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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Updated figures and network setting information	Jun 08

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1. OVERVIEW

1.1. 7780SDIB2-IP2 OVERVIEW

The 7780SDIB2-IP2 is a complete hardware based solution to carry 2 ASI or SDI Bi-directionally over IP. As more providers are trying to deliver contribution and distribution quality video over IP networks, the 7780SDIB2-IP2 is capable of bridging traditional compressed world (ASI) or uncompressed (SDI) with the standard IP networks.

Controlled by the industry leading VistaLINK® Pro, the 7780SDIB2-IP2 offers signal providers the capability to encapsulate two MPEG-2 transport stream payload or two SDI to a unicast or multicast standardized IP stream. The 7780SDIB2-IP2 is also capable of receiving two IP streams and re-creating ASI streams. For contribution application, the 7780SDIB2-IP2 offers industry standard FEC support to allow data recovery on the de-encapsulation side.

The 7780SDIB2-IP2 occupies two card slots and can be housed in a 1RU frame which will hold up to three modules, a 3RU frame which will hold up to 7 modules or a standalone enclosure.

Key Features:

- Fully integrated with the Industry leading Evertz VistaLINK® PRO NMS system
- 2 SDI/ASI inputs, 2 SDI/ASI outputs and 2 IP outputs/inputs
- Bitrate measurement and basic error on both ASI inputs
- Passive loop through on SDI/ASI inputs
- IP output encapsulated over GigaE RJ-45 for up to 2 TS on ASI inputs
- Optional FEC encoding - Pro MPEG forum code of practice #3- release 2<cop3>

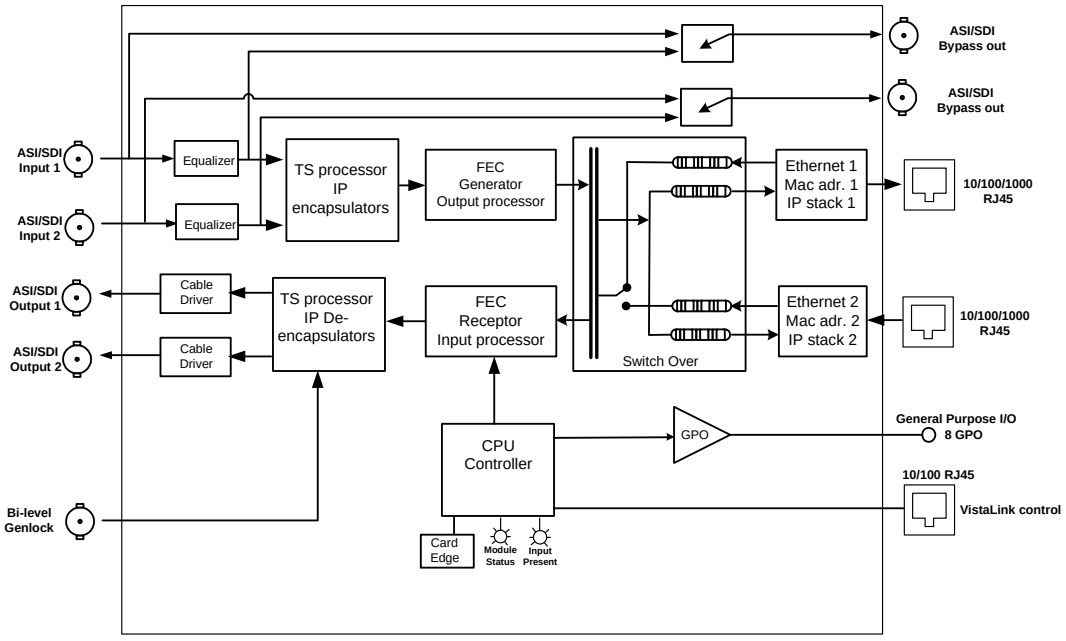

Figure 1-1: 7780SDIB2-IP2 Block Diagram

2. INSTALLATION

To successfully install the 7780SDIB2-IP2, 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

2.1. HARDWARE INSTALLATION

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.

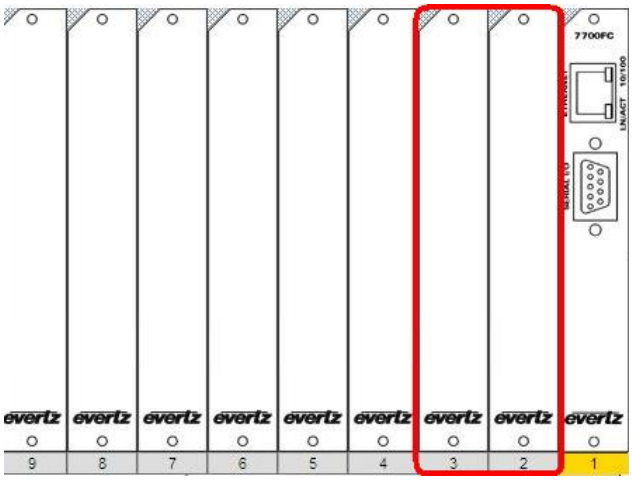

Figure 2-1: 7700 Chassis Rear Panel

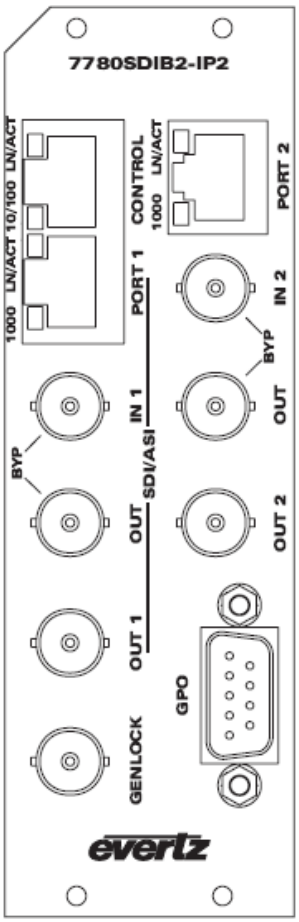

Figure 2-2: 7780SDIB2-IP2 Rear Plates

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 is 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).

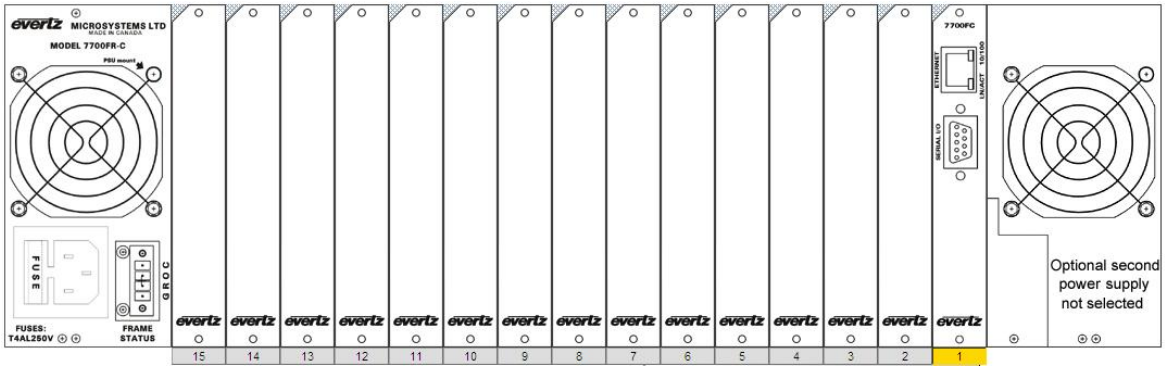

Figure 2-3: 7700 Frame Controller

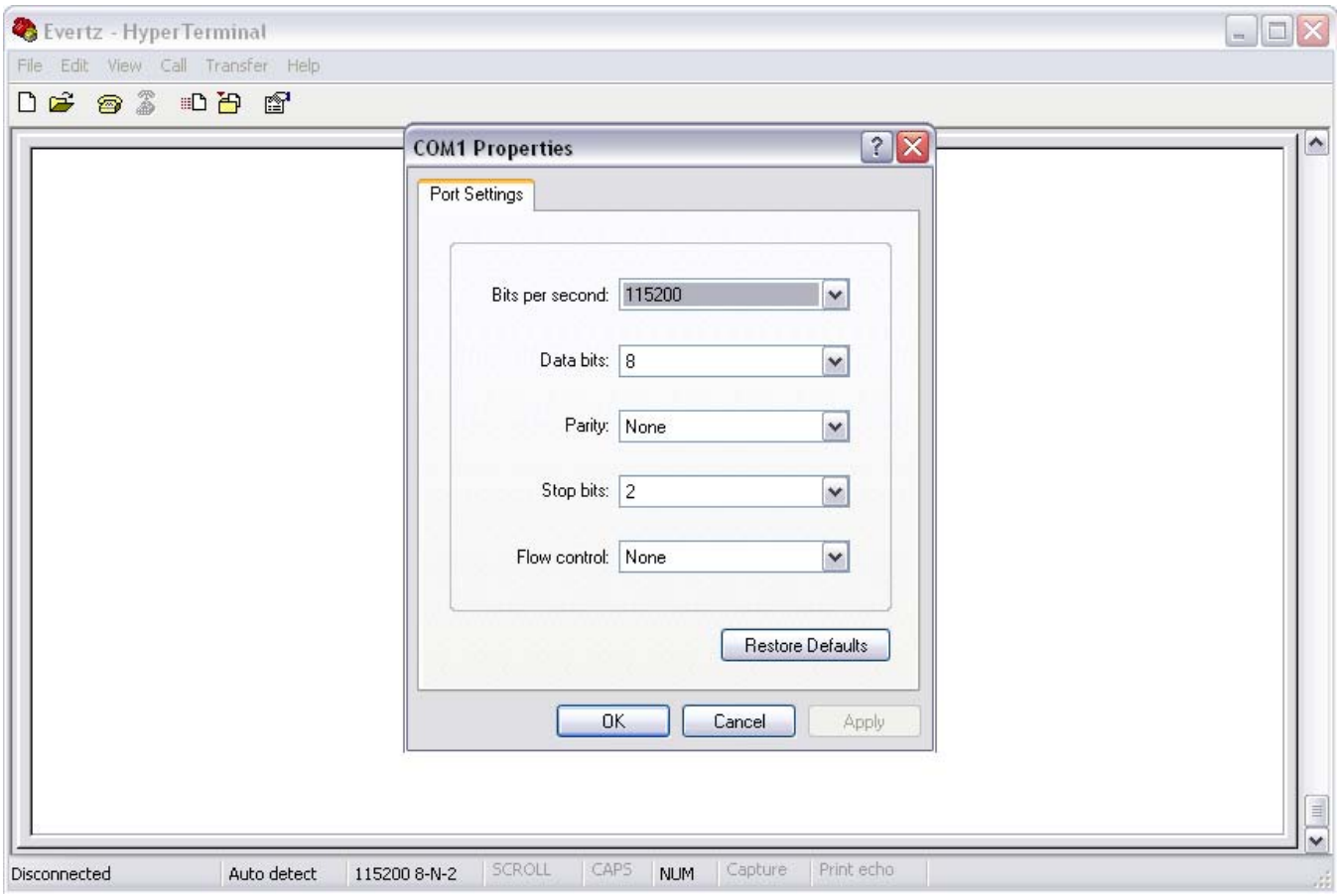

Figure 2-4: COM Port Properties Window

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	**115200**
Data Bits	**8**
Parity	**None**
Stop Bits	**2**
Flow Control	**None**

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:

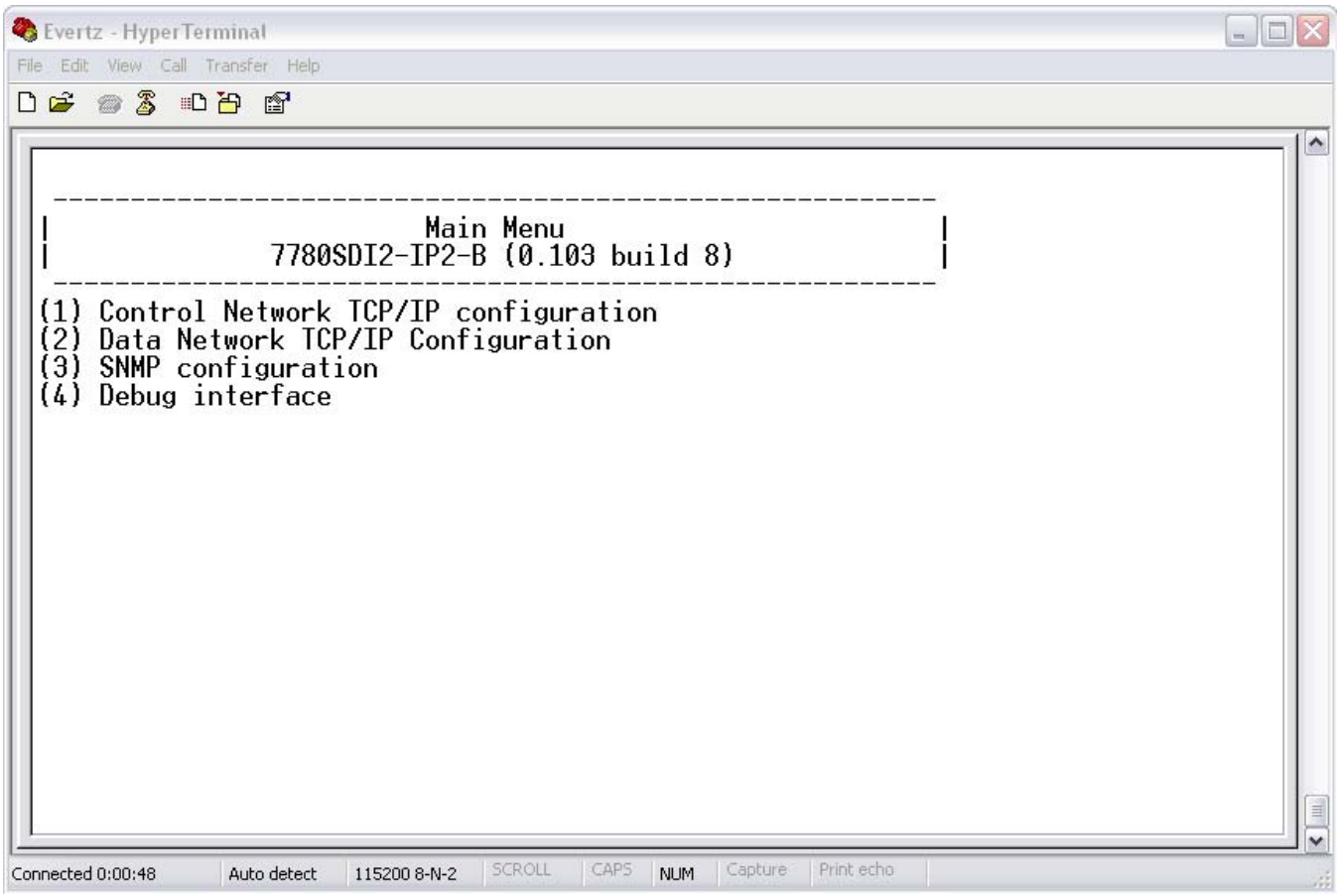

Figure 2-5: 7780SDIB2-IP2 HyperTerminal Main Menu

(1) Control Network Configuration
This sub-menu enables the user to configure the control network settings. 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 is it 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 2.2.

2.2. 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*.

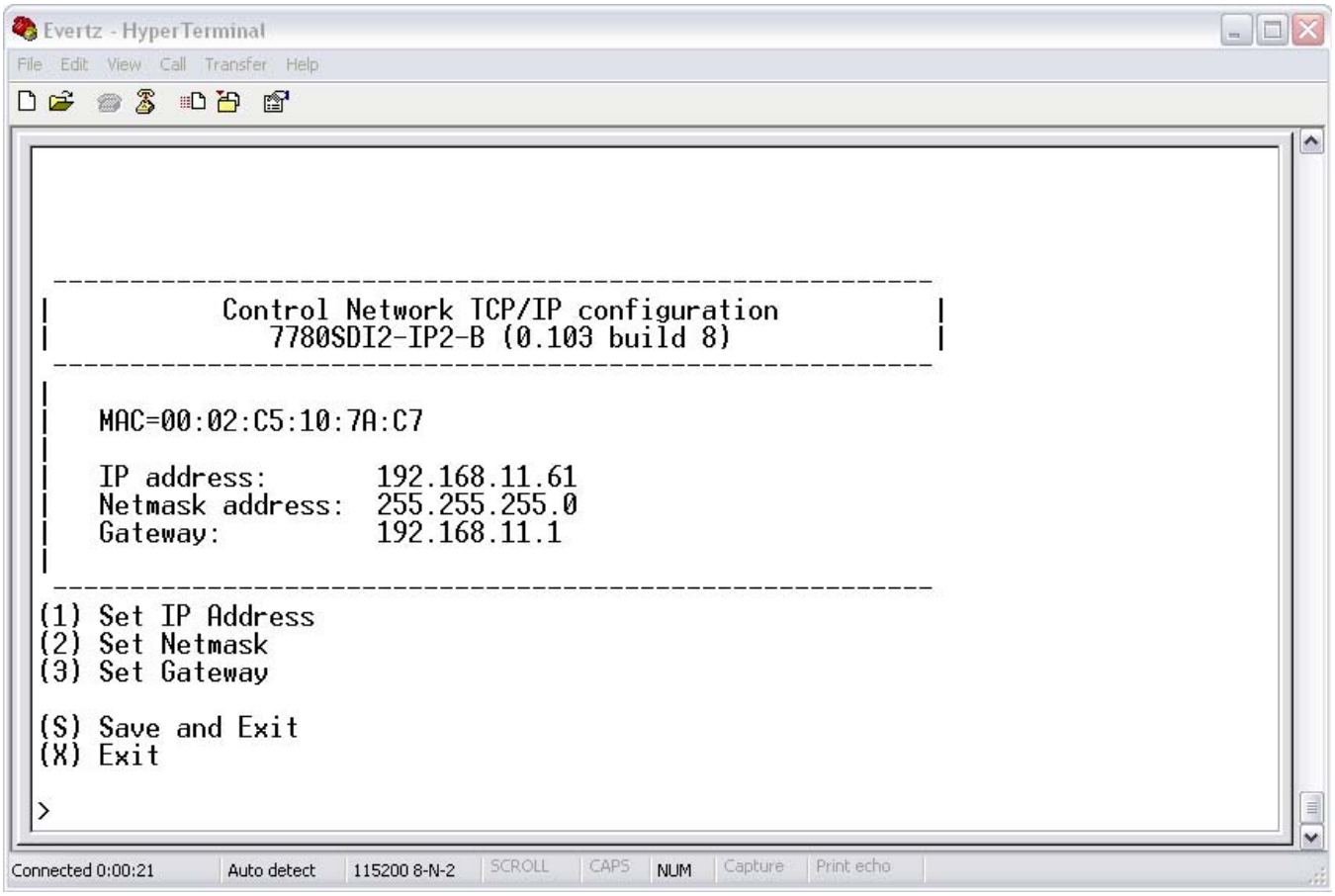

Figure 2-6: 7780SDIB2-IP2 Network Configuration Sub-Menu

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

2.3. 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 (VLProProd_7780SDI2IP2B.jar) to the server, and both the client and server applications have been restarted. Please refer to the VistaLINK® manual for instruction on how to load a jar file. If you are the network administrator refer to section 6.1 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).

As shown in Figure 2-8, the card will list two inputs (numbered one and two).

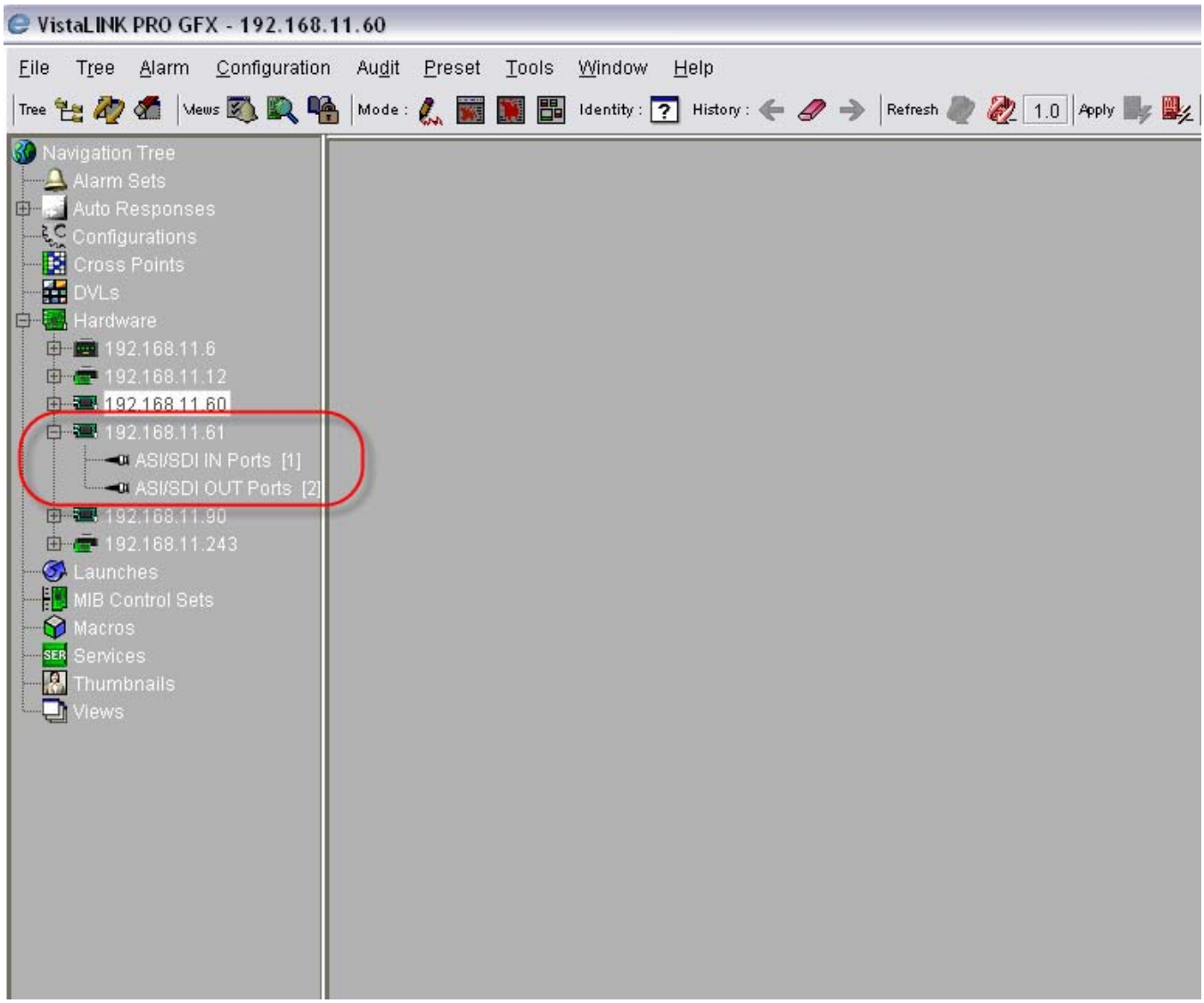

Figure 2-7: 7780SDIB2-IP2 VistaLINK® PRO Hardware Configuration

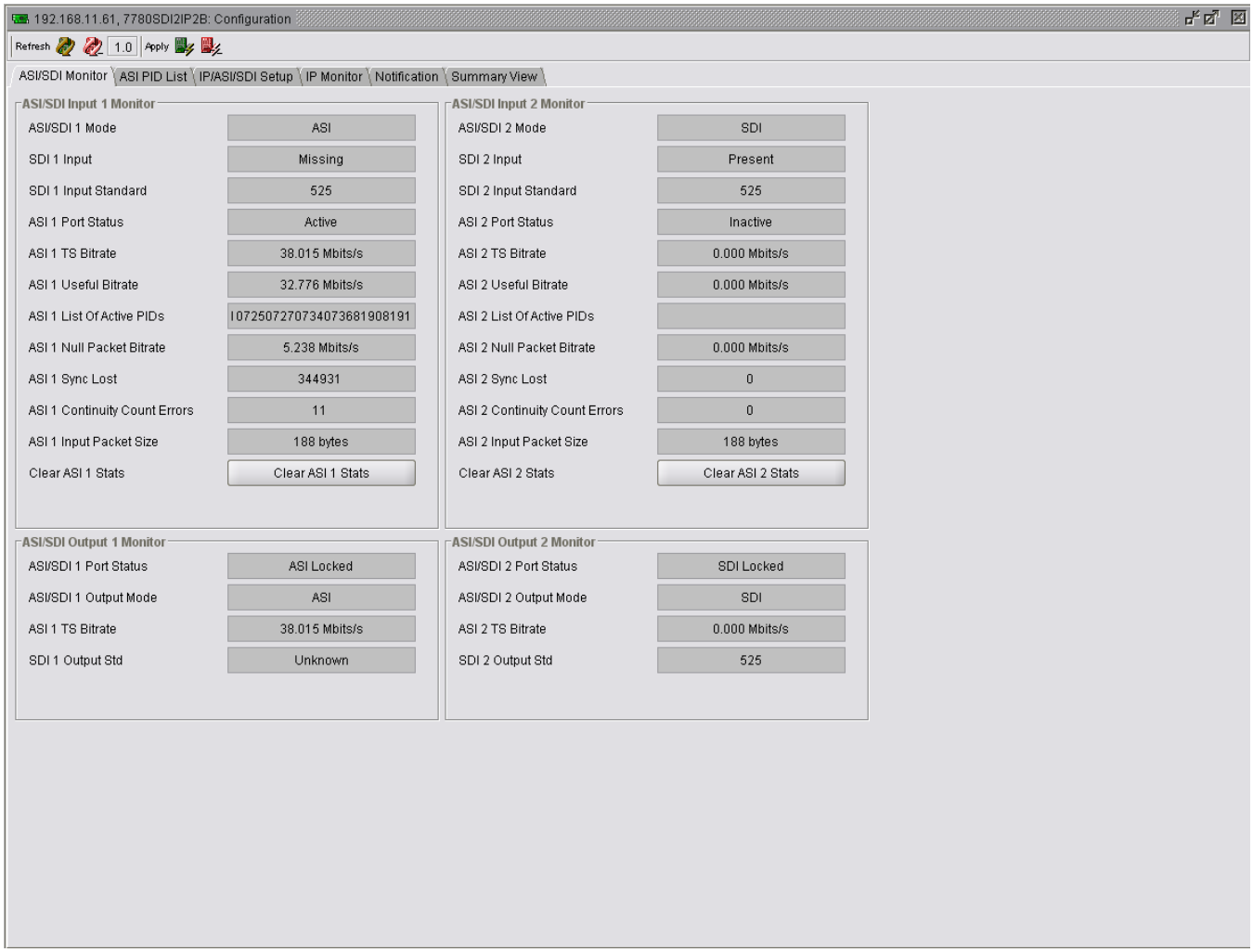

Figure 2-8: 7780SDIB2-IP2 VistaLINK® PRO Hardware Configuration

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. 7780SDIB2-IP2 TECHNICAL DESCRIPTION

3.1.1. Inputs and Outputs

- 2xASI input per DVB TR 101 891 270Mb/s
- 2xASI 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 GigaE output for MPEG over IP
- 1xRJ45 10/100 control port
- 1xDB25 Output relay (8 GPO)
- 1xGenlock Bi-level Input

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:
  $L*D \leq 100$
  $1 \leq L \leq 20$
  $4 \leq D \leq 20$
- 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

De-Encapsulation Parameters:

- Join Multicast by providing correct message using IGMP V2/V3
- Selection of the UDP Ports

3.1.3. Monitored Parameters

- Input Status
- Ethernet and ASI Port Status
- Ethernet and ASI TS Bitrate
- Useful Bitrate
- Null Packet Bitrate
- TS Sync Loss
- Continuity Count Error
- TS Input Packet Size
- PID List

4. 7780SDIB2-IP2 CARD CONFIGURATION

Right click the IP address of the 7780SDIB2-IP2 to access the sub-menu, and then select "View Configuration". The configuration page will open enabling the user to toggle the configuration tabs in order to configure the parameters of the 7780SDIB2-IP2. Sections 4.1 to 4.7 provide an explanation of the features and functions of the 7780SDI2B-IP2 card.

4.1. ASI/SDI MONITOR TAB

The Monitor page displays the status of the ASI/SDI inputs and the ASI/SDI outputs. The **ASI/SDI Input Monitor** section displays the real time status of the ASI or SDI input signals for Inputs 1 and 2. The **ASI/SDI Output Monitor** displays the real time status of the ASI or SDI output signals for ports 1 and 2.

ASI/SDI INPUT MONITOR	DESCRIPTION
ASI/SDI Mode:	This field will display ASI or SDI based on the operation input mode selected under the IP/ASI/SDI Setup tab.
SDI Input:	This field displays the status of the SDI signal whether it is *Active* or *Inactive*.
SDI Input Standard:	This field displays the video signal standard 525 or 625.
ASI Port Status:	This field displays the status of the ASI signal whether it 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 is a counter that keeps on incrementing 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.

Table 4-1: ASI/SDI Input Monitor

ASI/SDI OUTPUT MONITOR	DESCRIPTION
ASI/SDI Port Status:	The field indicates the type of the output signal ASI/SDI that the sync byte has detected. It will also indicate whether ASI is locked. Similarly, the SDI signal will be locked when correct framing is achieved.
ASI/SDI Output Mode:	The field indicates **the type of the output signal**, either ASI or SDI.
ASI TS Bitrate:	This field displays the overall bit rate of the outgoing ASI signal.
SDI Output Standard:	This field displays the video signal standard of 525 or 625.

Table 4-2: ASI/SDI Output Monitor

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

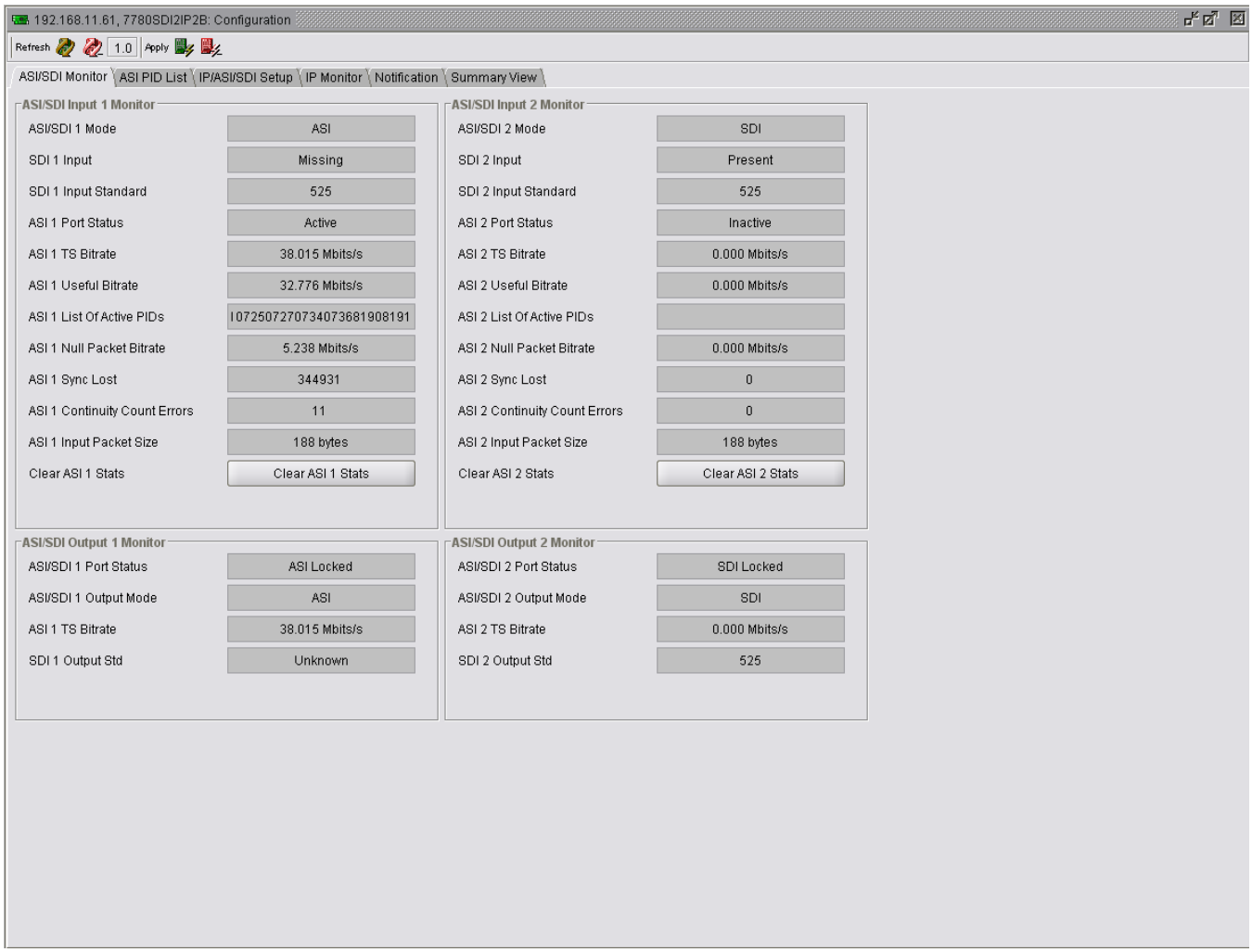

Figure 4-1: Monitor Tab

4.2. ASI PID LIST TAB

The **ASI PID List** tab displays the number of PIDs active within the applied ASI Transport Stream. The user may be required to refresh the status or select auto-refresh to view the changes.

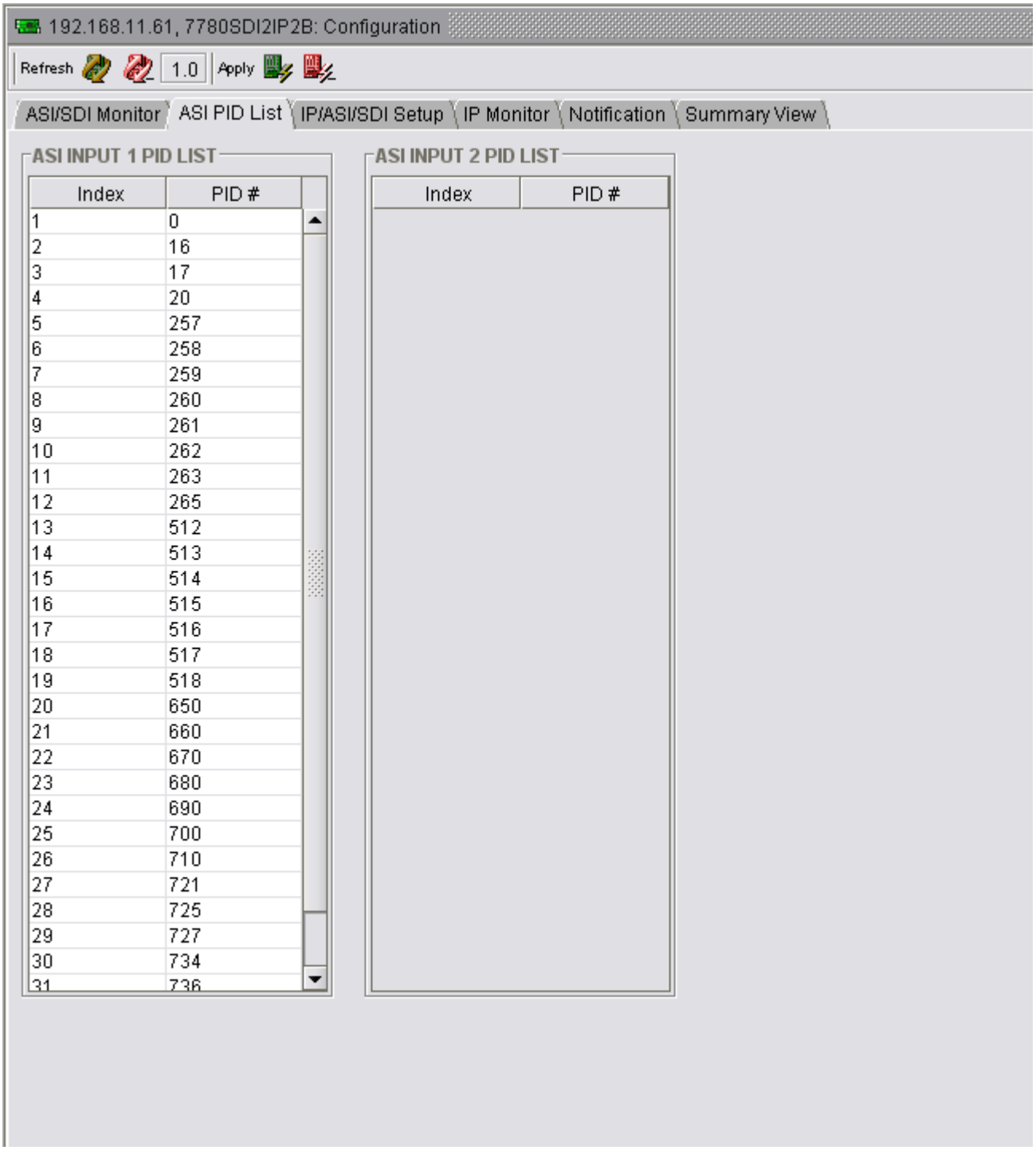

Figure 4-2: Active PID List Tab

4.3. IP/ASI/SDI SETUP TAB

The control tab is divided into three sub-sections, which include: **Operating Mode – Input 1/2**, **Ethernet Port Setup (Data Ports)** and **Trap Destination (Control Port)**.

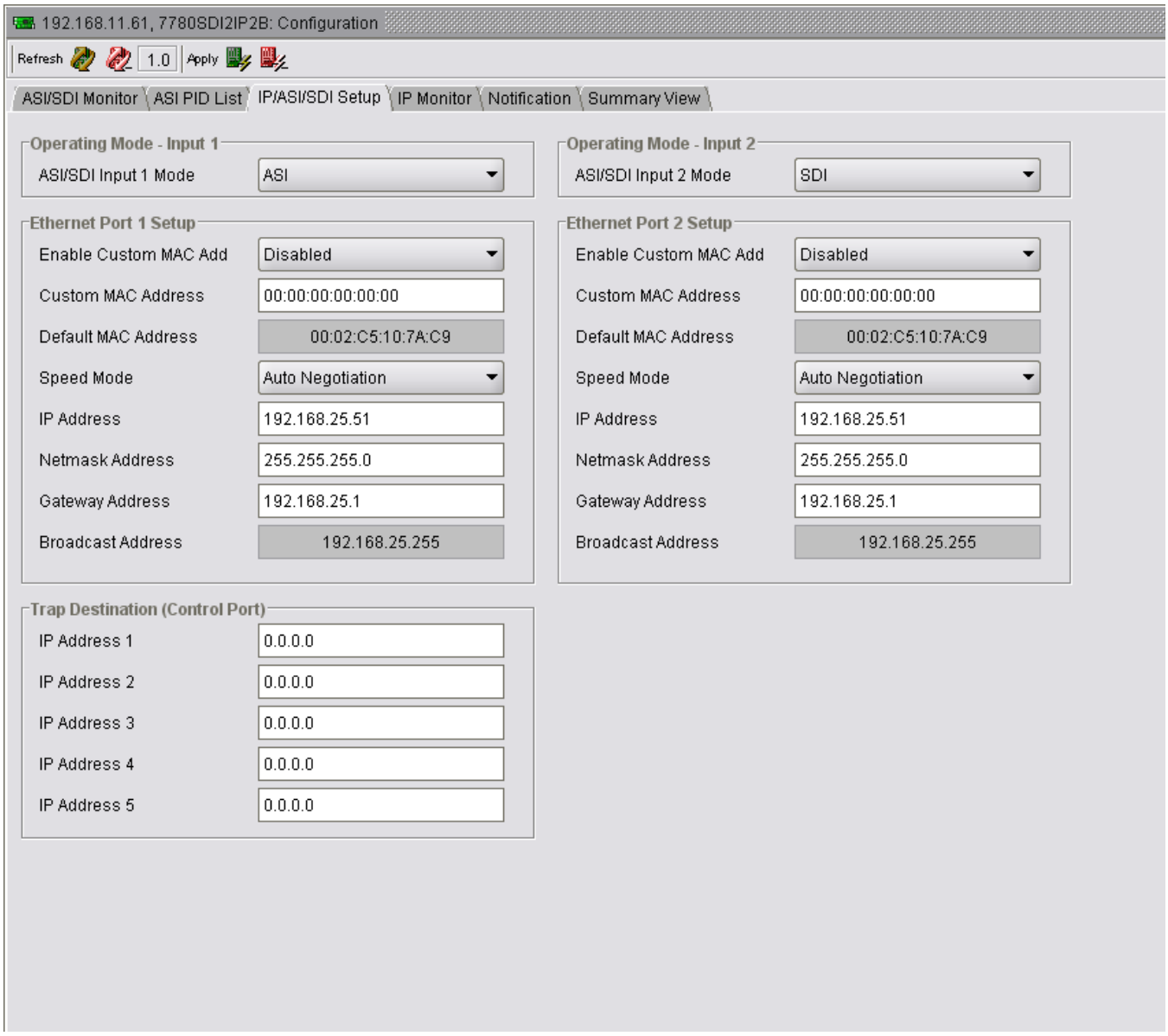

Figure 4-3: Control Tab

4.3.1. Operating Mode – Input 1/2

Use this drop down menu to select the type of the input signal, either **ASI** or **SDI**. In **Auto** mode the card will automatically detect the type of the input signal. To apply the setting, select the *Apply* button and the change will take effect.

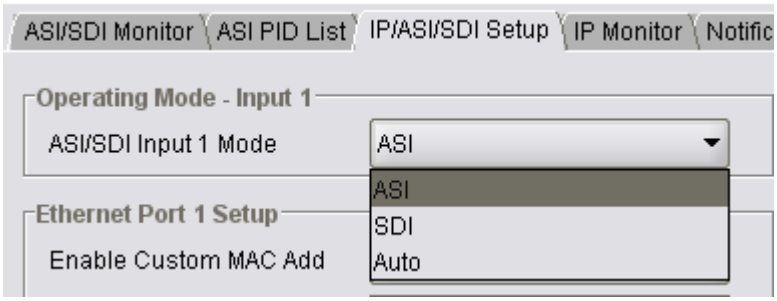

Figure 4-4: IP/ASI/SDI Setup Tab

4.3.2. Ethernet Port 1 / 2 Setup

The Ethernet Port Setup refers to the physical data ports of the 7780SDIB2-IP2 card. An IP address and subnet mask must be entered in this section. Entering these fields establishes a presence on the data network. The broadcast address will automatically calculate based on your Net Mask.

The user has the ability to assign a custom MAC address to the card (Not recommended). To use a custom MAC address, enable the custom MAC address by selecting the *enabled* button, as shown in Figure 4-5. Once *enabled* is selected enter a new MAC address in the "Custom MAC Address" field. Select the *Apply* button to allow changes to take effect.

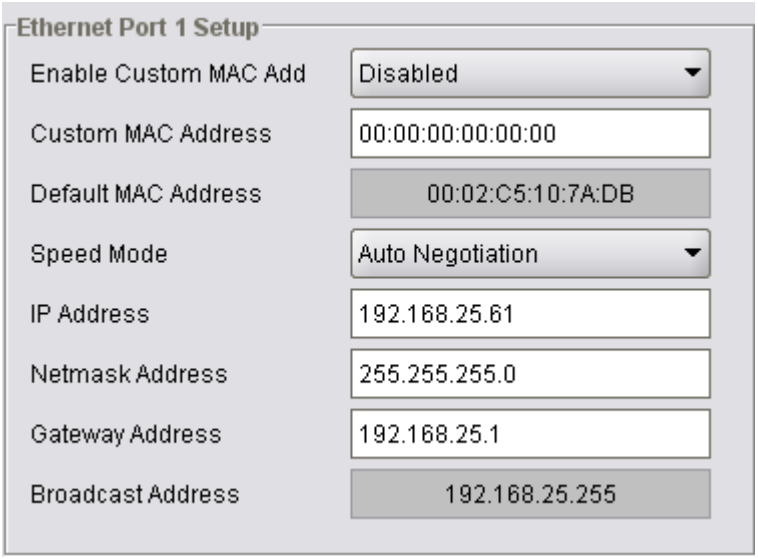

Figure 4-5: Ethernet Setup (Data Ports)

The speed of the data port can be manually set at any time by selecting the “Speed Mode” drop down box, as shown in Figure 4-6, and then selecting the desired port speed. By default “Speed Mode” is set to AUTO NEGOTIATION. Select the *Apply* button to allow changes to take effect.

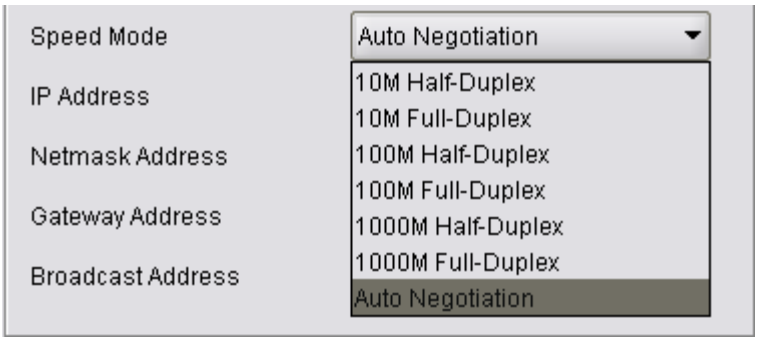

Figure 4-6: Speed Mode Drop Down Menu

4.3.3. Trap Destination (Control Port)

The *Trap Destination (Control Port)* window is used to configure the trap destination addresses. The user can assign up to five individual trap destination addresses in this section.

4.4. IP MONITOR TAB

The *IP Monitor* tab is used to display the network activity for the two individual gigabit Ethernet interfaces on the back plate.

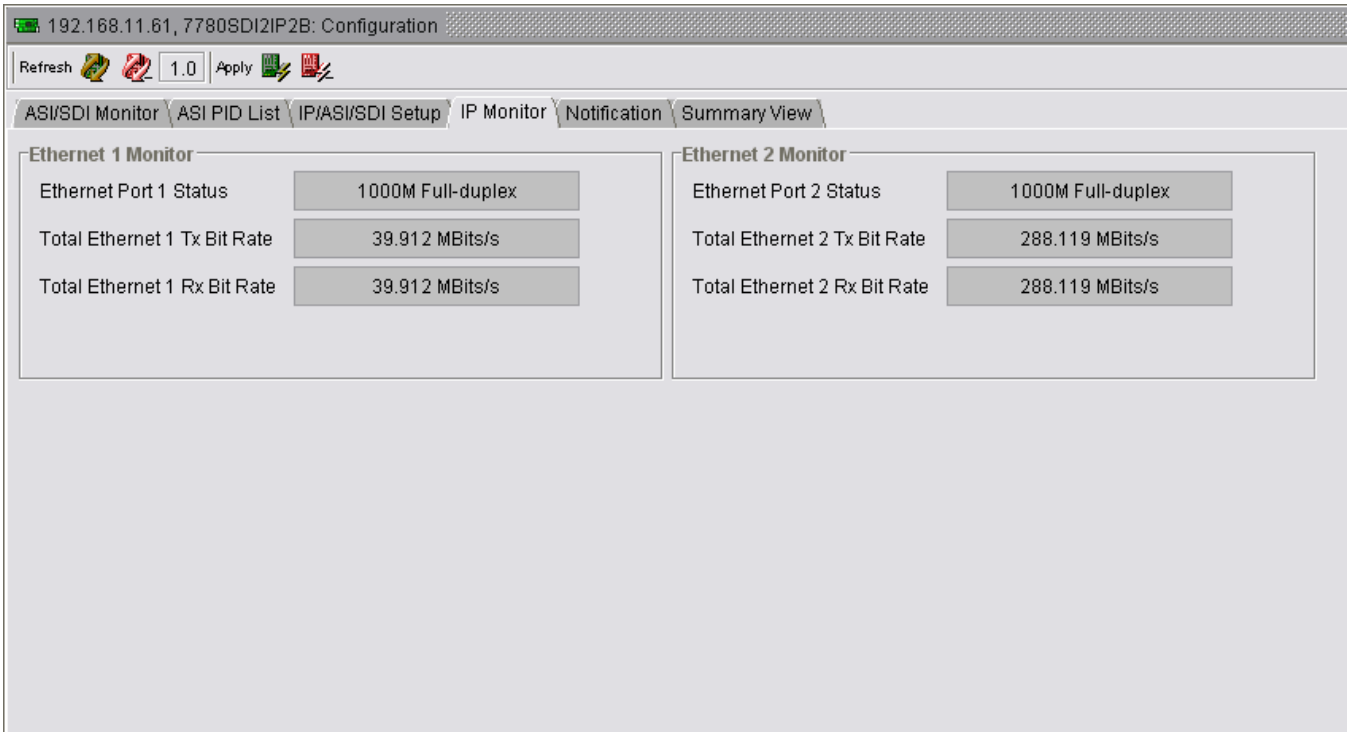

Figure 4-7: IP Monitor Tab

4.5. NOTIFICATION TAB

This tab is divided into two window subsections:

1. Send Trap allows the user to customize the top-level alarms.
2. Fault Present is used as a visual status indicator.

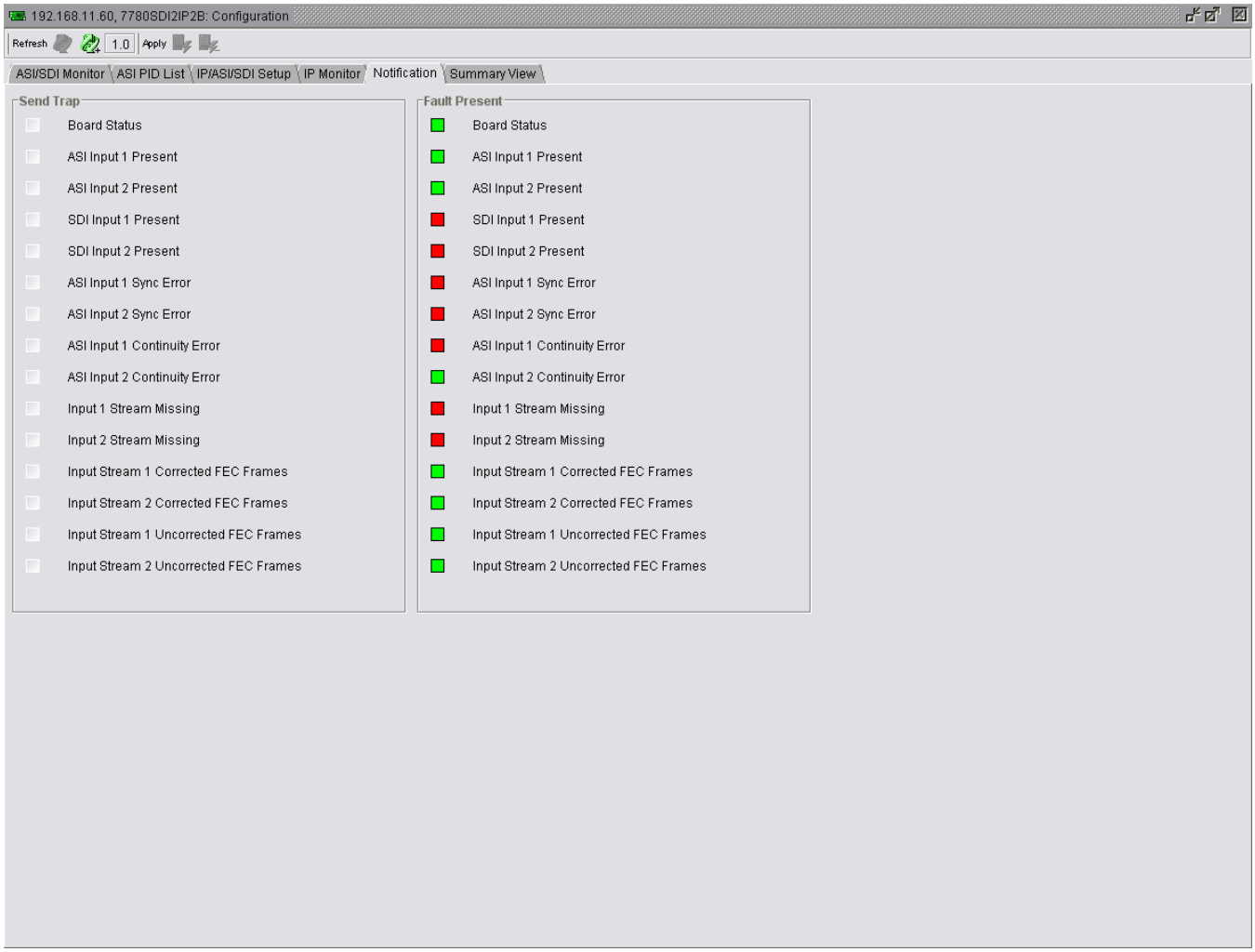

Figure 4-8: Notification Tab

4.6. SUMMARY VIEW TAB

The *Summary View* tab provides the user with a visual representation of the card configuration process. In addition, this view provides live status and statistical information about the SDI and IP ports.

An outgoing stream can be configured as follows:

1) Starting from the left side, select the signal source, either Input 1 or Input 2
2) Enter a destination IP address, either a multicast or a unicast.
3) Enter a destination Port Number.
4) Select the physical IP port that is to be used for streaming.
5) Enable Streaming.
6) Select *Apply* for the changes to take effect.

An incoming stream can be configured as follows:

1) Starting from the left, select the output signal destination, either Output 1 or Output 2
2) Subscribe to an IP stream by entering a multicast address in the **Subsc IP Add field**.
3) Enter the source port in the **Port Number** field.
4) Select the physical IP port that is to be used for streaming.
5) Enable Streaming.
6) Select *Apply* for the changes to take effect.

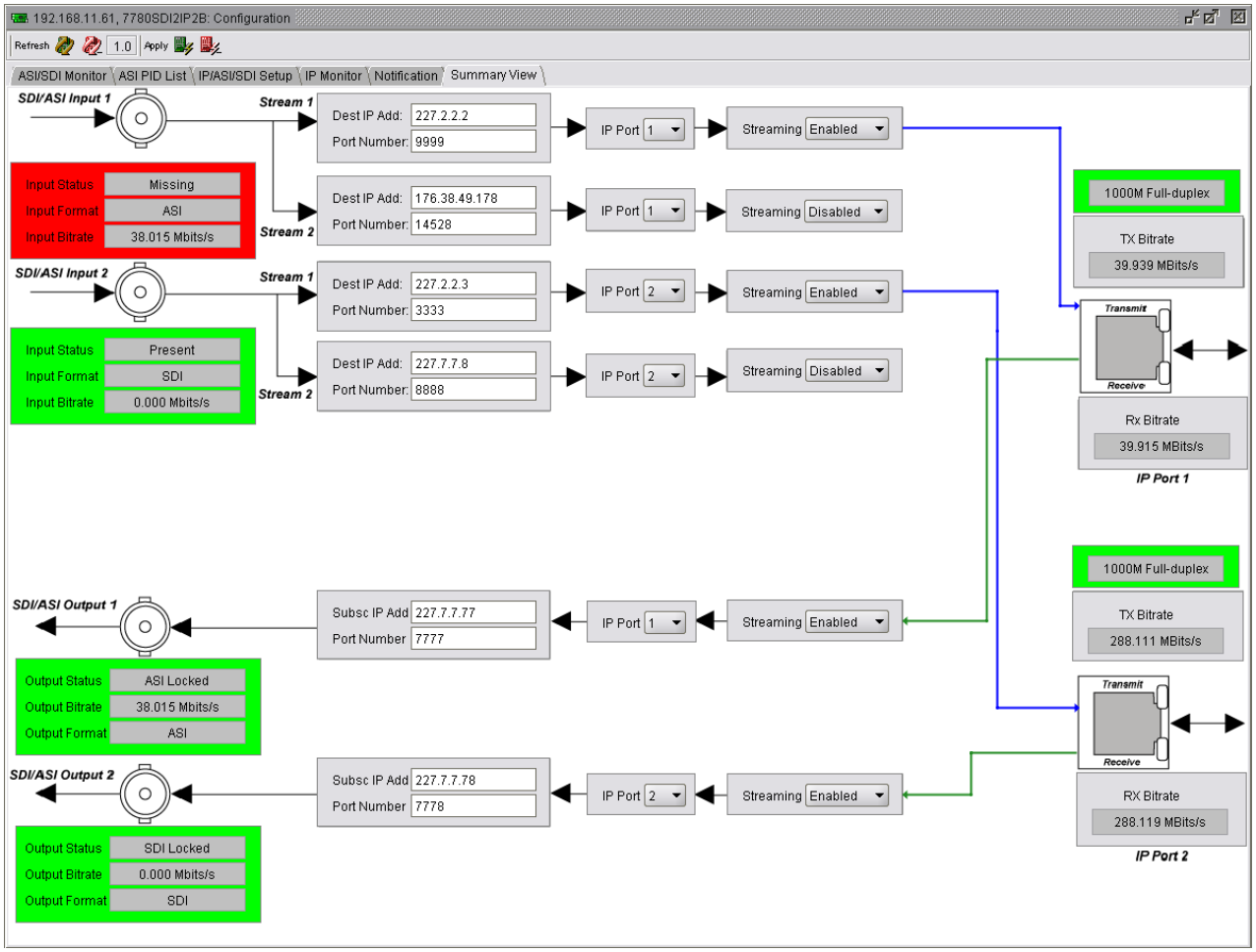

Figure 4-9: Summary View Tab

4.7. OUTPUT STREAM CONFIGURATION AND INPUT MODE CONFIGURATION

Click the '**+**' button next to the 7780SDIB2-IP2 address to expand the tree and access the sub-menus. Right click the *ASI/SDI IN Ports* and select the *View Configuration* option. The right window will display the 7780SDIB2-IP2 *ASI/SDI IN PORTS* configuration page as shown in Figure 4-10. The 7780SDIB2-IP2 allows the user to configure up to 4 outgoing streams. Each of the Ethernet Data ports has the ability to output two streams simultaneously. Below is the output stream configuration window. The description that follows applies to all 4 outgoing streams and both input 1 and 2. The ASI/SDI IN Ports window is divided into 2 sub-sections: **Input Mode** and **Output IP Stream**.

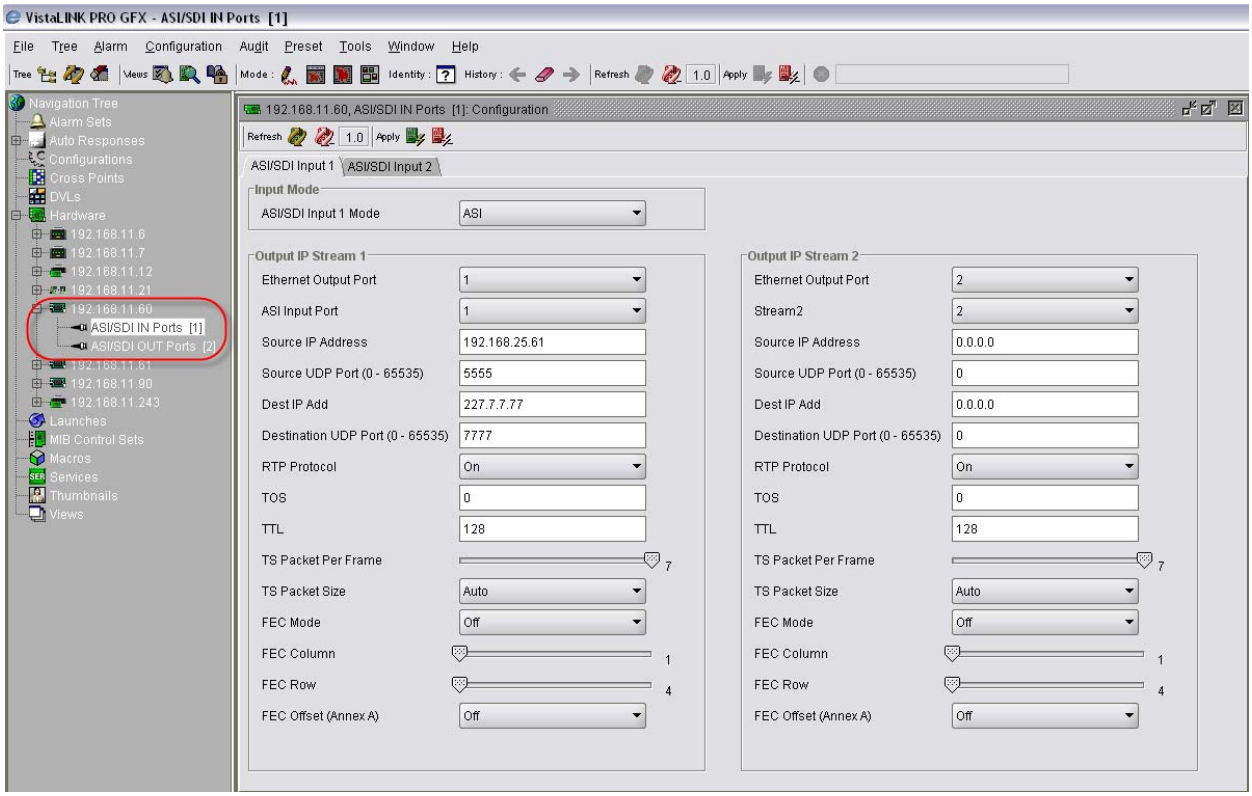

Figure 4-10: Output Stream

4.7.1. Input Mode

Use this drop down menu to select the type of the output signal, either **ASI** or **SDI**. In **Auto** mode the card will automatically detect the type of the output signal. To apply the settings, click the *Apply* button for the changes tol take effect.

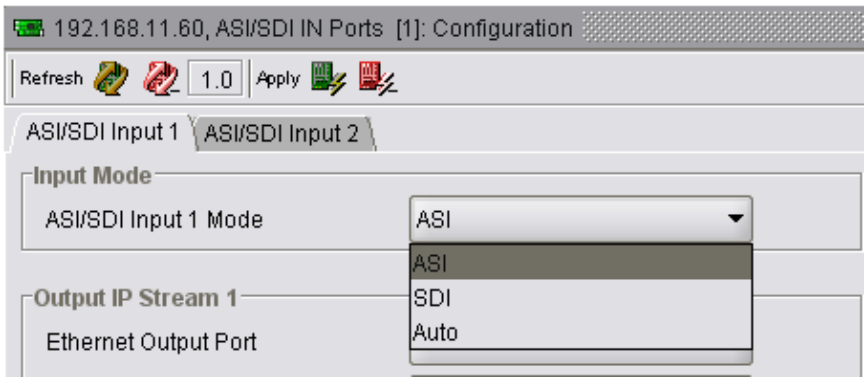

Figure 4-11: ASI/SDI Input 1 Tab

4.7.2. Output IP Stream

OUTPUT IP STREAM	DESCRIPTION
Ethernet Output Port:	This field shows which physical data port is being used for streaming data.
ASI Input Port:	This field allows the user to select the source of the ASI stream. The user will select either input 1 or 2.
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:	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:	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 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 enter the size of the TS packet. The size will be 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 1D (1 Dimensional) or 2D (2 Dimensional).
FEC Column:	This field enables the user to enter the number of packets per column to be associated with a 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 box 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.

Table 4-3: Output IP Stream

5. ASI/SDI OUT PORTS CONFIGURATION

Right click the IP address of the 7780SDIB2-IP2 to access the sub-menu and then select the "View Configuration" option. The **ASI/SDI OUT Ports** configuration page will open. The 7780SDIB2-IP2 allows the user to configure up to 2 incoming streams. Each of the Ethernet Data ports has the ability to receive two streams simultaneously. Below is the output stream configuration window, it is divided into three sections **Output Mode**, **Output Control** and **Input Stream Monitor**. The description that follows applies to both incoming streams and both outputs 1 and 2.

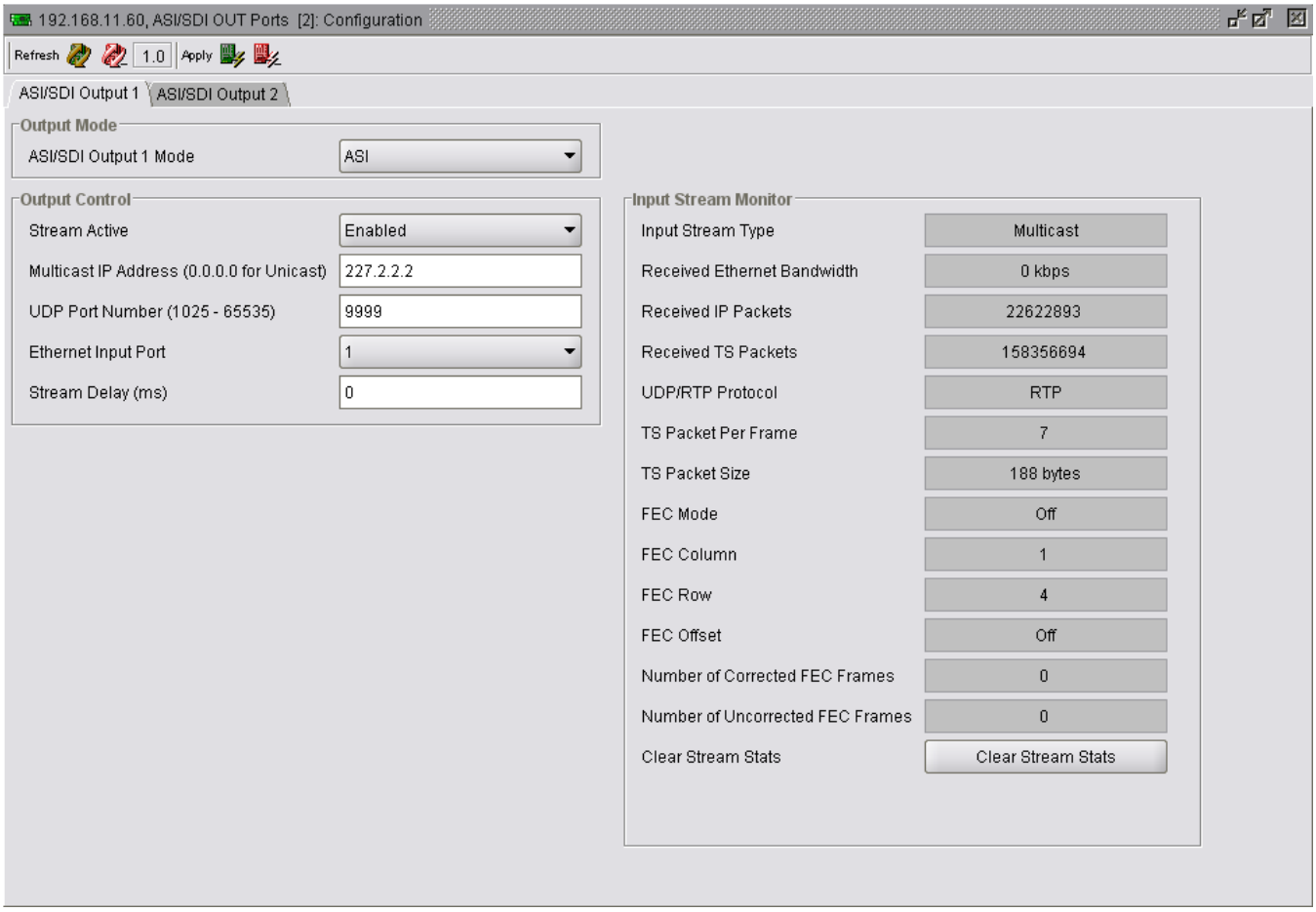

Figure 5-1: ASI/SDI Port Configuration

5.1. OUTPUT MODE

Use this drop down menu to select the type of the output signal, either **ASI** or **SDI**. In **Auto** mode the card will automatically detect the type of the output signal. To apply the newly selected setting, click the *Apply* button and the change will take effect.

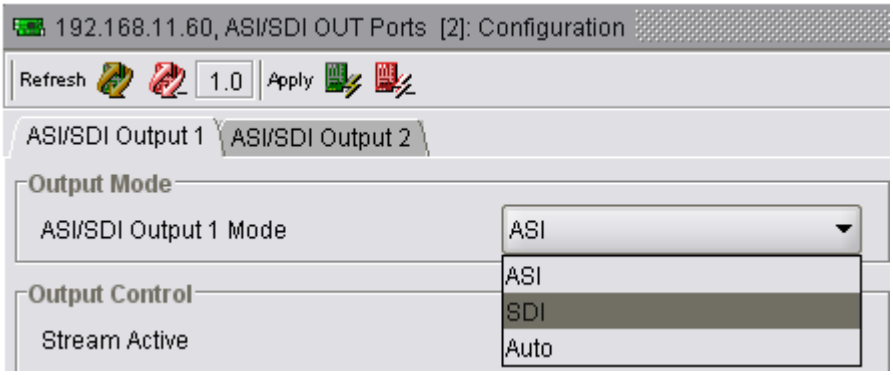

Figure 5-2: ASI/SDI Output 1 Mode Drop Down Menu

5.2. OUTPUT CONTROL SECTION

OUTPUT CONTROL SECTION	DESCRIPTION
Stream Active:	Use this drop box to disable or enable the incoming streams.
Multicast IP address (0.0.0.0 for Unicast):	Enter the IP address of the multicast that you wish to join, or enter the card's IP address if you are expecting a unicast. A multicast address should be in the range of 224.0.0.0 through 239.255.255.255.
UDP Port Number:	This field enables the user to enter the destination port number for the IP address entered above.
Ethernet Input Port:	Use this drop down 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.

Table 5-1: Output Control Section

5.3. INPUT STREAM MONITOR SECTION

INPUT STREAM MONITOR	DESCRIPTION
Input 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 ASI stream.
Received IP Packets:	This field will display the current total number of received IP packets.
Received TS Packets:	This field will display the number of TS packets within each IP packet.
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 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 FEC 2D or FEC 1D.
FEC Column:	This field displays the number of packets per column to be associated with a FEC packet.
FEC Row:	This field displays the number of packets per row to be associated with a 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.

Table 5-2: Input Stream Monitor Section

The network statistics can be reset at any time by clicking on the "*Clear Stream Stats*" button.

6. TROUBLESHOOTING

6.1. 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.

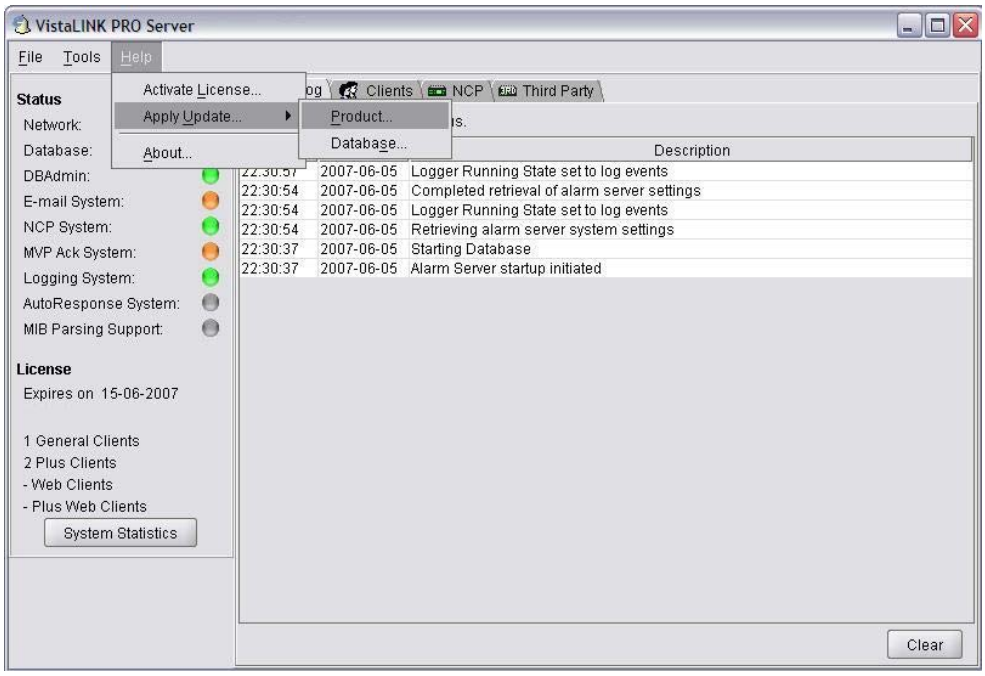

Figure 6-1: VistaLINK® PRO Server

A window will appear, as shown in Figure 6-2, 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.

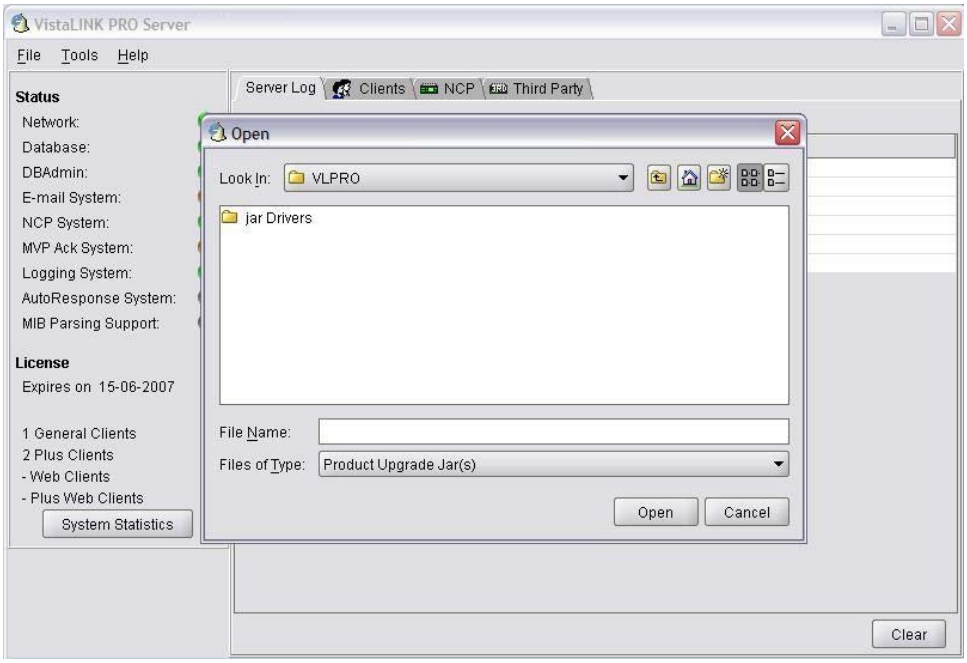

Figure 6-2: VistaLINK® PRO – Applying JAR Updates

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.

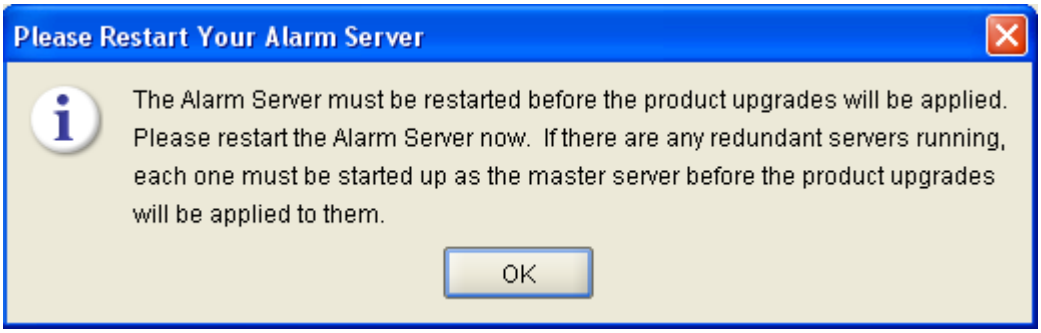

Figure 6-3: 'Please Restart Your Alarm Server' Window

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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