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## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	Oct 2009
1.1	Note added to Configuring the Basic Networks Setting section	Nov 2011

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Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

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## 1. OVERVIEW

The 7880IP-ASI-IP is a complete hardware based solution to transform ASI to IP, IP to ASI. It can also regenerate IP from IP input with different settings and add RTP and FEC. As more providers are trying to deliver contribution and distribution quality video over IP networks, the 7880IP-ASI-IP is capable of bridging traditional compressed world (ASI) with standard IP networks.

Controlled by the industry leading VistaLINK<sup>®</sup> PRO, the 7880IP-ASI-IP offers signal providers the capability to encapsulate MPEG-2 transport stream payload to a unicast or multicast standardized IP stream. The 7880IP-ASI-IP is also capable of receiving IP stream and re-create ASI stream. For contribution application, the 7880IP-ASI-IP offers industry standard FEC support for encapsulation or de-encapsulation.

The 7880IP-ASI-IP occupies one card slot and can be housed in a 1RU frame which will hold up to 3 modules, a 3RU frame which will hold up to 14 modules.

### Applications include:

- ASI to IP conversion
- IP to ASI conversion
- IP-IP translation
- Unicast/Multicast to Unicast/Multicast translation
- UDP or RTP input/output
- FEC ProMPEG CoP3 r2 option to IP streams

### Features:

- Fully integrated with the Industry leading Evertz VistaLINK<sup>®</sup> PRO NMS system
- 2 Independent IP Ports, 1 ASI input, 1 ASI Bypass and 1 ASI output
- ASI to IP conversion
- IP to ASI conversion
- IP to IP translation
- FEC encoding and decoding- Pro MPEG forum Code of Practice #3- Release 2<cop3>
- Built-in frame controller for control (separate IP port)

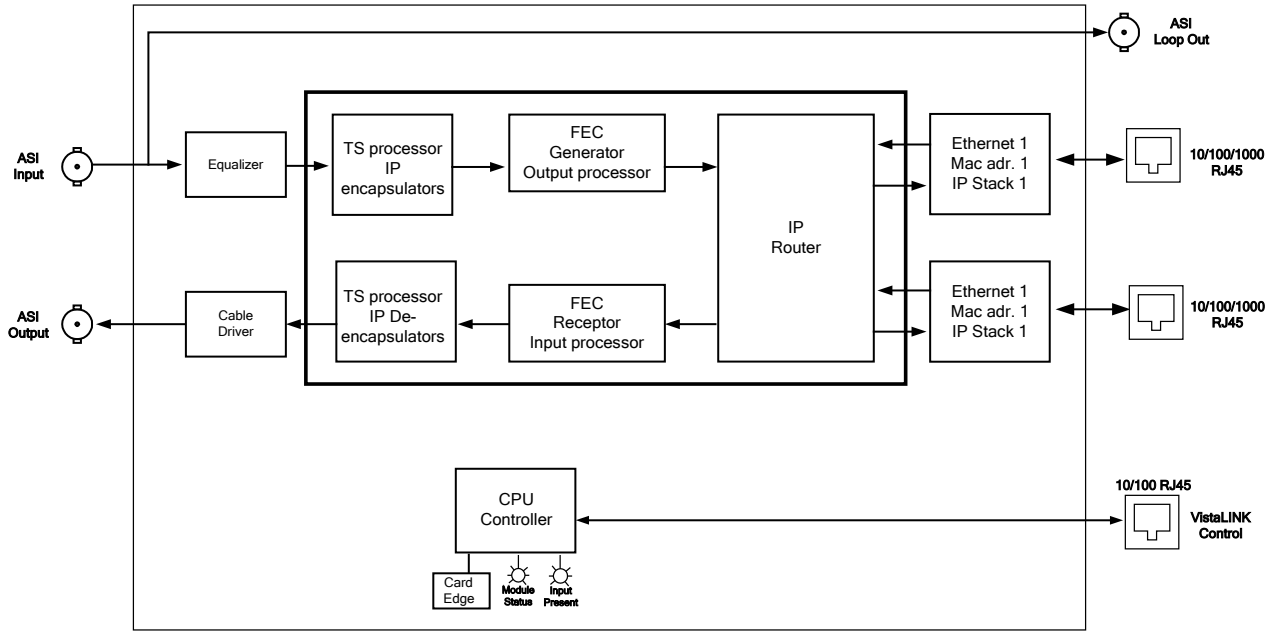


Figure 1-1: 7880IP-ASI-IP Block Diagram

## 2. INSTALLATION

### 2.1. REAR PLATE DESCRIPTION

The 7880IP-ASI-IP comes standard with a companion +3RU rear plate. Figure 2-1 provides an illustration of the 7880IP-ASI-IP rear plate. For information on mounting the rear plate and inserting the module into the frame, see section 3 of the 7700FR manual.

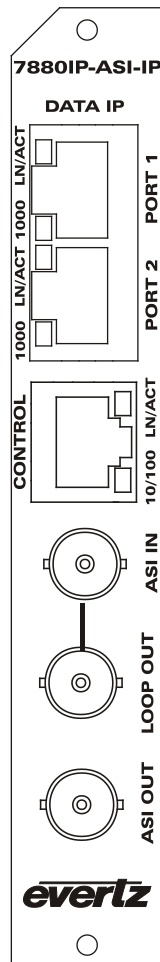


Figure 2-1: 7880IP-ASI-IP Rear Plate

#### 2.1.1. Video Connections

**ASI IN:** This BNC connector is compatible with DVB/ATSC-ASI standards. The maximum input bandwidth of each input cannot exceed 270 Mb/s. This ASI Input corresponds to the Loop Out on the 7880IP-ASI-IP module.

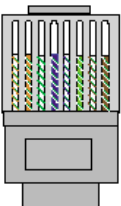
**LOOP OUT:** This BNC can be used to loop out the ASI input. It is mainly used for troubleshooting purposes.

**ASI OUT:** This BNC connector output is compatible with DVB/ATSC-ASI standards. This ASI Outputs corresponds to the IP Inputs on the 7880IP-ASI-IP module.

**2.1.2. Ethernet Connection**

The 7880IP-ASI-IP Series uses 10Base-T (10 Mbps), 100Base-TX (100 Mbps) or Gigabit (1Gbps) twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. The cable must be “straight-through” with an RJ-45 connector at each end. Establish the network connection by plugging one end of the cable into the RJ-45 receptacle of the card and the other end into a port of the supporting hub.

The straight-through RJ-45 cable can be purchased or can be constructed using the pin-out information in Table 2-1. A colour coded wiring table is provided in Table 2-1 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also refer to the notes following the table for additional wiring guide information.

Pin	Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT
	1	Transmit +	White/Green	White/Orange	X
	2	Transmit –	Green/White or White	Orange/White or Orange	X
	3	Receive +	White/Orange	White/Green	X
	4	N/A	Blue/White or Blue	Blue/White or Blue	Not used (required)
	5	N/A	White/Blue	White/Blue	Not used (required)
	6	Receive –	Orange/White or Orange	Green/White or Green	X
	7	N/A	White/Brown	White/Brown	Not used (required)
	8	N/A	Brown/White or Brown	Brown/White or Brown	Not used (required)

**Table 2-1: Standard RJ-45 Wiring Colour Codes**

Note the following cabling information for this wiring guide:

- Only two pairs of wires are used in the 8-pin RJ-45 connector to carry Ethernet signals.
- Even though pins 4, 5, 7 and 8 are not used, it is mandatory that they be present in the cable.
- 10BaseT and 100BaseT use the same pins (a crossover cable made for one will also work with the other).
- Pairs may be solid colours and not have a stripe.
- Category 5 cable must use Category 5 rated connectors.

The maximum cable run between the router and the supporting hub is 300 ft (90 m). The maximum combined cable run between any two end points (i.e. router and PC/laptop via network hub) is 675 feet (205 m).

Devices on the Ethernet network continually monitor the receive data path for activity as a means of checking that the link is working correctly. When the network is idle, the devices also send a link test signal to one another to verify link integrity. The rear panel is fitted with two LEDs to monitor the Ethernet connection.



**1000:** This Amber LED is ON when a 100Base-TX link is last detected. The LED is OFF when a 10Base-T link is last detected (the LINK LED is ON). Upon power-up the LED is OFF as the last detected rate is not known and therefore defaults to the 10Base-T state until rate detection is completed.

**LN/ACT:** This dual purpose Green LED indicates that the card has established a valid linkage to its hub, and whether the module is sending or receiving data. This LED will be ON when the module has established a good link to its supporting hub. This gives you a good indication that the segment is wired correctly. The LED will BLINK when the module is sending or receiving data. The LED will be OFF if there is no valid connection.

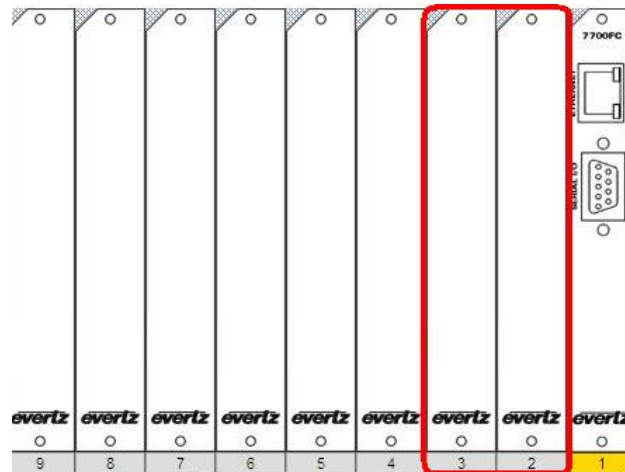
## 2.2. HARDWARE INSTALLATION

To successfully install the 7880IP-ASI-IP, you will require the following items:

1. Unused IP address on the network or a DHCP server
2. Evertz serial cable
3. VLPro Server IP address

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 a 7700 chassis two adjacent vacant slots. Unpack the card and separate the rear card from the main card. Locate on the rear of the rack the two slots and remove the blanking panels. Insert the rear card into the back of the chassis and secure using the four screws provided.



**Figure 2-2: 7700 Chassis Rear Panel**

Before inserting the front card, connect the serial cable to the board using the serial cable provided. Now insert the 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 plate that it has been securely pushed into a seated position. This can be confirmed when the connectivity lights for the Ethernet port are illuminated. Do not connect any cables to the rear card until the initial configuration has been completed (failure to do this could cause unwanted network issues).

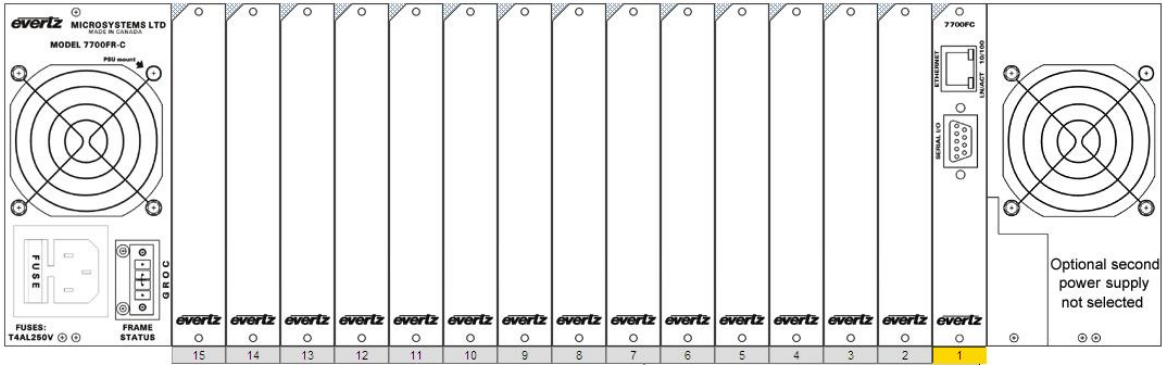


Figure 2-3: 7700 Frame Controller

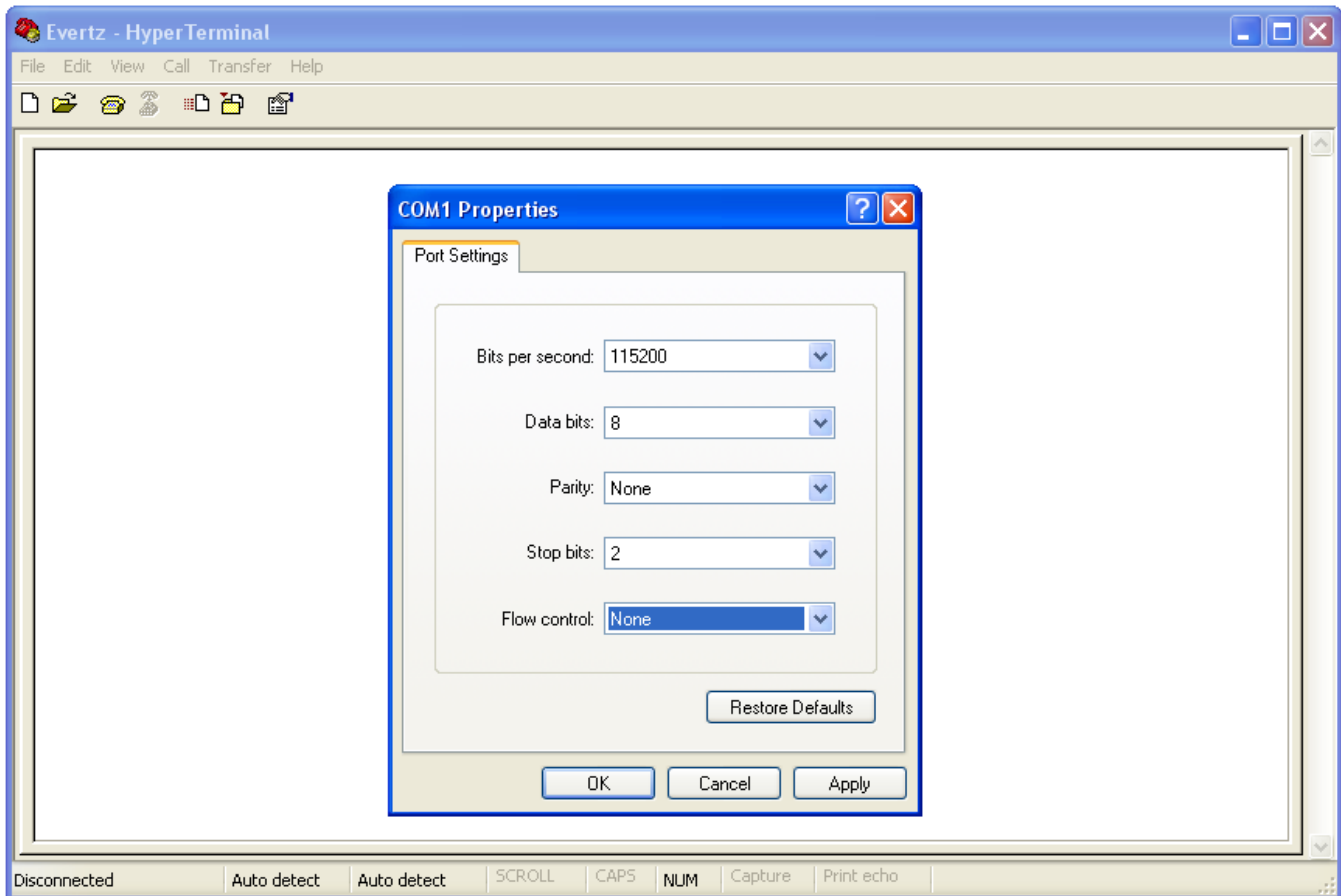
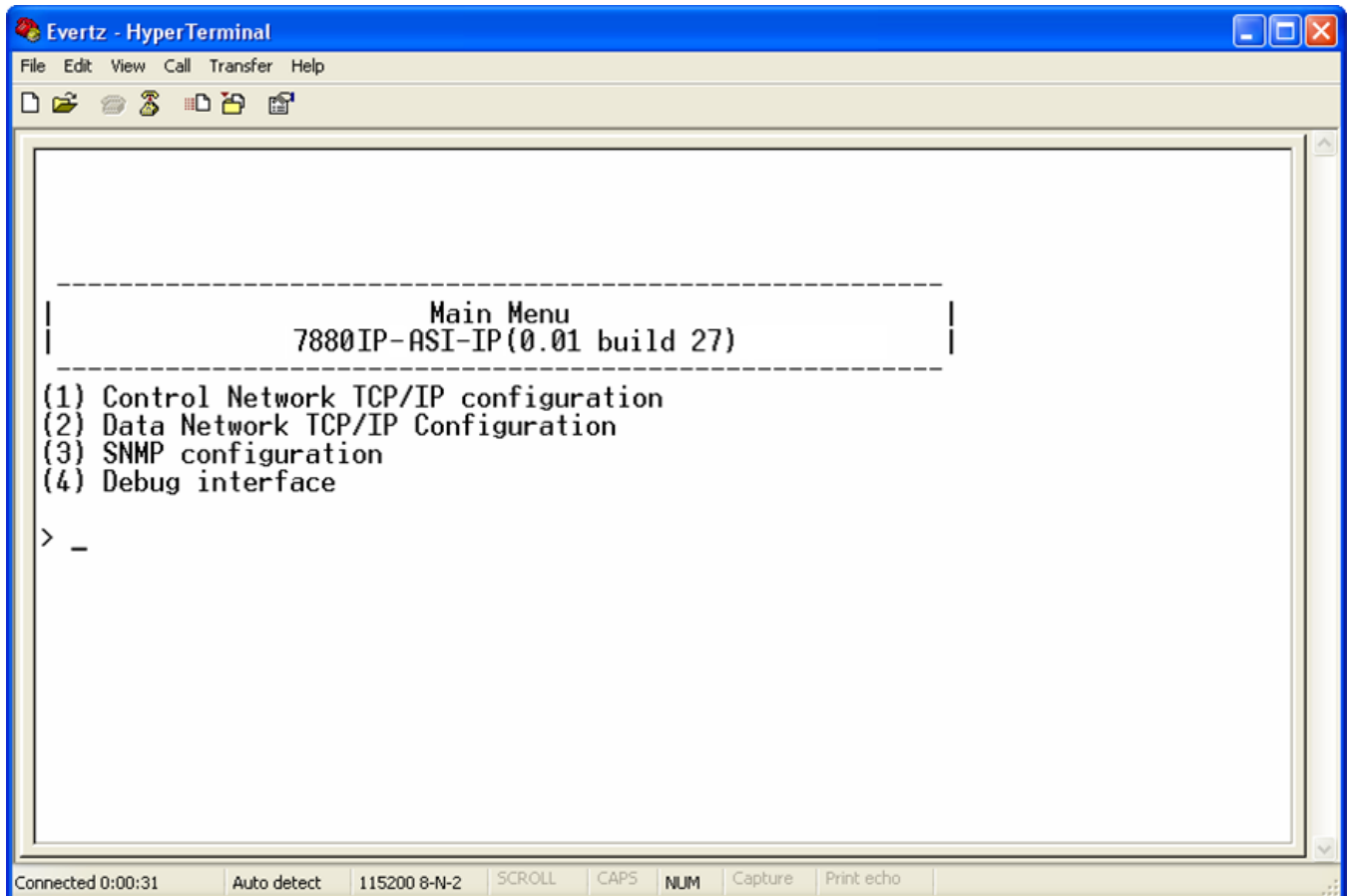


Figure 2-4: COM Port Properties Window

Connect the 9-pin d-type end of the serial cable to the serial port of your computer. Open a Terminal session and configure the port for the following configuration:

Bits per second	<b>115200</b>
Data Bits	<b>8</b>
Parity	<b>None</b>
Stop Bits	<b>2</b>
Flow Control	<b>None</b>

Click *OK* to apply these settings and press the *enter* button on your keyboard. The card Main Menu should appear as shown in Figure 2-5:



**Figure 2-5: 7880IP-ASI-IP HyperTerminal Main Menu**

### **(1) Control Network Configuration**

This sub-menu enables the user to configure the control network settings. The Configuring this sub-menu allows the user to access the card through the VLPro Client interface.

### **(2) Data Network Configuration**

This sub-menu enables the user to configure the data port network settings. This setup can alternatively be completed from VLPro once the control network settings have been established.

### **(3) SNMP Configuration**

This sub-menu enables the user to configure the Simple Network Management Protocol settings. In this menu you can set or remove the SNMP trap IP address and the SNMP Read and Set community strings.

### **(4) Debug Interface**

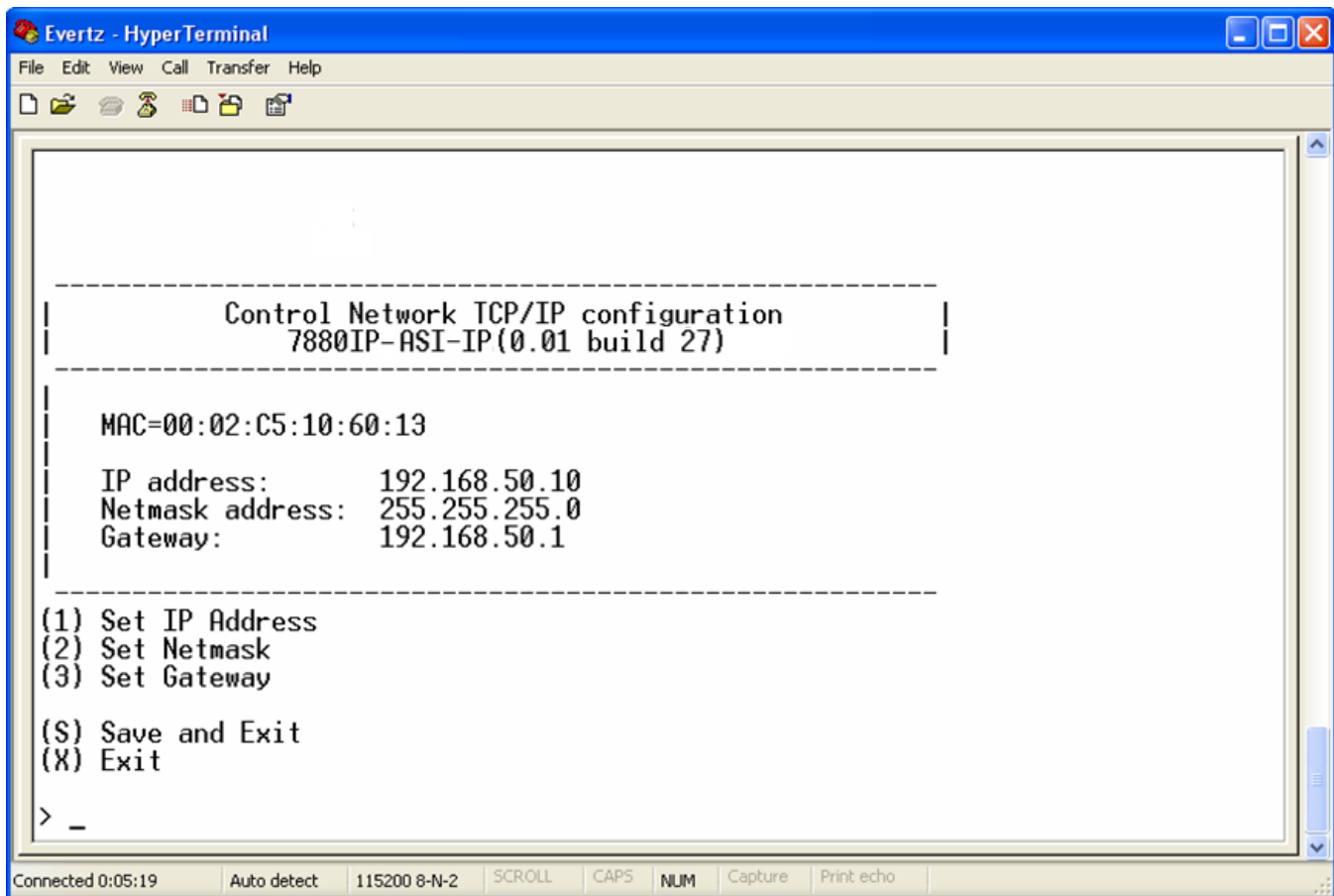
This menu is for Evertz personnel only. You may be requested to access and execute options within this menu when seeking technical support from Evertz. Guidance will be given should this be required.

Before it is possible to configure the card via VLPro it is first necessary to configure the initial basic network settings via the serial cable. Refer to section 2.3.

### 2.3. CONFIGURING THE BASIC NETWORK SETTINGS

From the terminal session window select option (1) *Control Network Configuration*, the Control Network Configuration menu will be displayed as shown in Figure 2-6.

1. Select option (1) *Set IP Address* and configure the card IP address, ensuring that the IP address is not already in use on the network.
2. Select option (2) *Set Netmask* and configure the correct subnet mask for your network.
3. If required also configure option (3) *Set Gateway*.
4. Exit the *Network Configuration* menu using (s) *Save and Exit*, NOT (x) *Exit*.



```
Evertz - HyperTerminal
File Edit View Call Transfer Help
Control Network TCP/IP configuration
7880IP-ASI-IP(0.01 build 27)
MAC=00:02:C5:10:60:13
IP address:      192.168.50.10
Netmask address: 255.255.255.0
Gateway:        192.168.50.1
(1) Set IP Address
(2) Set Netmask
(3) Set Gateway
(S) Save and Exit
(X) Exit
> _
```

Figure 2-6: 7880IP-ASI-IP Network Configuration Sub-Menu

You have now completed the necessary minimum configuration and can connect the cables to the rear card when ready.



**Note:** It is recommended that the Data Port traffic is on a subnet/VLAN that is isolated from the Control network.

## 2.4. CONNECTING TO VLPRO

This chapter assumes that the VLPro server and VLPro client are already configured for your network and you have basic knowledge of the VLPro interface. It also assumes that the user or network administrator has already added the appropriate jar file to the server, and both the client and server applications have been restarted. Please refer to the VistaLINK<sup>®</sup> manual for instruction on how to load a jar file. If you are the network administrator refer to section 5.1 for information on updating the VLPro Server Jar File.

Open VLPro and click on the refresh tree icon. Expand the hardware tree by clicking on the “+” button. Your card should appear as a newly listed device with the IP address used to configure the card in Step 1 above. It may take up to a minute to appear while the card and switch negotiate network settings (this can be verified directly on the switch if necessary). Please note that the 7880IP-ASI-IP will identify two items under the IP address in the navigation tree: **IpToAsi** and **InputToIp**. The user will be required to individually select each item to configure the appropriate function.



**It is important to note that the 7880IP-ASI-IP is designed to perform 1 translation at a time. ASI-IP, IP-ASI and IP-IP can all be preformed but not simultaneously. Proper settings on the card must be placed to ensure 1 translation is occurring at a time**

As shown in Figure 2-7, the card will list two inputs (numbered one and two).

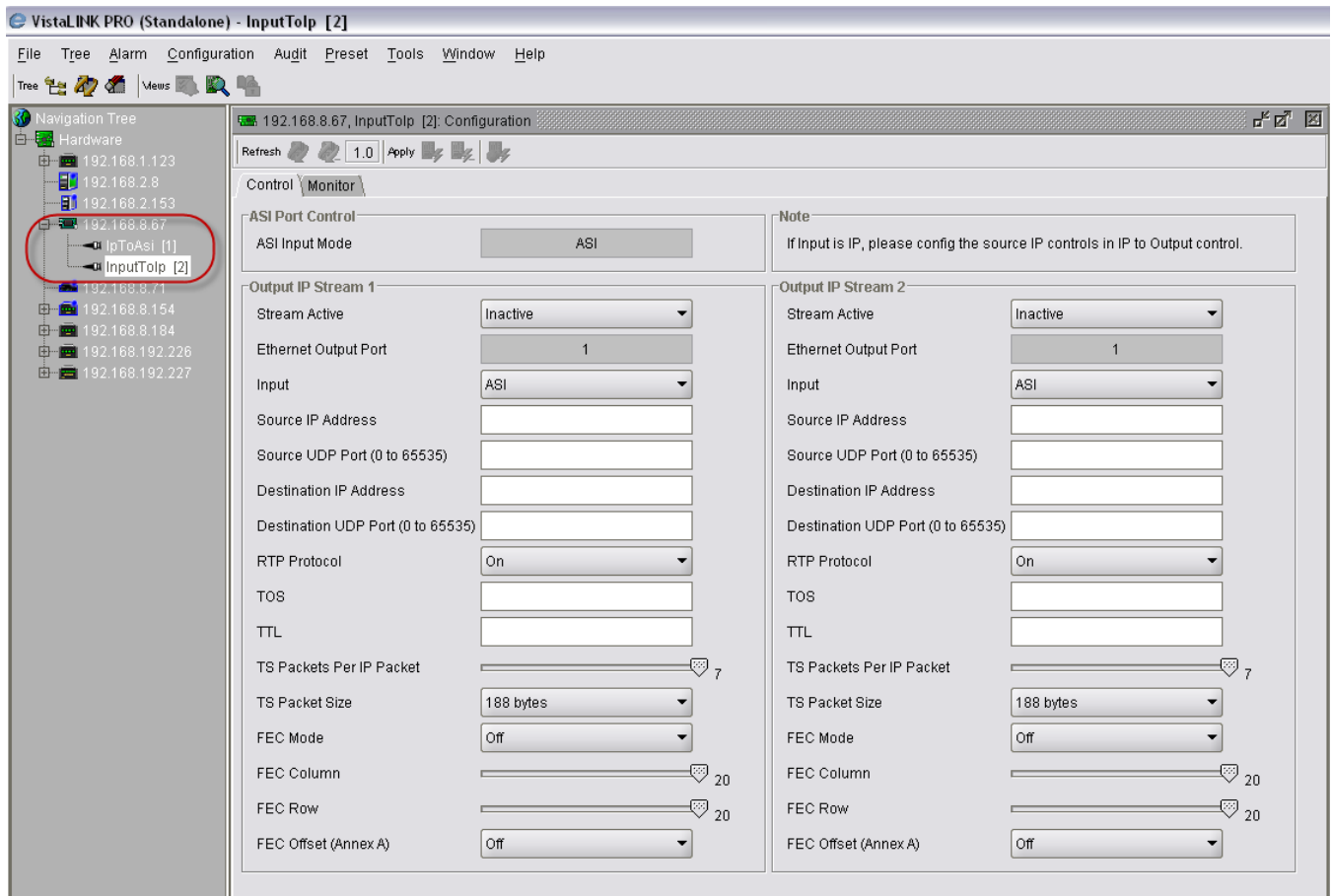


Figure 2-7: 7880IP-ASI-IP VistaLINK<sup>®</sup> PRO Hardware Tree Configuration



**Note:** If after a couple of minutes the card has still not appeared, try selecting *Add Agent* from the *Tree> Add/Update Agent* menu. Enter the IP address used in the configuration stage earlier and select OK. The card should now be listed and will remain greyed out for a moment while VLPro finds the card and confirms its configuration.

Please consult your network administrator if you continue to have problems connecting the card with VLPro, alternatively contact Evertz Microsystems Ltd. or your authorized reseller for technical support.

### 3. SPECIFICATIONS

#### 3.1. TECHNICAL DESCRIPTION

##### 3.1.1. Inputs and Outputs

- 1xASI input per DVB TR 101 891 270Mb/s
- 1xASI output per DVB TR 101 891 270Mb/s
- Min ASI TS input bitrate 100kb/s
- Max ASI TS input bitrate 200Mb/s
- 2xRJ45 10/100/1000 GigE I/O for MPEG over IP
- 1xRJ45 10/100 control port

##### 3.1.2. Encapsulation Parameters

- IP encapsulation for each ASI input:
  - MAC 802.3>IPV4>RTP>UDP>MPEG (RTP can be turned on and off)
  - Select 1 to 7 MPEG packets per IP frame
- Optional FEC encoding (Pro MPEG forum code of practice #3- release 2<cop3>) with L&D following the below mentioned range:
  - $L \cdot D \leq 100$
  - $1 \leq L \leq 20$
  - $4 \leq D \leq 20$
- IP address (IP, Subnet mask, Gateway) for the source
- IP address for the destination (Unicast and Multicast)
- Selection of the source port and destination port
- Set Local MAC address of the equipment

##### 3.1.3. De-Encapsulation Parameters

- Join Multicast by providing correct messaging using IGMP V2/V3 (SSM Support)
- Selection of the UDP Ports

##### 3.1.4. Monitored Parameters

- Total Bitrate
- Null Packet Bitrate
- TS\_sync\_loss
- Continuity count error
- PID List

##### 3.1.5. Physical (number of slots)

350FR: 1  
7700FR-C: 1  
7800FR: 1

## 4. CARD CONFIGURATION

Right click the IP address and sub-modules of the 7880IP-ASI-IP to access and configure their parameters. Select “View Configuration” from one of the modules available (Main, IpToAsi and InputToIp). The configuration page will open enabling the user to toggle the configuration tabs in order to configure the parameters of the 7880IP-ASI-IP. Sections 4.1 to 4.3 provide an explanation of the features and functions of the 7880IP-ASI-IP card.

### 4.1. CONTROL TAB

The control tab is divided into three sub-sections, which include: **ASI Port Control**, **Output IP Stream 1** and **Output IP Stream 2**.

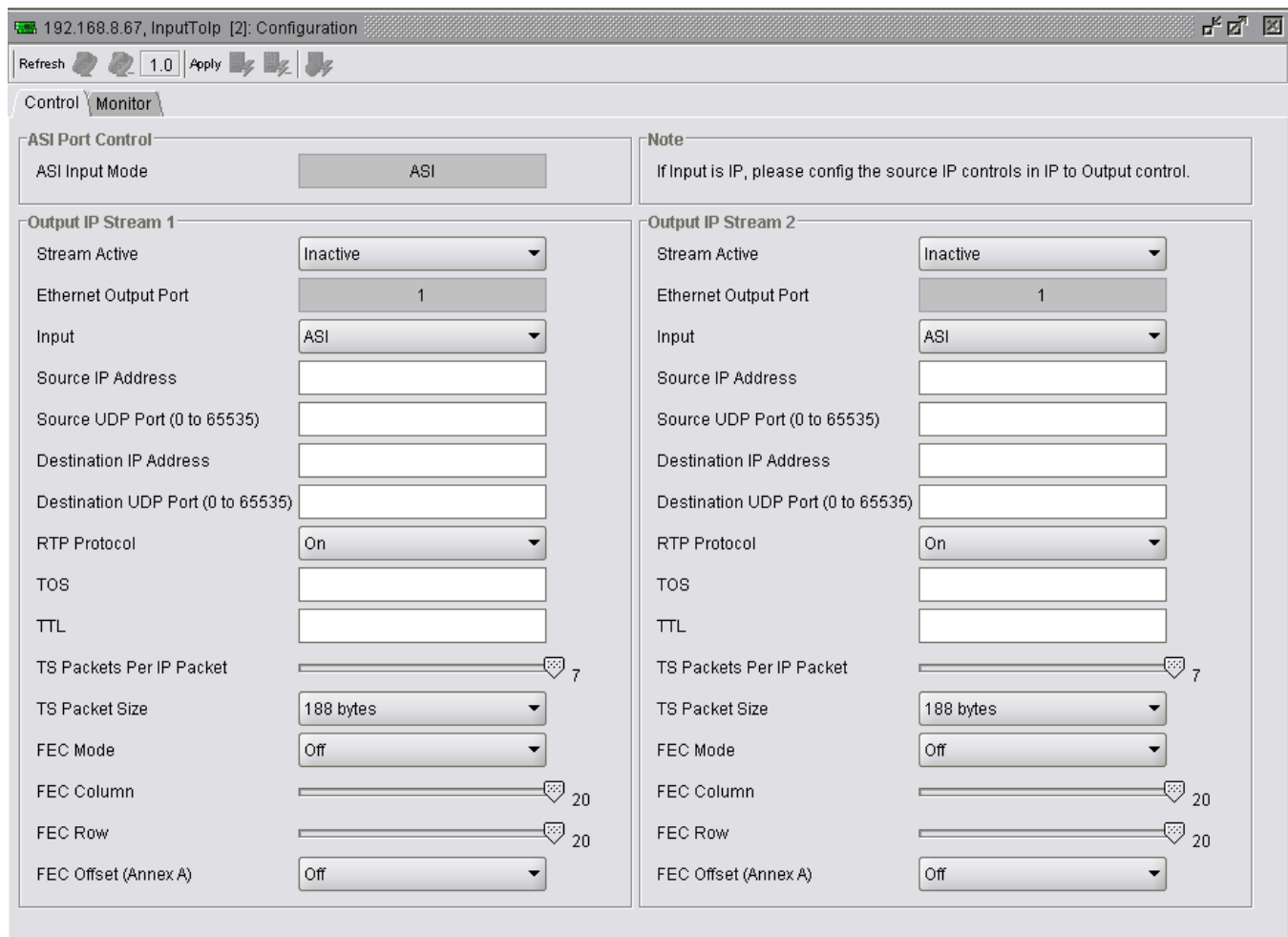


Figure 4-1: InputToIP Control Tab

#### 4.1.1. ASI Port Control Section

The ASI Port Control allows the user to enable or disable the physical ASI input on the card.



#### 4.1.2. Output IP Stream 1 & 2 Sections

Please note that the controls for Output IP Stream 1 and 2 are identical, therefore for the sake of simplicity only Output IP Stream 1 will be discussed in this manual.

- **Stream Active:** This option allows the user to quickly enable or disable the outgoing Ethernet stream by selecting either *Active* or *Inactive*.
- **Ethernet Output Port:** This field shows which physical data port is being used for streaming data.
- **Input:** This field allows the user to select the source of the stream. The user will select either ASI or IP.
- **Sources IP Address:** This field enables the user to enter the source IP address. This address can be the physical IP address of your data port, or any other address that you may want to be encapsulated within the IP packets.
- **Sources UDP Port (0 to 65535):** This field enables the user to enter the source port number for the IP address entered above.
- **Destination IP Address:** This field enables the user to enter the unicast or a multicast IP address. Multicast addresses should be in the range of 224.0.0.0 through 239.255.255.255.
- **Destination UDP Port (0 to 65535):** This field enables the user to enter the destination port number for the IP address entered above.
- **RTP Protocol:** Use this drop down box to enable (*On*) or disable (*Off*) the use of the RTP. The use of RTP is recommended as it provides services such as time stamping, sequence numbering and delivery monitoring, which can be beneficial for real-time delivery systems. Also this protocol must be enabled if the user wishes to use the FEC (Forward Error Correction) mode.
- **TOS:** This field enables the user to enter the ToS (Type of Service) value, if your network does not support ToS, use zero as default.
- **TTL:** This field enables the user to enter the TTL (Time to Live) value. Using the multicast IP protocol, the TTL value indicates the scope or range in which a packet may be forwarded. By convention:

- 0 is restricted to the same host
- 1 is restricted to the same subnet
- 32 is restricted to the same site
- 64 is restricted to the same region
- 128 is restricted to the same continent
- 255 is unrestricted

- **TS Packet Per Frame:** This field enables the user to enter the number of MPEG packets to be encapsulated per IP packet. The range of MPEG packets per IP packet is from 1 to 7. Long-length packets are undesirable due to the excessive impact from losing each IP packet. Short packets cause a high overhead so a value chosen will be a compromise between these two factors.
- **TS Packets Size:** This field enables the user to select the size of the TS packet. The size options include *Auto*, *204 bytes* or *188 bytes*.
- **FEC (Forward Error Correction) Mode:** This field enables the user to enter the FEC mode to be used. It will be either FEC 1D (1 Dimensional) or FEC 2D (2 Dimensional).
- **FEC Column:** This field enables the user to enter the number of packets per column to be associated with an FEC packet.
- **FEC Row:** This field enables the user to enter the number of packets per row to be associated with an FEC packet.
- **FEC Offset (Annex A):** Use this drop down menu to enable the use of a non-block aligned FEC arrangement, which is an alternative method of generating the FEC packets. For more information on the FEC offset refer to the Pro-MPEG Code of Practice #3 release 2, Annex A.

#### 4.2. MONITOR TAB

The Monitor page displays the status of the Ethernet Data ports and the ASI input ports. The **Output IP Stream Monitor** section displays the port's mode of operation in the **Status** field and the **Total Bit rate** that is being output.

The **ASI Input Monitor** section displays the status of the ASI inputs. The status will not change unless a valid ASI feed is detected (you may be required to refresh the status or select auto-refresh to view the change). Using the *auto refresh* button can aid troubleshooting of connectivity issues, however, it will prevent any configuration changes. The ASI monitoring fields can be reset at any time by clicking on the "**Clear ASI 1 Stats**" button.

There are no user configurable items on this page. This page is for information purposes only.

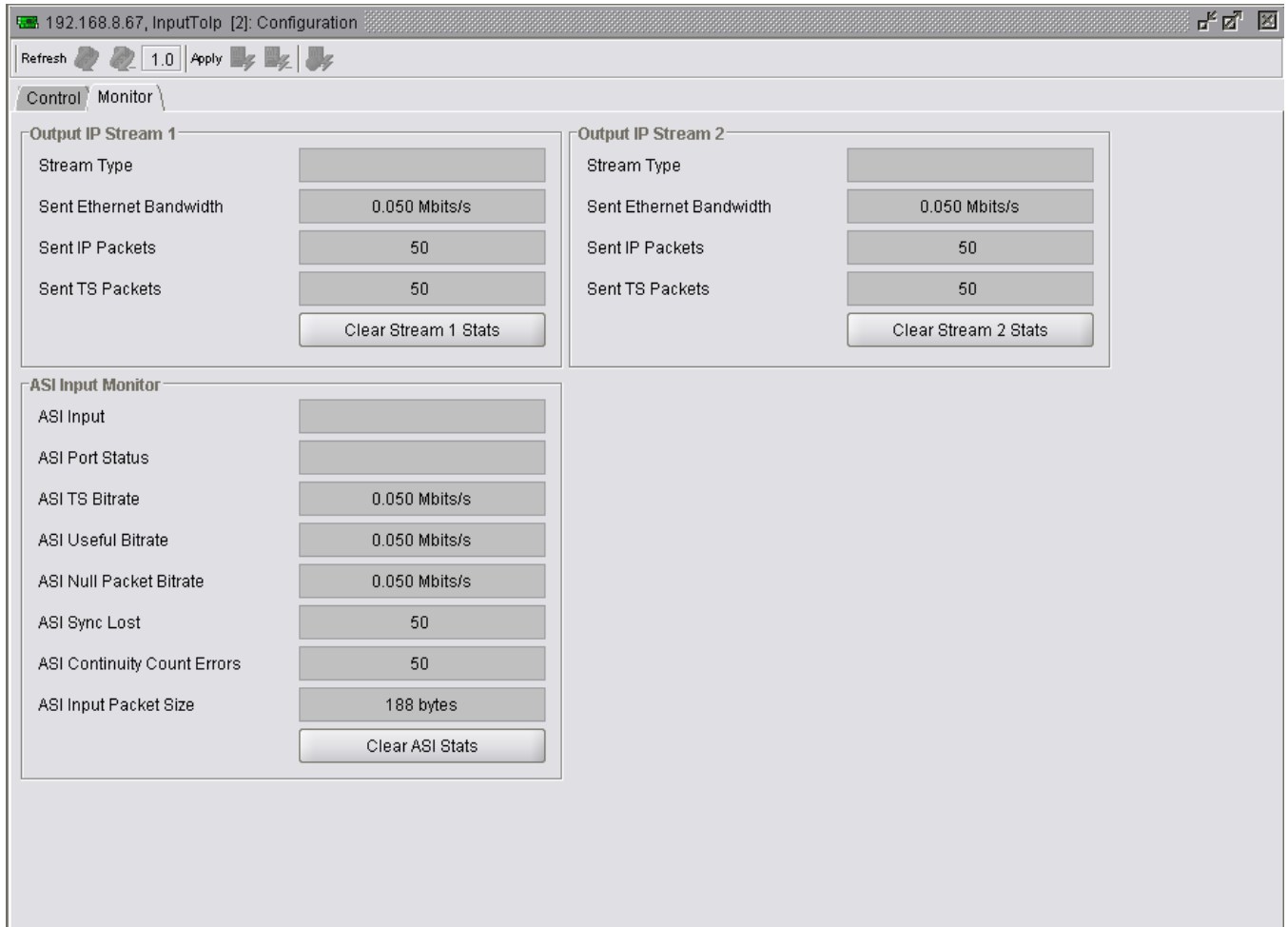


Figure 4-2: InputToIP Monitor Tab

#### 4.2.1. Output IP Stream 1 & 2 Sections

Please note that the field for Output IP Stream 1 and 2 are identical, therefore for the sake of simplicity only Output IP Stream 1 will be discussed in this manual.

- **Stream Type:** Depending on the destination IP addresses the **Stream Type** will be a **Multicast** or **Unicast**
- **Sent Ethernet Bandwidth:** This field identifies the current bitrate of the Output IP Stream 1.
- **Sent IP Packets:** This field identifies the current total number of IP Packets sent.
- **Sent TS Packets:** This field identifies the current total number of TS Packets sent.
- **Clear Stream Stats:** The network statistic can be reset at any time by selecting the “**Clear Stream Stats**” button. To apply the new setting, click the *Apply* button and the statistics will be reset and begin counting from zero again.

#### 4.2.2. ASI Input Monitor Section

- **ASI Input:** This field displays the standard of the ASI signal.
- **ASI Port Status:** This field displays whether the status of the ASI signal is *Active* or *Inactive*.
- **ASI TS Bitrate:** This field displays the overall bit rate of the incoming ASI signal.
- **ASI Useful Bitrate:** This field displays the payload total bit rate.
- **ASI Null Packet Bitrate:** This field displays the null packets bit rate
- **ASI Sync Lost:** This counter increments every time the sync bite is not detected. The actual synchronization of the TS depends on the number of correct sync bytes necessary for the device to synchronize; two or more consecutive corrupted sync bytes indicate sync loss.
- **ASI Continuity Count Errors:** A continuity counter error is indicated if the value of the continuity counter field within a payload packet is not incremented by one, and the packet is not a valid duplicate or discontinuity packet.
- **ASI Input Packet Size:** This field displays the input packet size: MPEG2 TS Packet 188/204 byte
- **Clear ASI Stats:** The ASI monitoring fields can be reset at any time by selecting the “**Clear ASI Stats**” button. To apply the new setting, click the *Apply* button and the statistics will be reset and begin counting from zero again.

### 4.3. IP TO OUTPUT TAB

The **IP to Output** tab enables to configure and view the parameters of the IP inputs and ASI Outputs. This tab controls the IP input to be used for ASI output or IP retransmission.

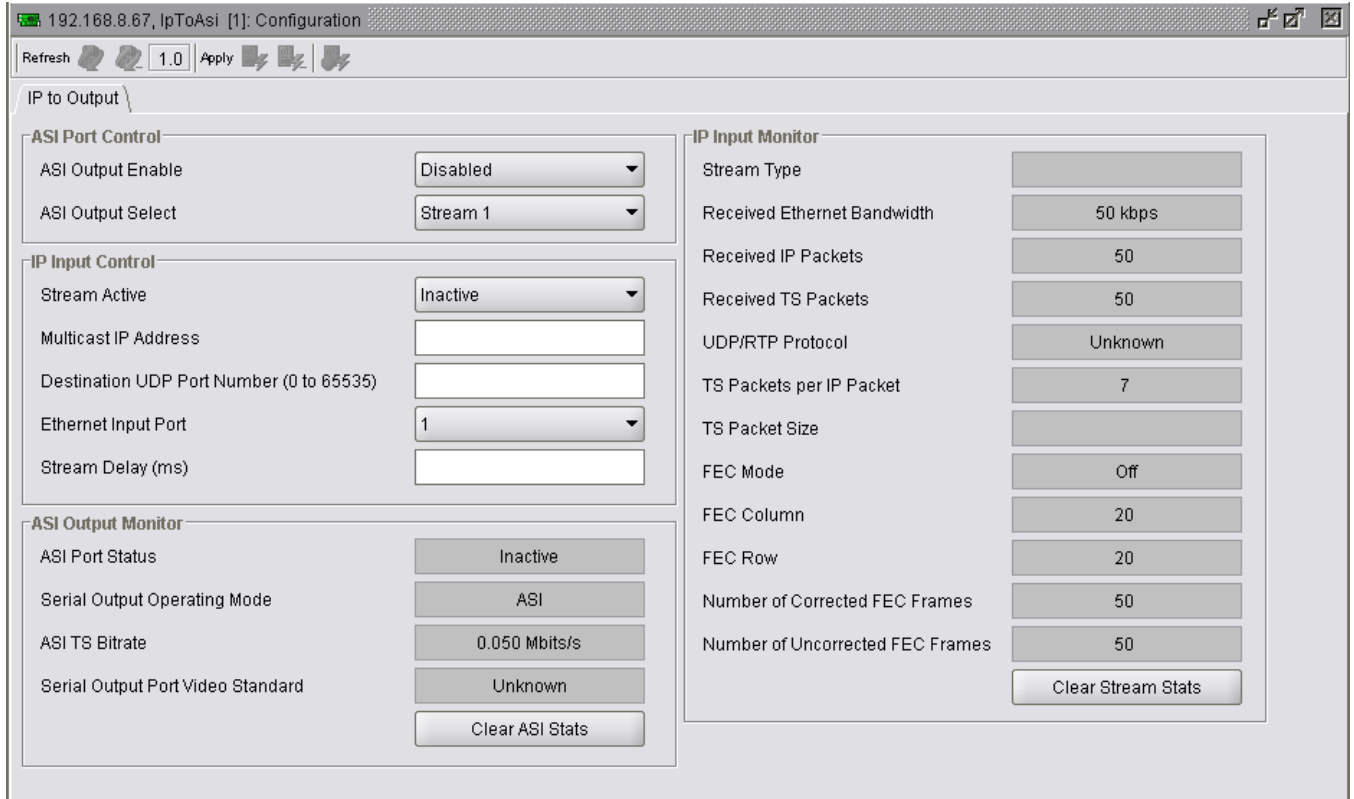


Figure 4-3: IP to Output Tab

#### 4.3.1. ASI Port Control

- **ASI Output Enable:** This control enables the user to enable or disable ASI Output.
- **ASI Output Select:** This control enables the user to select the source of the ASI Output. (Currently 1 Stream source)

#### 4.3.2. IP Input Control Section

- **Stream Active:** Use this drop box to disable or enable the incoming IP stream
- **Multicast IP address (0.0.0.0 for Unicast):** Enter the destination IP address (This will be the multicast address you want the 7880IP-ASI-IP to capture). Ensure that you enter the correct IP address. A multicast address should be in the range of 224.0.0.0 through 239.255.255.255.
- **Destination UDP Port Number (0 to 65535):** This field enables the user to enter the destination port number for the IP address entered above.
- **Ethernet Input Port:** Use this drop box to specify which physical data port is to be used to capture the IP stream.

- **Stream Delay (ms):** This field enables the user to set the size of the stream delay. A larger stream delay value will correspond to a larger buffer size. The total delay through the card is equal to the decapsulation processing time, plus FEC processing time, plus the stream delay time. The recommended stream delay value is 60 ms.

#### 4.3.3. ASI Output Monitor

- **ASI Port Status:** This field displays the status of the ASI signal whether it is *Active* or *Inactive*.
- **Serial Output Operating Mode:** This field displays the operating mode of the serial output. It will display ASI or IP.
- **ASI TS Bitrate:** This field displays the overall bit rate of the incoming ASI signal.
- **Serial Output Port Video Standard:** This field displays the video standard of the serial output port.
- **Clear ASI Stats:** The ASI monitoring fields can be reset at any time by selecting the “**Clear ASI Stats**” button. To apply the new setting, click the *Apply* button and the statistics will be reset and begin counting from zero again.

#### 4.3.4. IP Input Monitor

- **Stream Type:** This field will display whether the card is set to unicast or multicast.
- **Received Ethernet Bandwidth:** This field will display the current bitrate of the input IP stream
- **Received IP Packets:** This field will display the current total number of received IP packets.
- **Received TS Packets:** This field will display the current total number of received TS packets.
- **UDP/RTP Protocol:** This field will display the protocol setting depending on the incoming packets. The options will be either UDP or RTP.
- **TS Packet Per IP Packet:** This field will display the number of TS packets within each IP packet.
- **TS Packet Size:** This field will display the TS packet size. The values will be either 188 bytes or 204 bytes.
- **FEC Mode:** This field will display the FEC mode. The FEC packet mode will display either Off, FEC 2D or FEC 1D.
- **FEC Column:** This field displays the number of packets per column to be associated with an FEC packet.
- **FEC Row:** This field displays the number of packets per row to be associated with an FEC packet.
- **Number of Corrected FEC Frames:** This field will display the number of corrected frames by FEC.
- **Number of Uncorrected FEC Frames:** This field will display the number of uncorrected frames by FEC.

- **Clear Stream Stats:** The network statistic can be reset at any time by selecting the “**Clear Stream Stats**” button. To apply the new setting, click the *Apply* button and the statistics will be reset and begin counting from zero again.

## 5. TROUBLESHOOTING

### 5.1. UPDATING VLPRO SERVER JAR FILE

Evertz products are constantly evolving and new features are often added. It is therefore important to update the JAR files in use to provide access to all the latest features or enhancements. It will also be necessary to add JAR files for new products. If your new product has not appeared even after waiting a few minutes for the Ethernet switch negotiation to complete, then it is possible that your JAR file may be old or missing.

To perform a JAR update, ensure that all VLPro clients are closed (those clients which are not closed will automatically be disconnected as soon as the VLPro Server is restarted). Maximize the VLPro Server window from the Windows task bar, select *Help > Apply Update > Product* from the menu.

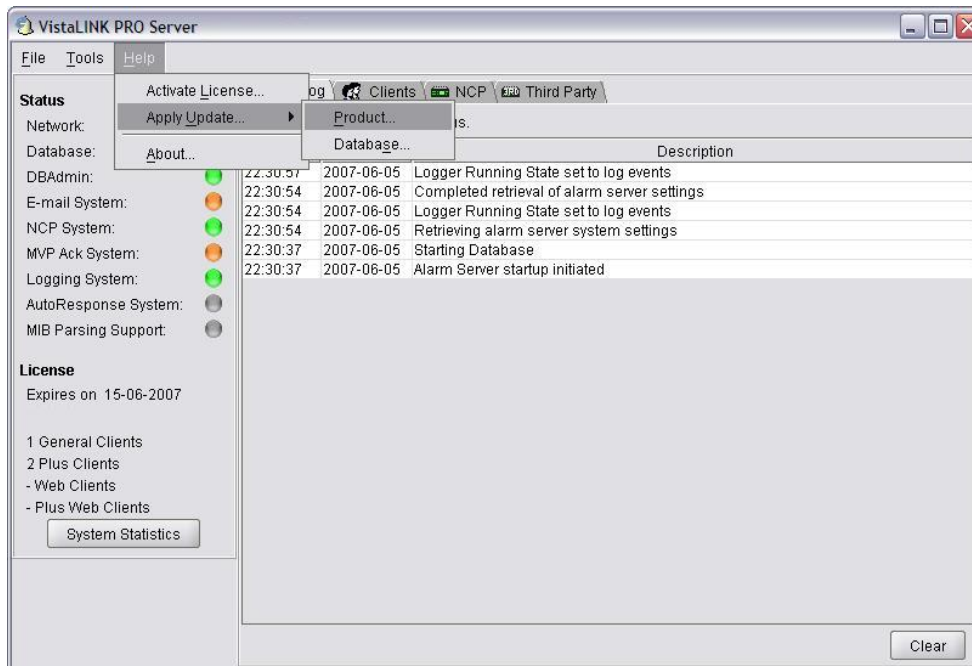
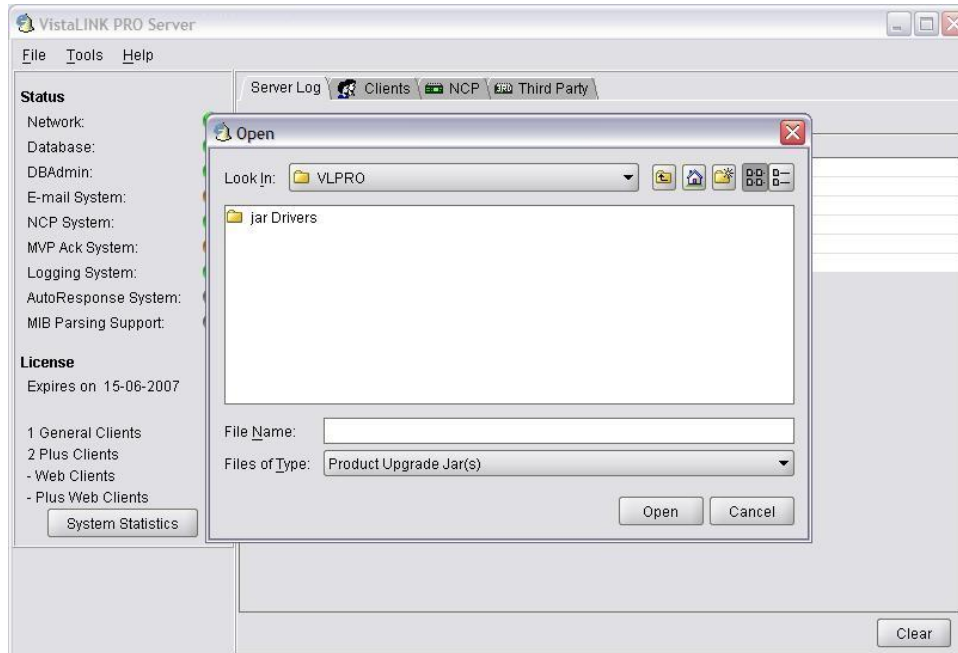


Figure 5-1: VistaLINK® PRO Server

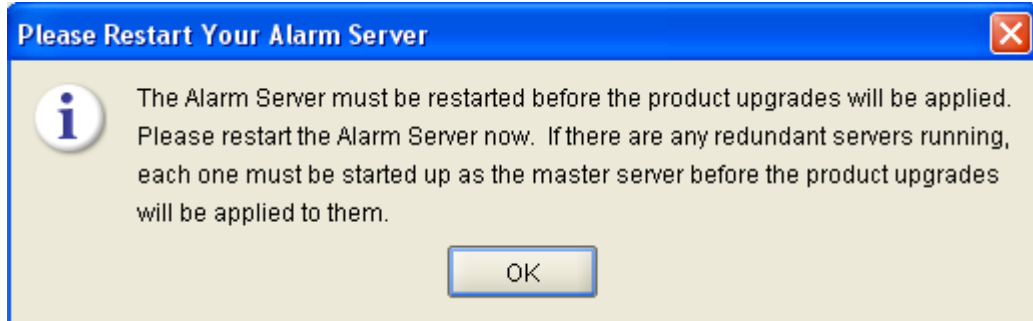
A window will appear, as shown in Figure 5-2, navigate to the location of the new JAR file and double click to select the file. The window will automatically close and the update will be applied in the background.





**Figure 5-2: VistaLINK® PRO – Applying JAR Updates**

You will be prompted to restart the server to enable the change to take effect. Apply as many JAR updates as required before restarting the server.



**NOTE:** You may confirm that all updates have been successfully applied by selecting from the menu *Tools>View>Show/Hide Product update log*.

From the menu, shutdown the server by selecting *File>Shutdown Server*. Now re-open the server, it is normal for the start-up to take marginally longer while each individual update is being applied. Once complete, you may restart the VLPro Clients. As the Client restarts you will experience a short delay while the update is applied. A prompt will appear confirming that the updates have been applied.

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