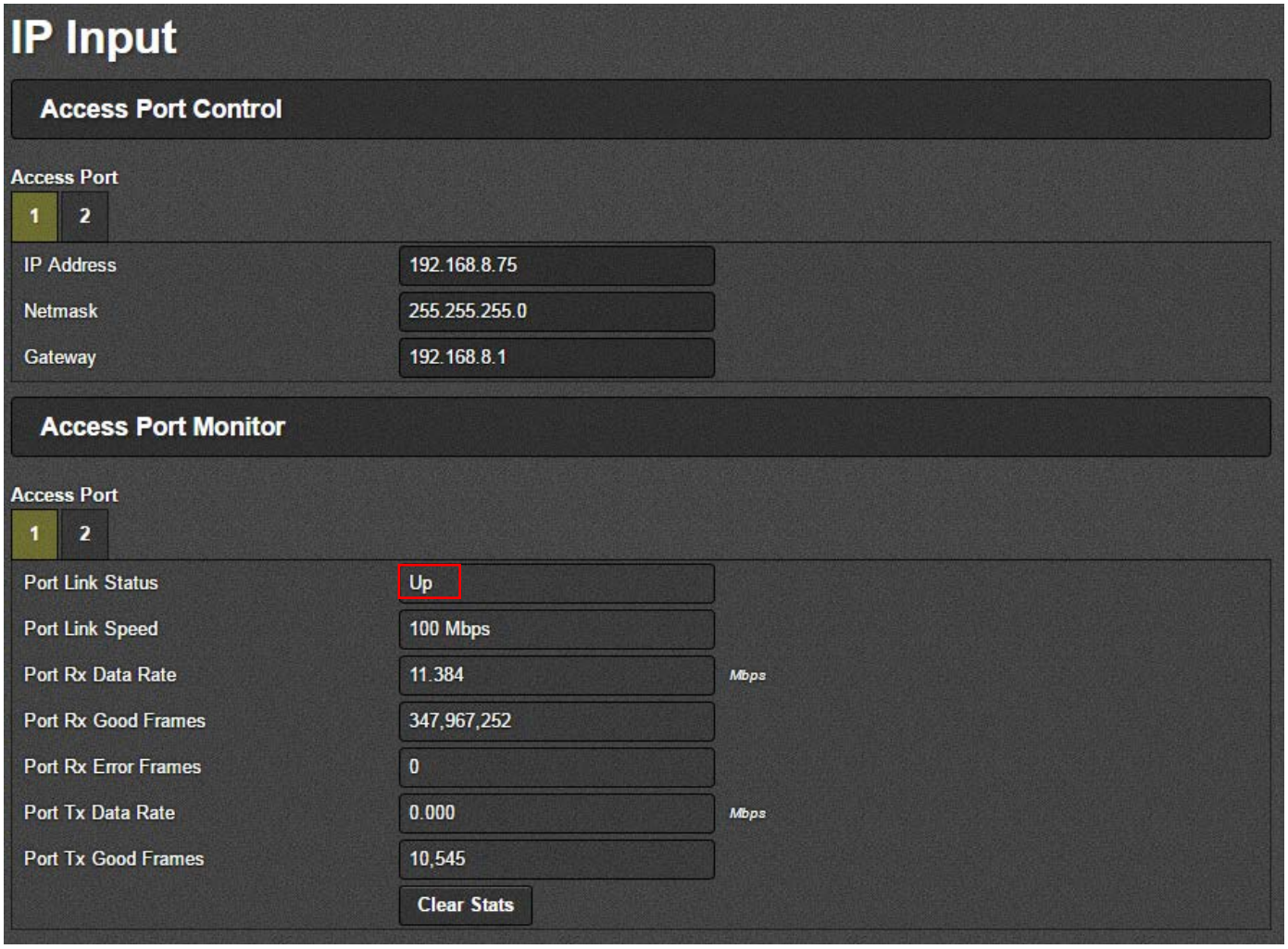

Figure 4-16 : WebEASY® - IP Input

If the link is “Down” and there is no signal communication between the TX side and the source, the user should check connectivity by connecting to the source path. If the path is good, check that the multicast subscription address matches with the desired source address.

4.4.2. No Signal communication between RX side and Destination

Signal Communication between the RX side and Destination can be confirmed by going to the IP Input Tab on the webpage and looking under Access Port Monitor. Check the link Up/Down status. It must be Up, if the link is “Down” please verify source connectivity.

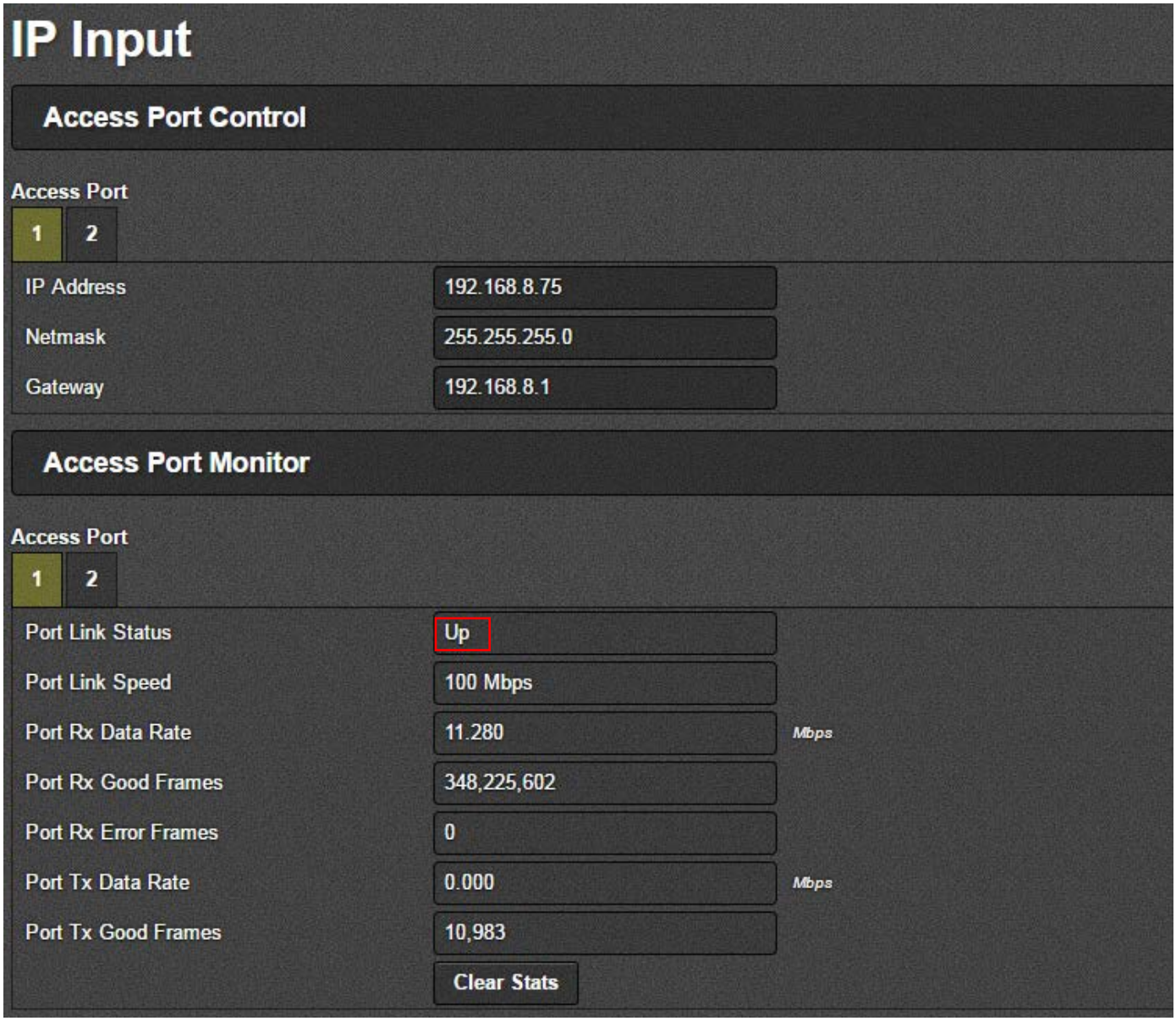

Figure 4-17 : WebEASY® - IP Input

If the link is “Down” and there is no signal communication between the RX side and the destination, check connectivity by connecting to the destination path. If the path is good, check that the multicast subscription address matches with the desired source address.

4.4.3. TX Side Not Streaming with RX Side or Stream Not Received by RX Side

Check the Internet Output IP Stream tab on the TX side webpage. The following information should match with the Internet Input IP Stream tab on the RX side webpage.

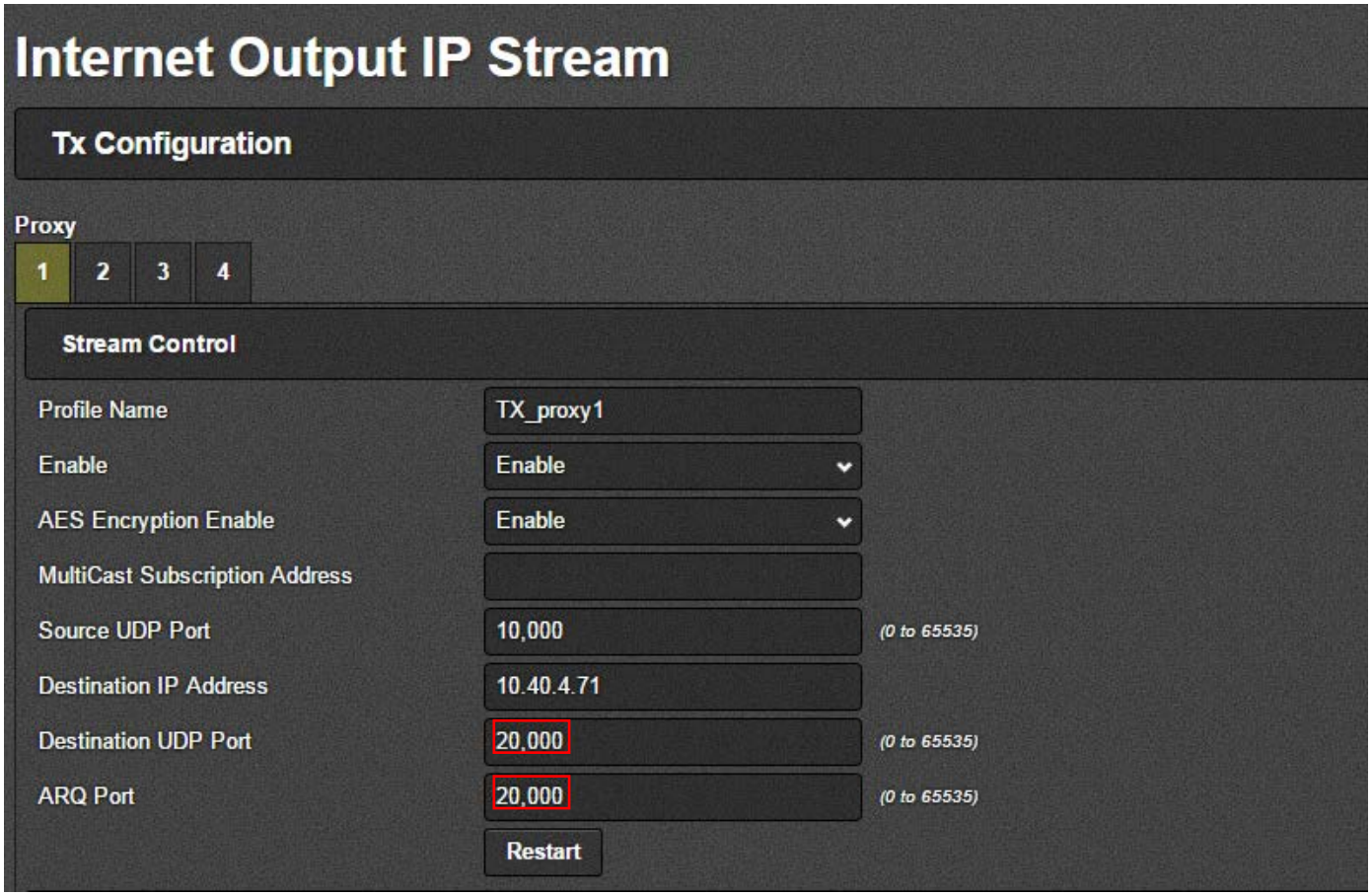

Figure 4-18 : WebEASY® - Internet Output IP Stream

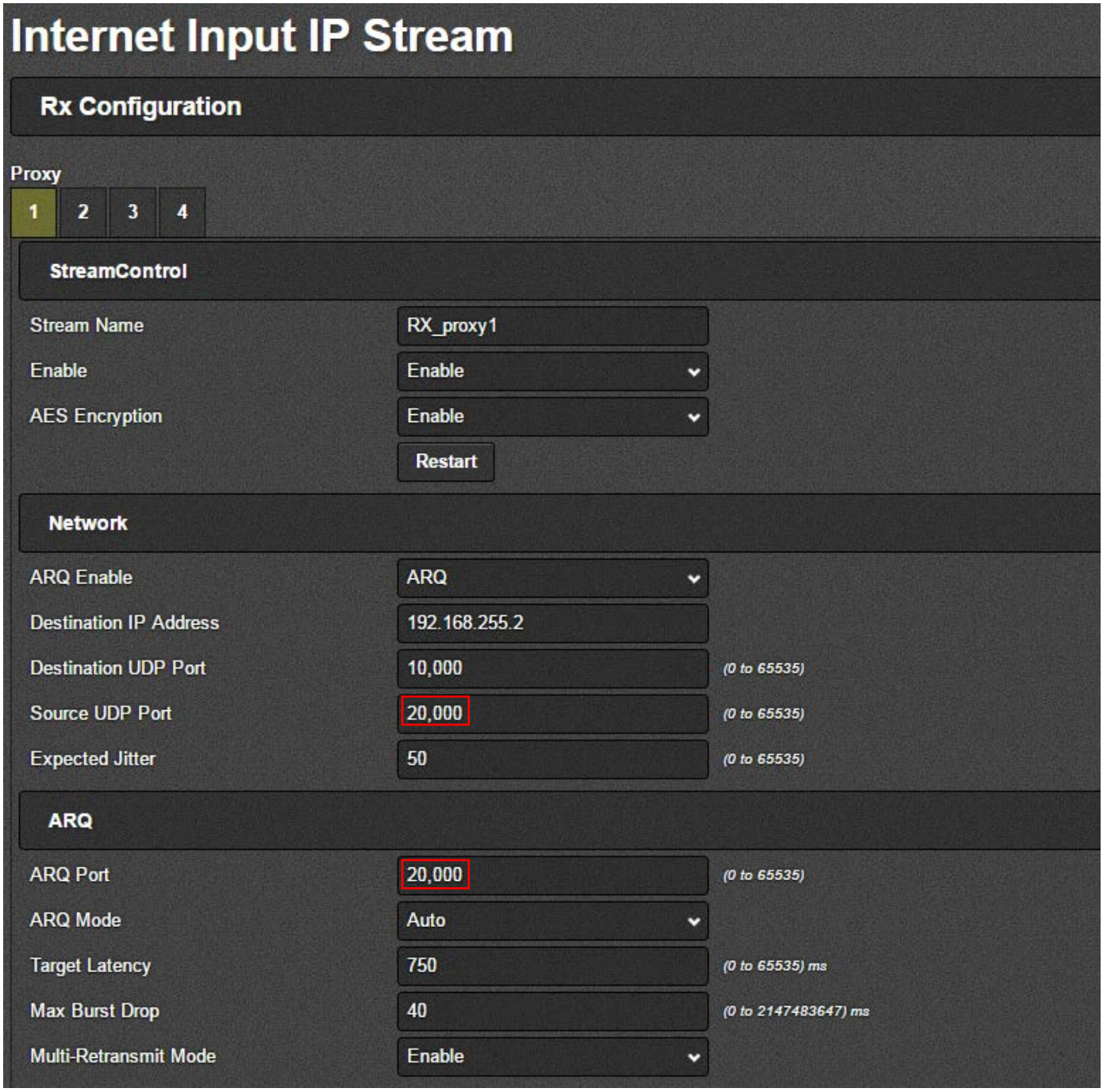

Figure 4-19 : WebEASY® - Internet Input IP Stream

If any of the settings are mismatched the signal will not go through. Please ensure all settings are configured correctly.

4.4.4. Data Loss on RX Side

The numbers of unrecovered (Data Lost) and recovered (Data Saved) Input data packets received by the RX side can be detected by going to the “Internet Input IP stream” tab on the RX side webpage at the bottom under “ARQ Status.” “Unrecovered” means the data packets were dropped and lost by the RX side. Recovered signifies the number of data packets that the RX side has successfully recovered. For

best operation, the number of unrecovered packets should always be 0. If this is not the case, verify the configuration settings between the TX and RX sides and check the Bitrate at both ends (Transmit status (TX), Network Status (RX)). If the bitrate and all configurations match and there is still data loss (unrecovered), the user may increase the Target Latency number. This will delay the time process of the RX side card (Please note: This setting will reduce the number of unrecovered data packets but will also add latency between TX and RX side).

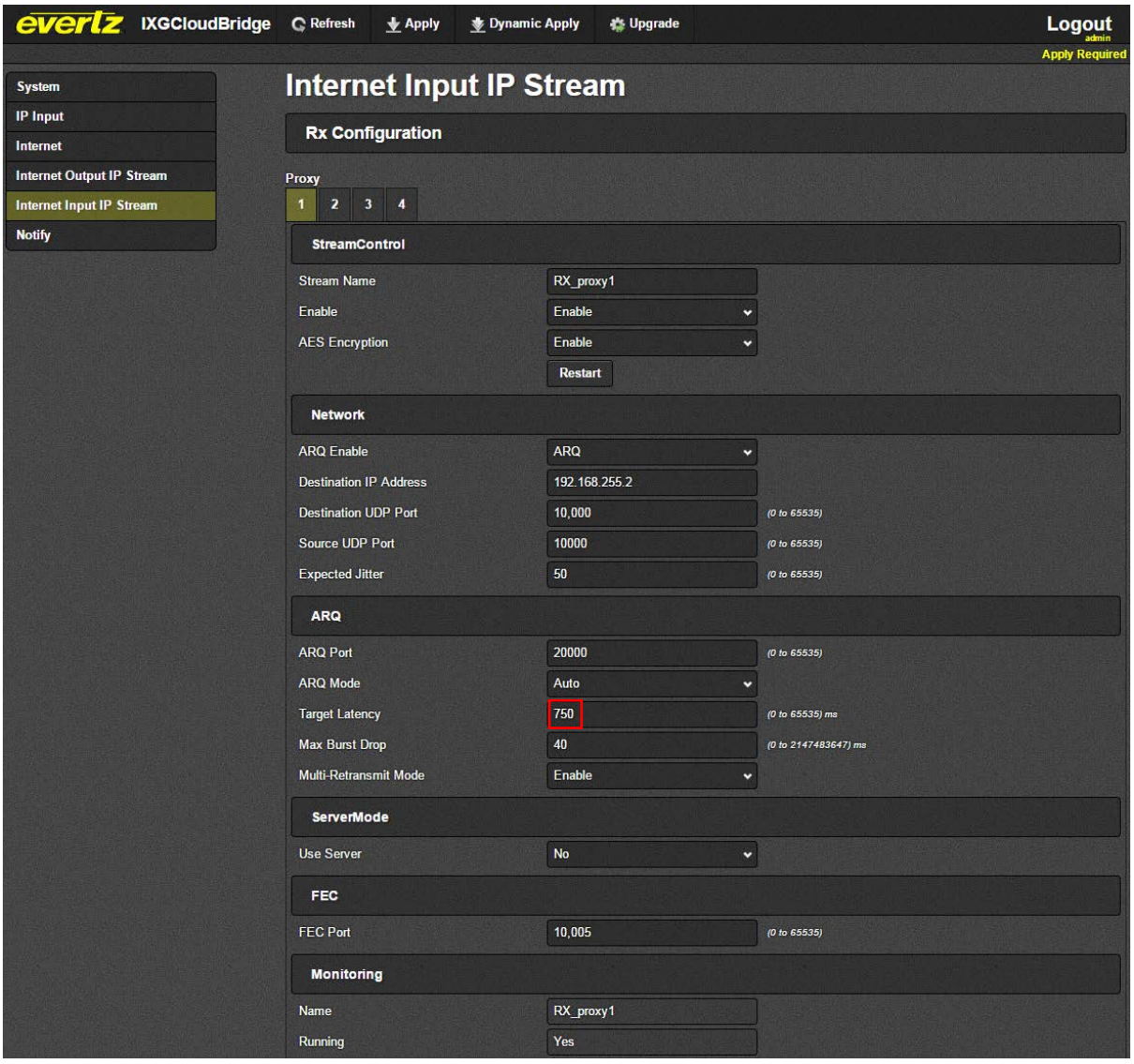

Figure 4-20 : WebEASY® - Internet Input IP Stream

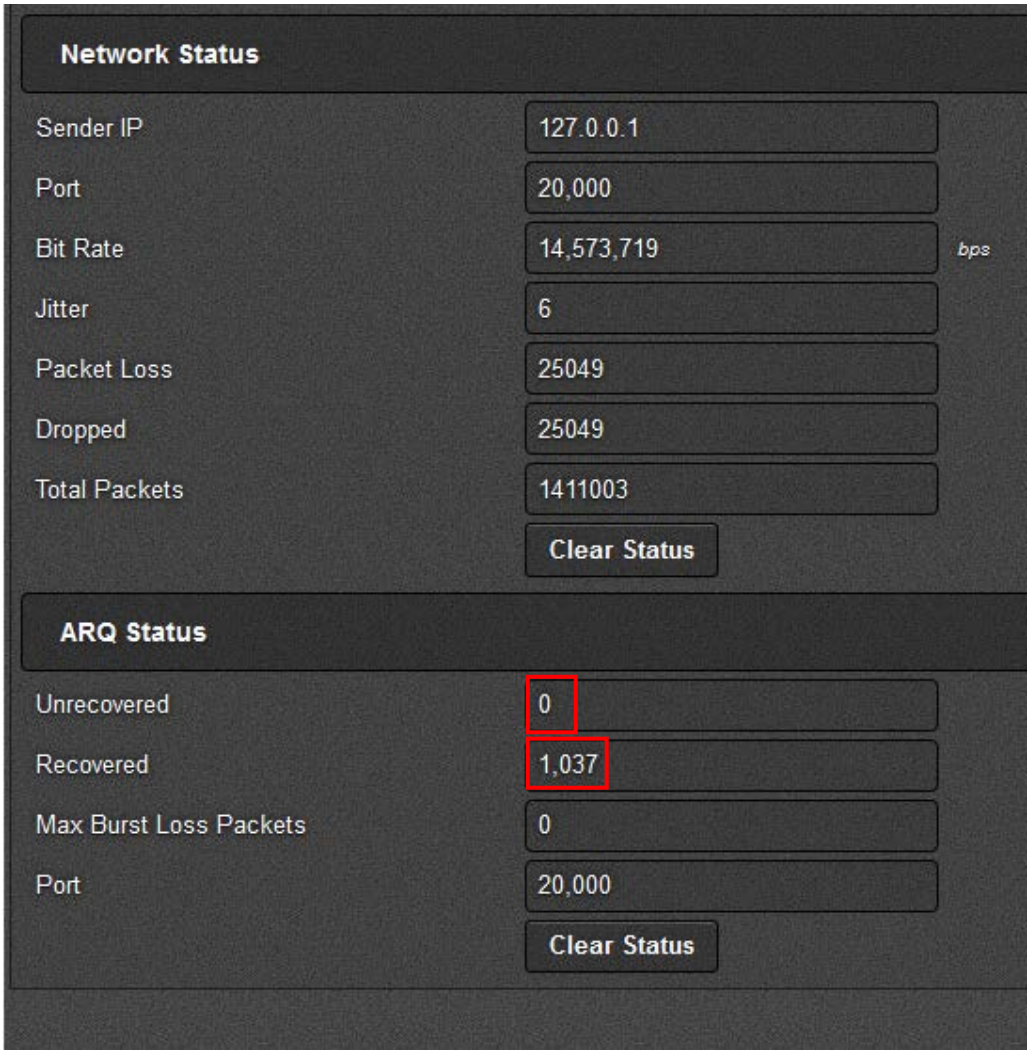

Figure 4-21 : WebEASY® - Internet Input IP Stream (Continue)

4.4.5. Web page not responding

If the webpage is not responding to the IXG card then the user should do the following:

- Verify by using a different browser (Mozilla Firefox or Chrome recommended).
- If the Card still does not respond, check the Ethernet connection, network settings of the card and computer network settings. Management PC should have access to the management subnet where the card is situated. Also verify that no IP conflict exists on the management network.

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5. WEBEASY REFERENCE CONTROLS

5.1. SYSTEM

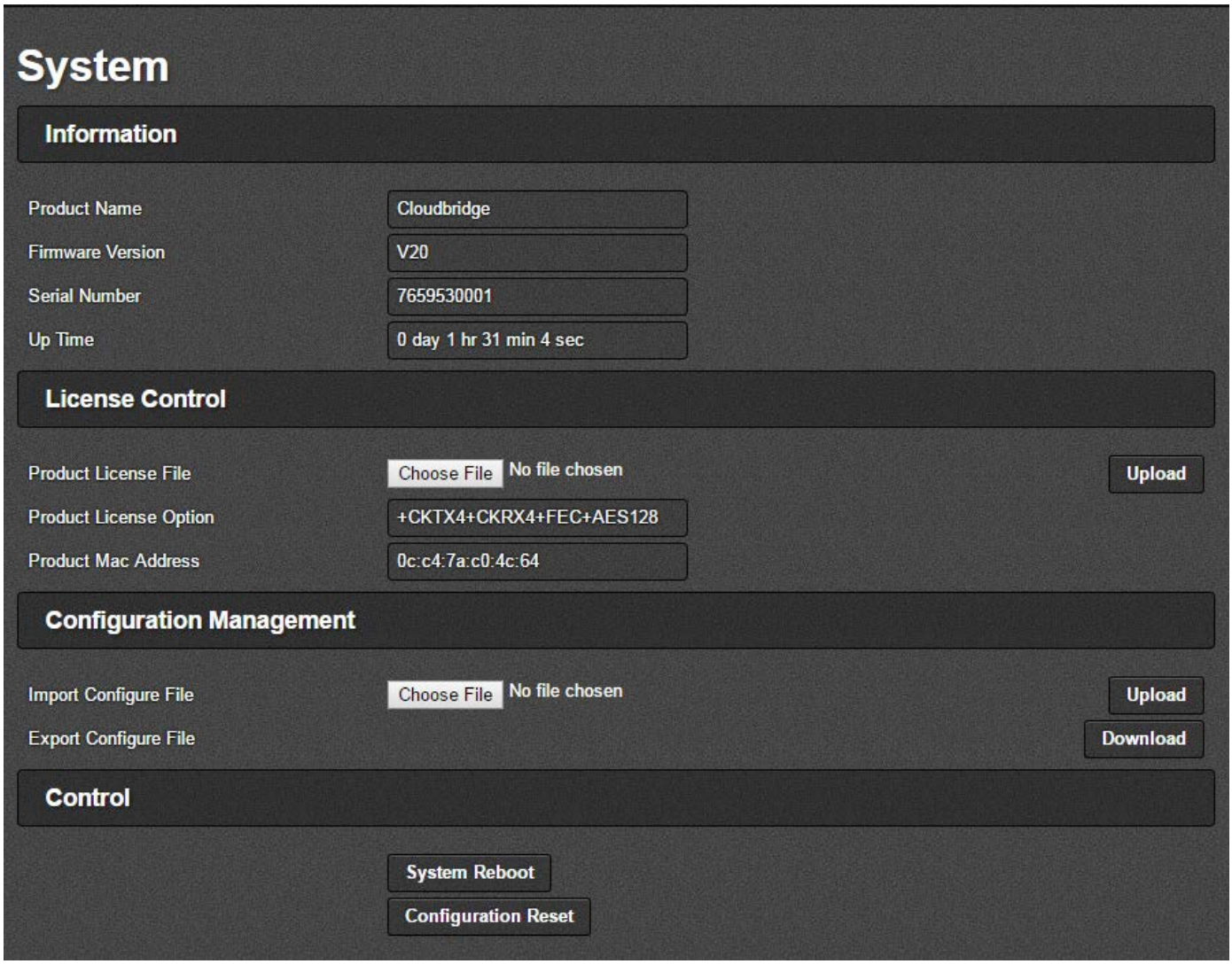

Figure 5-1 : WebEASY® - System Tab

5.1.1. Information

Product Name: This parameter displays the product name.

Firmware Version: This parameter displays the firmware version.

Serial Number: This parameter displays the serial number.

Up Time: This parameter returns the up time for the IXG CloudBridge Server.

5.1.2. License Control

Product License File: This control allows the user to select and upload a product license file.

Product License Option: This control allows the user to add options.

Product Mac Address: This parameter displays the card MAC address.

5.1.3. Configuration Management

Import Configure File: This control allows the user to select and upload a JSON configuration file to card.

Export Configure File: This control allows the user to save configuration data to a JSON file, and download the JSON file to a local host.

5.1.4. Control

Card Reboot: This control allows the user to reboot the card.

Configuration Reset: This filed allows the user to rest the entire configuration.

5.2. IP INPUT

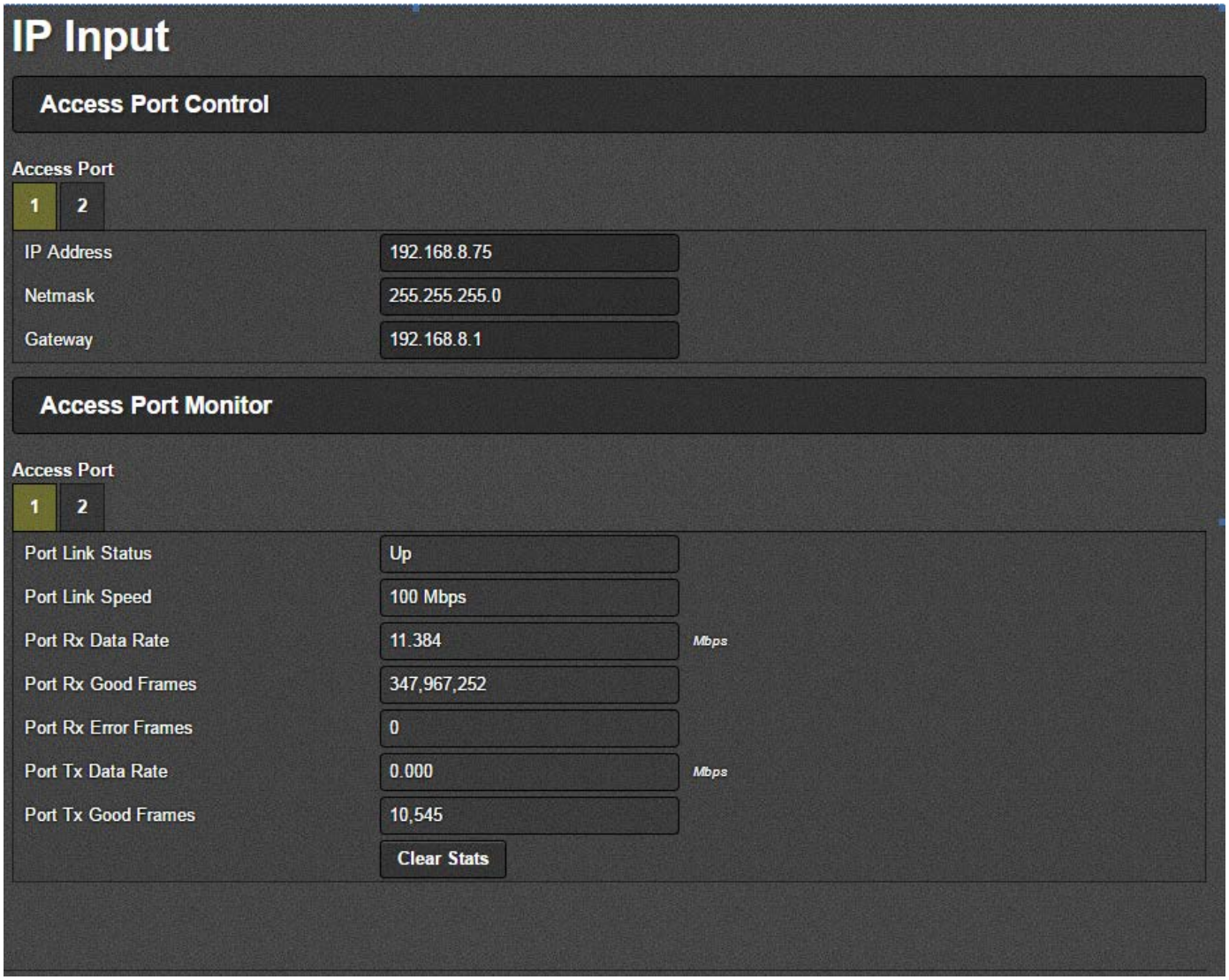

Figure 5-2 : WebEASY® - IP Input Tab

5.2.1. Access Port Control

IP Address: This parameter allows the user to set the IP Address for the data port.

Netmask: This parameter allows the user to set the netmask for the data port.

Gateway: This parameter allows the user to set the gateway for the data port.

5.2.2. Access Port Monitor

Port Link Status: This parameter returns the port link status: up or down.

Port Link Speed: This parameter returns the port link speed: down, spd10, spd100, spd1ge.

Port RX Data Rate: This parameter returns the port RX side data rate.

Port RX Error Frames: This parameter returns the amount of error port RX side frames.

Port TX Data Rate: This parameter returns the port TX side data rate.

Port RX Good Frames: This parameter returns the amount of good port RX side frames.

Port TX Good Frames: This parameter returns the amount of good port TX side frames.

Clear Stats: This control allows the user to clear all stats.

5.3. INTERNET

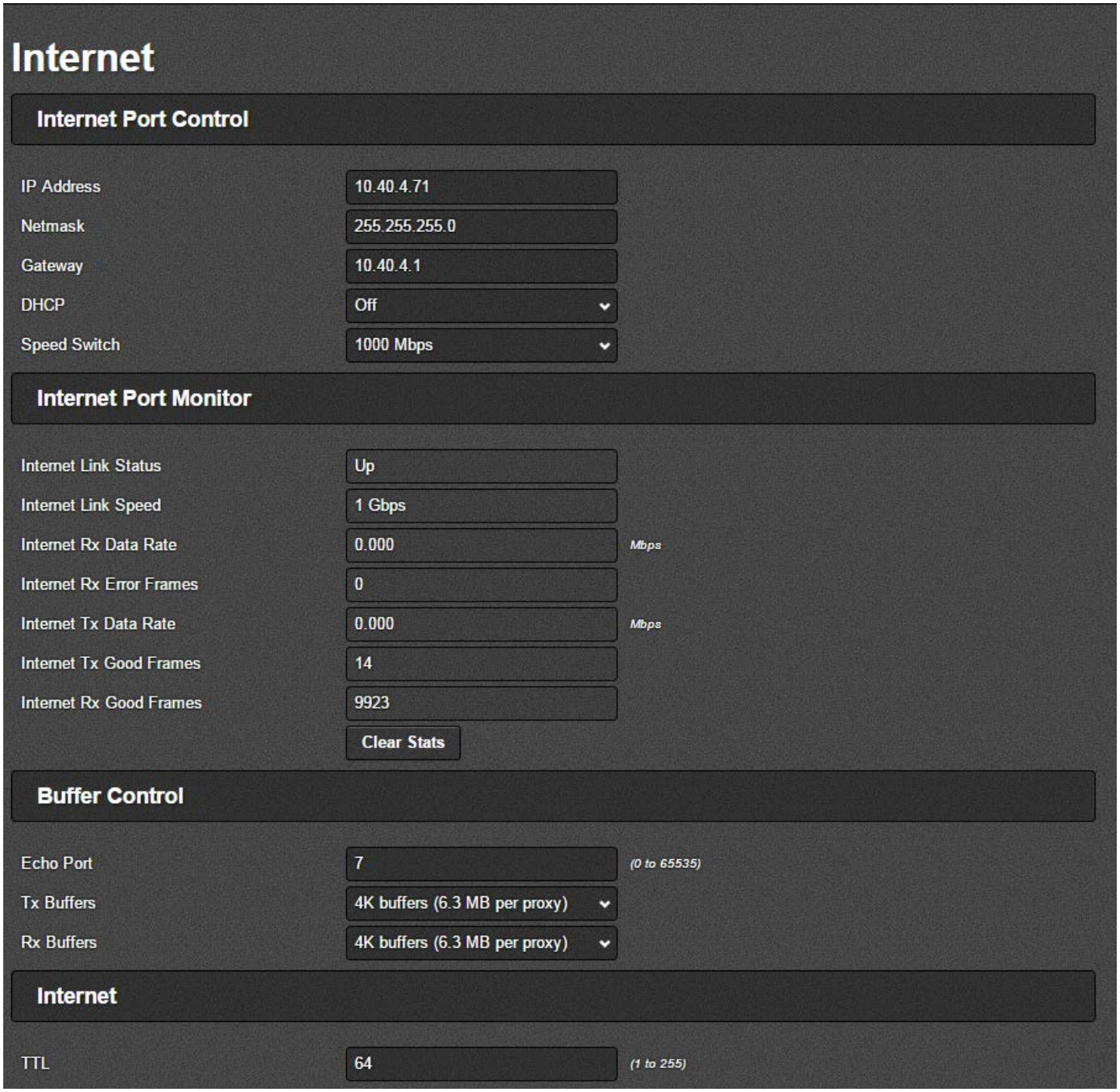

Figure 5-3 : WebEASY® - Internet Tab

5.3.1. Internet Port Control

IP Address: This parameter allows the user to set the IP Address for the control port.

Netmask: This parameter allows the user to set the netmask for the control port.

Gateway: This parameter allows the user to set the gateway for the control port.

DHCP: This control enables or disables DHCP.

Speed Switch: This control allows the user to change the switch speed.

5.3.2. Internet Port Monitor

Internet Link Status: This parameter returns the internet link status: up or down.

Internet Link Speed: This parameter returns the internet link speed: down, spd10, spd100, spd1ge.

Internet RX Data Rate: This parameter returns the internet RX SIDE data rate.

Internet RX Error Frames: This parameter returns the amount of error internet RX SIDE frames.

Internet TX Data Rate: This parameter returns the internet TX SIDE data rate.

Internet TX Good Frames: This parameter returns the amount of good internet TX SIDE frames.

Internet RX Good Frames: This parameter returns the amount of good internet RX SIDE frames.

Clear Stats: This control allows the user to clear all stats.

5.3.3. Buffer Control

Echo Port: This parameter allows the user to select **t**he echo port for the ARQ Qos Proxy.

TX Buffers: This parameter allows the user to select the TX SIDE Buffers for the ARQ Qos Proxy: k4, k8, k16, k32.

RX Buffers: This parameter allows the user to select the RX SIDE Buffers for the ARQ Qos Proxy: k4, k8, k16, k32.

5.3.4. Internet

TTL: This parameter allows the user to define Time to Live.

5.4. INTERNET INPUT IP STREAM

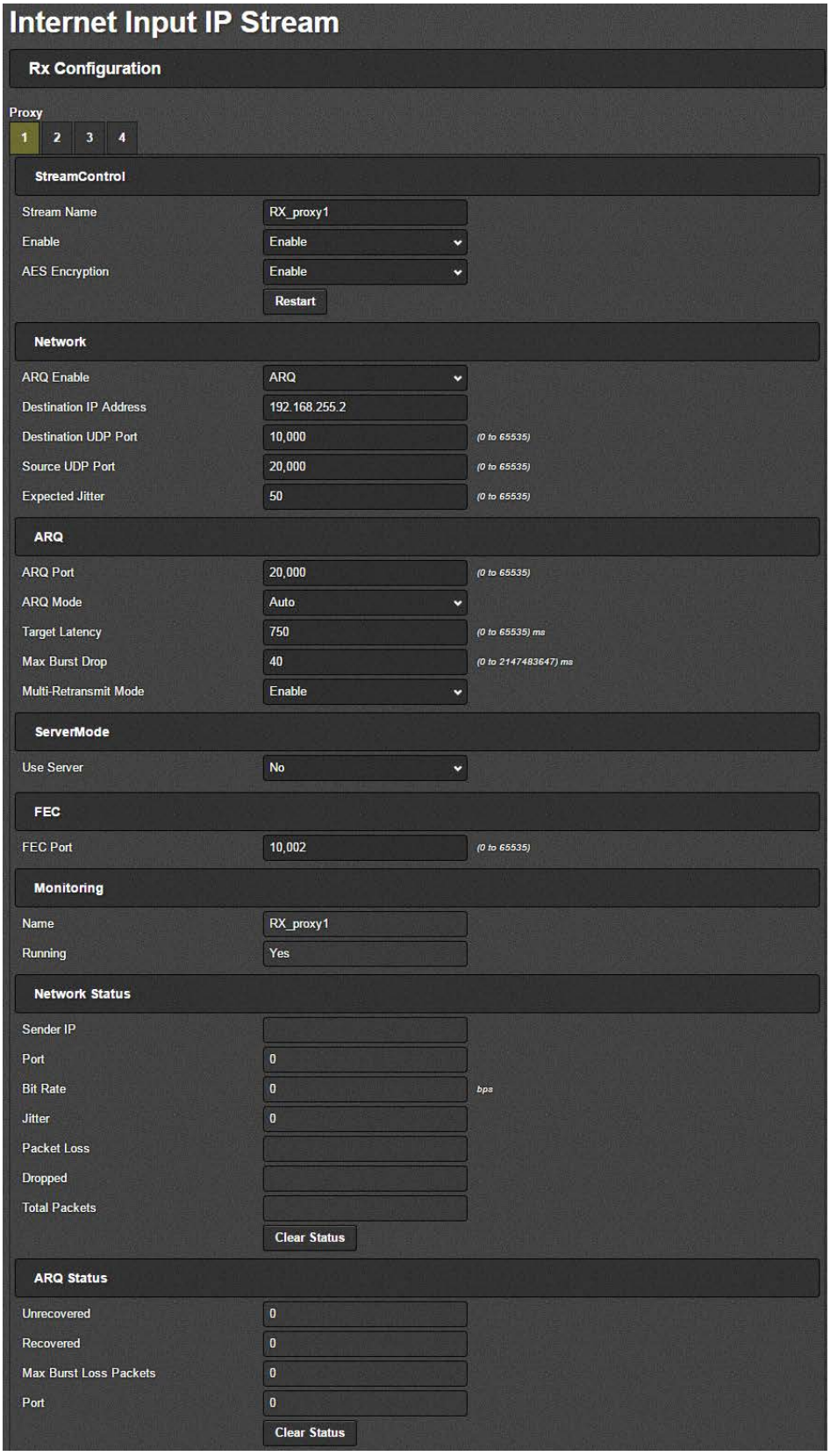

Figure 5-4 : WebEASY® - Internet Input IP Stream

5.4.1. Stream Control

Stream Name: This parameter displays the RX side IP Stream profile name.

Enable: This dropdown allows the user to enable or disable proxy.

AES Encryption: This dropdown allows the user to enable or disable AES encryption.

Restart: This control allows the user to **r**estart the individual RX side IP Stream.

5.4.2. Network

ARQ Enable: This parameter allows the user to select the RX side IP Stream IP Transport Mode: ARQ or RTP. ARQ enables retransmissions so should normally be enabled when transmitting over the public internet or similar lower reliability networks.

Destination IP Address: This parameter allows the user to set the RX side IP Stream Network Destination IP address. This means the IP address that the received transport stream will be output on to the access port.

Destination UDP Port: This parameter allows the user to set the RX side IP Stream Network Destination port number. This means the IP address that the received transport stream will be output on to the access port.

Source UDP Port: This parameter allows the user to set the RX side IP Stream Network Source UDP port number. This means the UDP port that the received transport stream will be output on to the access port.

Expected Jitter: This parameter allows the user to set the RX side IP Stream Network expected jitter for the WAN network.

5.4.3. ARQ

ARQ Port: This parameter allows the user to set the RX side IP Stream ARQ port. This must match the ARQ port on the transmitting IXG CloudBridge Server-T, or Evertz Cloudbridge. By default, ARQ normally sends upstream retransmission request packets on UDP port 7020. The ARQ Port setting can be changed to any valid and non-conflicting UDP port. However, the same port number at both the encoder and the decoder should be defined. To help bypass firewall blocking, reset this to be the same port as the media UDP port, usually 10000.

ARQ Mode: This parameter allows the user to set the RX side IP Stream ARQ mode**:** Auto or Manual. Auto will attempt to pick appropriate values based on network conditions, while manual gives the user full control over retransmission parameters. When AUTO is set, you cannot set the number of retransmits or the round trip latency.

Target Latency: Target Latency, specifies the total delay, in milliseconds, allotted for the request, retransmission, and recovery process. The ARQ mechanism will attempt as many retries as possible within this target latency time. Thus, larger target latency times increase the delay before video is output, but allows for more chances of requesting and recovering any missing packets. The ARQ error correction operates through the addition of a small additional buffering delay to provide enough time to request and receive replacement for each lost packet. Target Latency gives the ARQ mechanism a target value for determining the necessary ARQ delay. The ARQ divides the Target Latency, specified in milliseconds, by the round-trip time to the video encoding source to determine the number of request attempts. Unless Robust Mode is enabled, it sets a minimum ARQ latency of one round-trip time. A larger Target Latency allows the system to increase the number or repeat requests.

Max Burst Drop: A Burst Drop delay can also be specified to delay any retransmission requests for a time equal to the maximum expected packet loss time, such as from dynamic router changes of other sources of burst loss.

Multi-Retransmit Mode: This parameter allows the user to enable or disable RX side Proxy ARQ Auto Mode Robust Mode. This gives high performance for stream recovery with the tradeoff of more latency. Normally, the ARQ will only require that a minimum of one repeat request is sent to the video encoding source device, regardless of the Target Latency. However, enabling Robust Mode will increase the minimum number of repeat requests to a minimum of two retries.

5.4.4. ServerMode

Use Server: This dropdown allows the user to set the Rx proxy server mode. Select "No" to disable this feature. Select "Yes" to enable operation with a QoS Proxy Server.

5.4.5. Monitoring

Name: This parameter displays the RX side IP Stream Name.

Running: This parameter returns whether the RX side IP Stream is running or not: Yes or No.

5.4.6. Network Status

Sender IP: This parameter returns the RX side IP Stream Network Sender IP. For example this could be the IP address of the sending IXG CloudBridge Server-T.

Port: This parameter returns the RX side IP Stream Network port number.

Bit Rate: This parameter returns the RX side IP Stream Network bit rate.

Packet Loss: This parameter returns the RX side IP Stream Network packet loss.

Jitter: This parameter returns the RX side IP Stream Network jitter. Packets in incoming IP packet streams may lose their ordering or suffer variable delays during transport through an IP network. The proxy receiver buffers all incoming video/IP packets in a buffer and reorders RTP encapsulated packets by RTP sequence number. This parameter specifies the size of this incoming packet buffer in milliseconds of delay. Specify 0 here to disable this additional buffering when latency needs to be minimize.

Dropped: This parameter returns the RX side IP Stream Network drops.

Total Packets: This parameter returns the RX side IP Stream Network total packets.

5.4.7. ARQ Status

Unrecovered: This parameter returns the number of RX side IP Stream ARQ unrecovered packets.

Recovered: This parameter returns the number of RX side IP Stream ARQ recovered packets.

Max Burst Loss Packets: This parameter returns the number of RX side IP Stream ARQ max burst loss packets.

Port: This parameter returns the RX side IP Stream ARQ port number.

Clear Status: This field allows the user to clear all the current status.

5.5. INTERNET OUTPUT IP STREAM

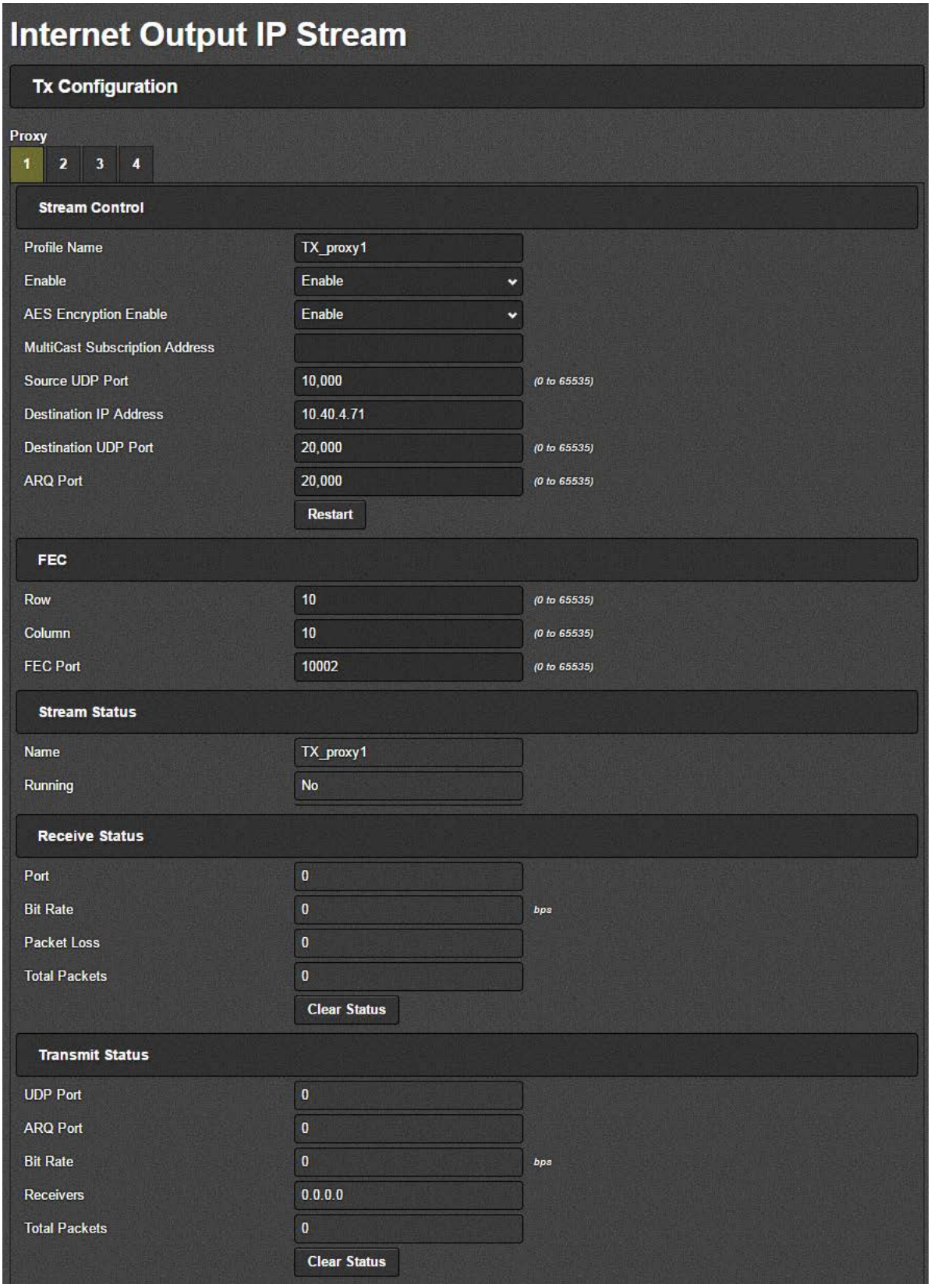

Figure 5-5 : WebEASY® - Internet Output IP Stream

5.5.1. Stream Control

Profile Name: This parameter allows the user to set the name for the IP stream profile.

Enable: This dropdown allows the user to enable or disable the proxy.

AES Encryption Enable: This dropdown allows the user to enable or disable AES Encryption.

MultiCast Subscription Address: This parameter allows the user to set The Multicast IP address of the target transport stream entering the IP access port.

Source UDP Port: This parameter allows the user to set the UDP port for the transport stream entering the IP access port.

Destination IP Address: This parameter allows the user to set the Unicast IP address for the destination device. This would be the Evertz cloud software address, or the address of the IXG CloudBridge Server-R that you wish to target.

Destination UDP Port: This parameter allows the user to set the Destination UDP port for the destination device. This would be the Evertz cloud software address or the address of the IXG CloudBridge Server-R that you wish to target.

ARQ Port: This parameter allows the user to set ARQ port for retransmission requests over the internet. NOTE: Failure to set this, and allow it through any firewalls will prevent any retransmission requests, giving little to no protection for your stream. Make sure this value is different than any UDP port for video data.

Restart: This control allows the user to restart the individual TX side Proxy.

5.5.2. FEC

Row: This parameter allows the user to define FEC row count.

Column: This parameter allows the user to define FEC column count.

FEC Port: This parameter allows the user to define FEC destination port.

5.5.3. Stream Status

Name: This parameter returns the name of the individual IP stream.

Running: This parameter returns whether the IP stream is running or not: Yes or No.

5.5.4. Receive Status

Port: This parameter returns the IP Stream Receive port number.

Bit Rate: This parameter returns the IP Stream Received bit rate.

Packet Loss: This parameter returns the IP Stream Received packet loss.

Total Packets: This parameter returns the IP Stream Received total packets.

5.5.5. Transmit Status

UDP Port: This parameter returns the IP Stream Transmit UDP port.

ARQ Port: This parameter returns the IP Stream Transmit ARQ Port.

Bit Rate: This parameter returns the IP Stream Transmit Bit rate.

Total Packets: This parameter returns the total number of IP Stream packets transmit.

Receivers: This parameter returns the IP Stream Transmit Receivers.

5.6. NOTIFY

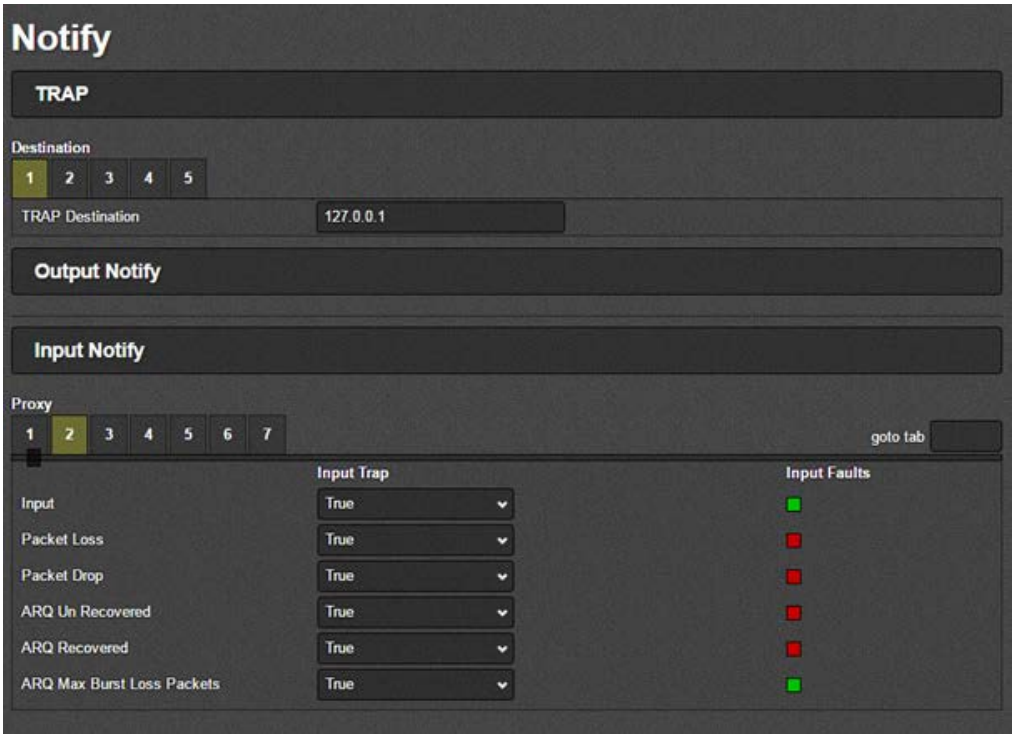

Figure 5-6 : WebEASY® - Notify

5.6.1. Trap

Trap Destination: This field allows the user to set the Trap destination IP address.

5.6.2. Output Notify

Note: The controls will be displayed only if output stream license is loaded.

Output Trap: This control allows the user to enable or disable trap reporting.

Output Faults: This parameter returns the present state of a particular fault. The values for this object are false and true.

5.6.3. Input Notify

Note: The controls will be displayed only if input stream license is loaded.

Input Trap: This control allows the user to enable or disable trap reporting.

Input Faults: This parameter returns the present state of a particular fault. The values for this object are false and true.

5.7. TRAPS

Description	Error
Output Proxy	Not present
Output Proxy Bandwidth	Over Limit
Input	Not present
Input Bandwidth	Over Limit

5.8. TOP MENU BAR

5.8.1. Refresh

Figure 5-7 : WebEASY® - Top Menu bar\Refresh

Refresh tab is used to refresh the page. By clicking on Refresh, It allows any changes made by the user to the card to reflect on the webpage.

5.8.2. Apply

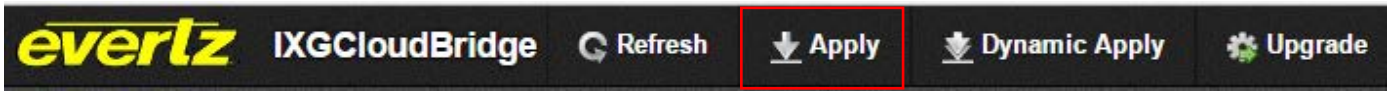

Figure 5-8 : WebEASY® - Top Menu Bar\Apply

Apply tab is used to implement any change through webpage. By clicking on apply, it allows to implement any change to the card through the webpage.

5.8.3. Dynamic Apply

Figure 5-9 : WebEASY® - Top Menu Bar\Dynamic Apply

Dynamic apply is used to implement changes automatically. This feature allows the user to automatically apply any change to the card through webpage

5.8.4. Upgrade

On the top of the web page for the IXG CloudBridge Server, there is a tab labeled **Upgrade**. The **Upgrade** tab is used to check current firmware version and upload the latest firmware.

Figure 5-10 : WebEASY® - Top Menu Bar\Upgrade

Selecting the Upgrade tab, will take you to Figure 5-11 where the current firmware version is shown. Should the firmware version be outdated, you will need to download the firmware image file.

Figure 5-11 : WebEASY® - Firmware Upgrade

NOTE: Contact Evertz get the latest firmware file.

Select "**Browse**" to choose the .bin file, use the file browser to find the appropriate .bin file. Once a file is selected, click open and return to the Firmware Upgrade screen.

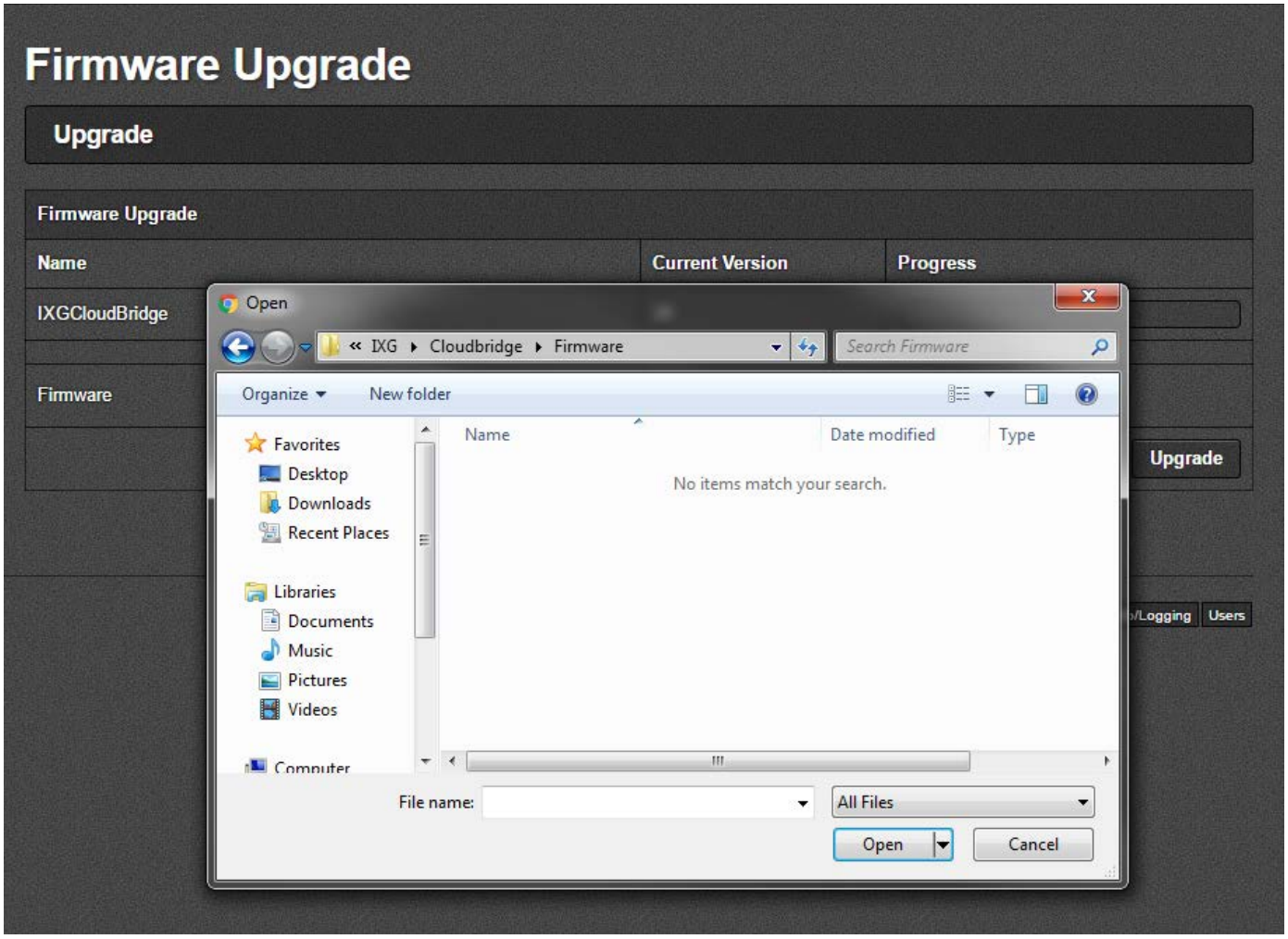

Figure 5-12 : WebEASY® - Browse Firmware Files

Select “Upgrade” to begin the process.

NOTE: The IXG CloudBridge Server will restart upon upgrade completion.

6. FEC

The Forward Error Correction allows the card to automatically recover lost packets. This increases the productivity of the card by transporting data with better quality. Once the card is upgraded to the FEC supported firmware, follow these steps to confirm if all configuration settings match the requirements to enable FEC**:**

Make sure these port values matches on the TX and RX side WebPages. The Destination IP address should not be entered more than one. To enable FEC the user must start three different TX side Proxies. For three different TX side Proxies to receive the stream, the user may need the source to multicast its stream.

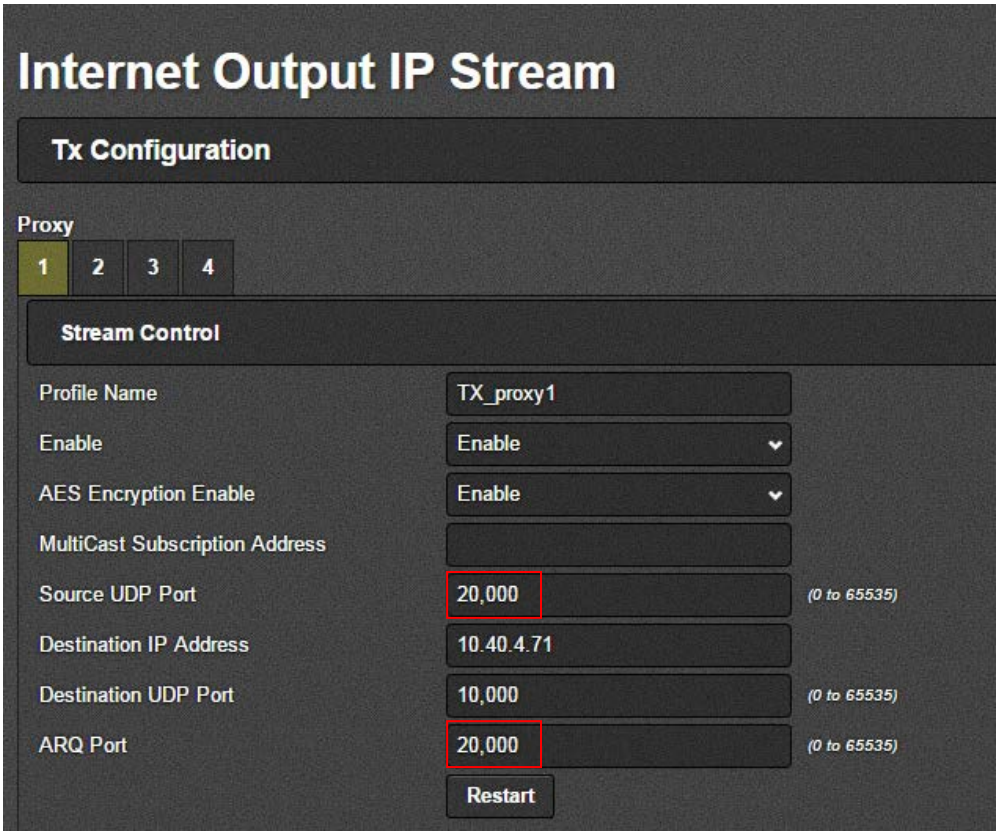

Figure 6-1 : WebEASY® - TX Side

All the source UDP ports on different streams on both TX and RX sides should be different and should match the destination UDP port on the other side. The ARQ port should be set equal to the source UDP port on the RX side.

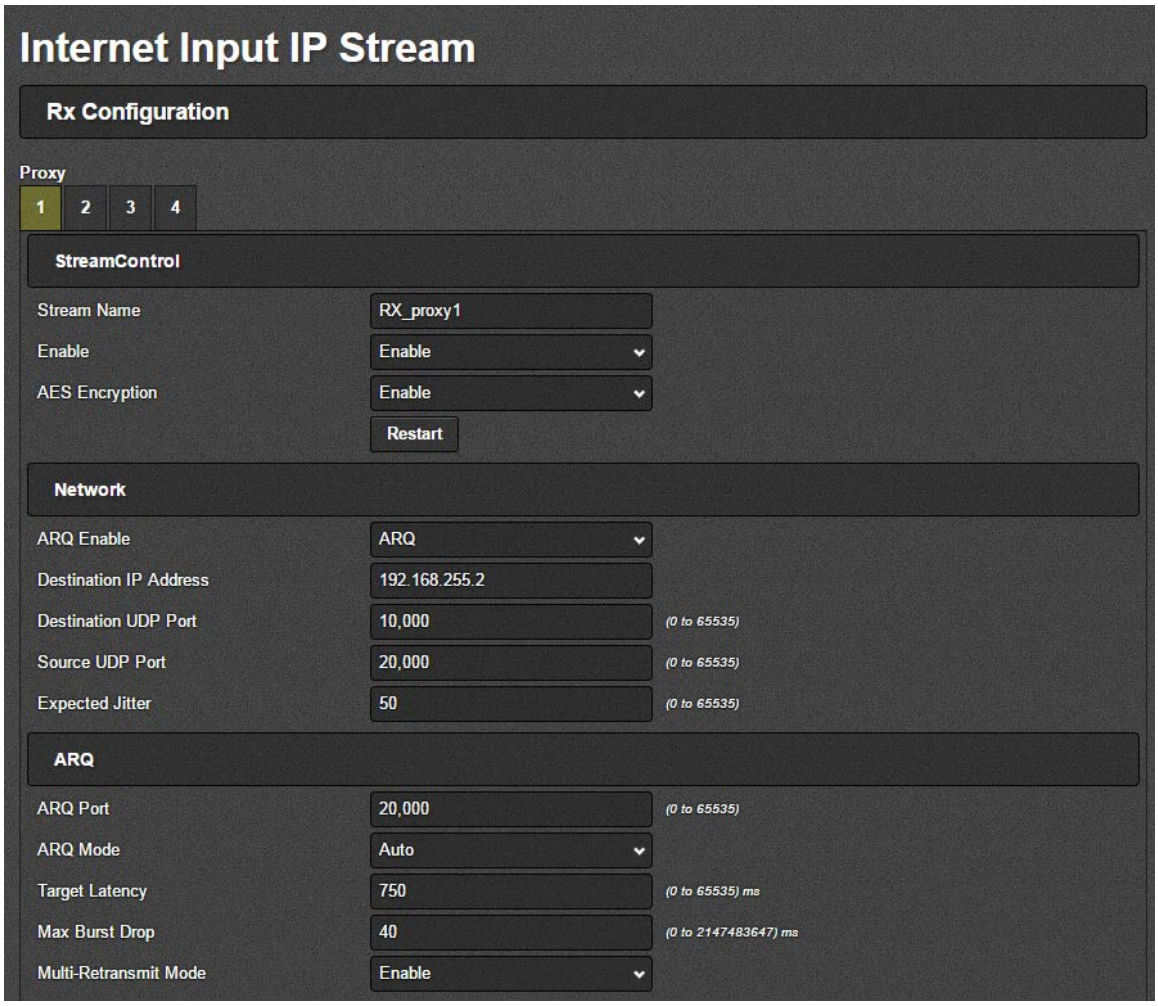

Figure 6-2 : WebEASY® - RX Side

Under the FEC tab the following parameters should match on the TX and RX sides and should have large gaps between the different FEC ports (ex. Keep a gap of 1000 to prevent from toggling between the streams). FEC row and column parameters should always be equal to 10.

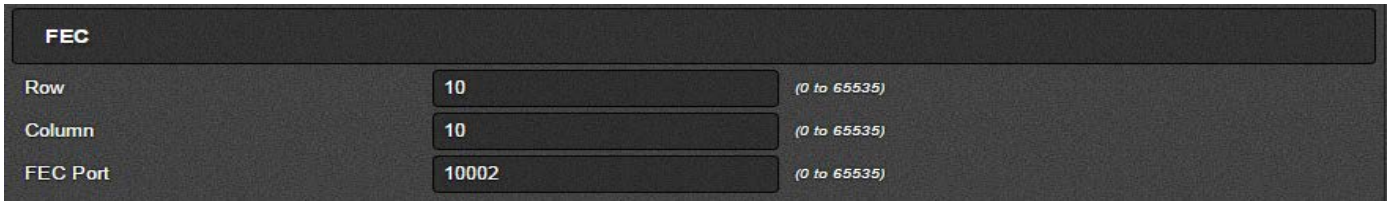

Figure 6-3 : WebEASY® - TX Side

Figure 6-4 : WebEASY® - RX Side