

# Quick Start Guide

West Pond Enterprises

FlexStream FEC / FEC Box IP IP™


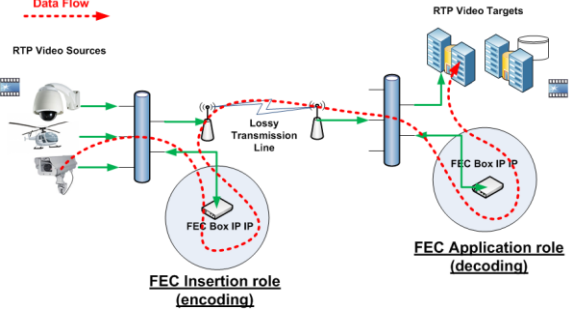
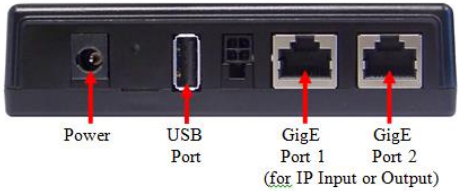

A/V transport escort technology

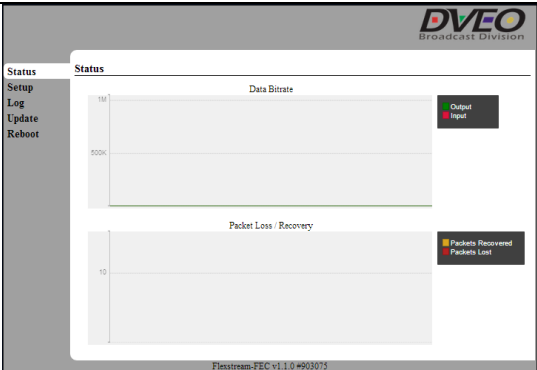
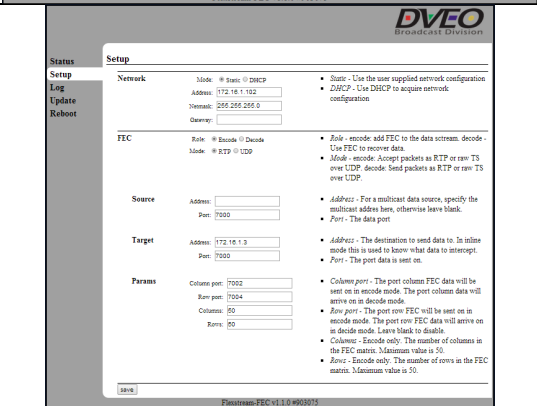
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*September 9, 2014, V1.4*

Provided by:



<p><u>Unpacking:</u> The Box FEC IP IP ships with a US power cord, DC power pack, and the Box FEC IP IP network appliance.</p>	
<p><u>Identify use:</u> The Box FEC IP IP configuration is different for send than receive.</p> <p>If this device is installed at the source, where the FEC data is created, it is configured as an “encoder”.</p> <p>If this device is installed at the receiver, where the FCC data is used to recover lost data, is configured as a “decoder”.</p>	<p style="text-align: center;"><a href="#">FEC Box IP IP Installations</a></p> 
<p><u>Power the device:</u> Insert and twist the DC power cable to ensure it lock in. Plug the AC power pack, and monitor the Status LED on the top of the box. It should turn green.</p>	
<p><u>Connect to device:</u> The Box FEC IP IP has an internal Web UI that can be accessed via the network. The IP address was preconfigured to 192.168.1.233. Connect one of the GigE ports of the Box FEC IP IP directly to a computer and configure that computers network port to the following IP address:</p> <p style="text-align: center;">IP: 192.168.1.234 Net Mask: 255.255.255.0</p> <p>The associated “Ethernet” LED should light when connected.</p> <p>Note: Disable WiFi on the computer to avoid LAN address conflicts.</p> <p>Note: The two ports may be used interchangeably as they configured internally as a switch.</p> <p>Note: If you suspect a network problem, or forgot the previous IP configuration of the device, it can be reset by inserting a</p>	

<p>paperclip into the hole near the DC power input just before applying power and holding for 6 seconds. Be aware that this resets the entire device configuration to factory defaults.</p>	
<p><b>Connect to the Box FEC IP IP:</b> Using the computers web browser, browse to <a href="http://192.168.1.233">http://192.168.1.233</a> . The UI in Figure 1 should be visible.</p>	
<p><b>Configure the LAN:</b> Browse to the settings tab and configure the network settings of the Box FEC IP IP for the target LAN. Remember this address as you will need it to access the Box FEC IP IP UI for reconfiguration.</p>	
<p><b>Configure the FEC Network Settings:</b> If this device is used as an encoder, select “encode”. If the decoder, select “decode”.  Select the type of stream that is being FEC protected. UDP or RTP?</p>	
<p><b>Configuring for encoding</b> If encoding a stream on a multicast address, enter that address on the “source” line.  Enter the source port number on which the original stream is being carried.  Enter the target IP address and port to which the stream should be directed. This should be the IP address of the device performing the decoding at the far end of the lossy transport.  Configure the column and row port. These are typically 2 and 4 greater than the original stream port.  Set the columns and rows as necessary to perfect the stream. Start with the default and adjust afterwards if the default settings are insufficient. The column value can be adjusted to</p>	

<p>compensate for burst loss. The row value can be adjusted to compensate for intermittent loss. Lower numbers conserve bandwidth but apply less forward error correction.</p>	
<p><b>Configuring for decoding</b>          If decoding a stream on a multicast address, enter that address on the “source” line.</p> <p>Enter the source port number on which the stream is being carried. This should match the port number on the sending unit target port.</p> <p>Enter the target IP address and port to which the corrected stream should be directed.</p> <p>The rest of the information will be passed to the decoder by the encoder and need not be configured for “decoding”.</p>	
<p><b>Save settings:</b>          Click Save to save settings. Once you do this you will likely lose contact with the device. Connect the device to the target network and reconfigure the computer to match the target network. The unused Ethernet port on the Box FEC IP IP can be used to connect the configuration computer to the target LAN. It is connected to the other port via an internal switch.</p>	
<p><b>Monitoring progress:</b>          The Status menu should show the data flow over time. See figure 2.</p>	
<p><b>Status LEDs</b>          Status: Green:              Green = System is operating normally              Red = System is in error state. Check configuration.</p> <p>Ethernet 1:              Lit when linked. Blinks with activity.</p> <p>Ethernet 2:              Lit when linked. Blinks with activity.</p> <p>USB:              Blinks when USB device is being accessed.</p> <p>Network:              Blinks when waiting for IP address, solid when address acquired.</p>	

<p><b>Data:</b></p> <ul style="list-style-type: none"> <li>Off - No data seen</li> <li>Blinking – Data missing for more than 1 second</li> <li>Solid – Data being received</li> </ul> <p><b>Lock:</b></p> <ul style="list-style-type: none"> <li>Off – No data seen</li> <li>Blinking – Recent packet errors (uncorrectable on “decode”)</li> <li>Solid – Data being received</li> </ul> <p><b>Signal:</b></p> <ul style="list-style-type: none"> <li>4 bars: Receiving 100% of data (before FEC applied)</li> <li>3 bars: Receiving &gt; 80% of data (before FEC applied)</li> <li>2 bars: Receiving &gt; 50% of data (before FEC applied)</li> <li>1 bar: Receiving &lt; 50% of data (before FEC applied)</li> </ul>	
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Figure 1

- Status
- Setup**
- Log
- Update
- Reboot

**Setup**

**Network**

Mode:  Static  DHCP  
 Address:   
 Netmask:   
 Gateway:

- *Static* - Use the user supplied network configuration
- *DHCP* - Use DHCP to acquire network configuration

**FEC**

Role:  Encode  Decode  
 Mode:  RTP  UDP

- *Role* - encode: add FEC to the data stream. decode - Use FEC to recover data.
- *Mode* - encode: Accept packets as RTP or raw TS over UDP. decode: Send packets as RTP or raw TS over UDP.

**Source**

Address:   
 Port:

- *Address* - For a multicast data source, specify the multicast address here, otherwise leave blank.
- *Port* - The data port

**Target**

Address:   
 Port:

- *Address* - The destination to send data to. In inline mode this is used to know what data to intercept.
- *Port* - The port data is sent on.

**Params**

Column port:   
 Row port:   
 Columns:   
 Rows:

- *Column port* - The port column FEC data will be sent on in encode mode. The port column data will arrive on in decode mode.
- *Row port* - The port row FEC will be sent on in encode mode. The port row FEC data will arrive on in decode mode. Leave blank to disable.
- *Columns* - Encode only. The number of columns in the FEC matrix. Maximum value is 50.
- *Rows* - Encode only. The number of rows in the FEC matrix. Maximum value is 50.

save

Figure 2

# FAQs

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1	What is the bandwidth overhead of the FEC data? .....	7
2	What latency is added by the FEC computation? .....	7
3	What is the maximum bitrate? .....	7

## 1 What is the bandwidth overhead of the FEC data?

The bandwidth consumed is dependent upon the original stream bandwidth and the configuration of the device. SMPTE2022 is based on the number of columns M and rows N. For every MxN packets M column FEC packets are created. For every N rows one row FEC packet is created. The equation to calculate overhead is:  $\text{overhead} = \frac{M+N}{M*N} + \frac{M}{M*N} + \frac{N}{M*N}$ .

For example:

- M=4, N=4 would produce 8 FEC packets. 8 of the total 24 packets would be FEC, so the overhead would be 33%.
- M=25, N=25 would produce 50 FEC packets. 50 of the total 675 packets would be FEC, so the overhead would be ~7.5%.
- M=50, N=50 would produce 100 FEC packets. 100 of the total 2600 packets would be FEC, so the overhead is ~4%.

## 2 What latency is added by the FEC computation?

The encoder (send) does not add any latency to the stream. FEC packets are generated as data packets are emitted.

The decoder (receive) does add latency. The decoder buffers MxN packets. Meaning the latency is the time interval of MxN. For constant bitrate streams this means the latency is constant. For variable bitrate the latency is variable.

The tradeoff between buffering and stalling (stopping output until correction can occur) is consistent latency or jitter.

## 3 What is the maximum bitrate?

The suggested maximum encoding bitrate is 20 mb/s for a row/column configuration of 50/50. Higher bitrates are possible at lower FEC row/column settings.

