570FEC-HW-X19

Bulk 10GE FEC Encode/Decode
with Support for SMPTE2022–7 Hitless Switching

User Manual

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EVERTZ MICROSYSTEMS LTD.
5288 John Lucas Drive
Burlington, Ontario
Canada L7L 5Z9

Phone:	+1 905-335-3700	
Sales:	sales@evertz.com	Fax: +1 905-335-3573
Tech Support:	service@evertz.com	Fax: +1 905-335-7571
Web Page:	http://www.evertz.com	

Version 1.0, March 2020

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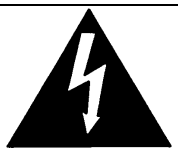
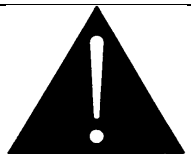
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only 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 defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or 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.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- 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 moisture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

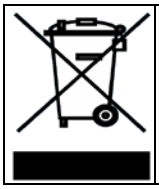
NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity



EN504192 2005
Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Mar 2020

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1. OVERVIEW

The 570FEC-HW-X19 platform is ideal for bulk FEC insertion and correction, offering flexibility with 3 modes of operation.

The first mode features bi-directional operation featuring up to 32x bi-directional processing flows. This mode will allow RTP and FEC insertion for up to 32x IP paths. FEC correction along with Multi-path Packet Merge will be applied for 32x processing paths.

The second mode of operation will insert FEC for up to 96x paths. It also supports RTP insertion.

The third mode of operation will perform FEC correction along with multi-path packet image for up to 96x processing paths.

The 570FEC-HW-X19 incorporates patent pending multi-path, multi-flow packet merge, accepting packets from two diverse SFP paths. The multi-path, multi-flow based solution allows for bit error resilience and for 100% QoS.

The 570FEC-HW-X19 can be managed via integrated HTTP web interface as well as VistaLINK PRO and MAGNUM Unified Control.

Features & Benefits

- 3 modes of operation
- Up to 32x bi-directional processing paths that can insert FEC and apply FEC correction. This mode also supports Multi-Path Packet Merge and supports insertion or removal of RTP
- Up to 96x processing paths that can insert FEC and RTP***
- Up to 96x processing paths that can apply FEC correction. This mode also supports Multi-Path Packet Merge and supports the insertion or removal of RTP Headers***
- Modules support control over frame controller or direct Ethernet interface. SNMP control from VistaLINK PRO or MAGNUM Unified Control

****Please contact the factory for further information about this mode*

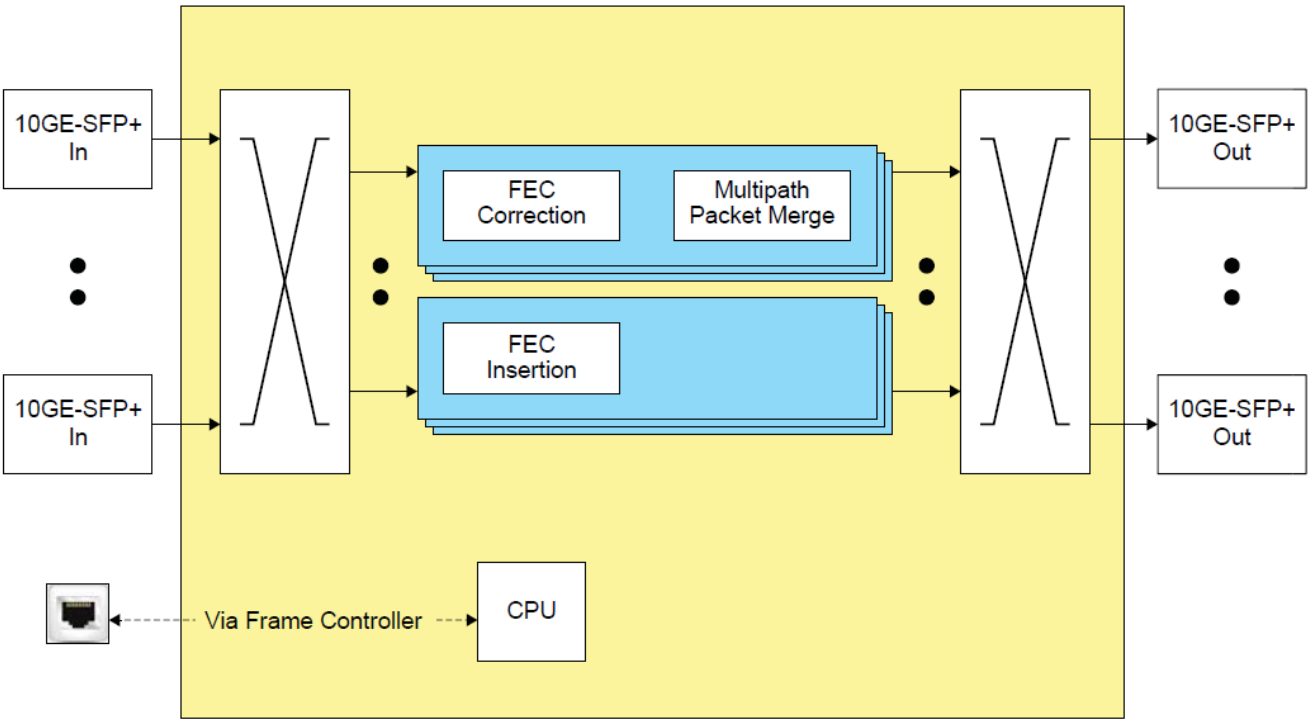

Figure 1-1: 570FEC-HW-X19 Block Diagram

2. GETTING STARTED

The 570FEC-HW-X19 modules come with a companion rear plate and occupy two slots in 570FR. Refer to Figure 2-1 for 570 FEC-HW-X19 Front plate layout.

Figure 2-1: 570FEC-HW-X19 Front Plate

The front plate of 570FEC-HW-X19 has 4 available SFP slots. These SFP slots can be populated with SFP10G-TR13-A. This will allow 10G interface to the 570FEC-HW-X19 Encoder and Decoder.

2.1. CARE AND HANDLING OF OPTICAL FIBER

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that the user maintains a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. The Evertz fiber optic modules come with cable lockout devices, to prevent the user from damaging the fiber by installing a module into a slot in the frame that does not have a suitable I/O module.

NOTE: Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end face of a connector before making a connection.

2.2. HARDWARE INSTALLATION

To successfully install the 570FEC-HW-X19, the following is required:

1. 570 Series Frame
2. 570 Frame Controller
3. WebEASY® using the 570FC frame controller with 570FEC-HW-X19 installed in frame.

Before handling the card, it is important to minimize the potential effects of static electricity. It is therefore recommended that an ESD strap be worn.

Locate on the chassis 2 adjacent vacant slots. Unpack the 570FEC-HW-X19 and separate the rear panel from the main card. Locate on the rear of the rack the two slots and remove the blanking panels. Insert the rear panel into the back of the chassis and secure using the four screws provided.

Now insert the 570FEC-HW-X19 card into the corresponding front slots ensuring the card lines up with the slot runners on the bottom and the top of the chassis. Push the card **firmly** into the slot ensuring that when it mates with the rear card it has been firmly pushed into a seated position. Do not connect any cables to the rear card (failure to do this could cause unwanted network issues) until the initial configuration has been completed.

This procedure can be completed to all the other modules and is hot swappable allowing for the frame to be powered on while installing.

3. SPECIFICATIONS

3.1. INPUTS AND OUTPUTS

Bi-directional Mode	64x IP inputs to allow for 32x processing paths of FEC insertion 32x IP outputs with FEC insertion
FEC insertion Mode	96x IP outputs with FEC insertion***
FEC Correction Mode	192x IP inputs to allow for 96 processing paths of FEC correction***
SFP Ports used	SFP 1-4

3.2. SFP MODULES

4xSFP modules
RTP headers can be enabled or disabled for FEC correct paths

3.3. FEC INSERTION PARAMETERS

FEC encoding (Pro MPEG forum code of practice #3 release 2<cop3>) with L&D following the below range:

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4. WEB INTERFACE

The 570FEC-HW-X19 series of products are controlled using Web Interface. WebEasy operates using Ethernet and SNMP control protocols.

After the card has been installed and configured with the required network addresses, it can be completely configured using the web interface. For doing this, simply type the IP address of the control port of the 570FEC-HW-X19 module in the web browser.

Note: Computer must be on the same Subnet in order to have communication with the module.

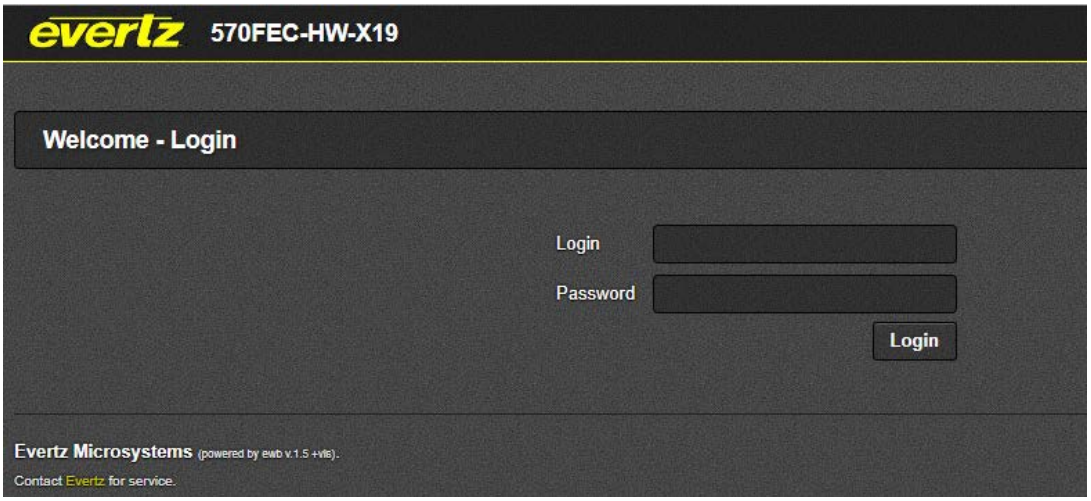

Figure 4-1: WebEASY® - Login Menu

Login and password is “root” and “evertz” respectively.

On the web interface there are several different types of menus highlighted in Figure 4-2.

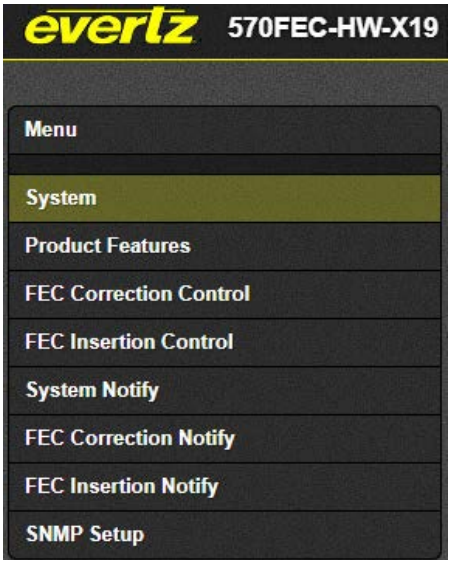

Figure 4-2: 570FEC-HW-X19 Main Menu

4.1. SYSTEM

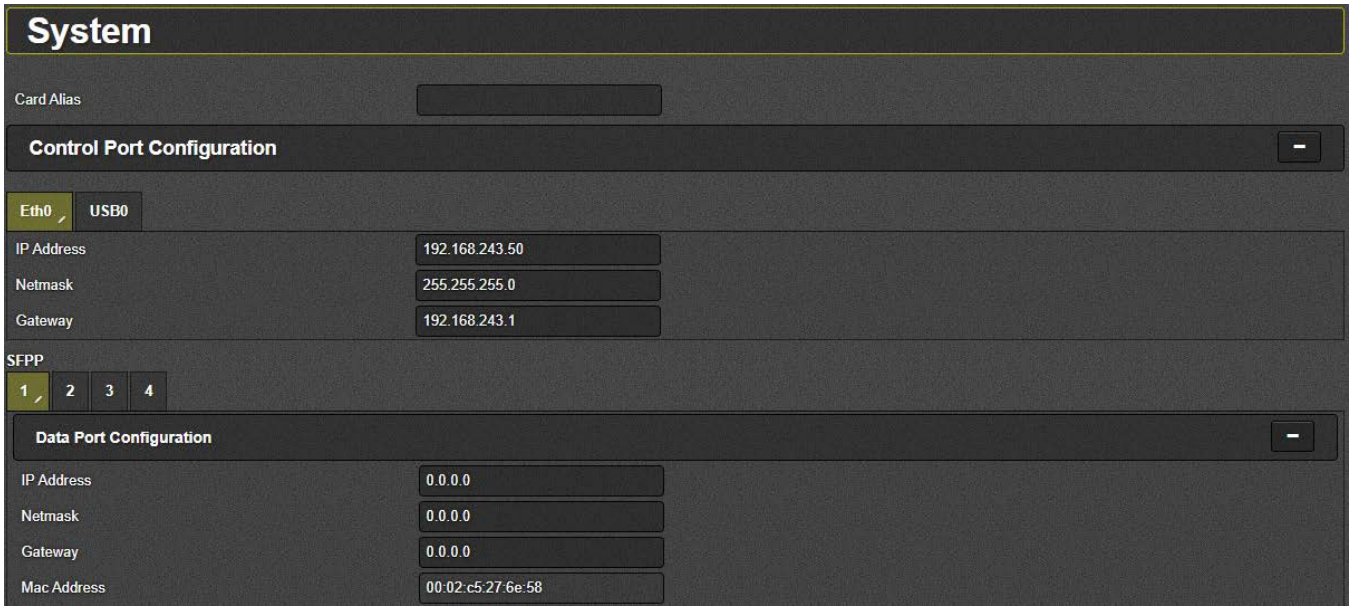

Figure 4-3: WebEASY® - System Section (Part 1 of 3)

4.1.1. System

Card Alias: This control returns the card alias string.

4.1.2. Control Port Configuration

For Eth0 & USB0

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

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

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

Please note the control port is only used when the 570FEC-HW-X19 is used in the S570FR.

4.1.3. Data Port Configuration

For SFPP 1 to 4

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

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

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

Mac Address: This parameter reflects the MAC Address of the data port.

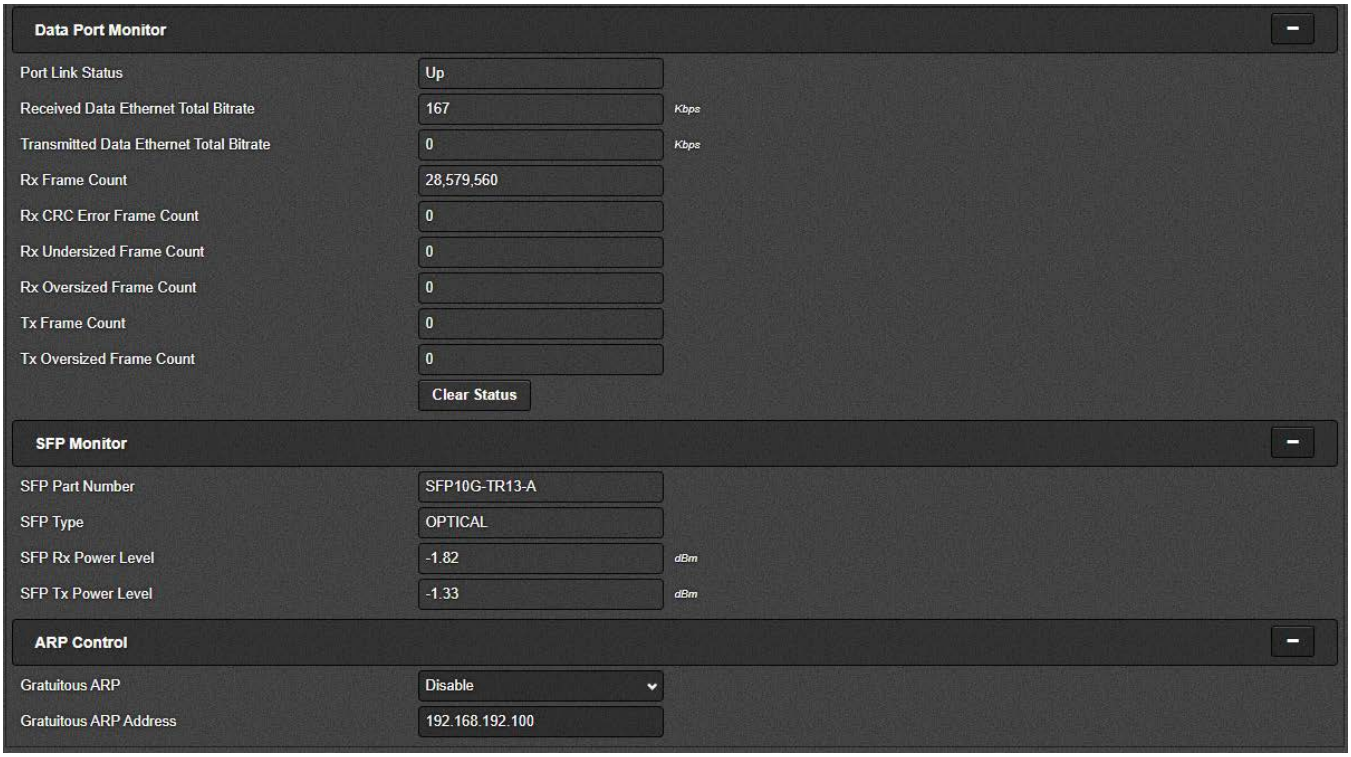

Figure 4-4: WebEASY® - System Section (Part 2 of 3)

4.1.4. Data Port Monitor

For SFPP 1-4

Port Link Status: This parameter returns the link status for Data port. The status can be “Up” or “Down”.

Received Data Ethernet Total Bitrate: This parameter displays the Total bitrate received on this Data port in kbps.

Transmitted Data Ethernet Total Bitrate: This parameter displays the Total bitrate transmitted on this output Data port in kbps.

Rx Frame Count: This parameter displays the received Rx frames on this Ethernet port.

Rx CRC Error Frame Count: This parameter displays the received Rx frames with CRC errors on this Ethernet port.

Rx Undersized Frame Count: This parameter displays the received Rx undersized frames on this Ethernet port.

Rx Oversized Frame Count: This parameter displays the received Rx oversized frames on this Ethernet port.

Tx Frame Count: This parameter displays the received Tx frames on this Ethernet port.

Tx Oversized Frame Count: This parameter displays the received Tx oversized frames on this Ethernet ports.

Clear Status: This button allows the user to reset the Ethernet monitor statistics.

4.1.5. SFP Monitor

For SFPP 1-4

SFP Part Number: This field displays the part number of SFP.

SFP Type: This field displays the type of SFP.

SFP Rx Power Level: This field displays the Rx power level of SFP.

SFP Tx Power Level: This field displays the Tx power level of SFP.

4.1.6. ARP Control

For SFPP 1 to SFPP 4

Gratuitous ARP: This dropdown allows the user to enable or disable Gratuitous ARP mode.

Gratuitous ARP Address: This field allows the user to set the IP address used for Gratuitous ARP.

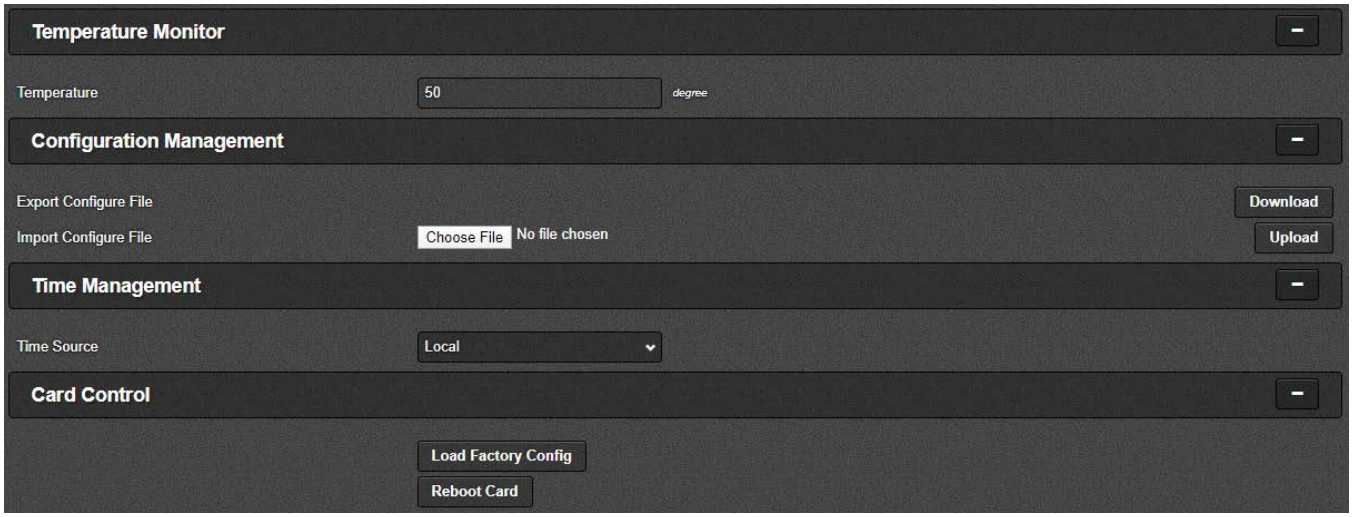

Figure 4-5: WebEASY® - System Section (Part 3 of 3)

4.1.7. Temperature Monitor

Temperature: This field monitors the current temperature of module.

4.1.8. Configuration Management

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

Import Configure File: This control allows the user to load config JSON file to card.

4.1.9. Time Management

Time Source: This field allows the user to select what will be used as system time source.

4.1.10. Card Control

Load Factory Config: This control is used to load factory configuration to each encoder.

Reboot Card: This control allows the user to perform a soft reboot on the encoder.

4.2. PRODUCT FEATURES

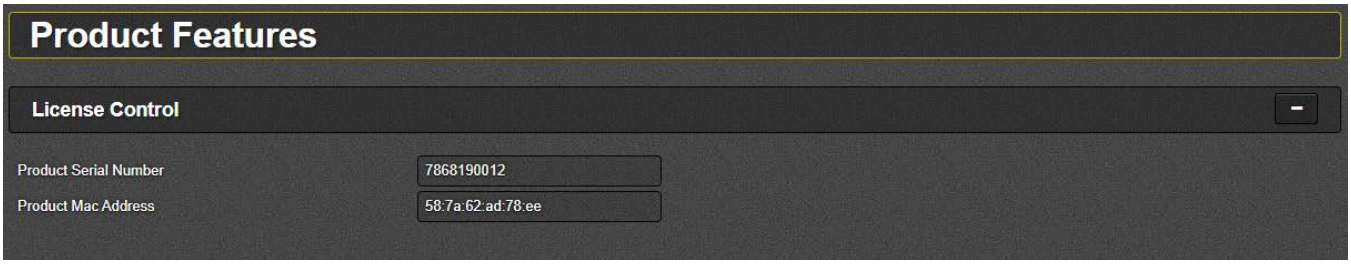

Figure 4-6: WebEASY® - Product Features Section

4.2.1. License Control

Product Serial Number: This parameter displays the card's serial number.

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

4.3. FEC CORRECTION CONTROL

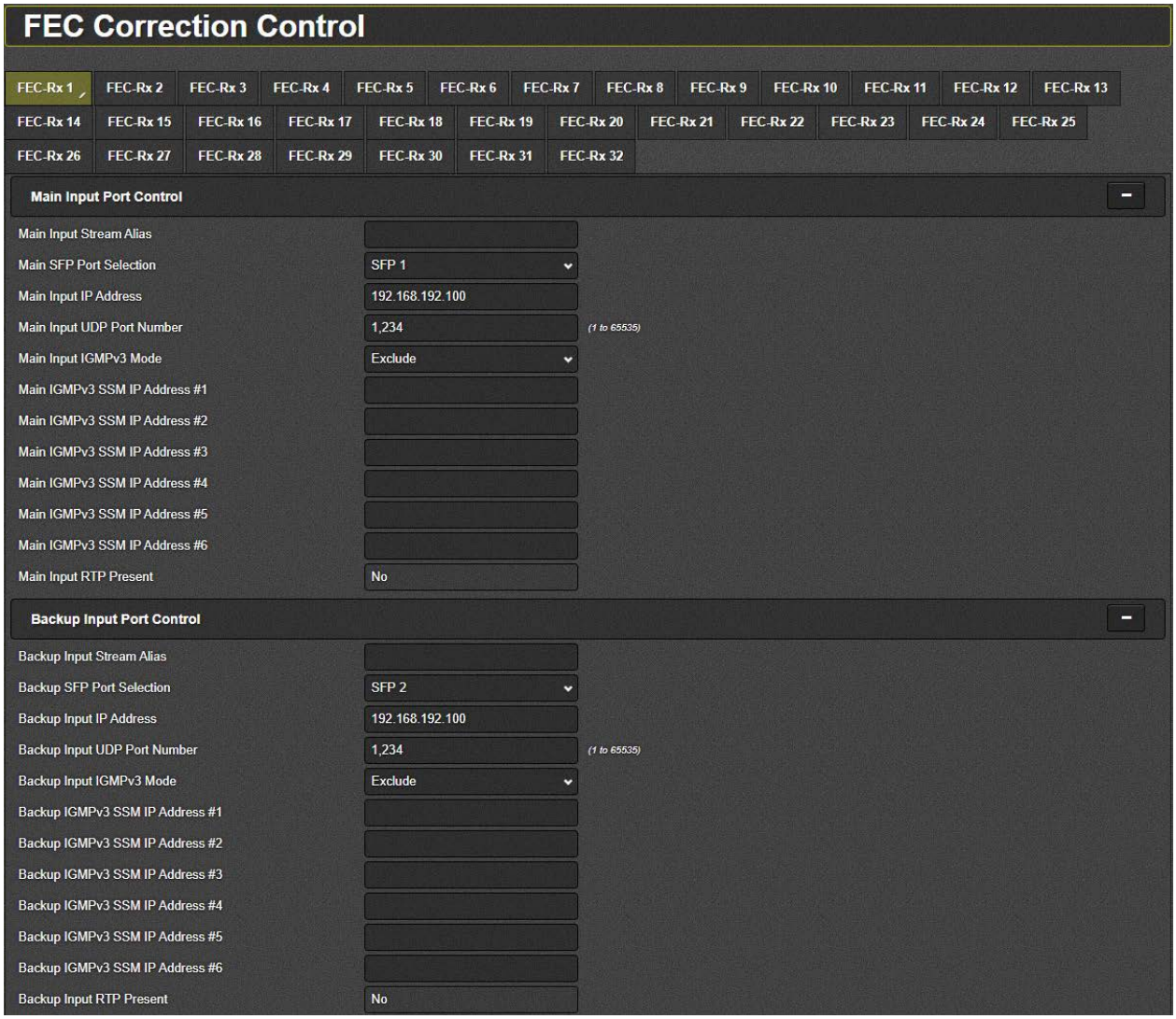

Figure 4-7: WebEASY® - FEC Correction Control Section (Part 1 of 3)

4.3.1. Main Input Port Control

For FEC-Rx1 to FEC-Rx32

Input Stream Alias: This field allows the user to set the input alias name.

Main SFP Port Selection: This dropdown allows the user to select the SFP where each channel will obtain their main stream source from.

Main Input IP Address: This field allows the user to set the input IP address/multicast address.

Main Input IP Port Number: This field allows the user to select the input UDP port number.

Main Input IGMPV3 Mode: This parameter allows the user to select the IGMP V3 mode to use.

Main IGMPV3 SSM Src1-6 IP Address: This field allows the user to set the IP addresses which will be used while forming the source filter for IGMPV3 communications.

Main Input RTP Present: This field displays the main input RTP presence status.

4.3.2. Backup Input Port Control

For FEC-Rx1 to FEC-Rx32

Backup input Stream Alias: This field allows the user to set the back up input alias name.

Backup SFP Port Selection: This dropdown allows the user to select the SFP where each channel will obtain their backup stream source from.

Backup input IP Address: This field allows the user to set the backup input IP address/multicast address.

Backup input IP Port Number: This field allows the user to select the input UDP port number.

Backup input IGMPV3 Mode: This parameter allows the user to include/exclude the backup IGMP V3 to use.

Backup IGMPV3 SSM Src1-6 IP Address: This field allows the user to set the IP addresses which will be used while forming the source filter for IGMPV3 communications.

Backup Input RTP Present: This field displays the backup input RTP presence status.

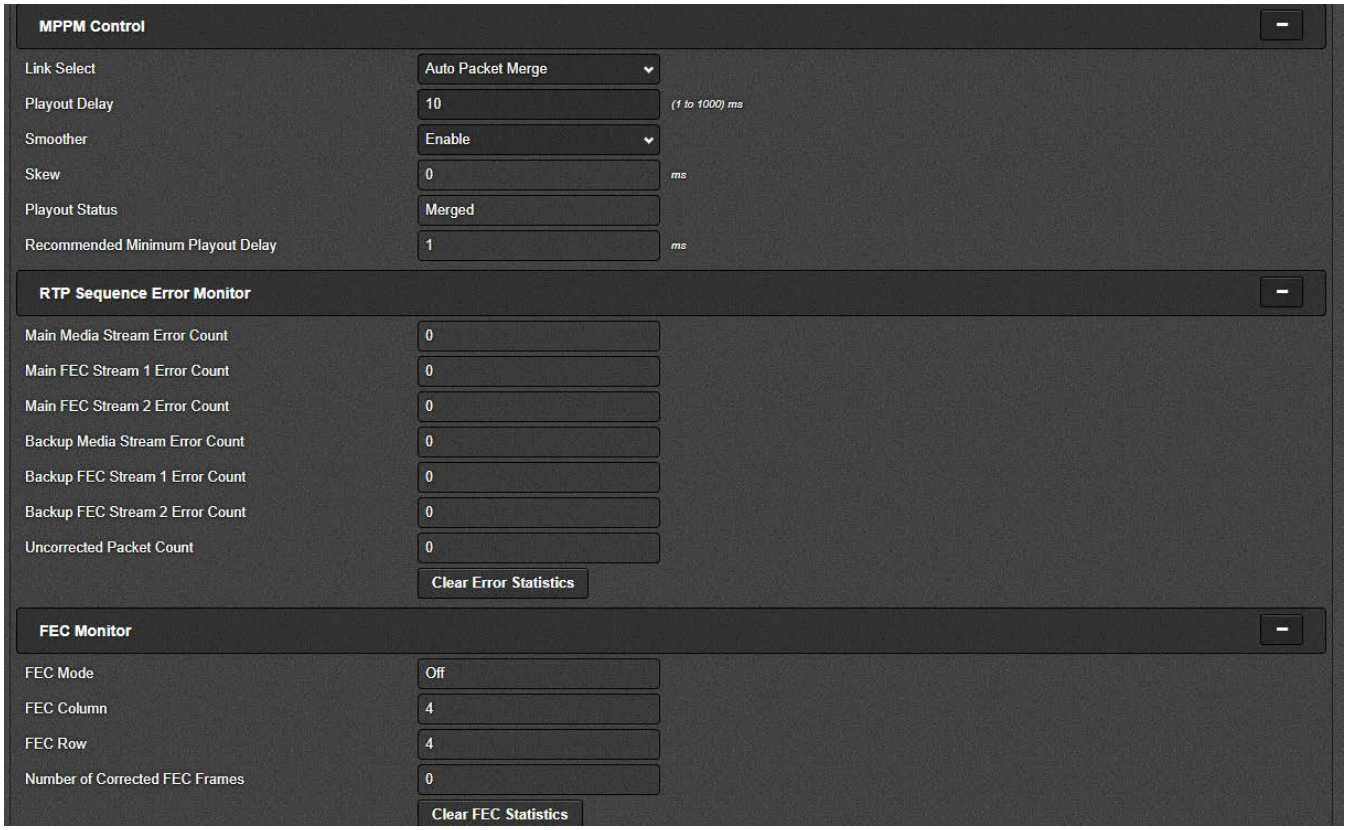

Figure 4-8: WebEASY® - FEC Correction Control Section (Part 2 of 3)

MPPM Control

For FEC-Rx1 to FEC-Rx32

Link Select: This dropdown allows the user to enable either Auto Packet Merge or select the port to receive data.

Playout Delay: This field allows the user to set playout delay.

Smoother: This parameter allows the user to enable the MPPM smoother for jitter tolerance.

Skew: This field allows the user to see the delay difference between the main and backup streams.

Playout Status: This parameter allows the user to see the playout status. It will reflect the use of the Main stream source, Backup stream source or the Merged input stream source.

Recommended Minimum Playout Delay: This parameter uses skew and FEC latency to provide a recommendation for minimum playout delay.

4.3.3. RTP Sequence Error Monitor

For FEC-Rx1 to FEC-Rx32

Main Media Stream Error Count: Count increments when a packet is dropped on the Main Stream.

Main FEC Stream 1 Error Count: Count increments when a packet is dropped on the Main FEC Stream 1.

Main FEC Stream 2 Error Count: Count increments when a packet is dropped on the Main FEC Stream 2.

Backup Media Stream Error Count: Count increments when a packet is dropped on the Backup Stream.

Backup FEC Stream 1 Error Count: Count increments when a packet is dropped on the Backup FEC Stream 1.

Backup FEC Stream 2 Error Count: Count increments when a packet is dropped on the Backup FEC Stream 2.

Uncorrected Packet Count: This parameter allows the user to monitor the MPPM error count.

Clear Error Statistics: This control allows the user to reset the received MPPM Error statistics.

4.3.4. FEC Monitor

For FEC-Rx1 to FEC-Rx32

FEC Mode: This field allows the user to monitor the FEC mode. For each output stream, FEC can be turned Off or On. If it is On, the options are either FEC 1 D or FEC 2 D.

FEC Column: This filed displays the FEC column.

FEC Row: This field displays the FEC row.

Number of Corrected FEC Frames: This field displays number of corrected FEC frames for the input stream.

Clear FEC Statistics: This control allows the user to reset the received FEC statistics.

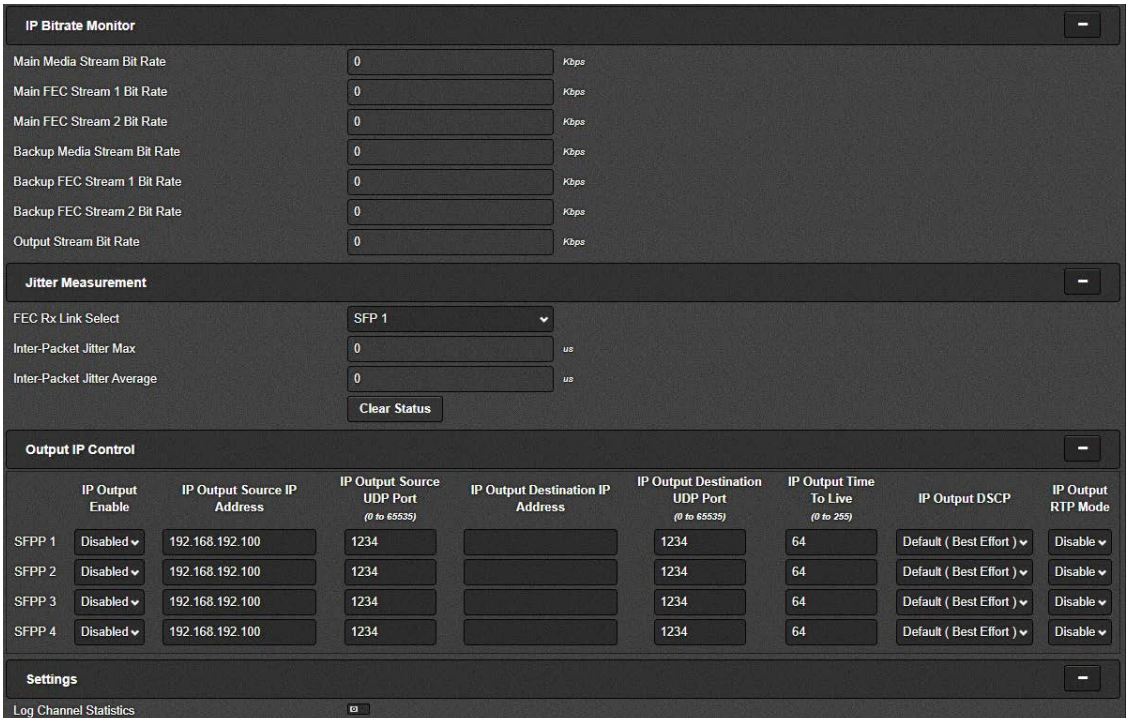

Figure 4-9: WebEASY® - FEC Correction Control Section (Part 3 of 3)

4.3.5. IP Bitrate Monitor

For FEC-Rx1 to FEC-Rx32

Main Media Stream Bit Rate: This field reflects the main input stream bitrate.

Main FEC Stream 1 Bit Rate: This field reflects the main input FEC stream 1 bitrate.

Main FEC Stream 2 Bit Rate: This field reflects the main input FEC stream 2 bitrate.

Backup Media Stream Bit Rate: This field reflects the backup input stream bitratel.

Backup FEC Stream 1 Bit Rate: This field reflects the backup input FEC stream 1 bitrate.

Backup FEC Stream 2 Bit Rate: This field reflects the backup input FEC stream 2 bitrate.

Output Stream Bit Rate: This field displays data stream bitrate.

4.3.6. Output IP Control

For FEC-Rx1 to FEC-Rx32

IP Output Enable: This field allows the user to enable/disable the output.

IP Output Source IP Address: This field allows the user to set the source IP address.

IP Output Source UDP Port: This field allows the user to set the source UDP port.

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

IP Output Destination UDP Port: This field allows the user to set the destination UDP port.

IP Output Time To Live: This field allows the user to set the time to live.

IP Output DSCP: This dropdown allows the user to set the DSCP.

IP Output RTP Mode: This dropdown allows the user to set enable/disable the RTP mode.

4.3.7. Settings

Log Control Statistics: This button allows the user to choose whether or not to log statistics for this channel. The logs will be available via syslog.

4.4. FEC INSERTION CONTROL

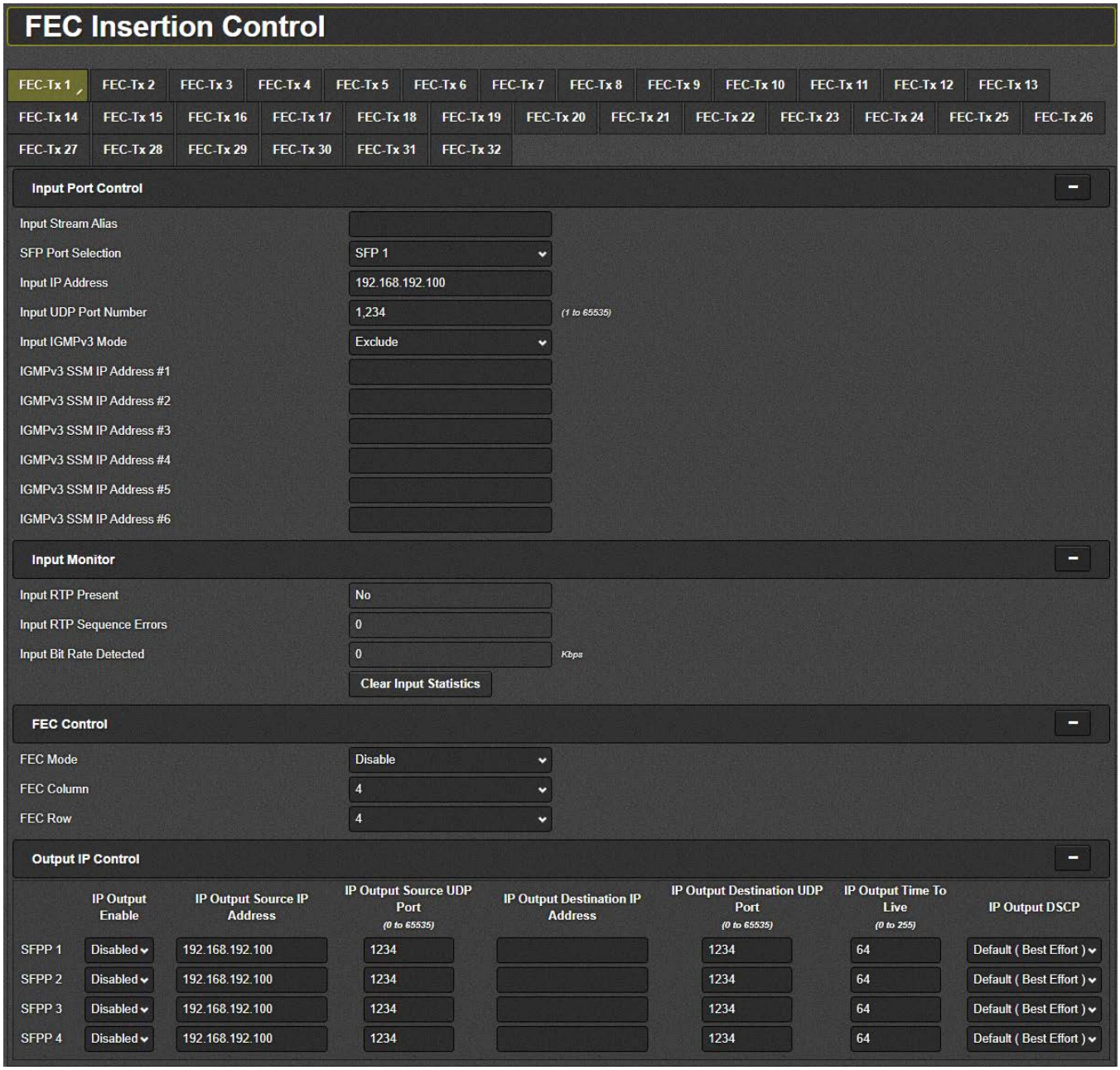

Figure 4-10: WebEASY® - FEC Insertion Control Section

4.4.1. Input Port Control

For FEC-Tx1 to FEC-Tx32

Input Stream Alias: This field allows the user to set the input stream alias name.

SFP Port Selection: This dropdown allows the user to select the SFP from which each channel will obtain their main stream.

Input IP Address: This field allows the user to set the input IP address/multicast address that they want to receive.

Input IP Port Number: This field allows the user to set the input UDP port number.

Input IGMPV3 Mode: This dropdown allows the user to select the IGMPV3 mode to use. The user can include SSM sources or exclude SSM sources.

IGMPV3 SSM Src1-6 IP Address: This field allows the user to set IP address to be used while forming the source specific filter for IGMPV3 communications.

4.4.2. Input Monitor

For FEC-Tx1 to FEC-Tx32

Input RTP Present: This filed displays if the Input RTP is present or not.

Input RTP Sequence Errors: This field displays the Input RTP sequence errors.

Input Bit Rate Detected: This field displays the detected input Bitrate.

Clear input Statistics: This control allows the user to reset received IP statistics.

4.4.3. FEC Control

For FEC-Tx1 to FEC-Tx32

FEC Mode: This dropdown allows the user to set the FEC mode which can be toggled for each stream.

FEC Column: This dropdown allows the user to set the FEC column.

FEC Row: This dropdown allows the user to set the FEC row.

4.4.4. Output IP Control

For FEC-Tx1 to FEC-Tx32

IP Output Enable: This parameter allows the user to enable or disable IP output.

IP Output Source IP Address: This parameter allows the user to set the IP address for IP output source.

IP Output Source UDP Port: This parameter allows the user to set the IP output source UDP port.

IP Output Destination IP Address: This parameter allows the user to set the IP address for IP output destination.

IP Output Destination UDP Port: This parameter allows the user to set the IP output destination UDP port.

IP Output Time To Live: This parameter allows the user to set the IP output time to live.

IP Output DSCP: This parameter allows the user to set the IP output DSCP.

4.5. SYSTEM NOTIFY

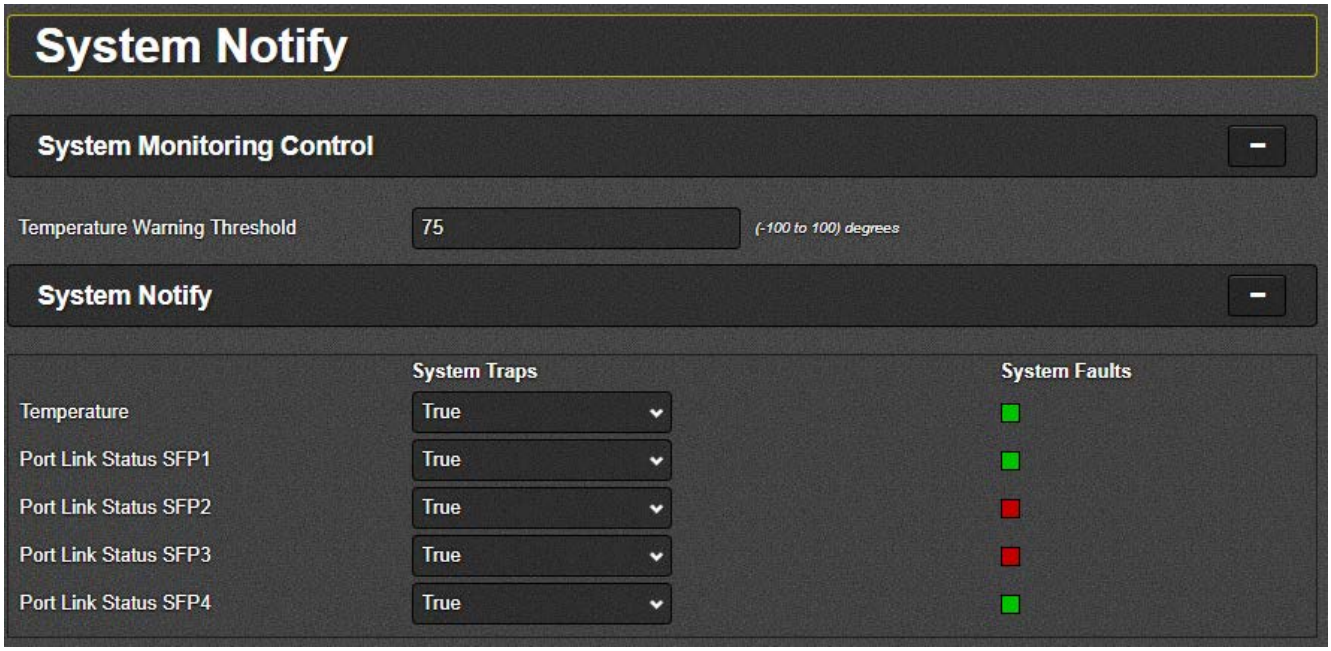

Figure 4-11: WebEASY® - System Notify Section

4.5.1. System Monitoring Control

Temperature Warning Threshold: This field allows the user to set the temperature threshold for the overheat temperature.

4.5.2. System Notify

System Traps: This control allows the user to turn traps On or Off.

System Faults: This parameter allows the user to check whether a fault is currently present or not.

4.6. FEC CORRECTION NOTIFY

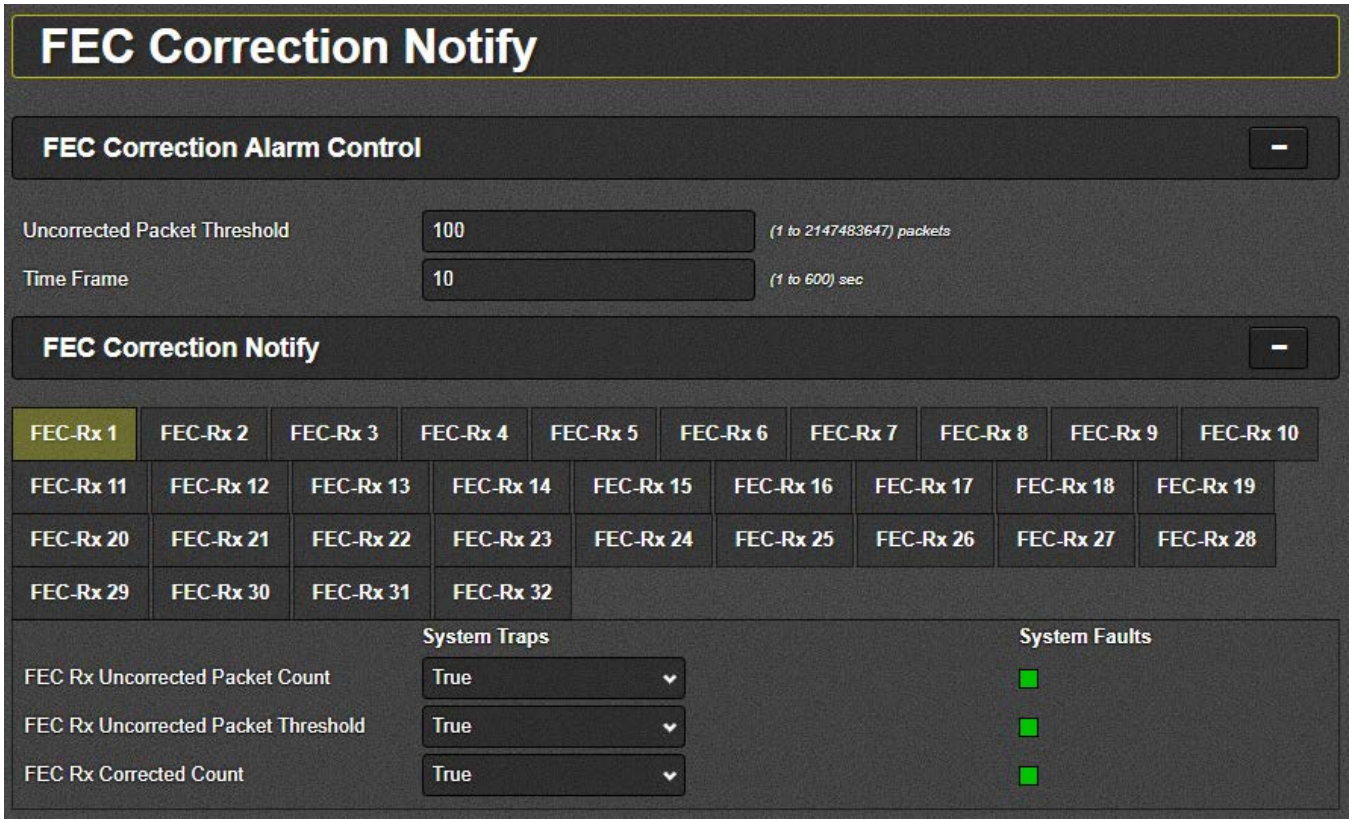

Figure 4-12: WebEASY® - FEC Correction Notify Section

4.6.1. FEC Correction Alarm Control

Uncorrected Packet Threshold: This field allows the user to set the error threshold before an alarm is sent.

Time Frame: This parameter allows the user to set the time frame after which a condition is triggered.

4.6.2. FEC Correction Notify

For FEC-Rx1 to FEC-Rx32

System Traps: This dropdown allows the user to turn the traps On or Off.

System Faults: This display will reflect green if there is no fault, and will reflect red for a fault indication.

4.7. FEC INSERTION NOTIFY

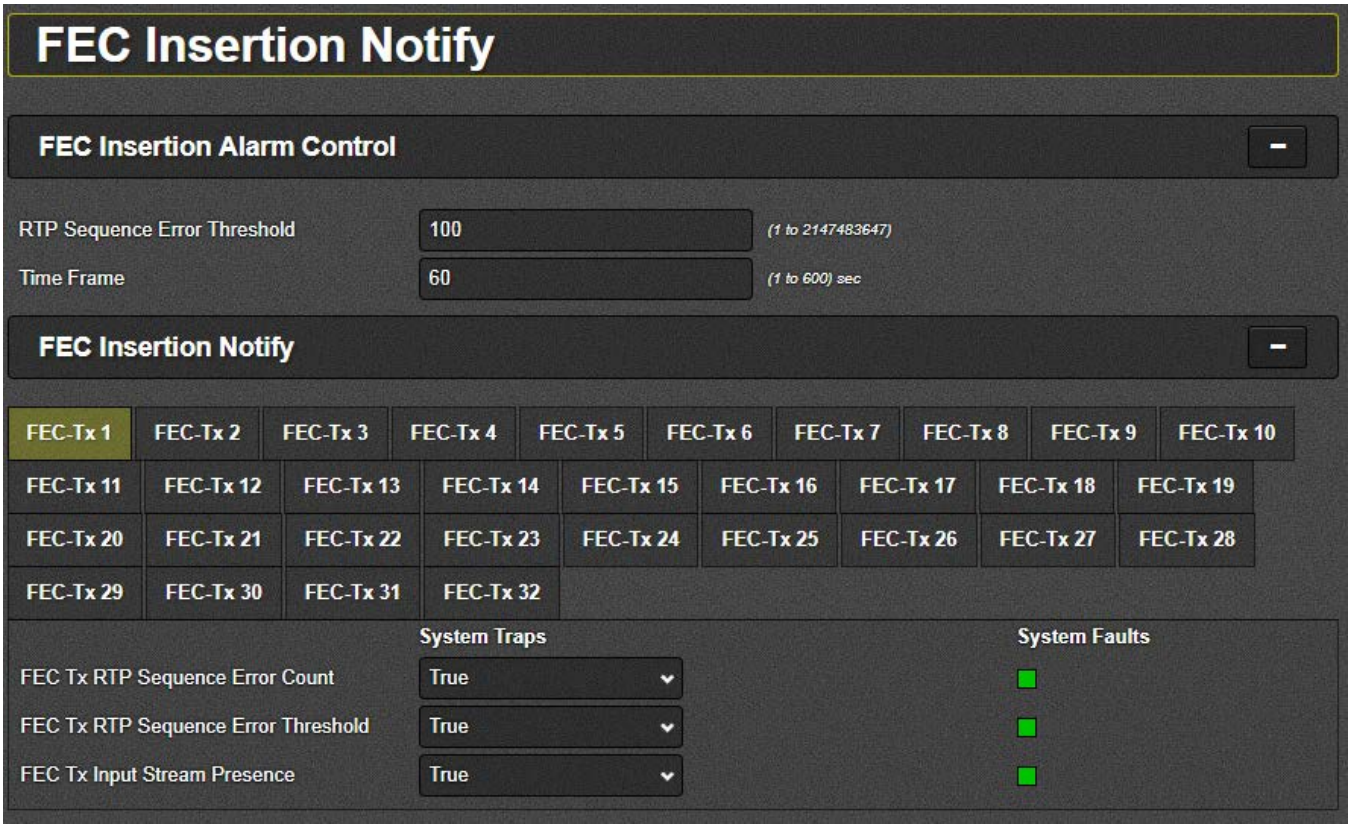

Figure 4-13: WebEASY® - FEC Insertion Notify Section

4.7.1. FEC Insertion Alarm Control

RTP Sequence Error Threshold: This control allows the user to set a threshold for RTP Sequence Error.

Time Frame: This control allows the user to set the time frame after which the condition is triggered.

4.7.2. FEC Insertion Notify

For FEC-Tx1 to FEC-Tx32

System Traps: This dropdown allows the user to turn the traps On or Off.

System Faults: This display will reflect green if there is no fault, and will reflect red for a fault indication.

4.8. SNMP SETUP

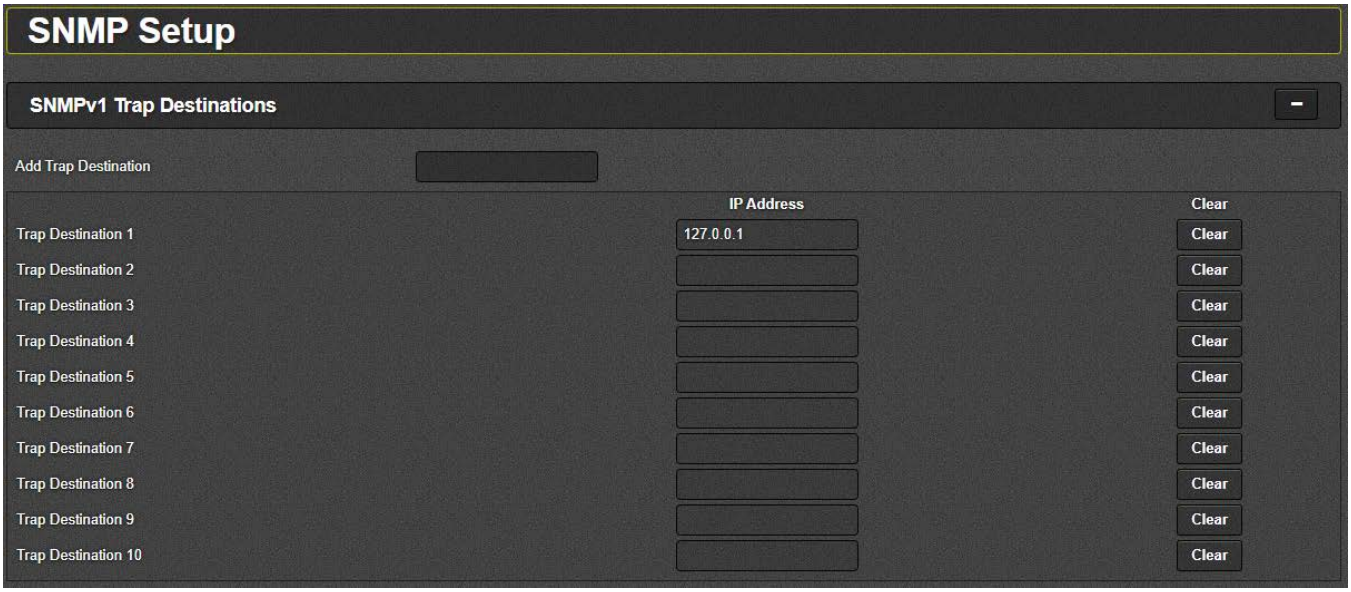

Figure 4-14: WebEASY® - FEC Insertion Notify Section

4.8.1. SNMPv1 Trap Destinations

Add Trap Destination: This field allows the user to set an IP address for a new trap destination.

IP Address: This field will display IP address for any currently set trap destinations.

Clear: This button will clear a currently set trap destination.

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5. UPGRADE PROCEDURES

5.1. FIRMWARE UPGRADE

Using the WebEASY® on a web interface is the fasted and recommended way to load the firmware onto the 570FEC modules.

On the top of the web page for the 570FEC modules, there is a button labelled Upgrade. The Upgrade tab is used to check current firmware version and upload the latest firmware (Figure 5-1).

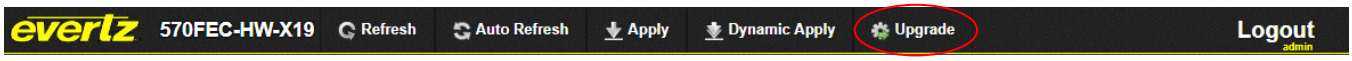

Figure 5-1: WebEASY® - Upgrade Button on Top Menu Bar

Selecting the Upgrade tab, will take the user to Figure 5-2 where the current firmware version is shown. Should the firmware version be outdated, the user needs to download the firmware image file.

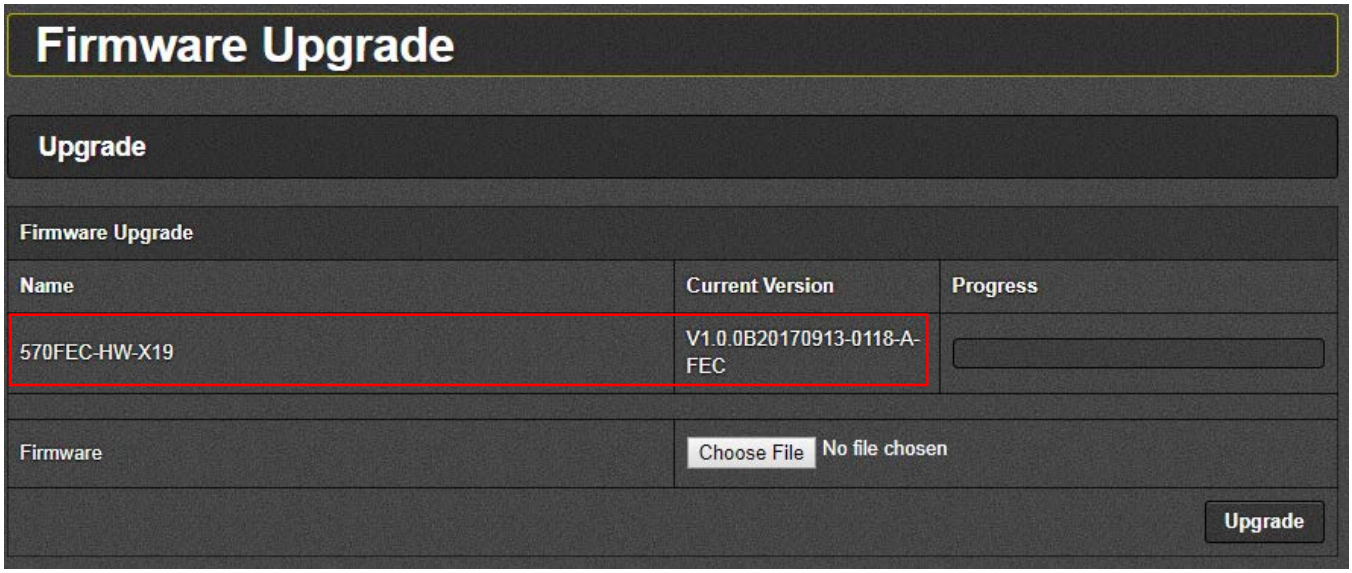

Figure 5-2: WebEASY® - Firmware Upgrade Menu

Click choose file and browse to locate image file (Figure 5-3). Once selected, click open to advance to next step. Click upgrade and watch progress bar for status. Once completed, the device will automatically restart.

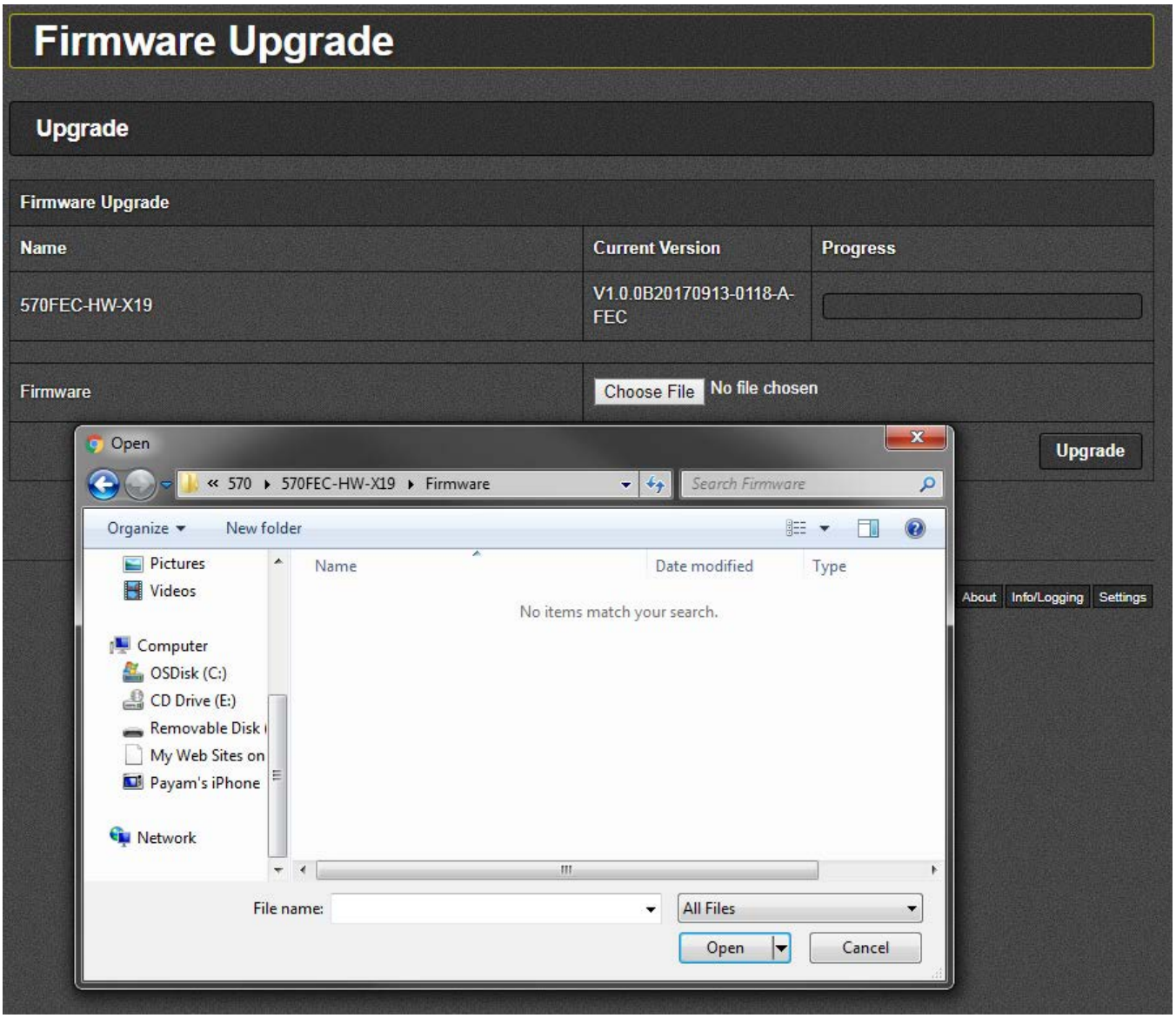

Figure 5-3: WebEASY® - Firmware Upgrade Menu