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Figures

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Nov 07
1.1	Modified format	Jan 08

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1. OVERVIEW

The 7780MUX8x2-ASI is a compact, affordable DVB and ATSC re-multiplexer. The 7780MUX8x2-ASI offers on-board stream processing, such as PID re-mapping, program add and drop, DVB or ATSC basic table regeneration and creation, and externally generated program guide insertion. The 7780MUX8x2-ASI offers basic input monitoring to ensure the incoming signals are properly MPEG-2 framed.

The user can select which incoming programs will be used on the output. The 7780MUX8x2-ASI fits in the 7700 chassis and only occupies three slots. Seven independent 7780MUX8x2-ASI can be fitted in a single 3RU Chassis. The 7780MUX8x2-ASI is controlled through VistaLINK®-Pro via SNMP commands.

Features:

- 8xASI inputs per TR101 891
- 2xASI outputs (Mirrored)
- Support 188 and 204 Bytes packets on inputs and outputs
- Support MPEG-2 Video as well as H.264
- Monitoring of ASI inputs
- Display of transport stream tree and bitrate
- Basic MPEG table insertion
- DVB table insertion through ASI or external IP input
- ATSC table insertion through ASI or external IP input
- Status view, configuration through VistaLINK® PRO®
- Fits in 7700 Chassis

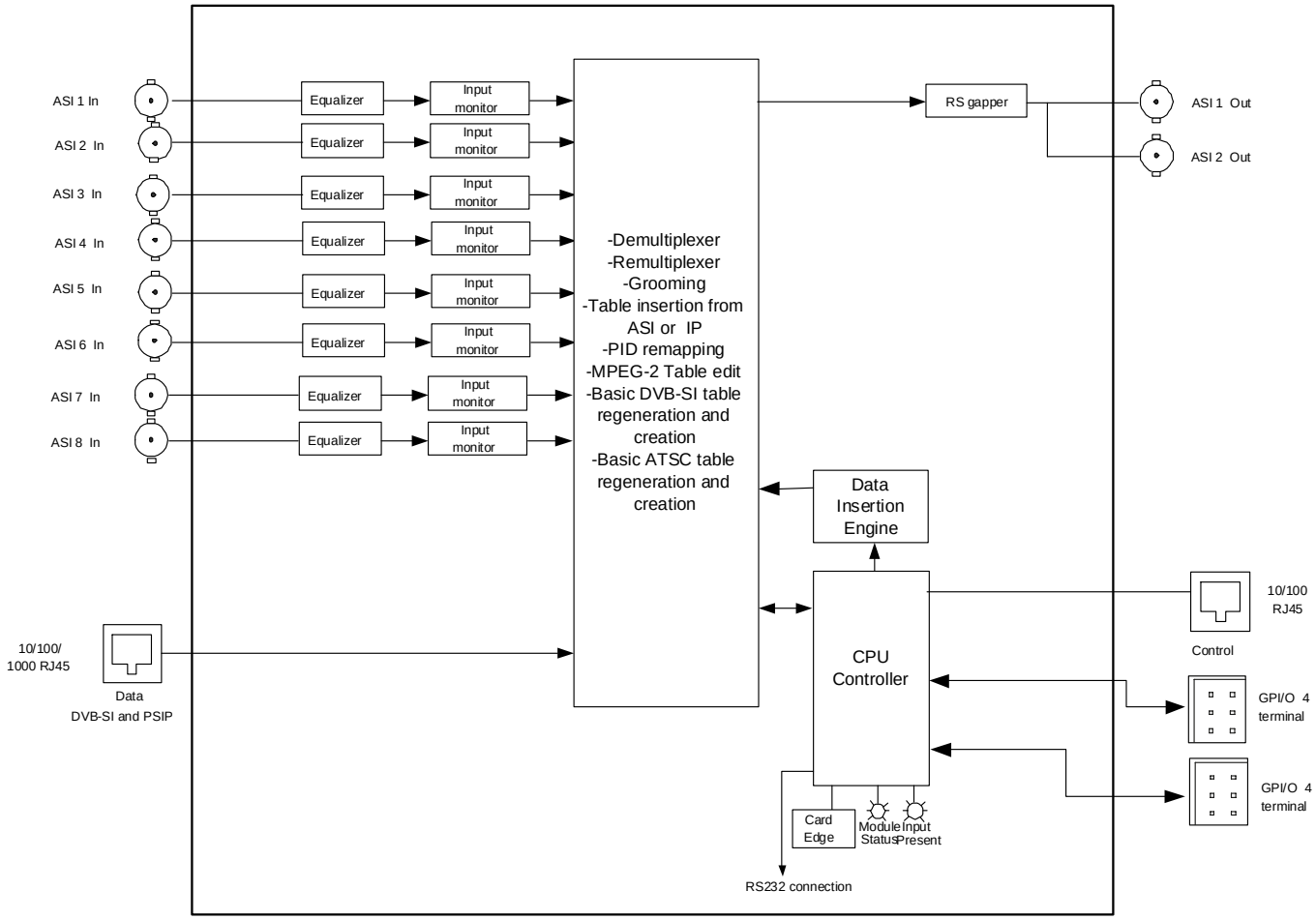

Figure 1-1: 7780MUX8x2-ASI Block Diagram

2. INSTALLATION

The following materials are required to successfully install the 7780MUX8x2-ASI:

1. Unused IP addresses 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 three adjacent vacant slots. Unpack the 7780MUX8x2-ASI and separate the rear panel from the main card. Locate on the rear of the rack the three slots and remove the blanking panels. Insert the rear panel into the back of the chassis and secure using the six screws provided.

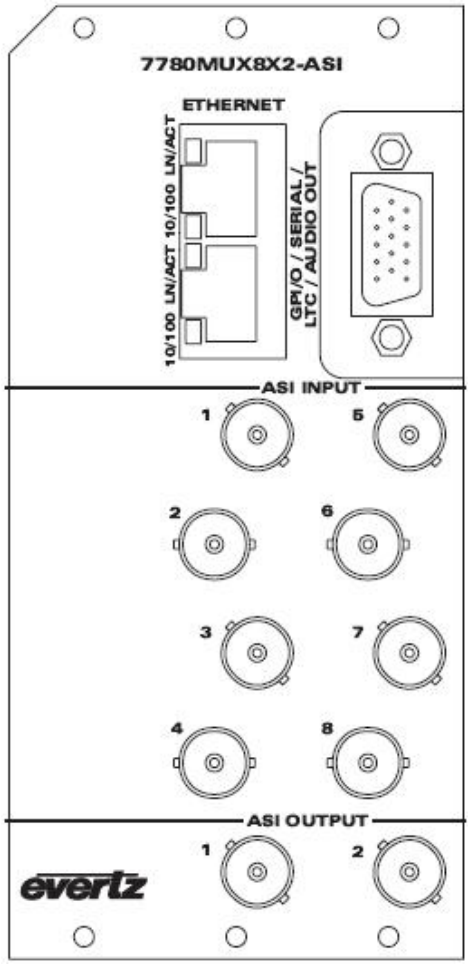

Figure 2-1: 7780MUX8x2-ASI Rear Panel

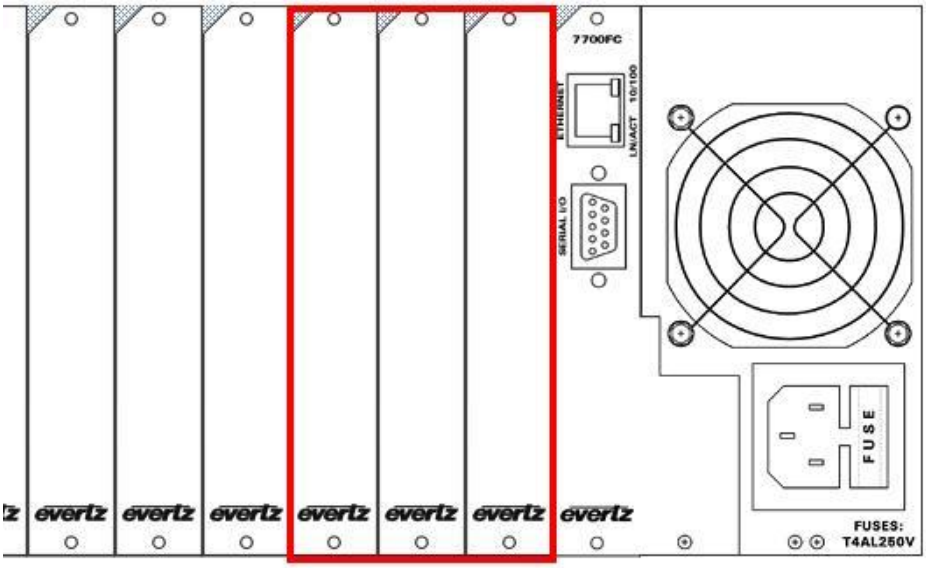

Figure 2-2: 7700 Chassis

Before inserting the front card, connect the serial cable to the board using the serial cable provided. Now insert the 7780MUX8x2-ASI 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 into the slot ensuring that when it mates with the rear panel that is has been firmly 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 panel (failure to do this could cause unwanted network issues) until the initial configuration has been completed.

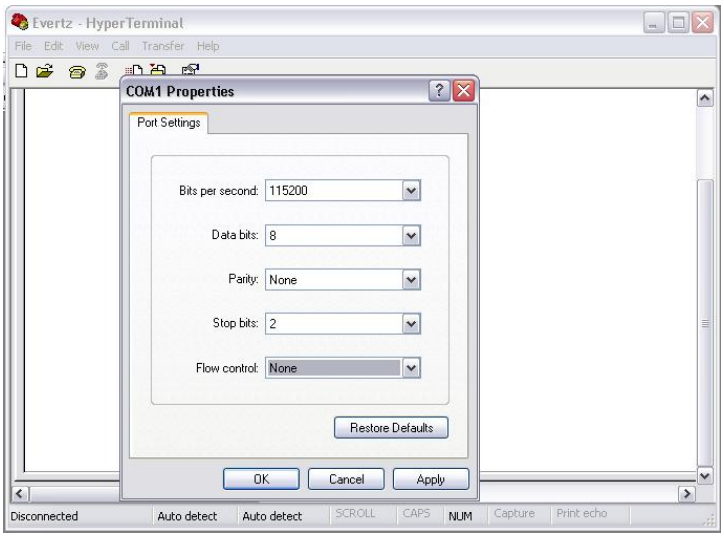

Figure 2-3: COM Properties Window

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 session should respond by displaying the 7780MUX8x2-ASI Main Menu, as shown in Figure 2-4:

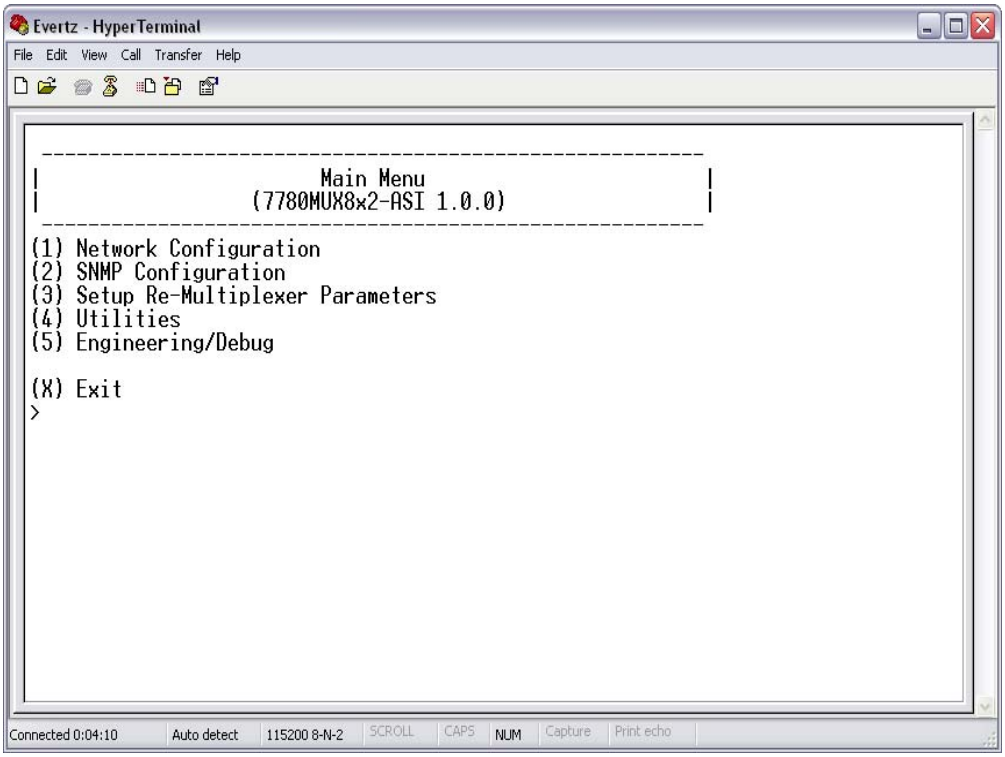

Figure 2-4: HyperTerminal Main Menu

(1) Network Configuration
This sub-menu enables the user to configure the network settings for the card.

(2) 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.

(3) Setup Re-Multiplexer Parameters
This sub-menu is used to configure the re-multiplexer parameters. As this configuration can also be performed via VLPro this sub-menu will not be covered in this section.

(4) Utilities
This sub-menu contains two utilities. One command is for clearing the memory and the other for clearing the flash. In normal operation it should not be necessary to use either of these options.

(5) Engineering/Debug
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. See section 2.2.

2.2. CONFIGURING THE BASIC NETWORK SETTINGS

Now select option (1) *Network Configuration*, the Network Configuration menu will be displayed as shown in Figure 2-5. If you prefer to use DHCP then you may select option (5) *Use DHCP*, and then continue from step 4:

1. Select option (1) *Set IP Address* and configure the IP address for the 7780MUX8x2-ASI ensuring that the IP address is not already in use on the network.
2. Now 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 from the Network Configuration menu using the (S) *Save and Exit* option, NOT (x) *Exit*.

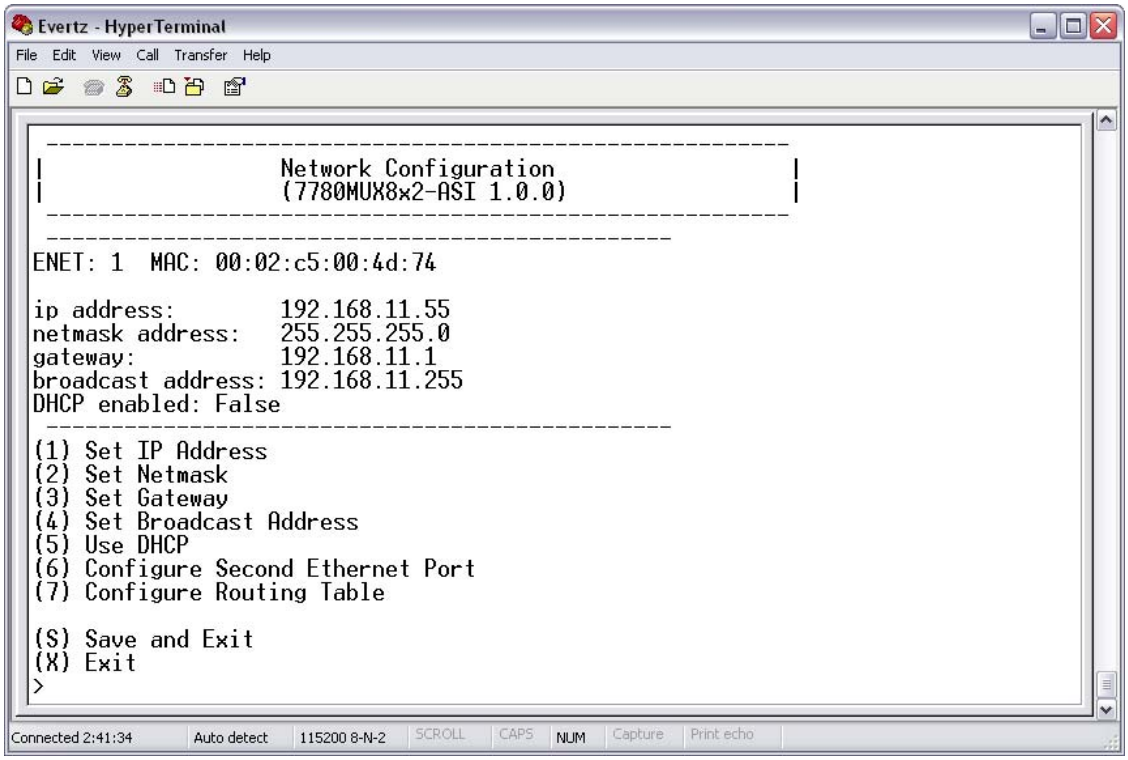

Figure 2-5: Network Configuration Sub-Menu

5. From the Main Menu select option (2) *SNMP Configuration*. Select option (1) *Set IP Address* and enter the IP address of your VLPro Server. Exit using the (S) *Save and Exit* option, now extract the card from the rack, remove the serial cable and re-insert it.

You have now completed the necessary minimum configuration and can connect the cables to the rear panel 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 7780MUX8x2-ASI jar file to the server and both the client and server applications have been restarted. If you are the network administrator refer to section 5.2 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 "+" symbol. The 7780MUX8x2-ASI should appear as a newly listed device with the IP address used to configure the card in Step 1 of section 2.2. 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).

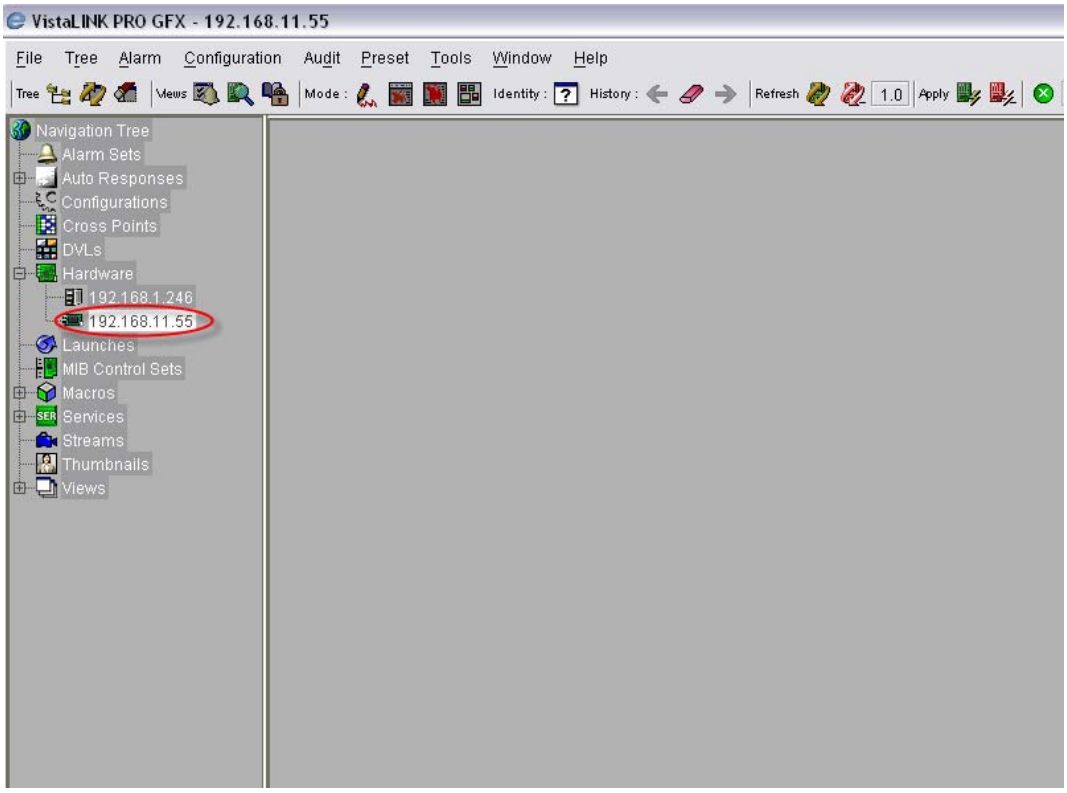

Figure 2-6: VistaLINK® PRO Navigation Tree

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. CONFIGURATION

The 7780MUX8x2-ASI card can be configured using VistaLINK® software. Once the card is connected to VLPRO as described in section 2.3, right click the IP address, selected earlier, of the 7780MUX8x2-ASI. When the drop down menu appears, select the "*View Configuration…*" option.

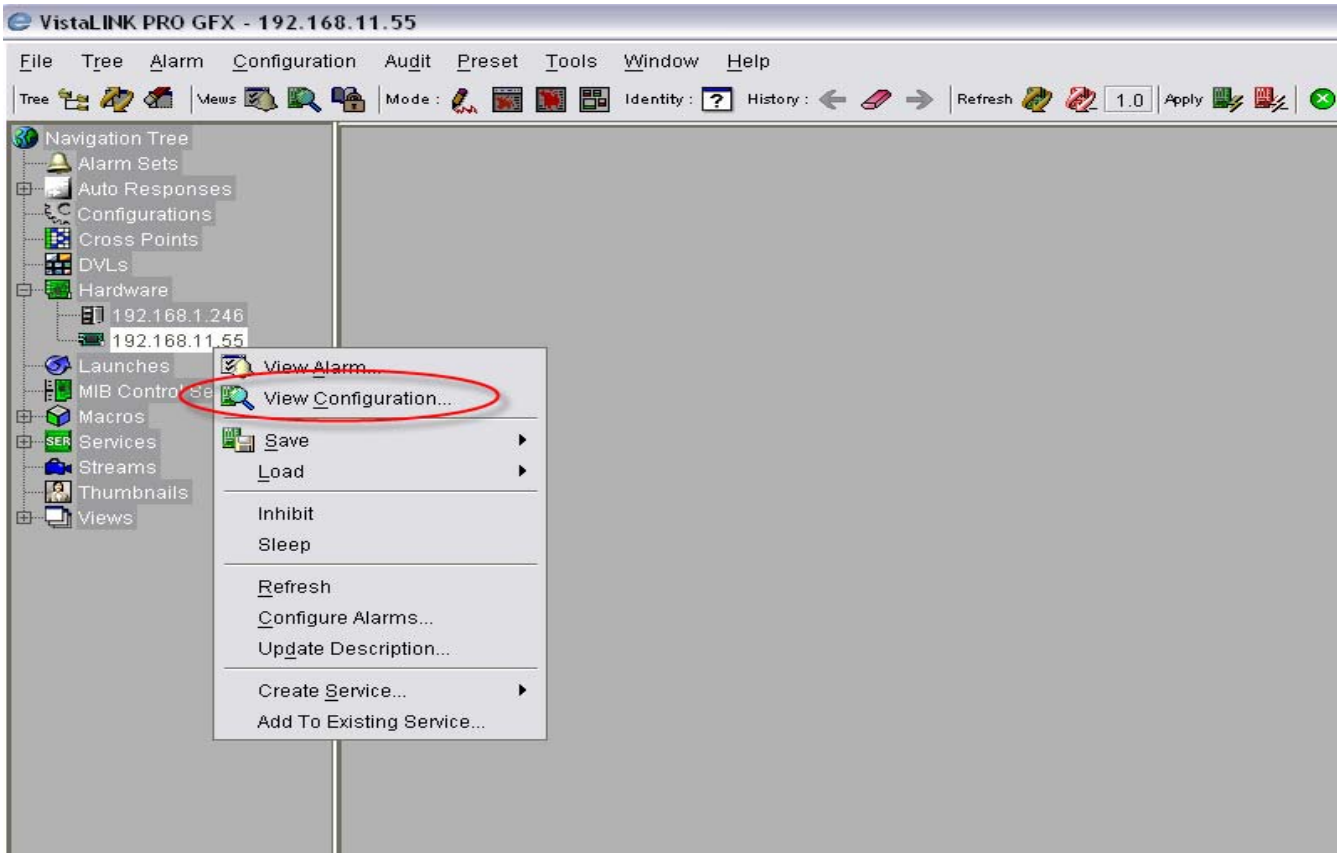

Figure 3-1: Select View Configuration

As shown in Figure 3-2, the Mux configuration screen will appear. The 7780MUX8x2-ASI can be configured using the tabs in Figure 3-2. Refer to section 3.1 and 3.2 to identify the configuration items and their functions. Figure 3-2 also displays the *Frame Status* tab, however, the frame status is currently not active.

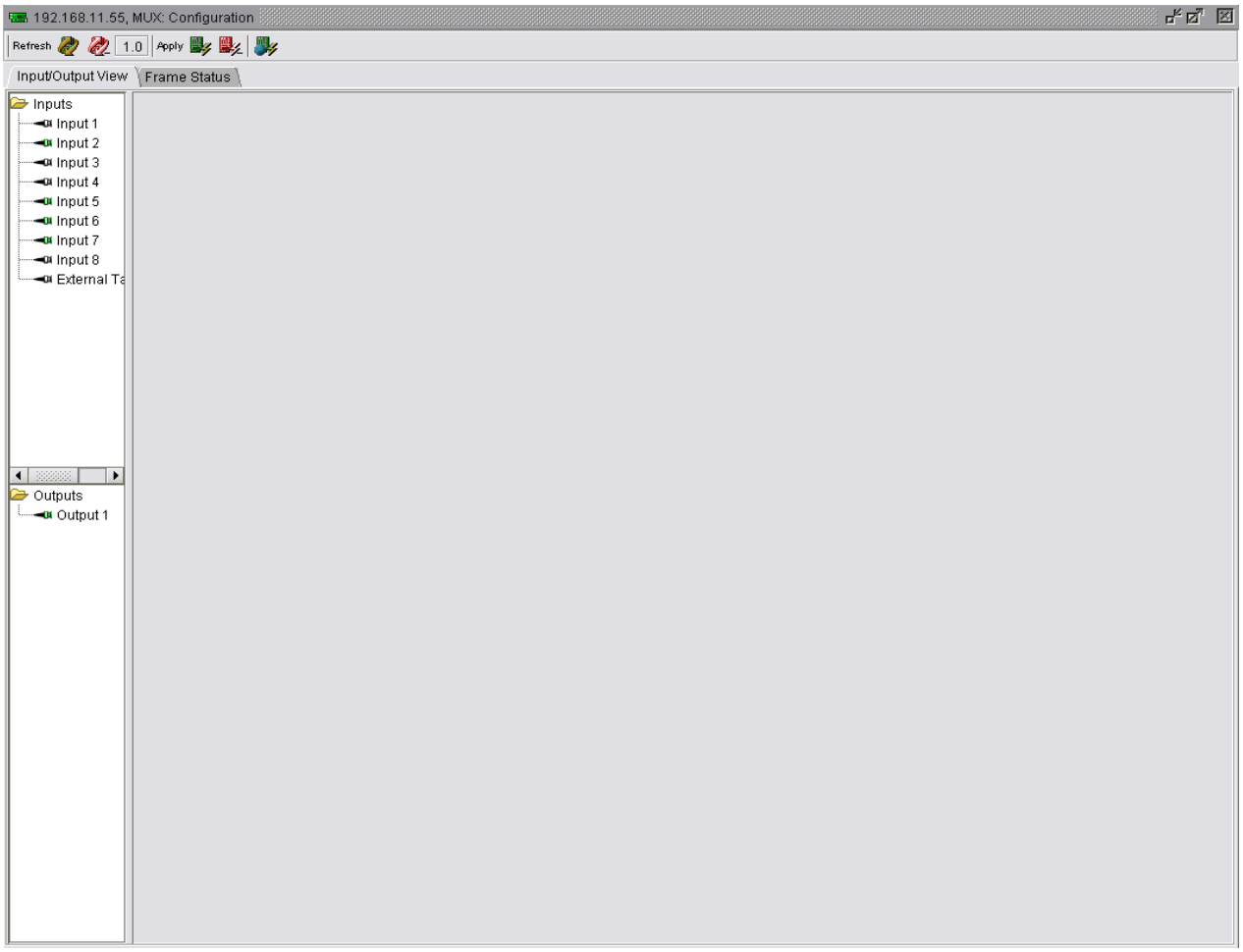

Figure 3-2: Mux Configuration

3.1. INPUTS

The 7780MUX8x2-ASI has eight ASI-inputs and one IP-input labelled *External Table Input*. To view the content of any input, select the desired input number from the Input folder side panel. Once the desired input has been selected, the settings for that input will be displayed in the *General Input Settings* tab, as shown in Figure 3-3.

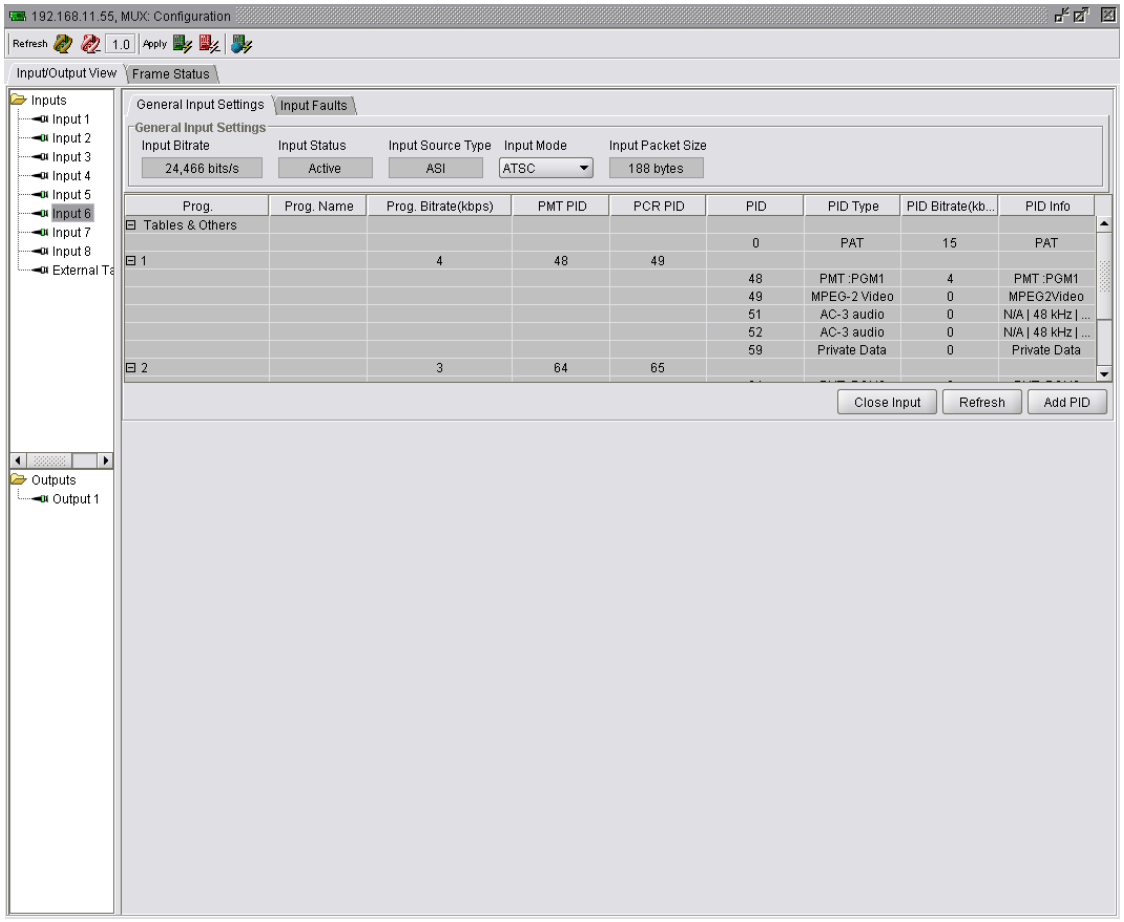

Figure 3-3: General Input Settings Tab

3.1.1. General Input Settings

Input Bit rate: This field identifies the current bit rate of the ASI input stream.

Input Status: This field displays the input status. The available options are either active or inactive.

Input Source Type: This field displays the source type of the input. The options are either ASI or Ethernet.

Input Mode: This field sets the input mode. The available options are ATSC, DVB and MPEG.

In order to avoid conflict of PIDS, it is important to select the standard to which the stream is being coded.

Input Packet Size: This field displays the input packet size. The options will be either 188 Bytes or 204 Bytes.

3.1.2. Input buttons

Close Input: This button enables the user to close the input window view.

Refresh: This button enables the user to recapture and display the content of the ASI stream.

Add PID: This button enables the user to add an individual PID to the stream.

3.2. OUTPUTS

The 7780MUX8x2-ASI has one configurable output, as shown in Figure 3-4. To view the content of Output 1, select Output 1 from the Output folder side panel. When the output is selected the output settings will be displayed in the *Config Output* tab, as shown Figure 3-4.

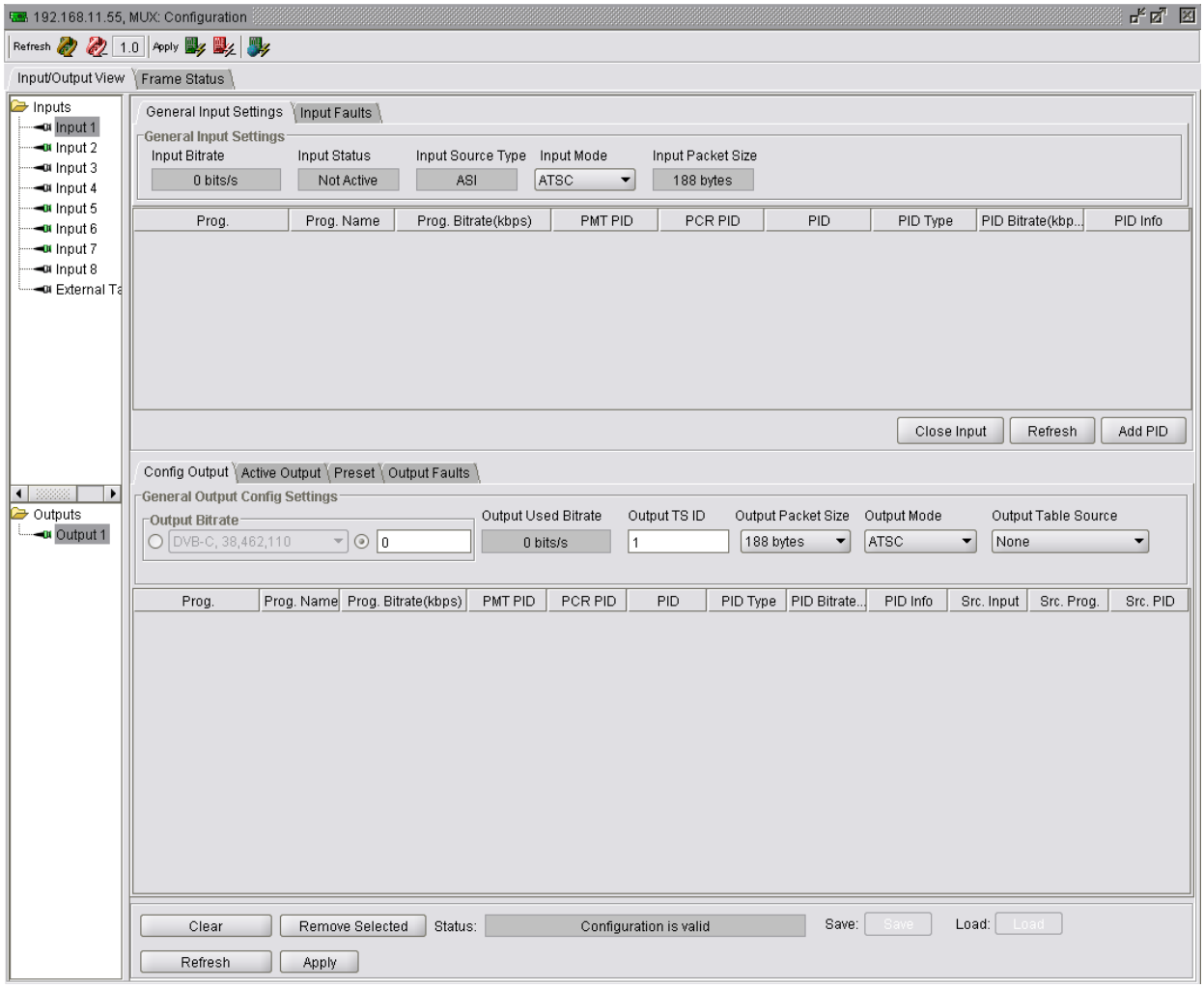

Figure 3-4: Displays Configuration Input and Output Settings

3.2.1. Config Output Tab

Output Bitrate: This field enables the user to change the output bitrate. The user can use the standard output rate for DVB-C, ATSC/SCTE or specify a custom output bit rate.

The value of the output bit rate must equal the sum of the bit rate of the PIDS that are being added to the output

Output Used Bit Rate: This field displays the actual output bit rate that is being used.

Output TS ID: This field displays the output transport stream ID. The default setting is 1.

Output Packet Size: This field displays the output packet size. The options will be either 188 Bytes or 204 Bytes.

Output Mode: This field sets the output mode. The available options are ATSC, DVB and MPEG.

Output Table Source: The output tables related to the stream will be created by the MUX if **None** is selected, or they may be added to the output stream from an external source originating from one of the eight ASI inputs or the Ethernet input.

3.2.1.1. Config Output buttons

Clear: This button clears the output configuration window

Remove Selected: This button removes a selected PID.

Refresh: This button refreshes the output configuration window

Apply: This button applies the output Mux configuration.

Save: This button saves the configuration to the MUX flash memory.

Load: This button loads the previously saved configuration from MUX flash memory.

3.2.2. Active Output Tab

The Active Output tab displays the content of the outputted ASI stream. For real time monitoring of the output ensure that **Auto Refresh – ON** is selected.

Output Bitrate: This field enables the user to change the output bitrate. The user can set the standard output rate to DVB-C, ATSC/SCTE or specify a custom output bit rate.

The value of the output bit rate must equal the sum of the bit rate of the PIDS that are being added to the output

Output Used Bit rate: This field displays the actual bit rate being used.

Output TS ID: This field displays the output transport stream ID. The default setting is 1.

Output Packet Size: This field displays the output packet size. The options will be either 188 Bytes or 204 Bytes.

Output Mode: This field sets the output mode. The available options are ATSC, DVB and MPEG.

Output Table Source: The output tables related to the stream will be created by the MUX if **None** is selected, or they may be added to the output stream from an external source originating from one of the eight ASI inputs or the Ethernet input.

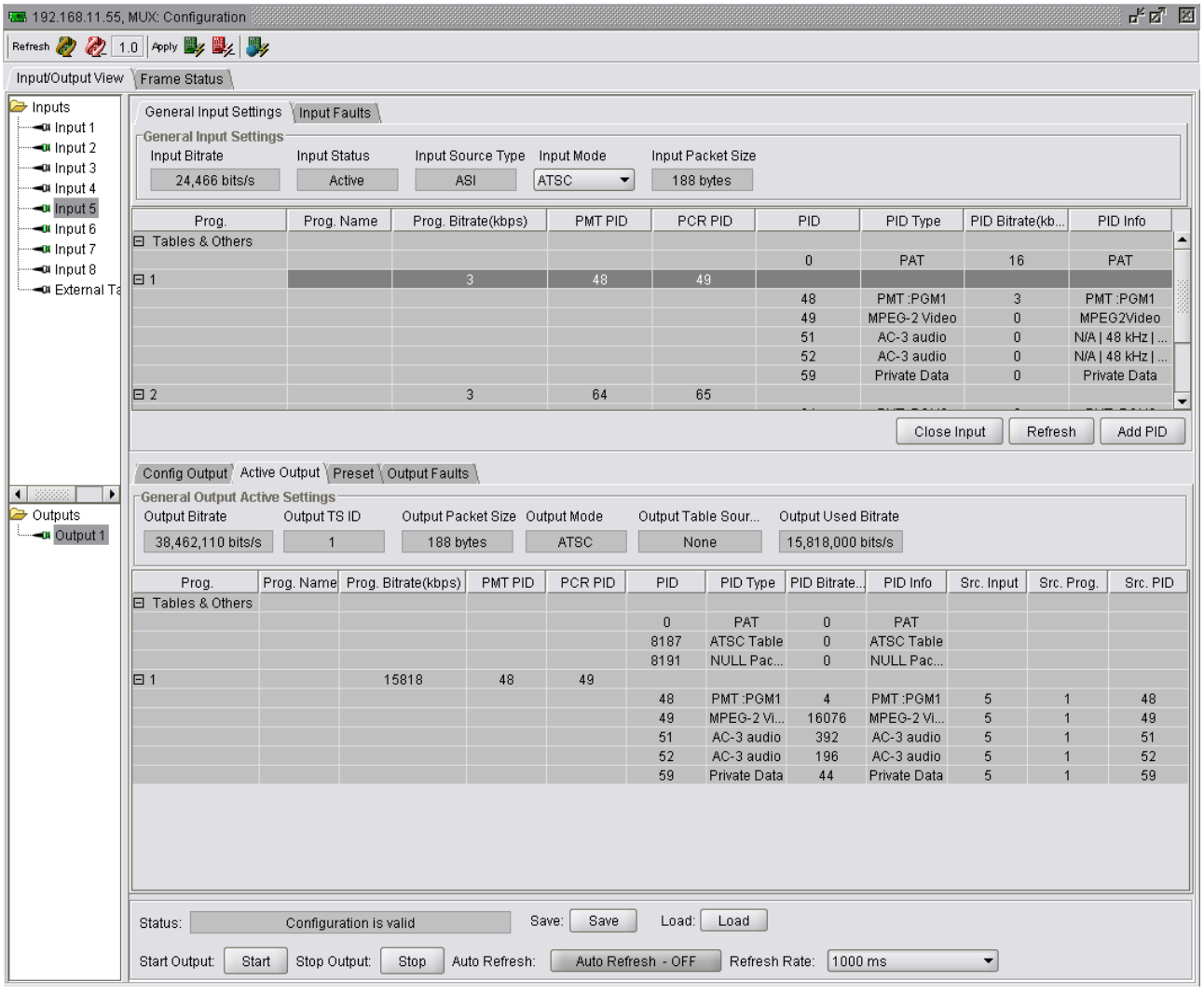

Figure 3-5: Active Output Tab

3.2.2.1. Active Output Buttons

Start: This button starts the output of the ASI stream.

Stop: This button stops the output of the active ASI stream.

Save: This button saves the current configuration to flash memory.

Load: This button loads the previously saved configuration.

Auto Refresh: If this button is set to ON, the active output will be automatically refreshed. If this button is set to OFF, it will not auto-refresh.

Refresh Rate: This field sets the refresh rate of the active output. Using the drop down menu, the user can set the refresh rate to 10000ms, 1000ms or 500ms

3.2.3. Preset Tab

Selecting the Preset Tab enables the user to manage the flash memory by deleting existing content, importing presets or exporting previously saved presets.

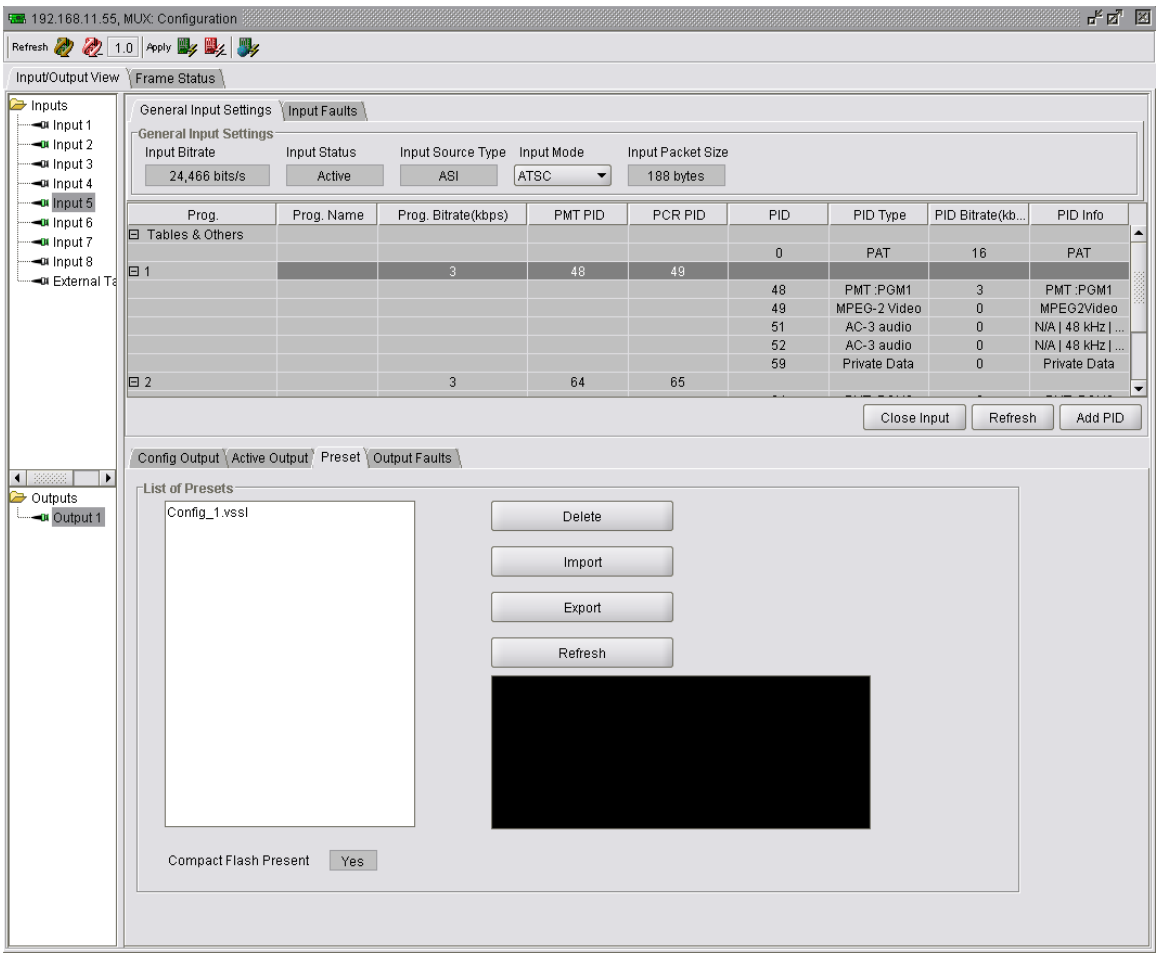

Figure 3-6: Preset Tab

List of Presets: This field displays a list of existing presets. For example, if a preset is imported, it will be listed in this field.

Delete: This button enables the user to delete an existing configuration. To delete a preset select the preset file name from the *List of Presets* and click on the *Delete* button.

Import: This button imports presets to local flash memory.

Export: This button exports presets from flash memory.

Refresh: This button retrieves the content from the local flash memory.

Compact Flash Present: This field displays whether the compact flash is present or not present.

3.2.4. Input and Output Faults

The *Input Faults* and *Output Faults* tabs enable the user to view and modify the input and output traps. Figure 3-7 displays the input and output traps for the 7780MUX8x2-ASI.

3.2.4.1. Input Faults

Input Trap Enable: The *input trap enable* permits the user to customize whether or not to send an alarm when the input is inactive.

Input Trap Status: The *input trap status* provides a quick visual overview of the input status. The status will display whether or not the input is active.

3.2.4.2. Output Faults

Output Trap Enable: The *output trap enable* permits the user to customize whether or not to send an alarm when the output has stopped.

Output Fault Status: The output fault status provides a quick visual overview of the output status. The status will display whether or not the output has *stopped.*

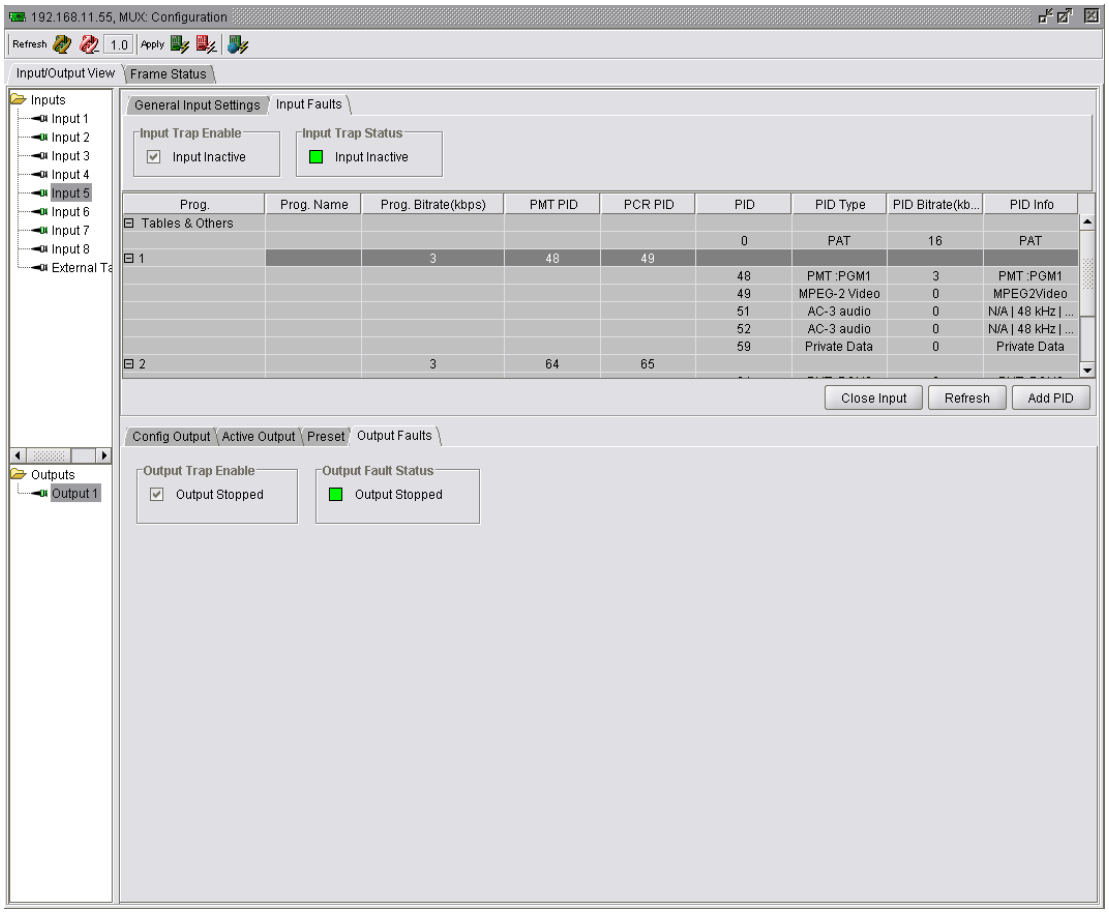

Figure 3-7: Input and Output Faults

3.2.5. Adding a Program to the MUX Output

1. Select Output1 from the Outputs folder. See Figure 3-8, step 1.
2. Select an active input from the Inputs folder. This input should be one from which you would like to add a program. See Figure 3-8, step 2.
3. Once the Input configuration appears, highlight the program that you would like to add to the output. See Figure 3-8, step 3.
4. Drag and drop the highlighted program into the output configuration window. See Figure 3-8, step 4.

To add an entire input to the MUX output, select the desired input(s) from the *Inputs* folder and drag the highlighted input(s) into the output configuration window.

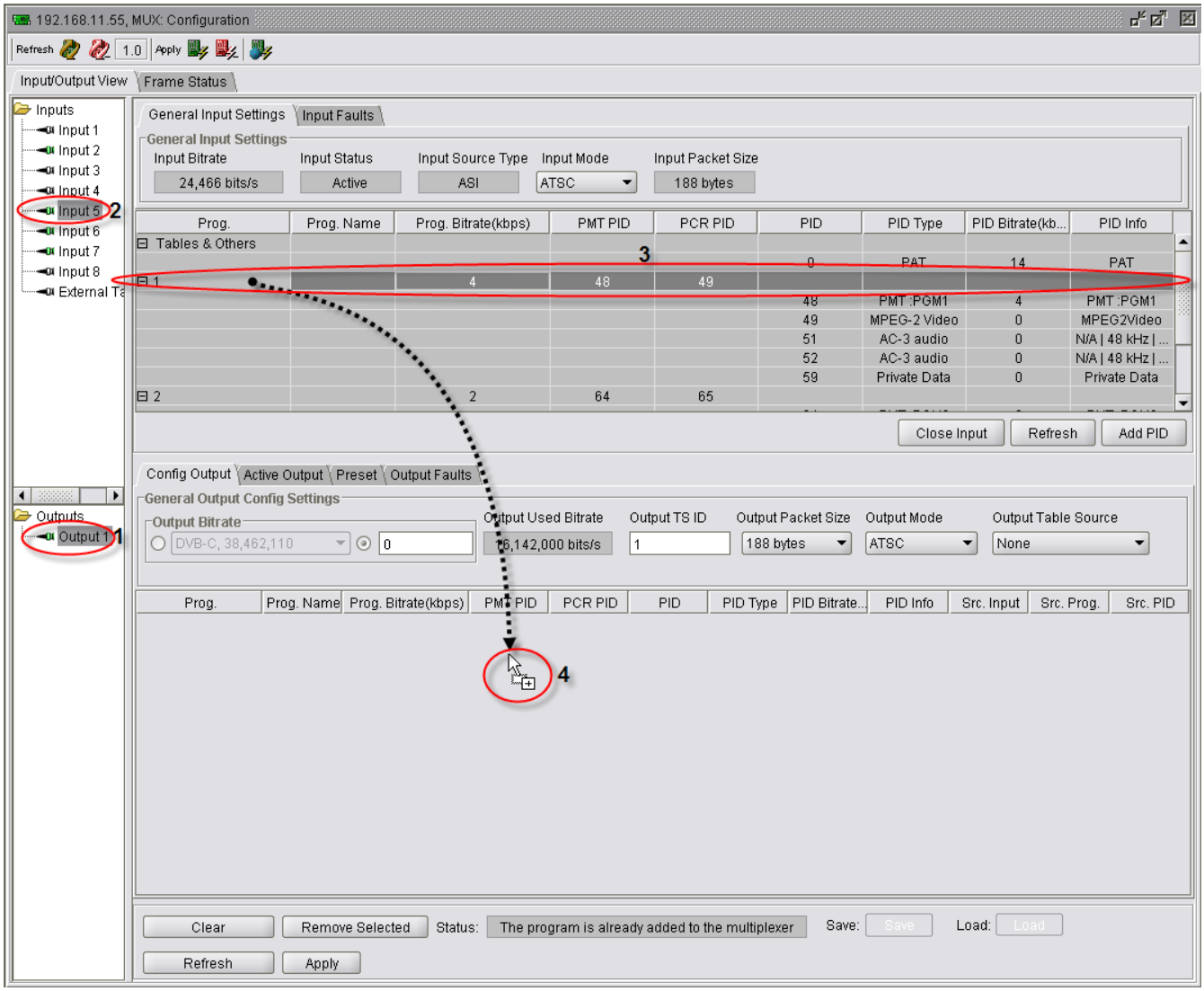

Figure 3-8: Adding a Program to a MUX Output

5. To add additional programs to the output, repeat steps 2 to 4.
6. Once all desired programs have been added, select an output bit rate in the *Config Output* tab. See Figure 3-9, step 6.
7. Enter the output TS ID.
8. Enter the output packet size.
9. Enter the output mode.
10. Enter the output table source.
11. When all the desired settings have been entered, press the *Apply* button to start the MUX. See Figure 3-9, step 11.

Note: Once the *Apply* button is selected, the configured output will be applied and transferred to the *Active Output* window.

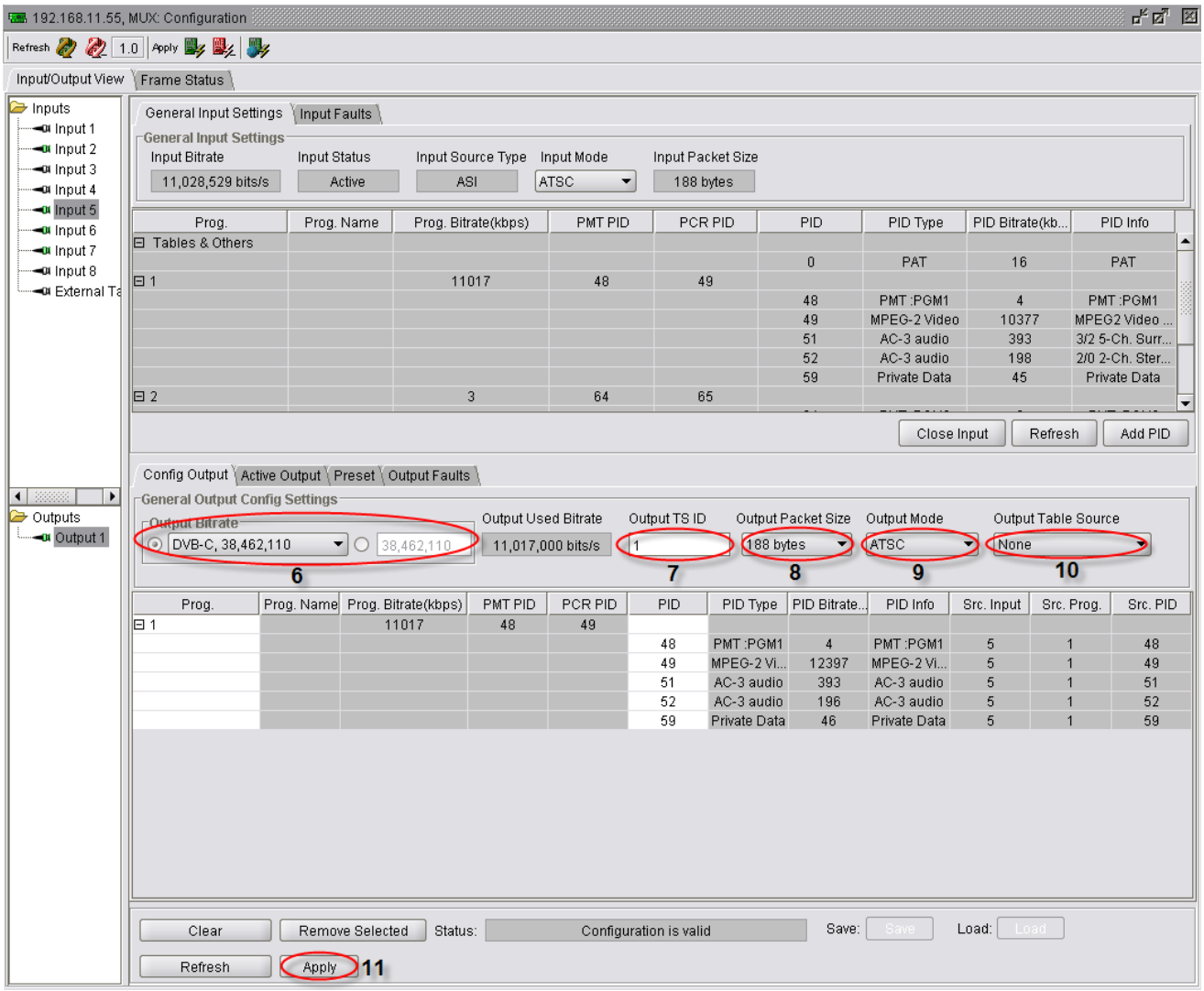

Figure 3-9: Identifying the Output Properties

3.2.6. Adding Individual PIDs to the MUX Output

If you wish to add individual PIDS to the MUX, select the PID from the list in the *General Input Settings* window and press the *Add PID* button. The input will be added to Output1. See Figure 3-10.

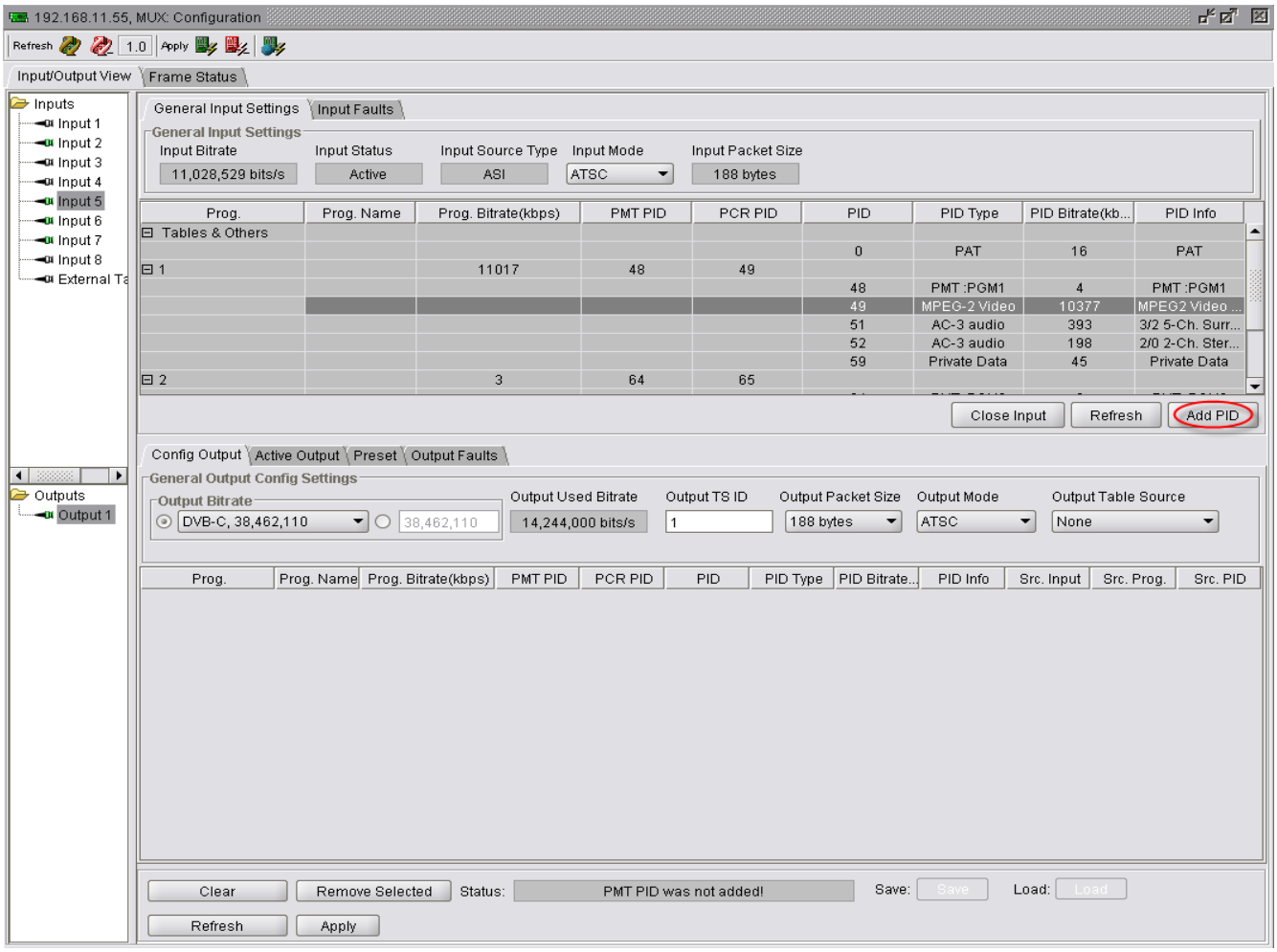

Figure 3-10: Adding PID to MUX Output

4. TECHNICAL DESCRIPTION

4.1. SPECIFICATIONS

4.1.1. Inputs and Outputs per switch

- 8 x ASI inputs per TR 101 891
  - Min ASI bitrate: 100 Kb/s per input
  - Max ASI bitrate: 200 Mb/s per input
- 2 x ASI outputs per TR 101 891 (Mirrored)
  - Min ASI bitrate: 100Kb/s
  - Max ASI bitrate: 100Mb/s

- 1 x RJ45 Input10/100/1000 for DVB-SI and ATSC PSIP

- 1 x RJ45 10/100/1000 control port

4.1.2. Processing

- PID re-mapping
- Basic table generation: PAT/PMT/NIT
- DVB-SI Table insertion up to 2Mb/s
- ATSC-PSIP Table insertion up to 2Mb/s

4.1.3. Electrical

Power: 41W

4.1.4. Physical

Number of Slots: 3

5. TROUBLESHOOTING

5.1. VLPRO DOES NOT DISPLAY THE 7780MUX8X2-ASI ALARMS

Refer to section 1 to connect directly to the board via the serial port. Once a connection has been established check and/or configure the SNMP settings with the correct VLPro Server IP address and ensure the community strings are correctly set. Refer to the network administrator if you are in doubt as to what these should be set to.

5.2. UPDATING VLPRO SERVER JAR FILE

Products from Evertz 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.

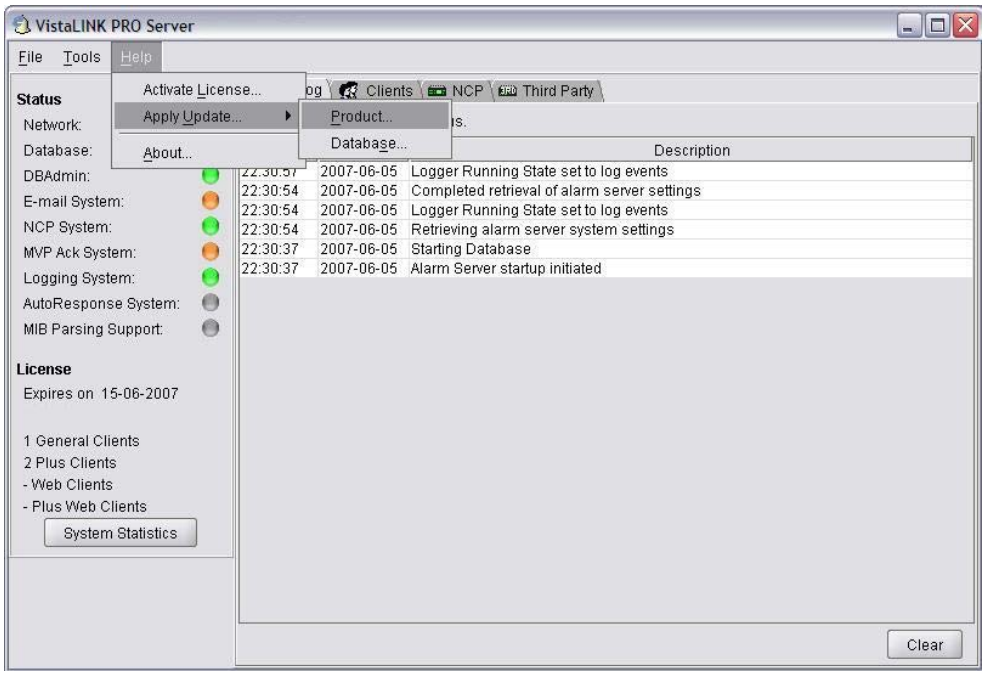

Figure 5-1: VistaLINK® PRO Server

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

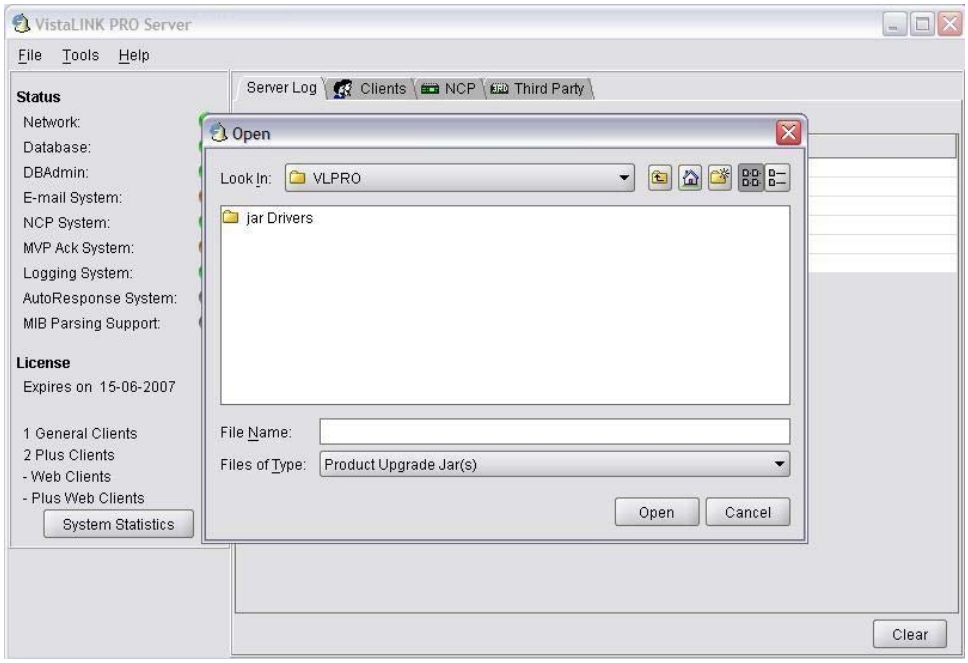

Figure 5-2: VistaLINK® PRO – Applying JAR Updates

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.

Shutdown the server by selecting from the menu: *File>Shutdown Server*. Now re-open the server, it is normal for the startup 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.

6. ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

BAT Bouquet Association Table
BER Bit Error Rate
BW Band Width
CA Conditional Access
CAT Conditional Access Table
CPE Common Phase Error
CRC Cyclic Redundancy Check
ETSI European Telecommunications Standards Institute
DC Direct Current
DVB Digital Video Broadcasting
DVB-C Digital Video Broadcasting baseline system for digital cable television (EN 300 429 [6])
DVB-CS Digital Video Broadcasting baseline system for SMATV distribution systems (EN 300 473 [13])
DVB-S Digital Video Broadcasting baseline system for digital satellite television (EN 300 421 [5])
DVB-T Digital Video Broadcasting baseline system for digital terrestrial television (EN 300 744 [9])
EIT Event Information Table
ETR ETSI Technical Report
ETS European Telecommunication Standard
FEC Forward Error Correction
GOP Group of Pictures
HEX Hexadecimal
ISO International Organization for Standardization
ITU International Telecommunication Union
MGT Master Guide Table
MPEG Moving Picture Experts Group
NIT Network Information Table
PAT Program Association Table
PCR Program Clock Reference
PID Packet Identifier
PMT Program Map Table
PSI MPEG-2 Program Specific Information (as defined in ISO/IEC 13818-1 [1])
PSIP Program and System Information Protocol
PTS Presentation Time Stamps
RS Reed-Solomon
RST Running Status Table (see EN 300 468 [7])
RTE Residual Target Error
SDT Service Description Table
SI Service Information
TDT Time and Date Table
TOT Time Offset Table
TS Transport Stream
UTC Universal Time Co-ordinated

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