TSMIP-10GE
IP Transport Stream Monitor

User Manual

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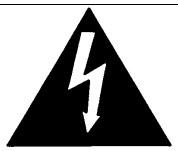
IMPORTANT SAFETY INSTRUCTIONS

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

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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

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

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

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

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

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

CE

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

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

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

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

WARNING

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

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

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Jun 2016

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1. OVERVIEW

The TSM (Transport Stream Monitor) line of products is a complete software based solution for compressed network monitoring. By monitoring the MPEG Transport Stream at strategic points within the distribution network, in conjunction with the industry leading VistaLINK® PRO NMS (Network Management System), the TSM-IP10GE offers service providers the tools to continuously and effectively have the confidence that their IP signals within any IPTV, Satellite, terrestrial or cable network is being delivered properly.

The TSM-IP 10GE can monitor up to 256 transport streams. It can monitor MPEG2 or H.264 content and can in real time separate encoder errors from network delivery errors allowing the operator to act quickly and avoid down time. The industry leading Evertz® VistaLINK® PRO NMS offers a new dimension to TS monitoring by allowing a graphical customization of any measurement performed and a quick viewing of the different points in the system. It makes the TSM probe system a valuable system in any operational environment.

Features & Benefits

- 10G inputs (Over 2 SFPs)
- IGMP v1, v2, v3 subscription and IP layer monitoring including MDI
- Real-time T-STD buffer analysis
- Transport Stream analysis:
    - Presence, Bitrate analysis, table rate analysis
    - TR101290 Level 1, level 2*, and partial level 3
- Complete TS and PID bitrate measurement from 100kb/s to 200Mb/s with settable limits
- Display of Transport Stream tree (PID Tree View)
- Program Properties (Name, Program ID, etc.)
- Video/Audio/Data Component Properties (PID, Type, Codec, Bitrate, Resolution, Sampling Rate, etc.)
- Matching of PID assignment with pre-defined PID list and TSID verification
- Fully Integrated with the Industry leading Evertz® VistaLINK® PRO NMS
- Auto-Response Scripting Capability
- Comparing of same stream at different location in network
- SNMP-enabled (control and alarms for monitoring)
- Complete customization of status view and error report in VistaLINK® PRO
- Built-in frame controller for control
- Dense Multi Service Ingest, NFS Server & Client

*Only PCR accuracy and PCR repetition rate supported at this time. No jitter measurement.

Figure 1-1 : TSMIP-10GE Front and Rear Panel

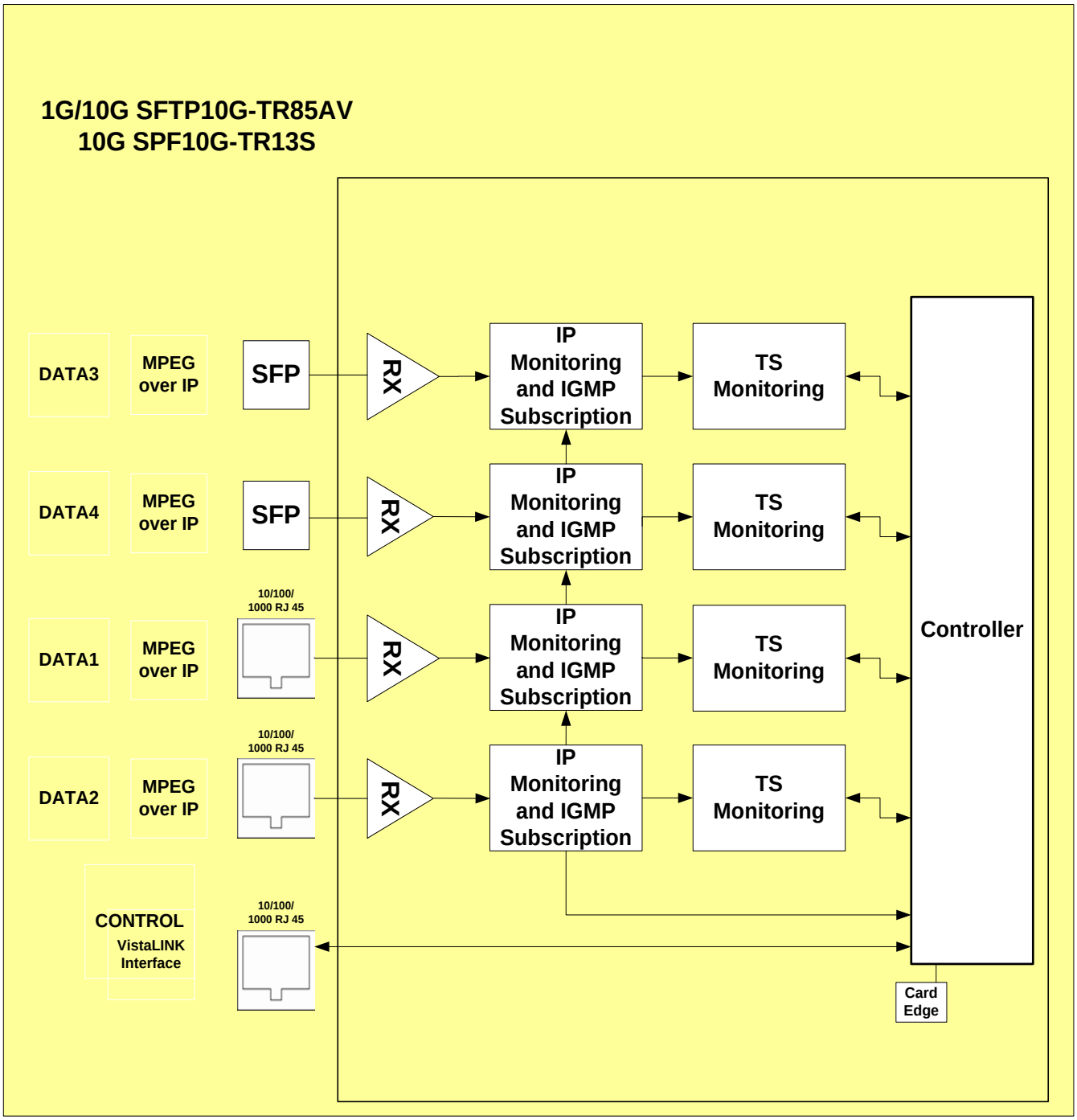

Figure 1-2 : TSMIP-10GE Block Diagram

Note: The 10GE ports currently support up to 5 Gb/s per port.

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2. SPECIFICATIONS

2.1. INPUTS AND OUTPUTS

- 2xRJ45 10/100/1000 Data Ports
- 2x10GbE SFP Input
- 2xRJ45 10/100/1000 control port

2.2. SFP SUPPORTED TYPES

- SFP1G-TR13 SFP Optical Transceiver, 1.25Gbs, 1310mm, SMF, 20km
- SFP1G-TR15S SFP Optical Transceiver, 1.25Gbs, 1550mm, SMF, 40km
- SFP1G-TR15H SFP+ Optical Transceiver, 1.25Gbs, 1550mm, SMF, 80km
- SFP10G-TR13-A SFP Optical Transceiver, 10Gbs, 1310nm, SMF, 10km
- SFP10G-TR15S SFP+ Optical Transceiver, 10Gbs, 1550nm, SMF, 40km

2.3. MPEG-2 TS MEASUREMENTS

TR101290 P1	TR101290 P2	TR101290 P3 (DVB)	TR101290 P4 (ATSC)
1.1 TS_sync_loss	2.1 Transport_error	3.1 NIT_repetition	3.1 MGT_repetition
1.2 Sync_byte_error	2.2 CRC_error	3.2 NIT_error	3.2 TVCT_repetition
1.3 Pat_error	2.3 PCR_error	3.3 Unreferrenced_PID	3.3 CVCT_repetition
1.4 Continuity_count_error	2.4 PCR_accuracy_error	3.4 SDT_repetition	3.4 EIT_repetition
1.5 PMT_error	2.5 PTS_error	3.5 SDT_error	3.5 RRT_repetition
	2.6 CAT_error	3.6 EIT_repetition	3.6 STT_repetitiion
		3.7 EIT_error	
		3.8 RST_repetition	
		3.9 RST_error	
		3.10 TDT_repetition	
		3.11 TDT_error	

Table 2-1 : MPEG-2 TS Measurements

2.4. ELECTRICAL

Power: 920W

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3. INSTALLATION OF TSMIP-10GE

Upon unpacking, the user should find:

1 x TSMIP-10GE
2 x Power cords contained in a plastic bag
2 x Mounting brackets contained in a plastic bag

Remove the power cords from their package and connect each one to one of the two black power cords on the rear plate of the TSMIP. Then connect the other end of each power cord to a power source that meets product requirements. Connecting to a power source should automatically power the device on.

If there was a problem, pressing the Power button manually should power on the unit.

3.1. CONFIGURE IP INTERFACES TO THE TSMIP

a. Connect RS 232 cable to the TSM and set 115200 bitrate. Login and password is “customer”.

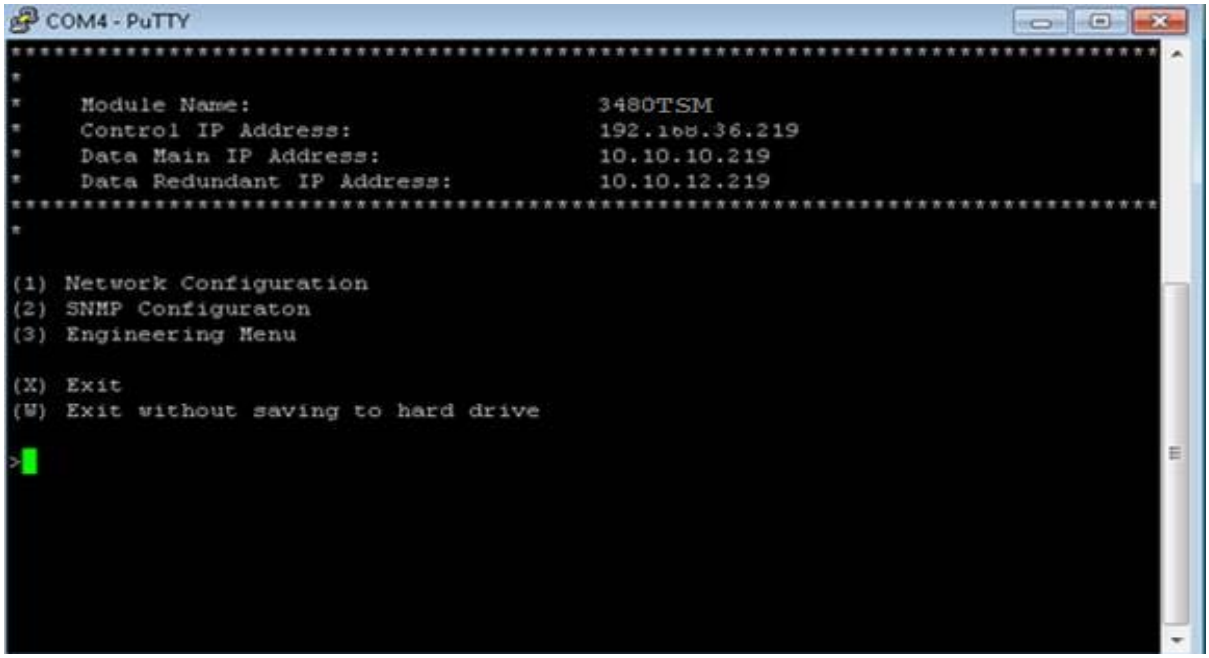

Figure 3-1 : Configure IP Interfaces to the TSMIP

b. Type 1 to open Network Configuration menu.

c. Type 1 to open Control port menu.

d. Type 2 to set IP address.

e. Type 4 to set Gateway.

f. Type x to exit Control port menu.

g. Type x to exit Network Configuration menu.

h. Type x to exit and save configuration.

i. The same steps can be done for Data 1 (Data Main) and Data 2 (Data Redundant) interfaces

j. All other Data ports must be configured through VLPro

3.2. SET UP INPUTS AND OUTPUTS

1. Connect the Ethernet cable to the CONTROL Ethernet ports on the rear panel and the other end to an Ethernet switch. See Figure 3-2.

2. Connect Ethernet cables to desired ports and the other end to the Ethernet switch. User can connect to 10GE ports.

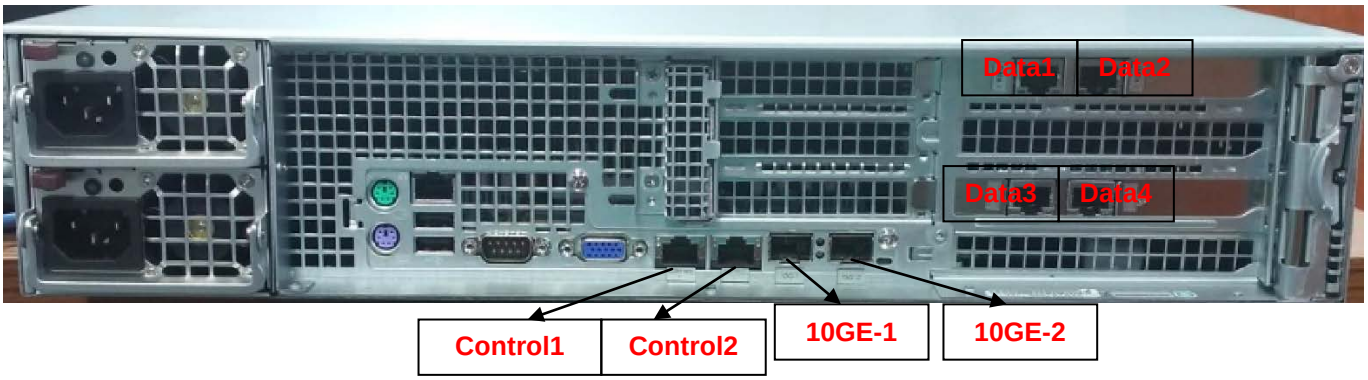

Figure 3-2 : TSMIP-10GE Rear Panel

Control 1&2: These connectors allow the TSMIP to be able to communicate with the computer, allowing for the user to control the TSM through the interface of choice.
Note: Control 2 is not used.

Data1: Data Port 1

Data2: Data Port 2

Data3: Data Port 3

Data4: Data Port 4

10GE-1 and 10GE-2: To access the 10GE Data port, connect a full duplex fiber cable to the 10GE1 and 10GE2 SFP ports on the rear panel. See specifications on the SFP modules that need to be inserted before fiber connections can be made.

3.3. CONNECTING DEVICE TO COMPUTER

a. Plug in a standard Ethernet cable (Cat 5e) from computer's Ethernet port to the Ethernet switch where the TSMIP is connected.

b. Power On the device.

c. On the computer screen, select "Start" in the bottom left corner. Then select "Control Panel". Search for the "Network and Sharing Center" icon and double click it. Double click on "Change adapter settings". Select "Local Area Connection" and click the "properties" button. Following that, select "Internet Protocol (TCP/IPv4)" and click the "properties" button again. Select the button labelled "Use the following IP address" and click "ok". Enter in an IP address that is on the same subnet as the TSMIP with the same subnet mask and gateway.

d. Now check communication with the device. Select "Start" in the bottom left corner of the computer screen. Then select "Run..." and in the space provided enter "cmd" followed by clicking the "ok" button. In the command prompt type "ipconfig" and push the Enter key, this will confirm the IP address has been set on your computer. Type in "ping" followed by the IP address of the TSMIP and press the Enter key again; if the IP address replies then you are connected. If "Request timed out" appears then there is a network problem.

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4. VISTALINK® PRO CONFIGURATION

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 TSMIP-10GE jar file to the server and both the client and server applications have been restarted. If you are the network administrator refer to section 5.1 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 "+" symbol. The TSMIP-10GE should appear as a newly listed device with the IP address used to configure the card. 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).

Note: If after a couple of minutes the card has still not appeared, select *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 grayed out for a moment while VLPro finds the card and confirms its configuration.

Please consult the network administrator if the user continue to have problems connecting the card with VLPro, alternatively contact Evertz Microsystems Ltd. or the authorized reseller for technical support.
Under device IP (3480FR) there are three different types of menus:

- **TSMIP Frame:** This section is used for general settings like: Status, Ethernet Ports, and SNMP Configuration etc.
- **TSM General:** This section is used for general settings like Card Status and Card Controls.
- **TSM Input:** This section is used for Input Configuration

Figure 4-1 : Tree View

4.1. TSMIP FRAME

4.1.1. Status

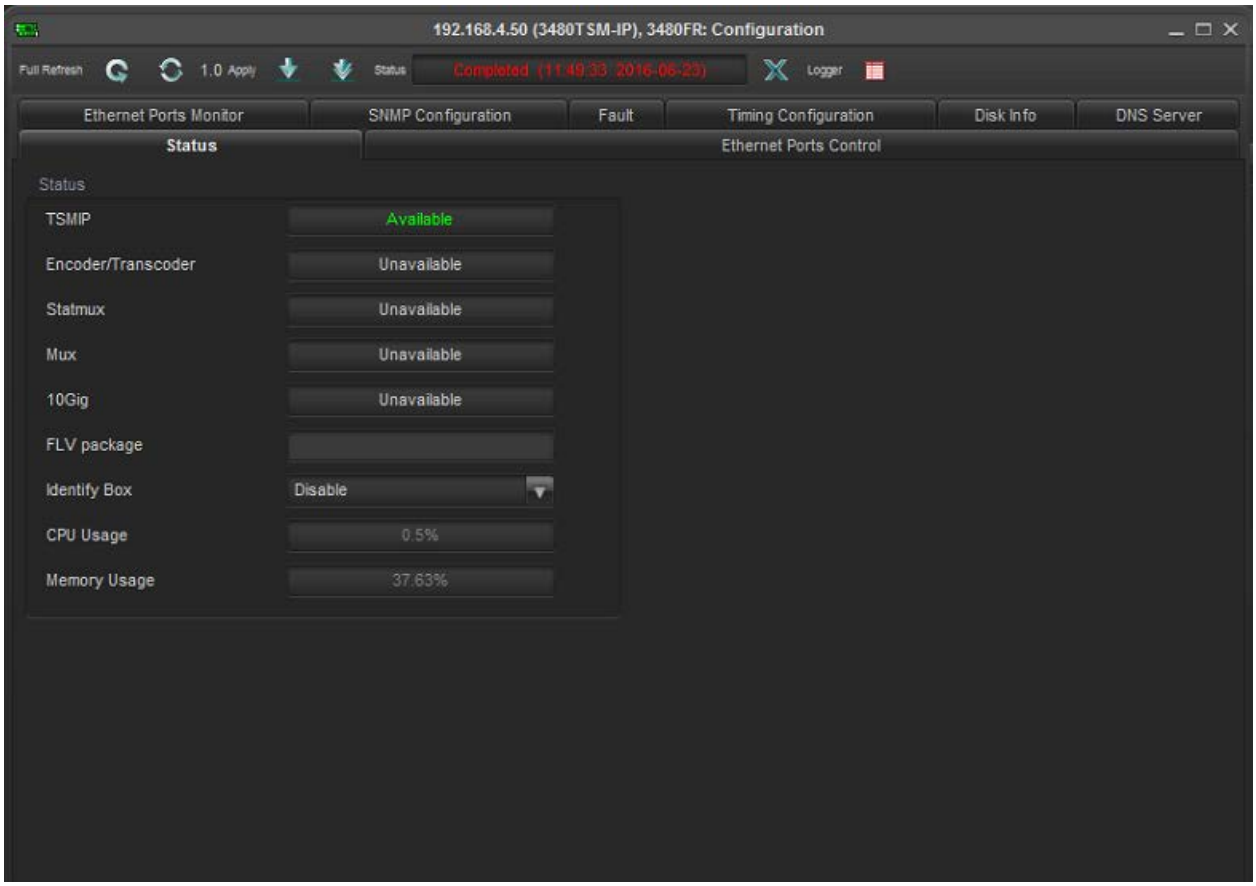


Figure 4-2 : VistaLINK® PRO Hardware Configuration-Status Tab

The Status tab indicates the current status of the module including firmware installed on the box and CPU and memory usage in percentage.

4.1.2. Ethernet Ports Control

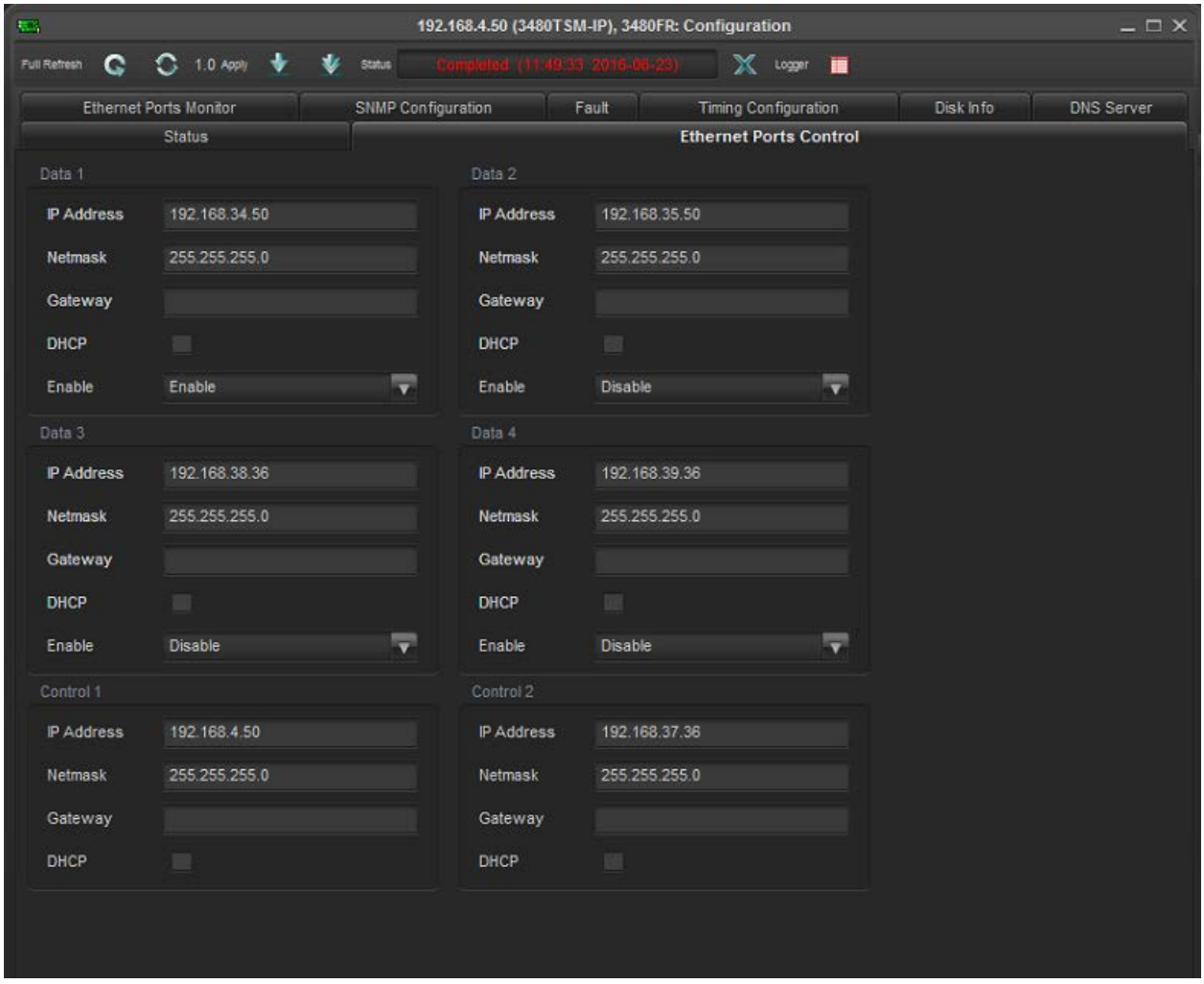


Figure 4-3 : VistaLINK® PRO Hardware Configuration - Ethernet Ports Control Tab

This tab allows Mapping on the rear of the TSMIP to VLPro data port configurations. **Control Port 2 is not used**.

Control Port 1	Control Port 2	Data Port 1	Data Port 2	Data Port 3	Data Port 4
Control	NA	DATA1	DATA2	DATA3	DATA4

Table 4-1 : VistaLINK® PRO Mapping to Rear to TSMIP-10GE

IP Address: Self IP address of the port.

Netmask: The Netmask address which is 255.255.255.0 by default.

Gateway: Gateway IP address for this port.

DHCP: This check box can be enabled or disabled.

4.1.3. Ethernet Ports Monitor

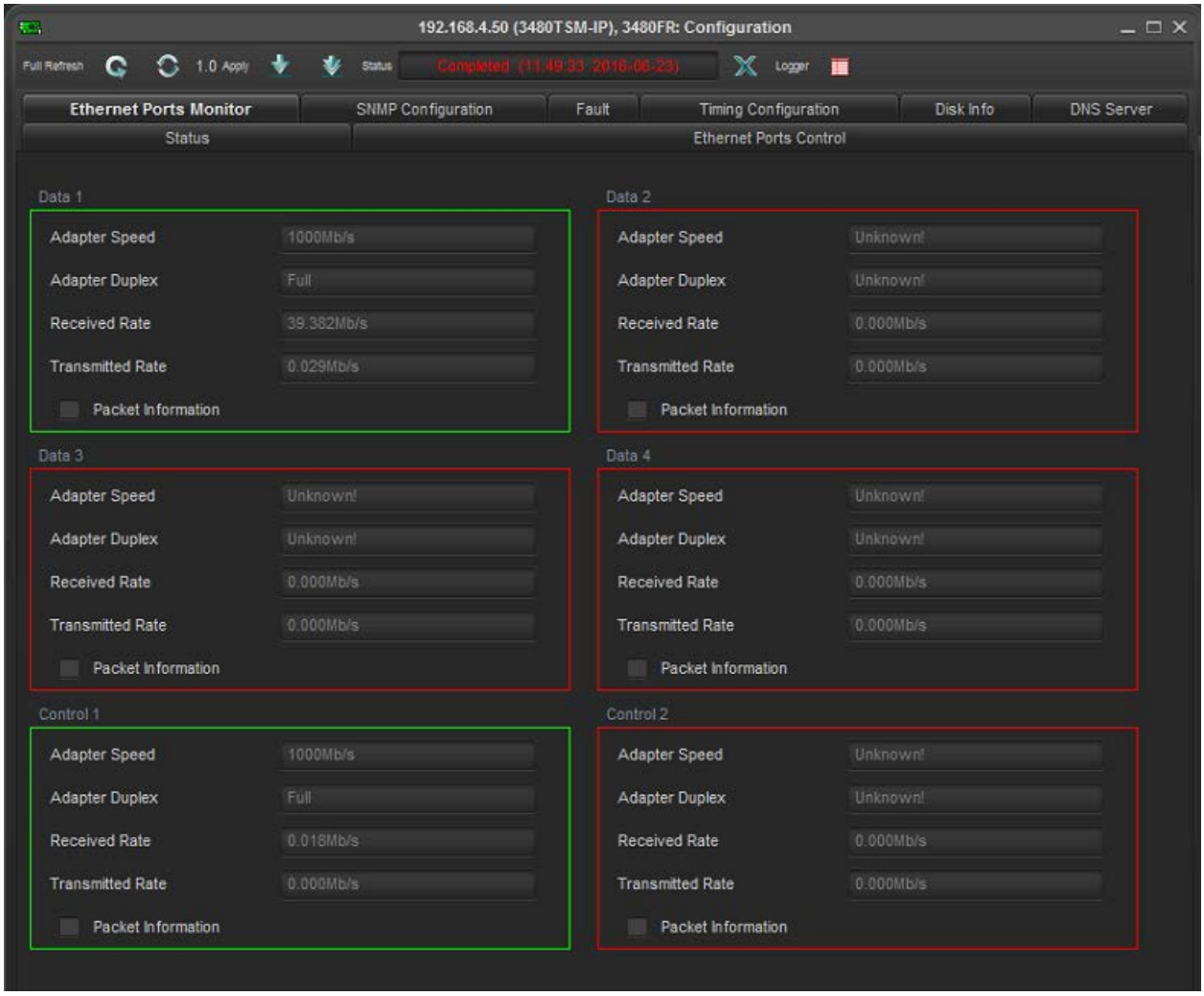


Figure 4-4 : VistaLINK® PRO Hardware Configuration - Ethernet Ports Monitor Tab

The “Ethernet Ports Monitor” tab indicates the current status of the Ethernet ports.

4.1.4. SNMP Configuration

This tab is used to configure the traps Destination IP addresses.

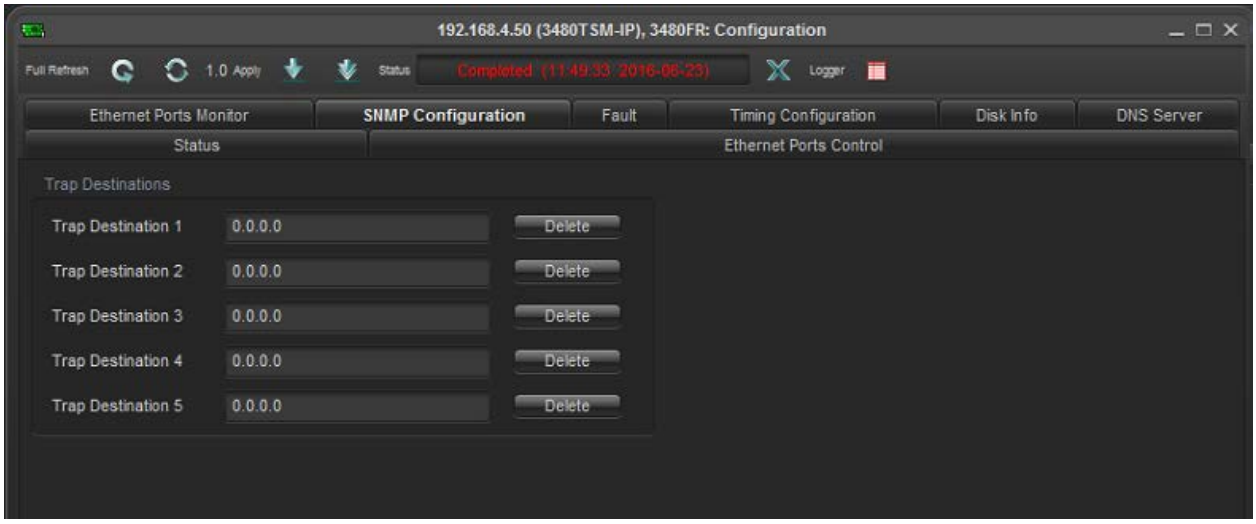


Figure 4-5 : VistaLINK® PRO Hardware Configuration – SNMP Configuration Tab

Trap destination 1-5: The user can define IP addresses of VLPro server where SNMP traps will be sent.

4.1.5. Fault Tab

This tab indicates status of the ports and also allows the user to enable/disable traps to be sent upon fault detection.

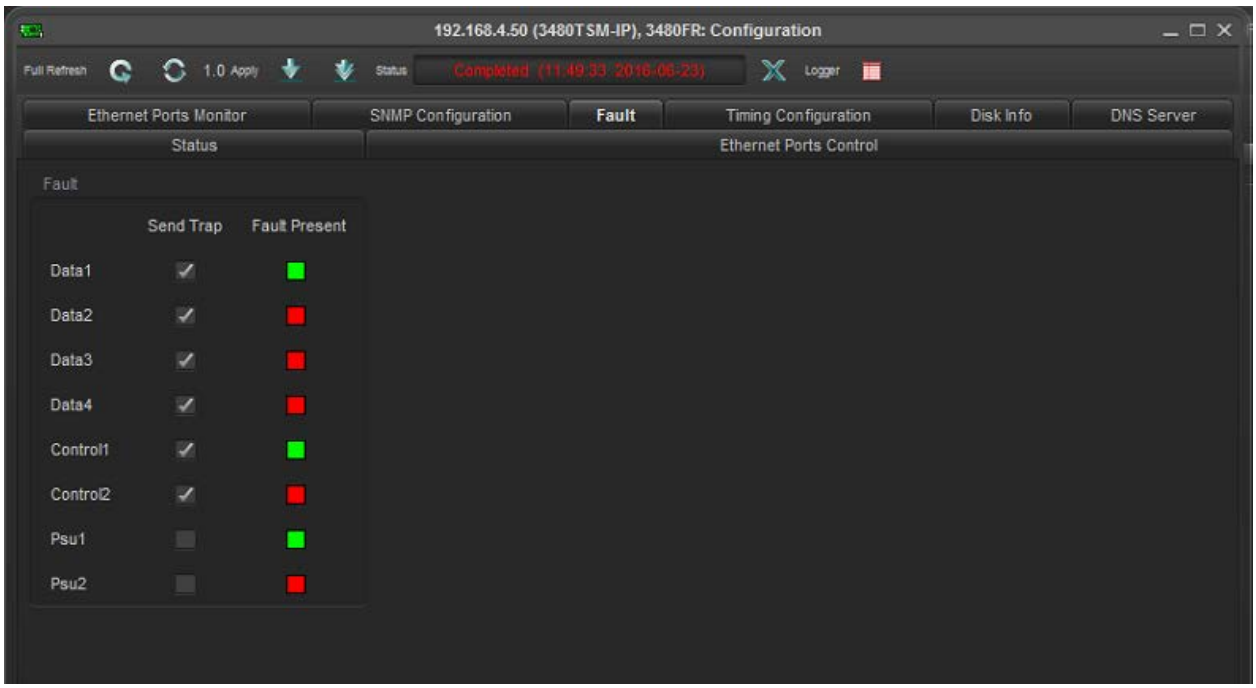


Figure 4-6 : VistaLINK® PRO Hardware Configuration – Fault Tab

4.1.6. Timing Configuration

This tab allows the user to configure time specifications.

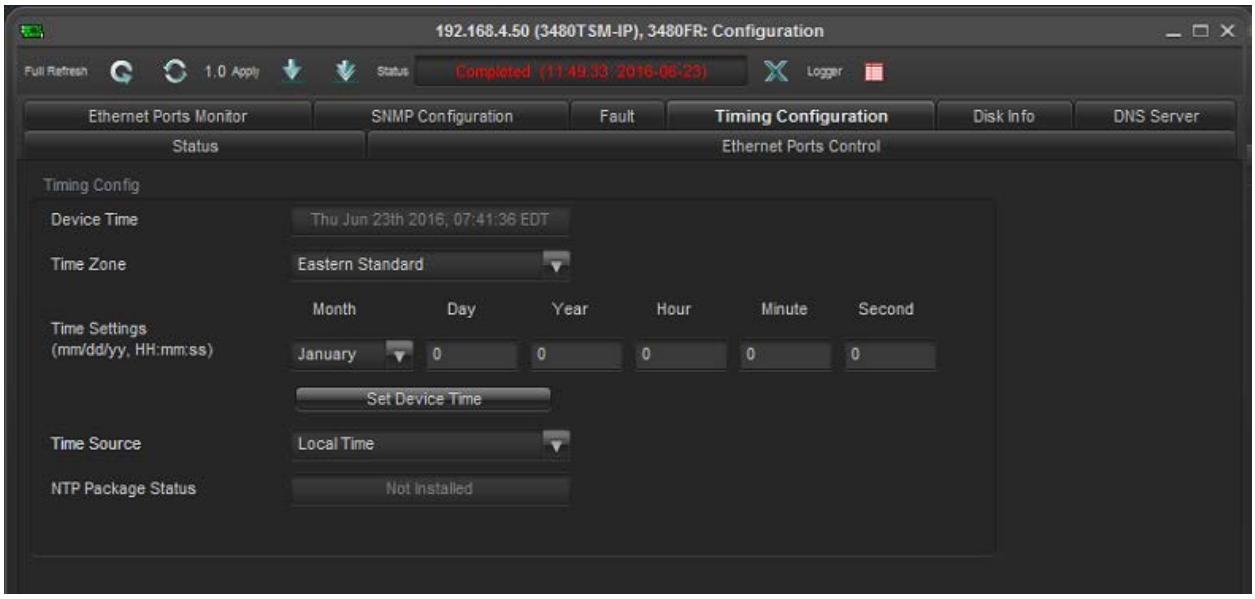


Figure 4-7 : VistaLINK® PRO Hardware Configuration – Timing Configuration Tab

4.1.7. Disk Info

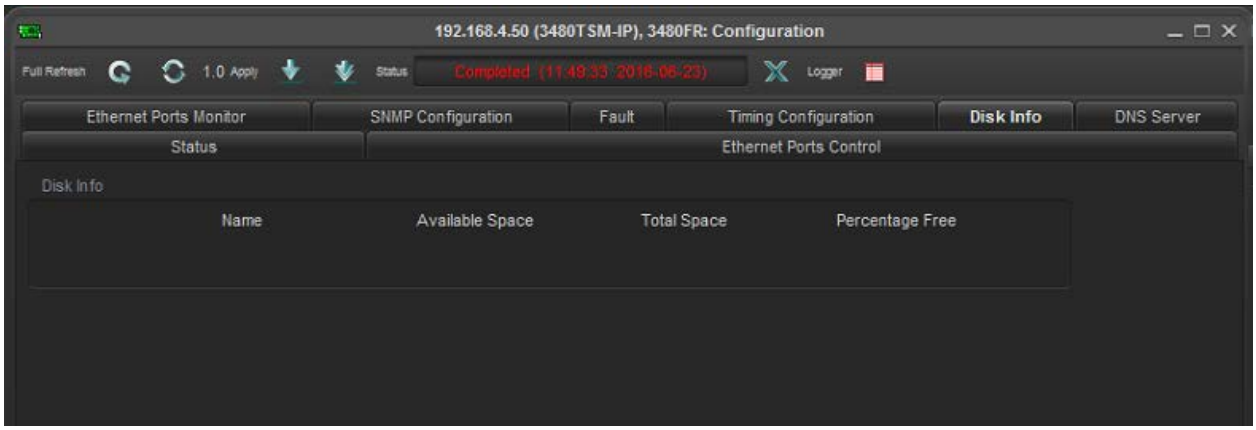


Figure 4-8 : VistaLINK® PRO Hardware Configuration – Disk Info

The functionality of this section will be added in the future.

4.1.8. DNS Server

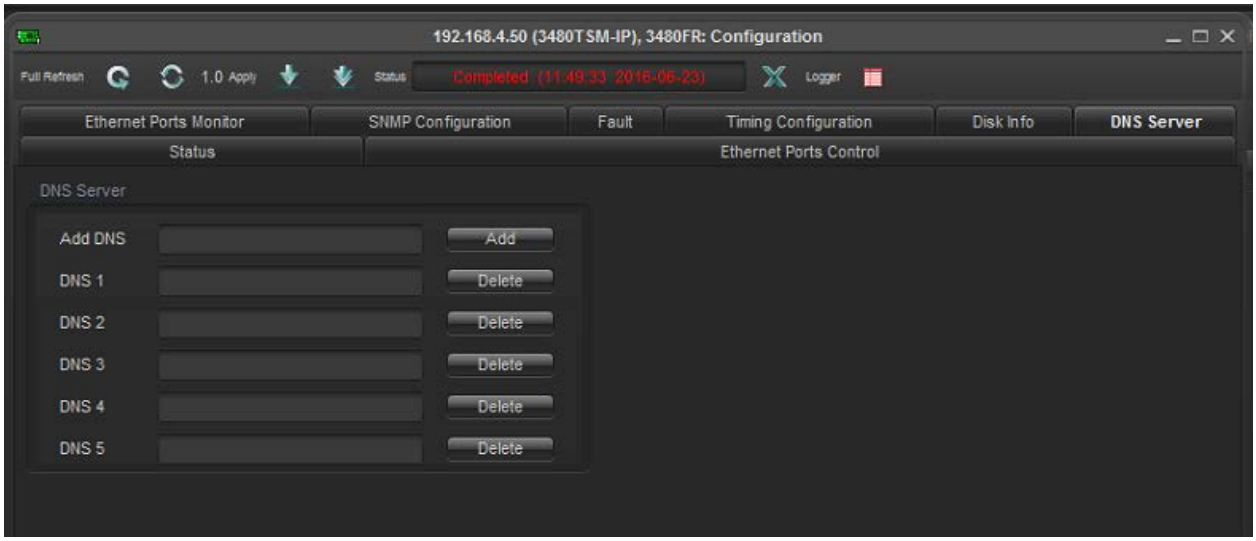


Figure 4-9 : VistaLINK® PRO Hardware Configuration – DNS Server

The functionality of this section will be added in the future.

4.2. TSMIP GENERAL

Right-click on the "TSM General" on hardware tree and select *View Configuration*.

4.2.1. General

The configuration parameters for the IP inputs are displayed in the mapping table of General view. This view provides an overview of all the streams configured on the box and also allows for quick configuration modifications. After any change (e.g. IP Address), clicking 'apply' will make the change effective immediately.

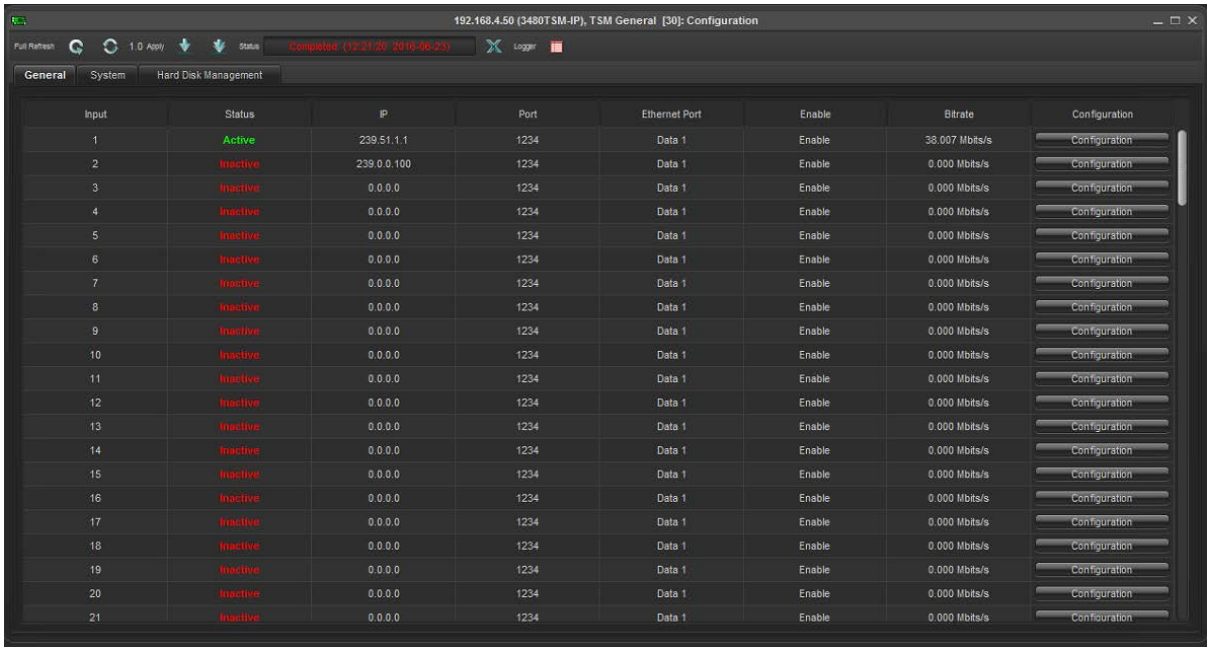


Figure 4-10 : VistaLINK® PRO General Configuration – General

Mapping Table Columns

Input: Displays the index number of each IP input.

Status: This field indicates the status of input.

IP: Control to set the Source IP address (Multicast/Unicast) of each IP input.

Port: Control to set the Transport Protocol port of each IP input.

Ethernet Port: Control to select the DATA GigE for each IP input.

Enable: Control to Enable/Disable each IP input.

Bitrate: Displays the bitrate value (Mbit/s) of the monitored MPEG-2 TS.

Configuration: By clicking the Configuration button, the user can make TSM Input configurations as is explained in 4.3.

Sync

By clicking Sync button on the top of **IP**, **Port**, **Ethernet Port** and **Enable** columns, the information in the first field will be copied to the rest of the column. This facilitates lesser manual entries. Increment option is also available for IP and Port columns where in upon sync, the IP address and ports could be automatically synced incremented based on the first value (Figure 4-11).

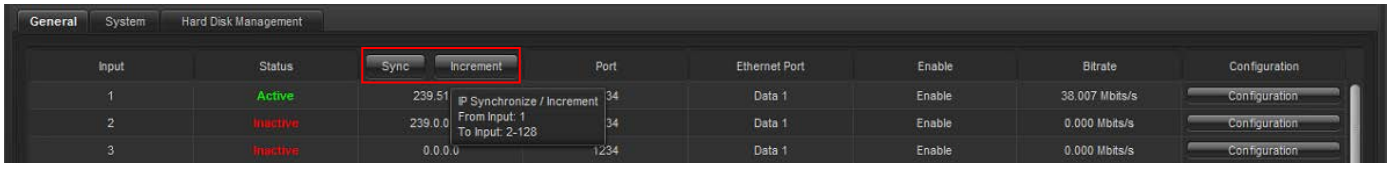


Figure 4-11 : VistaLINK® PRO General Configuration – Sync Option

4.2.2. System

This tab shows the device type and also allows the user to Reboot the device if needed.

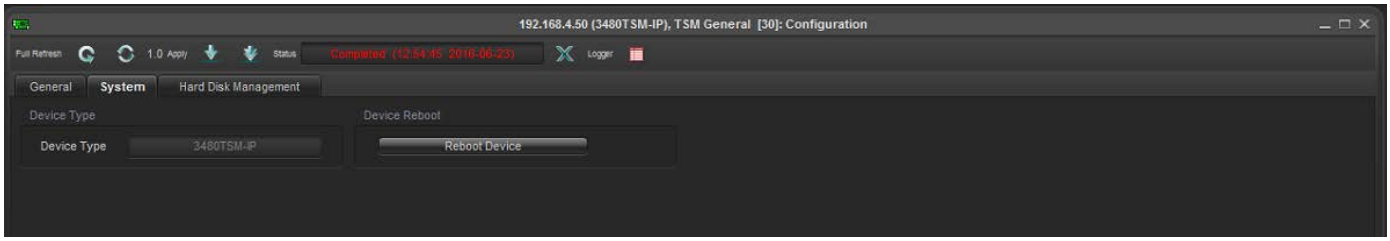


Figure 4-12 : VistaLINK® PRO General Configuration – System

4.2.3. Hard Disk Management

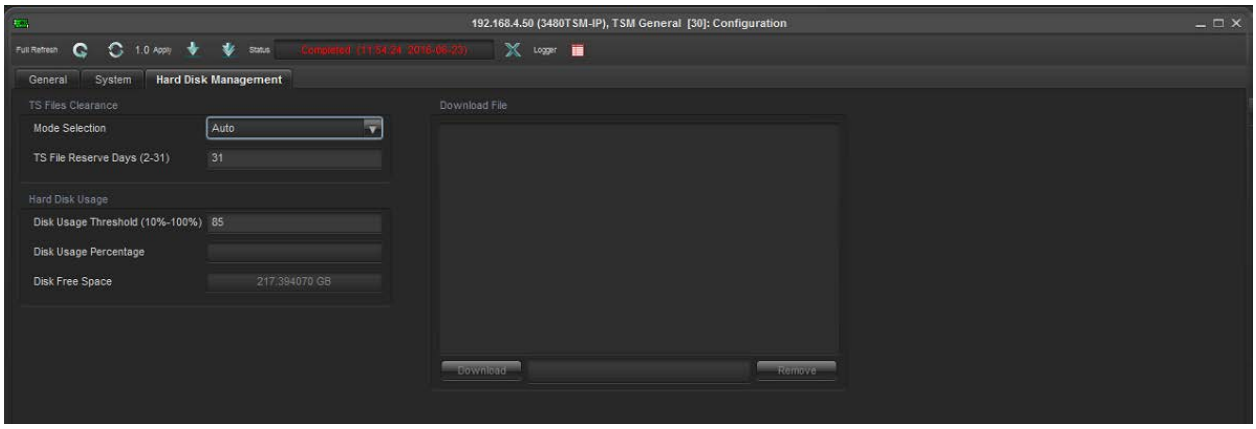


Figure 4-13 : VistaLINK® PRO General Configuration – Hard Disk Management

This tab allows the user to have a management on Hard Disk specifications such as TS file reserve days, Data usage and percentage and also free space. This functionality is currently under development and will be available in future releases.

4.3. INPUT CONFIGURATION

Right click on the Input and select view configuration to access the “Configuration” different tabs. This functionality could also be accessed using the ‘Configure’ button in the General Tab as explained earlier in section 4.2.1

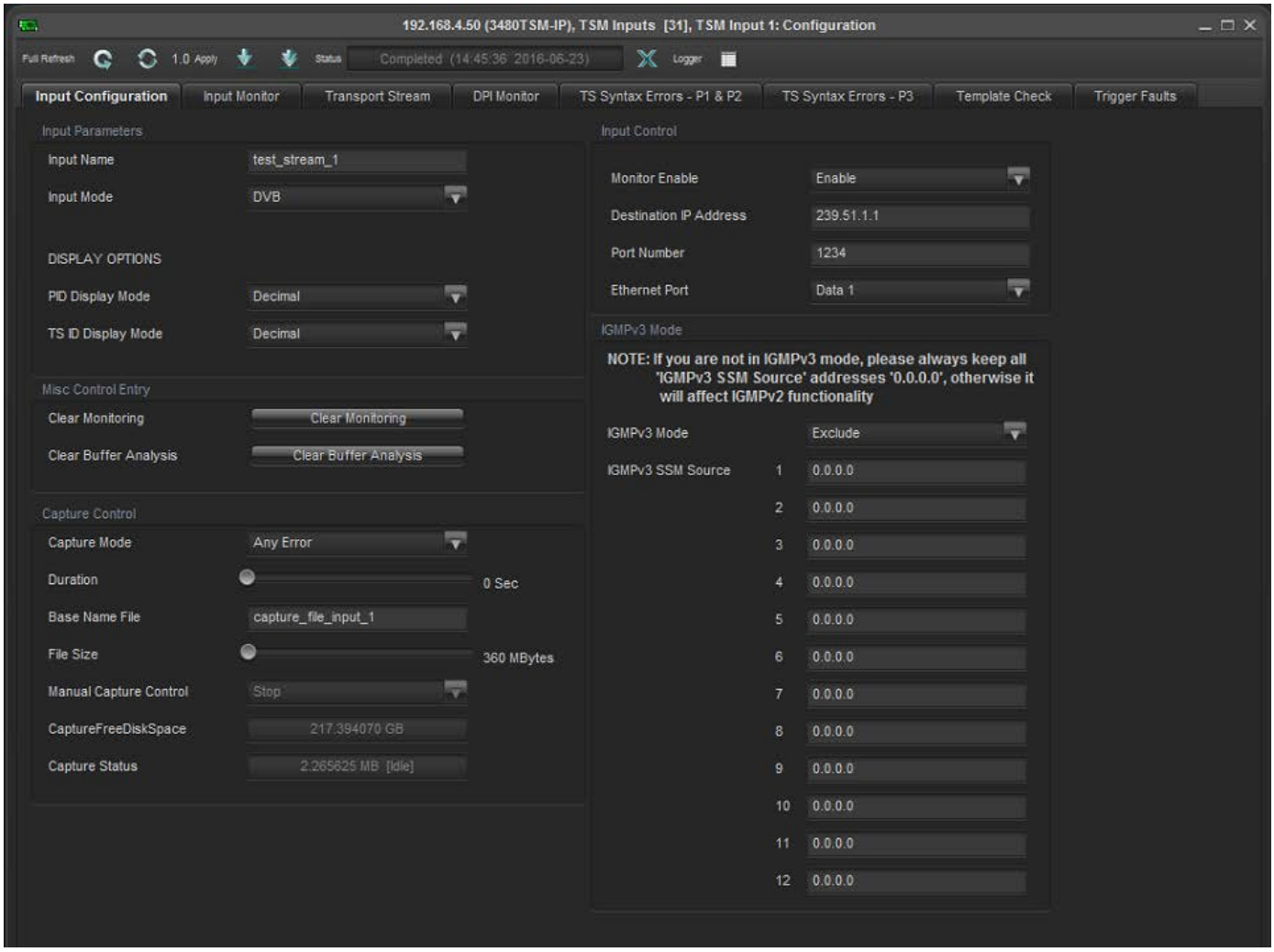


Figure 4-14 : VistaLINK® PRO Input Configuration Tab

4.3.1. Input Configuration

Input Parameters

Input name: This field allows the user to define an easily identifiable and user configurable name to the stream.

Input Mode: This drop down menu allows the user to define the input mode of the stream. Possible options are ATSC, DVB and MPEG.

PID Display Mode: This drop down menu allows the user to choose the Display Mode of stream.

TS ID Display Mode: This drop down menu allows the user to choose the TS ID Display Mode of stream.

Misc Control Entry

Clear Monitoring: This control allows the user to clear the recorded statistics for the Max and Min bitrates as well as reset the error counts for all Priority1, 2 and 3 Syntax Errors.

Clear Buffer Analysis: The functionality of this tab will be added in the future.

Capture Control

Capture Mode: The TSMIP features the function to record the TS which is monitored based upon configurable triggers. This drop down menu allows the user to select the capture mode. Possible options are Manual, Any error, P1 Error, P2 Error, P3 Error and OFF.

Duration: This control allows the user to set the capture duration for recording a stream. The final recorded file size will be limited by the setting of the **file size** or duration (which ever comes first). The unit of duration is in seconds. The maximum is 1 hour-length.

Base Name File: This control allows the user to set the file base name for a stream. The maximum length of the octet string is 256 characters. The real name of the captured stream will be base name file Plus timestamp.

File Size: This control allows the user to set the maximum size of file when recording a stream into a file. The final recorded file size will be limited by the setting of the **file size** or duration (whichever comes first). Maximum size is 360 and the unit is measured in Mega bytes.

Manual Capture Control: This control allows the user to manually record the stream. If the user does not stop the recording, the recording will stop when file size reaches maximum.

Capture Free Disk Space: This field displays the storage size available for additional capture. The unit is in Giga bytes.

Capture Status: This field displays the capturing process progression. The unit is in Mega bytes.

Input Control

Monitor Enable: This drop down menu allows the user to enable or disable individual inputs to stop alarm generation. This stops all alarms from the TSMIP being sent to the VLPro Server.

Desination IP Address: This field allows the user to enter the destination IP address (Unicast/Multicast) which wants the TSMIP to monitor.

Port Number: This filed allows the user to enter the destination port number for the IP address which is entered above.

Ethernet Port: This drop down menu allows the user to select the GigE port to be used to receive the stream to be monitored. Possible options are Data 1, Data 2, Data 3 and Data 4.

IGMPv3 Mode

IGMPv3 Mode: IGMP is the protocol used by IPv4 systems to report their IP multicast group memberships to neighbouring multicast routers. Version 3 of IGMP adds support for “source filtering” which is the ability for a system to report interest in receiving packets “only” from **specific source addresses**, sent to a

particular multicast address. This information is to be used by multicast routing protocols to avoid delivering multicast packets from specific sources to network where there are no interested.

This drop down menu allows the user to set the IGMPv3 mode to *Include* or *Exclude* Source address(es) defined.

IGMPv3 SSM Source: This control allows the user to enter the Source Specific Multicast (SSM) IP address. Up to twelve SSM could be configured for the same Multicast Group.

4.3.2. Input Monitor

The input monitor tab provides the user an overview of the input status.

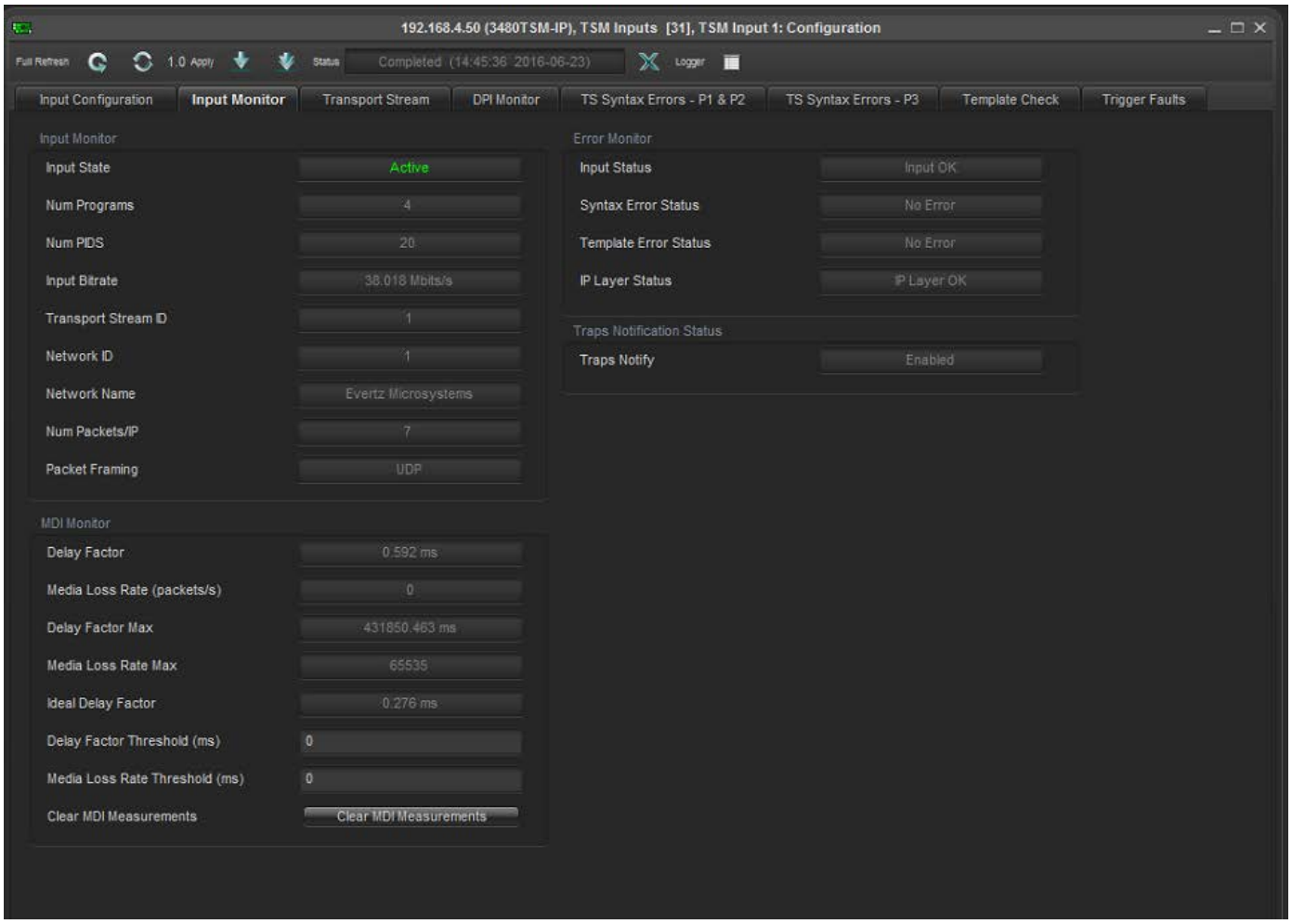


Figure 4-15 : VistaLINK® PRO Input Configuration- Input Monitor Tab

Input Monitor Entry

Input State: This filed shows the current state of input. It can be either Active or Inactive.

Num programs: This field shows the number of programs that can be found in the stream.

Num PIDS: This field shows the total number of individual PIDs found in the stream. It includes all ghost PIDs and Null packets.

Input Bitrate: This field shows the current bit rate of the input ASI stream.

Transport Stream ID: This field shows the decimal value for the input stream. For example, corresponds to one satellite transponder.

Network ID: This field shows the decimal value for Transport Stream Network ID. For example, corresponds to one entire satellite of transponders.

Network Name: This field shows the network name if it is available.

Num packets/IP: This field displays the number of MPEG packets per IP packet.

Packet Framing: This field displays the type of framing being used. It can be either UDP or TCP.

MDI Monitor

Delay Factor: The Delay Factor is the maximum difference measured between the arrivals of each packet over a one second period. The value shown is measured in milliseconds and represents the delay factor in the last second.

Media Loss Rate (packets/s): This field displays the media loss rate. This is defined as the number of lost or out-of-order media packets per second. This is measured using the continuity count in the MPEG header.

Delay Factor Max: This field indicates the maximum number of Delay Factor which is measured in milliseconds.

Ideal Delay Factor: This field displays a calculated value representing the ideal delay factor in milliseconds, which depends on the stream bitrate and the available bandwidth of the network (Up to 200 Mb/s for the TSM).

Delay Factor Threshold (ms): This field shows a user definable value in milliseconds. When the value is exceeded an SNMP trap will be sent to VLPro providing notification that the stream has exceeded the preset Delay Factor Threshold value.

Media Loss Rate Threshold (ms): This field shows a user definable value in milliseconds. When the value is exceeded an SNMP trap will be sent to VLPro providing notification that the stream has exceeded the preset Media Loss Rate Threshold value.

Clear MDI Measurements: By clicking the button, all the MDI measurements will be reset.

Error Monitor

Input Status: This field shows a system message to notify the user if the input is a valid IP or not.

Syntax Error Status: This field shows a system message to notify the user if any of the ETSI TR 101 290 P1/P2/P3 monitoring tests are currently in an alarm condition. The tests which have been checked (Fault Monitor) are displayed here. The determination of the severity can be selected on the syntax tabs.

Template Error Status: This field shows a system message to notify the user if the TS input does not comply with the template parameters entered in the Input Configuration Window TS.

IP Layer Status: This field shows a system message that displays the current status of the IP layer. If the IP address and port number has been correctly entered and the stream is available, this field shows that the IP layer is OK.

4.3.3. Transport Stream

Where the Transport Stream Parameters are displayed using trees for which the branches can be expanded or collapsed by pressing respectively the “+” or “-“sign.

Selecting the “+” beside the PID tree root, will drill down to the PSI/SI “Tables & Others” and Programs sub-tree. Selecting the “+” beside “Tables & Others” will drill down to tables (PAT, PMT, SDT,) submenu. Each table submenu will drill down to the table descriptors.

Selecting the “+” beside each program will drill down to the Elementary Streams (ES) submenu. Each will drill down to the ES descriptors.

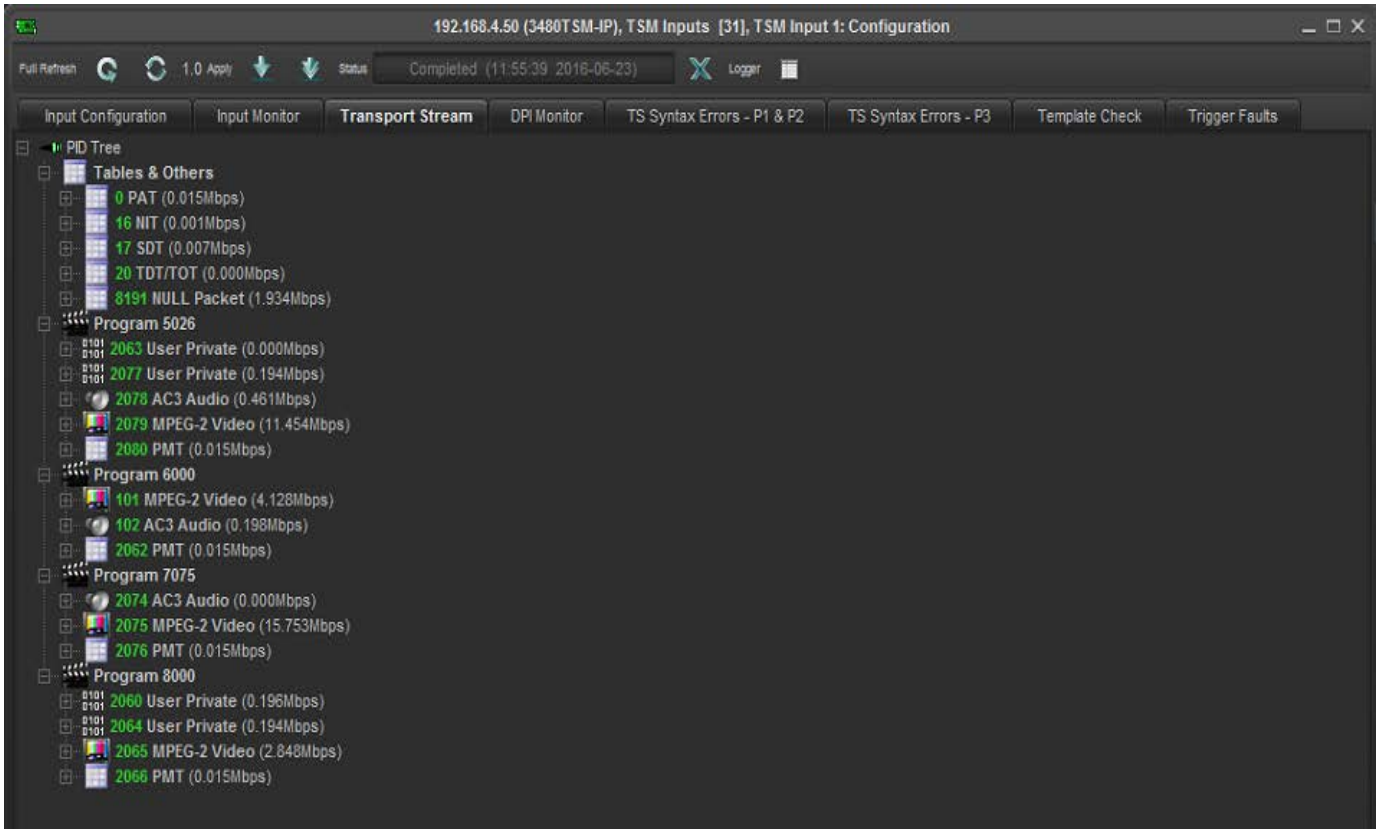


Figure 4-16 : VistaLINK® PRO Input Configuration - Transport Stream Tab

4.3.4. DPI Monitor

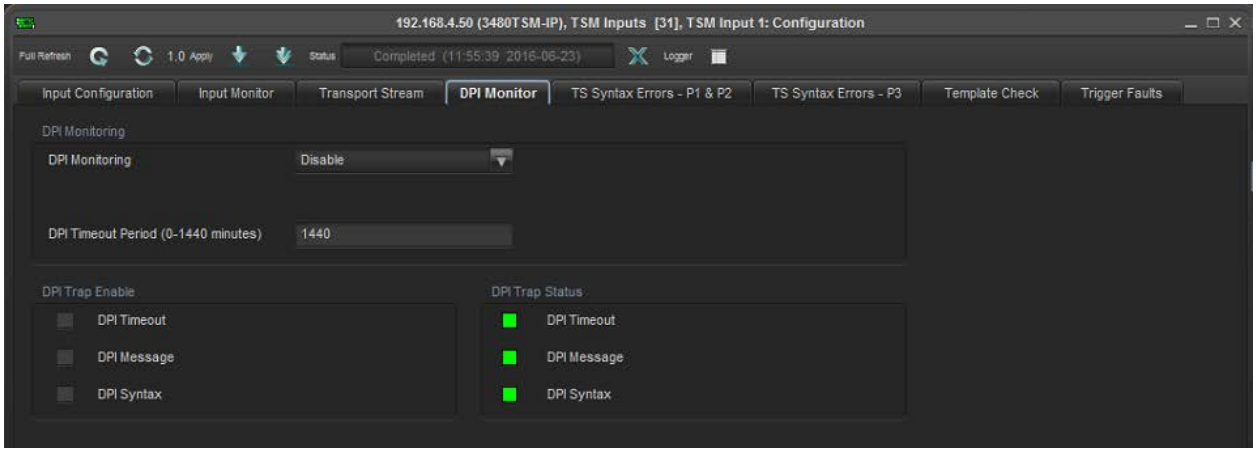


Figure 4-17 : VistaLINK® PRO Input Configuration - DPI Monitor Tab

DPI Monitoring

DPI Monitoring: This field allows the user to enable or disable all DPI monitoring. It is a global enable/disable for all DPI traps.

DPI Timeout Period (0-1440 minutes): This field sets the duration of the DPI inactivity timeout in minutes. If the period set on the slider is exceeded between DPI pid arrivals, a DPI timeout trap is triggered.

DPI Trap Enable

DPI Timeout: This control allows the user to enable/disable the DPI Timeout SNMP trap.

DPI Message: this control allows the user to enable/disable the DPI Message SNMP trap.

DPI Syntax: This control allows the user to enable/disable the DPI Syntax SNMP trap.

DPI Trap Status

DPI Timeout: This field indicates whether the specified timer runs out before the program receives a new DPI message since the last DPI message was received. If the DPI inactivity Timeout setting is met before the next DPI packet arrives, a trap will be sent. This is only the status and this parameter wouldn't send any trap.

DPI message: This field indicates whether the stream has received a DPI PID. This parameter will send a trap every time a DPI message is received on the input. This is only the status; this parameter wouldn't send any trap.

DPI Syntax: This field indicates whether the received DPI message has a syntax error. A trap will be sent if there is any issue with the structure of a DPI packet in the stream. This is only the status; this parameter wouldn't send any trap.

4.3.5. TS Syntax Errors- P1&P2

This tab displays a general health check of the most important elements of the TS. The tests are not exhaustive and are outlined in detail in the document Digital Video Broadcasting (DVB), measurement guideline for DVB systems ETSI TR 101 290. It should be noted that the P3 errors are context sensitive to the type of input stream selected (under Input Configuration).

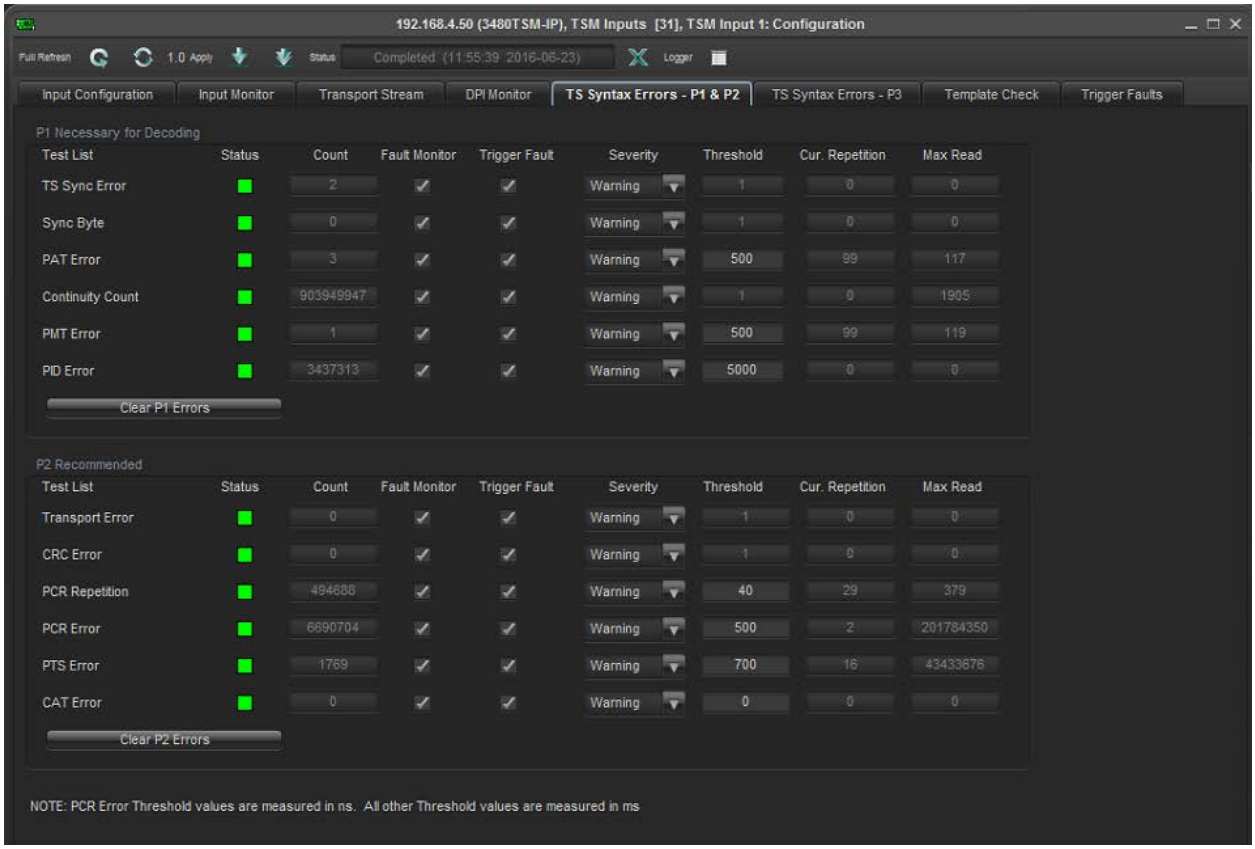


Figure 4-18 : VistaLINK® PRO Input Configuration- TS syntax Errors- P1&P2

For each test, there is a Fault Monitor check box (1) and a Trigger Fault (2). Selecting the check box 1 will update the Input Configuration Tab Syntax Error status. The highest alarm severity will prevail when selecting the checkbox 1 from the drop down menu, be sure to select, the severity that is associated with this alarm. Selecting the check box 2 will enable the relevant SNMP trap to be triggered and send to VLPro.

P1 necessary for Decoding

TS Sync Error: The most important function for the evaluation of the data from the MPEG-2 TS is the sync acquisition. 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. After synchronization has been achieved the evaluation of the other parameters is carried out.

Sync Byte: The indicator “Sync_byte_error” is set as soon as the correct sync byte (0×47) does not appear after 188 or 204 bytes. This is fundamental because this structure is user throughout the channel encoder and decoder chains for synchronization. It is also important that every sync byte is checked for correctness since encoders do not necessarily check the sync byte.

PAT Error: The Program Association Table (PAT), which only appears in PID 0×0000 packets, tells the decoder what programs are in the TS and points to the Program Map Table (PMT) which in turn point to the component video, audio and data streams that make up the program. If the PAT is missing then the decoder can do nothing, no program is decidable. Nothing other than a PAT should be contained in a PID 0×0000.
Continuity Count: For this indicator three checks are combined. The preconditions "Incorrect packet order" and "Lost packet" could cause problems for receivers that are not equipped with additional buffer storage and intelligence. It is not necessary for the test equipment to distinguish between these two preconditions as they are logically OR-ed, together with the third precondition, "a packet occurs more than twice" into one indicator.

PMT Error: The Program Association Table (PAT) tells the decoder how many programs there are in the stream and points to the PMTs that contain the information where the elementary streams for any given event program can be found. Elementary streams in this context are the video stream (normally one) and the audio streams and the data streams (e.g.Teletext). Without a PMT the corresponding program is not decidable.

PID Error: It is checked whether there exists a data stream for each PID that occur. This error often occurs where TS are multiplexed, or demultiplexed and again remultiplexed.

P2 Recommended

Transport Error: The primary Transport_error indicator is Boolean which counts the erroneous TS packets. This counter is intended for statistical evaluation of the errors. If an error occurs, no further error indication should be derived from the erroneous packet.

CRC Error: The CRC check for the CAT, PAT, PMT, NIT, EIT, BAT, SDT and TOT indicates whether the content of the corresponding table is corrupted. In this case no further error indication should be derived from the content of the corresponding table.

PCR Repetition: The PCRs are used to re-generate the local 27 MHz system clock. If the PCR do not arrive with sufficient regularity then this clock may jitter or drift. The receiver/decoder may even go out of lock. This error indicates that the time interval between two consecutive PCR values is more than 40 ms.

PCR Error: The accuracy of ±500 ns is intended to be sufficient for the color sub carrier to be synthesized from the system clock. This test should only be performed on a constant bitrate TS as defined in ISO/IEC 13811-1.

PTS Error: Presentation Time Stamp Error is the reception of a time reference value for presentation of media that is beyond a time limit (over 700 msec for MPEG).

CAT Error: The CAT is the pointer to enable the receiver to find the EMMs associated with the CA system(s) that is used. If the CAT is not present, the receiver is not able to receive management messages.

4.3.6. TS Syntax Errors-P3

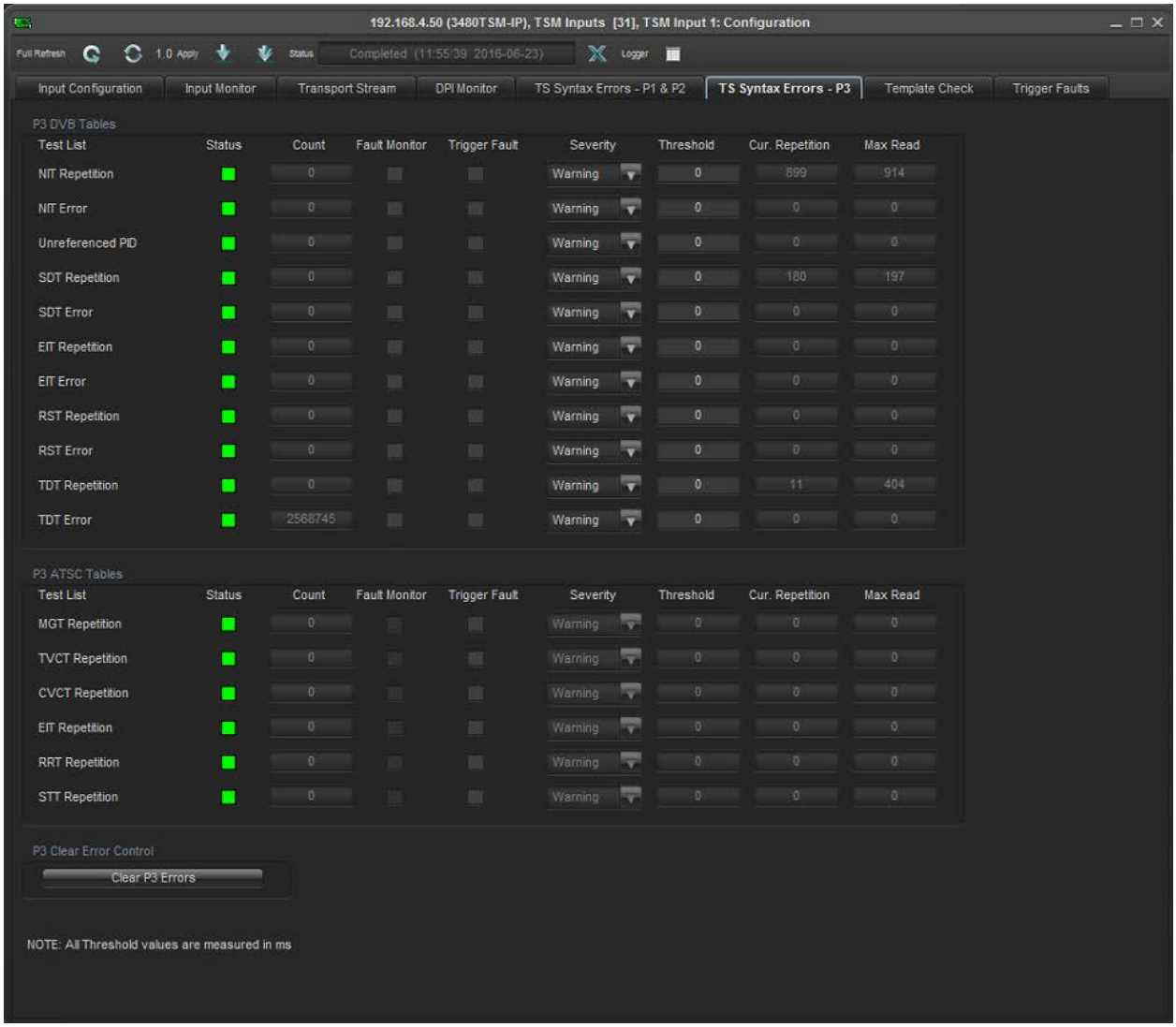


Figure 4-19 : VistaLINK® PRO Input Configuration -TS Syntax errors-P3

P3 DVB Tables

NIT Repetition: This test checks that any two sections with table_id=0×40 (NIT_actual) occur on PID 0×0010 within a 25 ms.

NIT Error: Network Information Tables (NITs) as defined by DVB contain information on frequency, code rates, modulation and polarization etc. of various programs that the decoder can use. It is checked whether NITs are present in the TS and whether they have the correct PID. The test checks that sections with table_id 0×40 or 0×41 in PID value 0×0010 occur at least every 10 s.

Unreferenced PID: Each non-private program data stream should have its PID listed in the PMTs. This test detects the presence of a PID (other than PAT, CAT, CAT_PIDs, PMT_PIDs, NIT_PID, SDT_PID, TDT_PID, EIT_PID, RST_PID, reserved for future use PIDs.

SDT Repetition: This test checks that the SDT information which describes the services contained in a particular Transport Stream is transmitted at least every 2 seconds on PID 0×0010.

SDT Error: The SDT describes the services available to the viewer. It is split into sub-tables containing details of the contents of the current TS (mandatory) and other TS (optional). Without the SDT, the IRD is unable to give the viewer a list of what services are available. It is also possible to transmit a BAT on the same PID, which groups services into “bouquets”.

EIT Repetition: This test checks the EIT information that describes what is currently on and what will be on next on each service in a particular Transport System. By default it is transmitted at least every 2 seconds.

EIT Error: The EIT (Event Information Table) describes what is on now and next on each service, and optionally details the complete programming schedule. The EIT is divided into several sub-tables, with only the “present and following’ information for the current TS being mandatory. The EIT schedule information is only accessible if the TS is not scrambled.

RST Repetition: This test checks that any two sections with table_id=0×71 (RST) occur on PID 0×0013 within 25 ms (or lower).

RST Error: The RST is a quick updating mechanism for the status information carried in the EIT.

TDT repetition: This test checks that any two sections with table_id=0×70 (RST) occur on PID 0×0014 within 25 ms (or lower).

TDT Error: Sections with table_id=0×70 (TDT) not present on PID 0×0014 for more than 30 s. The TDT carries the current UTC time and date information.

More information can be found at: http://www.etsi.org

P3 ATSC Tables

MGT Repetition: Master Guide Table. For each type of PSIP tables, the MGT provides the location in the Transport stream, the current version of the table and the length in bytes. This test checks that the Master Guide Table repetition rates do not exceed 150ms.

TVCT Repetition: Terrestrial Virtual Channel Table. Consists of virtual channel definitions where each channel is characterized by the two-part channel number that the user will use to access the service, its text name, how the service is physically delivered, its MPEG-2 program_number, its “source ID” and the type of service. This test checks the Terrestrial Virtual Channel table repetition rates do not exceed 400ms.

CVCT Repetition: Cable Virtual Channel Table. Consists of virtual channel definitions where each channel is characterized by the two-part channel number that the user will use to access the service, its text name, how the service is physically delivered, its text name, how the service is physically delivered, its MPEG-2 program_number, its “source ID” and the type of service. This test checks the Cable Virtual Channel Table repetition rates do not exceed 400ms.

EIT Repetition: The PSIP table that carries program schedule information for each virtual channel, this test checks the following is true:

- EIT-0 Once every 0.5 seconds
- EIT-1 Once every three seconds
- EIT-2 and EIT3 Once every minutes

RRT Repetition: Rating region Table. Defines a rating system for a given region characterized by a number of rating dimensions, each of which is composed of two or more rating levels. This test checks that the rating Region table repetition rates do not exceed 60,000 ms.

STT Repetition: System Time Table. Provides a reference for the time-of-day to receivers. This test checks that the System Time table repetition rates do not exceed 1000ms.

More information can be found at: http://www.stc.org

ETSI TR 101 290 test Conditions:

The status LED located to the left of each test will highlight, when in Auto-refresh the dynamic status of the stream.
For the majority of the ETSI TR 101 290 test, it is possible to configure custom configurations to ensure that particular alarms and conditions are fed back to the operator. It is important to select the Monitor Enable Check box (to enable custom monitoring parameters to be invoked), select the desired alarm Severity and then configure the test Threshold.

Note: Syntax Errors P1, P2 & P3 are measured in ms. PCR errors are measured in ns.

TR 101 290 DVB REFERENCE VALUES:

Test	DVB
TS_Sync_Loss	
Sync_byte_error	
PAT_error	500ms
Continuity_count_error	
PMT_error	500
PID_error	500
Transport_error	
CRC_error	
PCR_repetition_error	40ms
PCR_error	100ms
PTS_error	700ms
CAT_error	

Table 4-2 : TR 101 290 DVB Reference values

4.3.7. Template Check

The template check tab is a user configurable tab for validating the compliancy of the TS input against the template parameters entered.

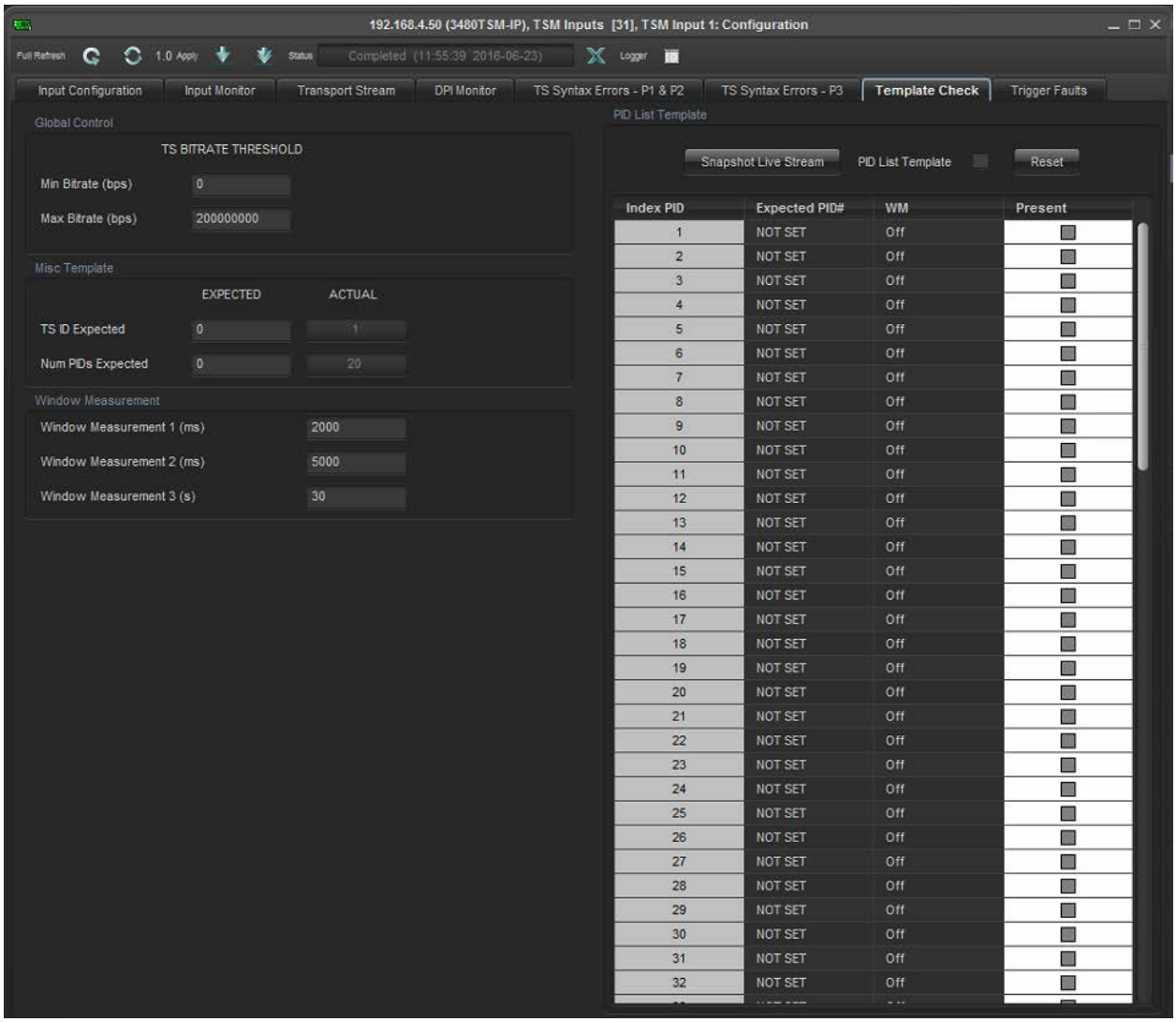


Figure 4-20 : VistaLINK® PRO Input Configuration -Template Check

Global Control

Min Bitrate (bps): Enter a decimal value corresponding to the absolute lowest bitrate expected for the whole stream; an alarm condition will be caused if the stream rate drops below this value.

Max Bitrate (bps): Enter a decimal value corresponding to the highest bitrate expected for the whole stream; an alarm condition will be caused if the stream rate exceeds this value.

Misc Template

TS ID Expected: Enter the value for the Transparent Stream ID expected, enter zero to disable the test.

Note: This is not possible to enter the TS ID as a hex value.

Num PIDs Expected: Enter here the number of PIDs expected in the stream (including the null packets if any), enter zero to disable the test.

Window Measurement

The window measurement values determine at what interval each PID (within the PID List Template) should be expected before an alarm condition is met.

Window Measurement 1&2 (ms): Enter a decimal value, measurement is in milliseconds.

Window Measurement 3 (s): Enter a decimal value, measurement is in seconds.

PID List Template

The PID List Template provides a stream conformance or validation check. Here the user can check the presence of each PID using one of the Window Measurements as detailed above.

Snapshot Live Stream: This control is used to populate PID List Window with the PIDs currently found in the stream. Use of this control is slightly different to most normal operations within VLPro.

- Upon selecting the Snapshot Live Stream button, the action trigger is automatically executed and the PID List template Window is refreshed after selecting “OK” in the popup windows.
- On an operational system ensure to de-select the PID List Template check box before making a new snapshot, this will avoid alarm conditions being raised as the PID List change.

PID List Template: Once the PID List Template has been populated and fully configured, this check box must be checked to activate the PID List Checking. Be sure to check the box once all configuration changes have been made.

Reset PID Template: This control is used to reset the PID List. All entries will be set to “NOT SET”, all Windows measurements (WM) set to “OFF”.

4.3.8. Trigger Faults

The Trigger Control tab provides a user configurable custom configuration for the top-level alarm status and Traps trigger. This can be used to provide quick visual overviews of the ETS TR 101 290 test status. An operator would need to refer either the TS Syntax Error tabs and review the status LED's, or the alarm log to identify the test condition(s), which have triggered the alarm (status red).

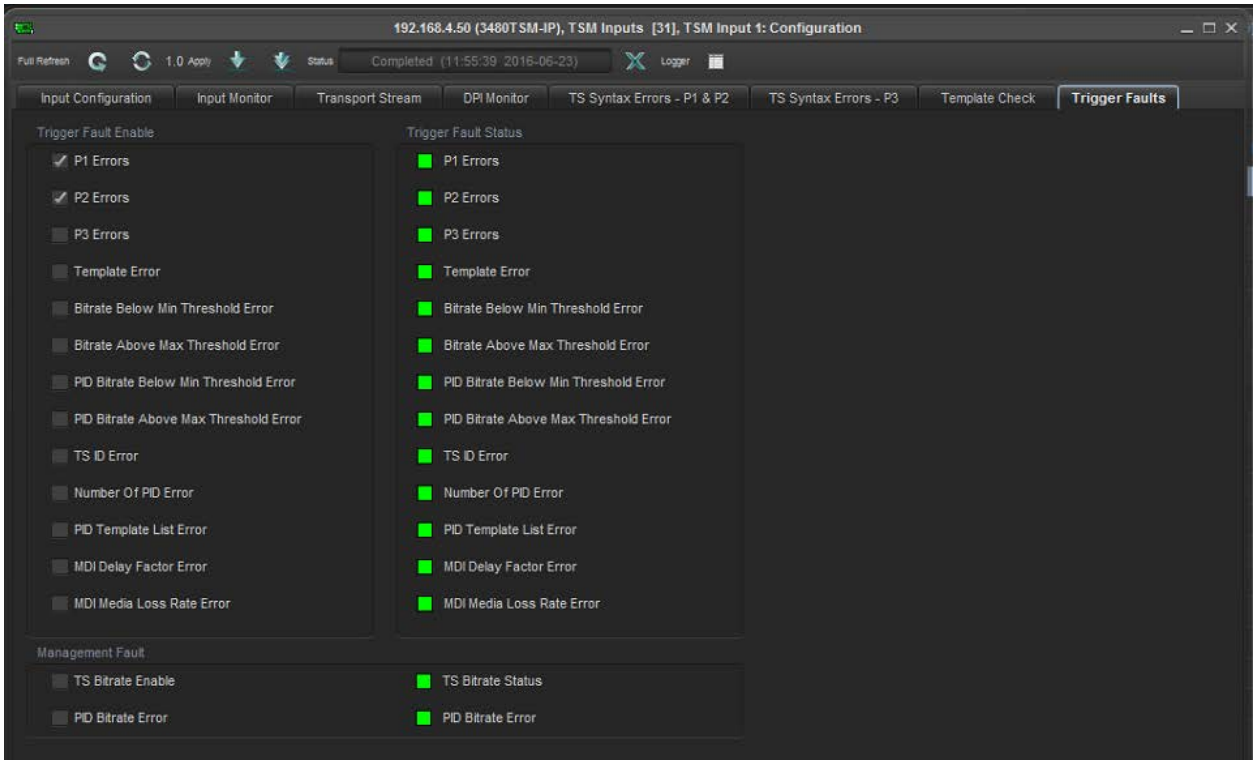


Figure 4-21 : VistaLINK® PRO Input Configuration -Trigger Faults

The two window subsections, "Trigger Fault Enable" and "Trigger Fault Status", permits the user to customize the top-level alarms. By de-selecting, all levels are checked by default.

In the third window subsection there is a single fault called "TS Bitrate Enable". This relates to the Template Check tab and provides a summary alarm for the status of the maximum and minimum bitrates that were configured. No alarm would be therefore implying that all the PIDs are within the configured bandwidth limits defined by the user.

4.4. VIEW FUNCTIONAL

Right click on an input of TSMIP in hardware tree and select “View Functional”. (Figure 4-22)

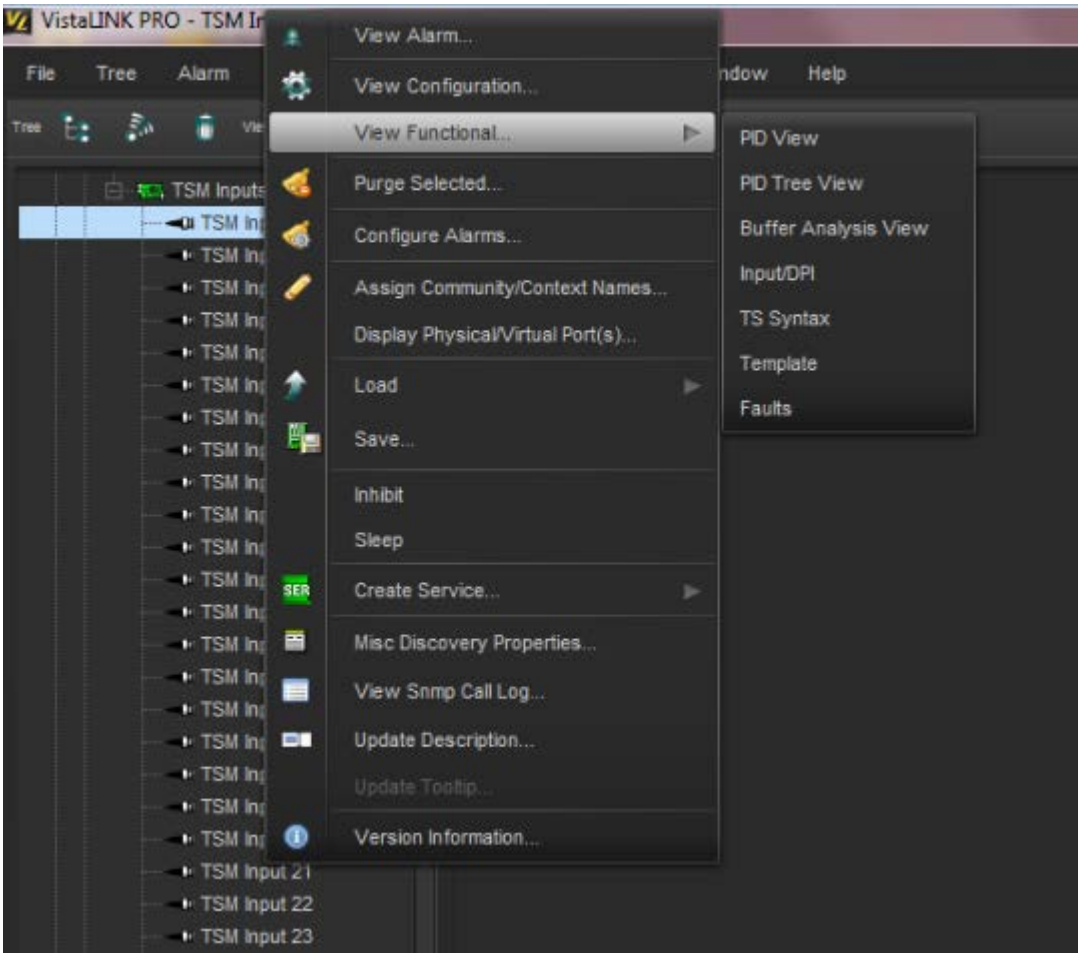
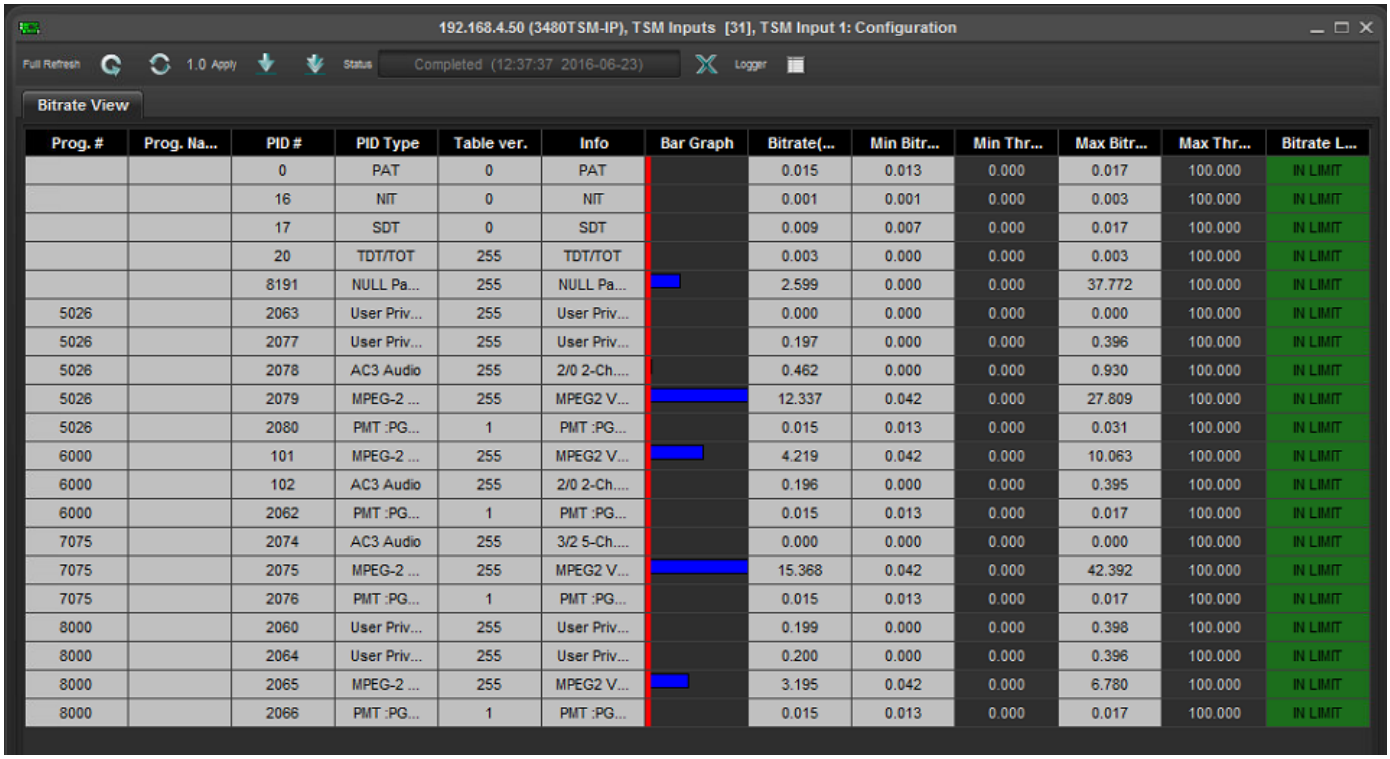


Figure 4-22 : VistaLINK® PRO - View Functional Selection

4.4.1. PID View

Select “PID View” to access this tab where the standard Transport Stream parameters are displayed. As shown in Figure 4-23, it is possible to see all the packets within the TS stream, organized in ascending order by Service ID. It is possible to reverse the ordering or select another column to re-sort the data. This can be done by double clicking the column header. Make sure it is not in auto refresh mode when doing this.

For each individual PID, it is possible to view minimum and maximum Bitrate since the last reset. By configuring the minimum and maximum threshold, it is possible to configure the desired thresholds for notifying the user through VLPro. The Bitrate View is a dynamic view; by clicking the auto refresh it is possible to see near instantaneous values for the stream.



Prog. #	Prog. Na...	PID #	PID Type	Table ver.	Info	Bar Graph	Bitrate(...	Min Bitr...	Min Thr...	Max Bitr...	Max Thr...	Bitrate L...
		0	PAT	0	PAT		0.015	0.013	0.000	0.017	100.000	IN LIMIT
		16	NIT	0	NIT		0.001	0.001	0.000	0.003	100.000	IN LIMIT
		17	SDT	0	SDT		0.009	0.007	0.000	0.017	100.000	IN LIMIT
		20	TDT/TOT	255	TDT/TOT		0.003	0.000	0.000	0.003	100.000	IN LIMIT
		8191	NULL Pa...	255	NULL Pa...		2.599	0.000	0.000	37.772	100.000	IN LIMIT
5026		2063	User Priv...	255	User Priv...		0.000	0.000	0.000	0.000	100.000	IN LIMIT
5026		2077	User Priv...	255	User Priv...		0.197	0.000	0.000	0.396	100.000	IN LIMIT
5026		2078	AC3 Audio	255	2/0 2-Ch....		0.462	0.000	0.000	0.930	100.000	IN LIMIT
5026		2079	MPEG-2 ...	255	MPEG2 V...		12.337	0.042	0.000	27.809	100.000	IN LIMIT
5026		2080	PMT :PG...	1	PMT :PG...		0.015	0.013	0.000	0.031	100.000	IN LIMIT
6000		101	MPEG-2 ...	255	MPEG2 V...		4.219	0.042	0.000	10.063	100.000	IN LIMIT
6000		102	AC3 Audio	255	2/0 2-Ch....		0.196	0.000	0.000	0.395	100.000	IN LIMIT
6000		2062	PMT :PG...	1	PMT :PG...		0.015	0.013	0.000	0.017	100.000	IN LIMIT
7075		2074	AC3 Audio	255	3/2 5-Ch....		0.000	0.000	0.000	0.000	100.000	IN LIMIT
7075		2075	MPEG-2 ...	255	MPEG2 V...		15.368	0.042	0.000	42.392	100.000	IN LIMIT
7075		2076	PMT :PG...	1	PMT :PG...		0.015	0.013	0.000	0.017	100.000	IN LIMIT
8000		2060	User Priv...	255	User Priv...		0.199	0.000	0.000	0.398	100.000	IN LIMIT
8000		2064	User Priv...	255	User Priv...		0.200	0.000	0.000	0.396	100.000	IN LIMIT
8000		2065	MPEG-2 ...	255	MPEG2 V...		3.195	0.042	0.000	6.780	100.000	IN LIMIT
8000		2066	PMT :PG...	1	PMT :PG...		0.015	0.013	0.000	0.017	100.000	IN LIMIT

Figure 4-23 : VistaLINK® PRO - PID View Tab

4.4.2. PID Tree View

Select “PID Tree View” to access this tab where the standard Transport Stream parameters are displayed using trees for which the branches can be expanded or collapsed by pressing respectively the “+” or “-“ sign.

Selecting the “+” beside the PID tree root, will drill down to the PSI/SI “Tables & Others” and Programs sub-tree. Selecting the “+” beside “Tables & Others” will drill down to tables (PAT, PMT, SDT,) submenu. Each table submenu will drill down to the table descriptors.

Selecting the “+” beside each program will drill down to the Elementary Streams (ES) submenu. Each will drill down to the ES descriptors.

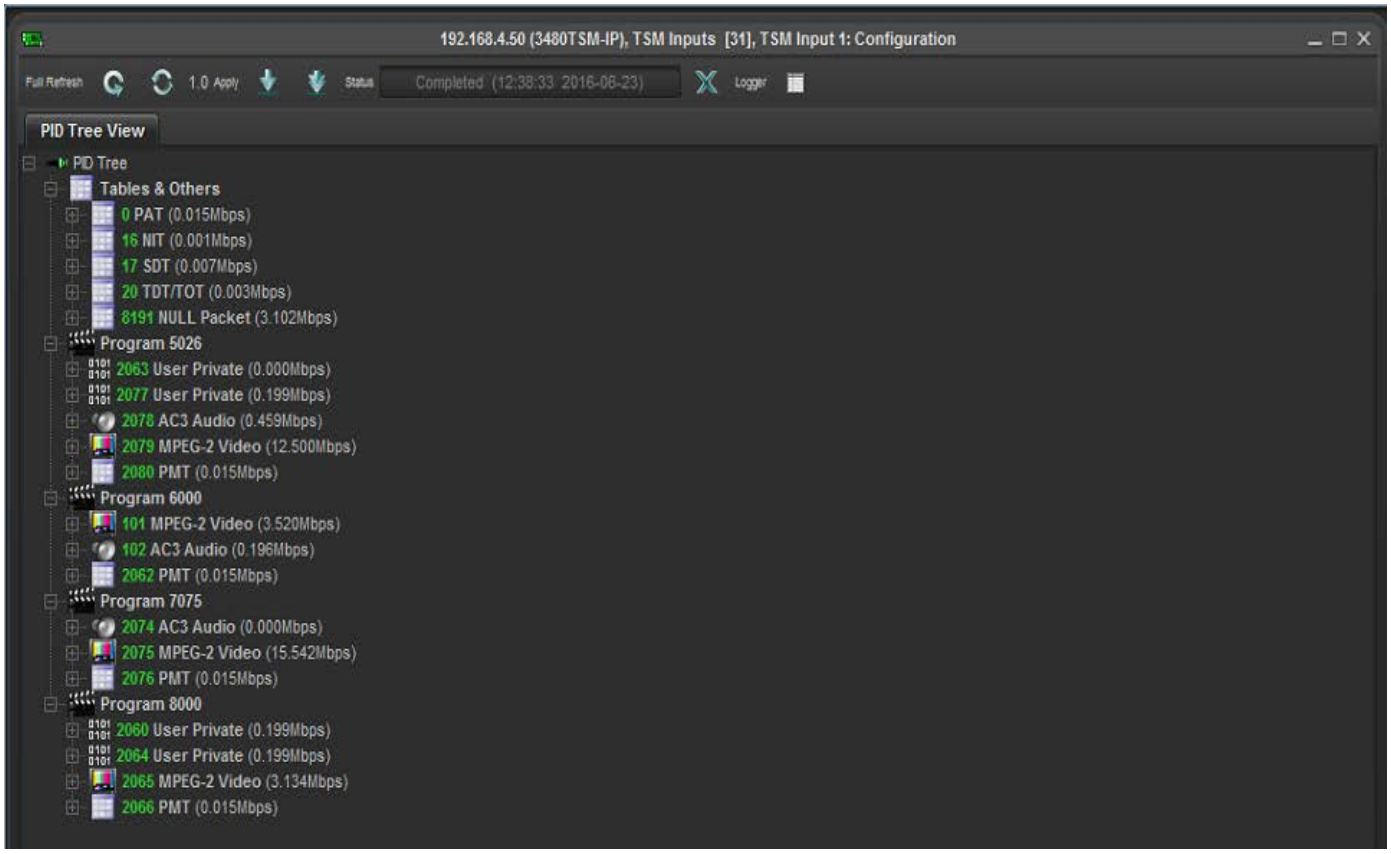


Figure 4-24 : VistaLINK® PRO - PID Tree View Tab

4.4.3. Buffer Analysis View

The function of this section is not available and will be added in the future.

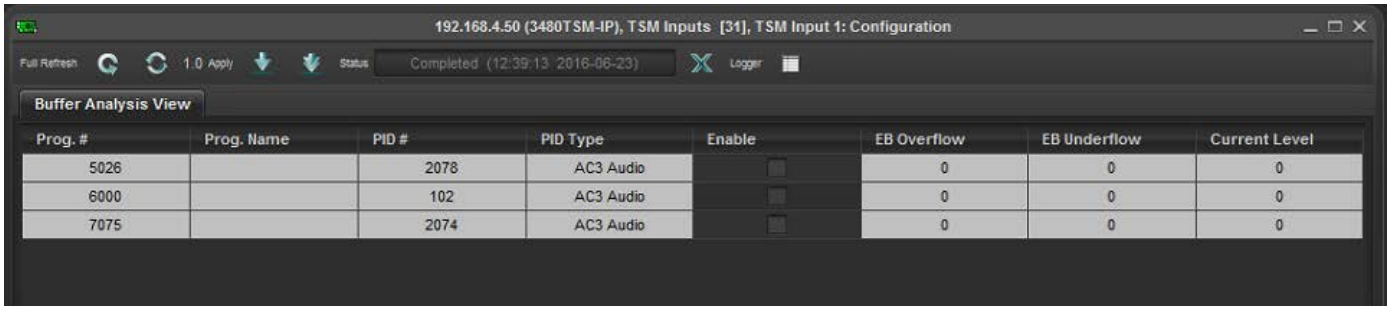


Figure 4-25 : VistaLINK® PRO Buffer Analysis View Tab

The definition for other parameters is explained before in configuration section.

5. UPGRADE PROCEDURES

5.1. UPDATE VLPRO SERVER JAR FILE

Jar file is needed for new products and also it is recommended to update the in use Jar files in order to have access to the latest features of the module.

For updating a Jar file, new version of Jar file supplied by Evertz is needed. Follow the below steps to update a jar file.

- Ensure that all VLPro clients are closed. (If the clients are not closed, they will be automatically disconnected after restarting VLPro server.)
- On the main page of VLPro Server, select **Help** on task bar then choose **Apply Update** and **Product**.(Figure 5-1)

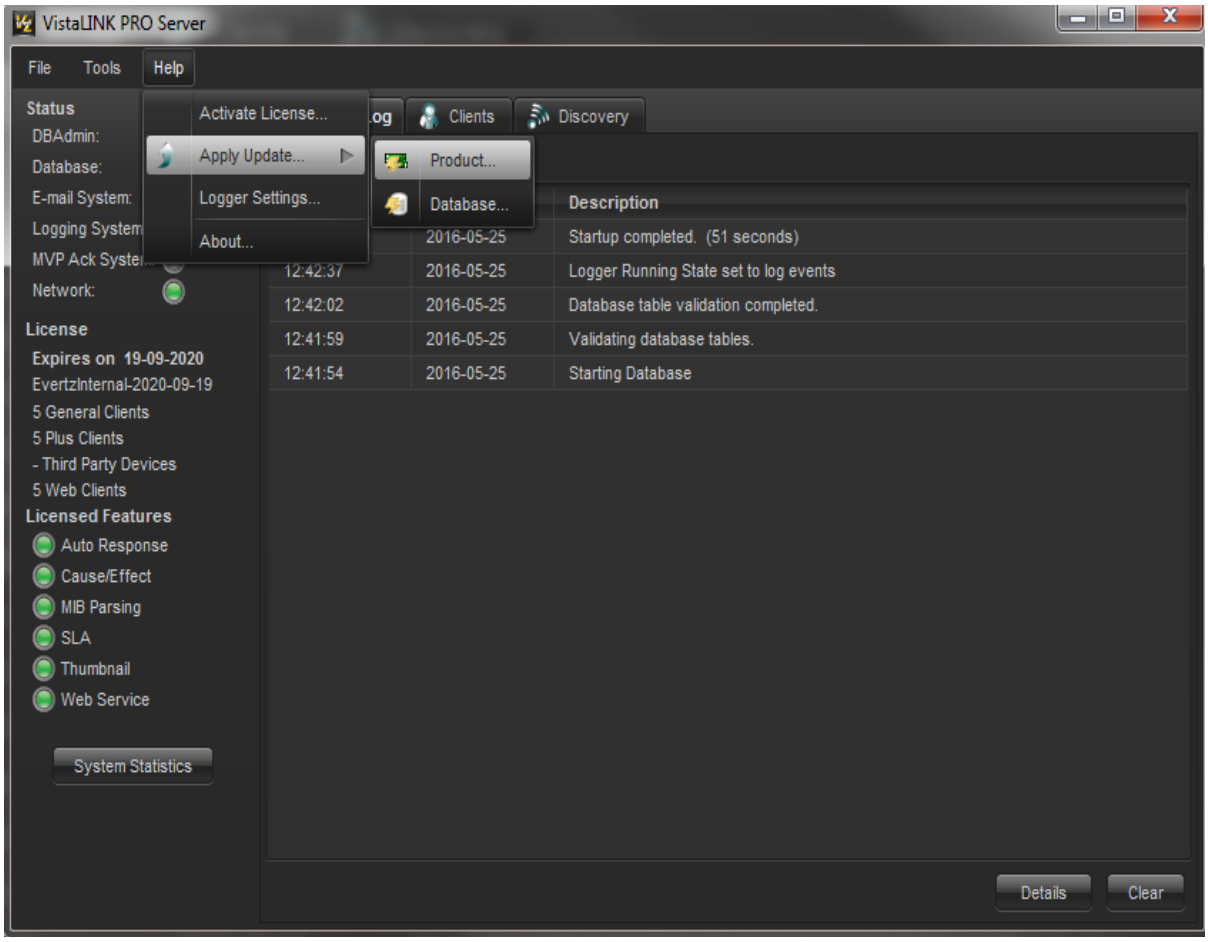


Figure 5-1 : VistaLINK® PRO - Updating Jar file

- In the new appeared window, navigate to the proper Jar file and double click on it to select the Jar file. The window will be automatically closed and the update will be applied.
- A message will be prompted and ask to restart the server. Apply as many Jar updates as required and restart the server.

5.2. FIRMWARE UPGRADE USING VISTALINK®

The firmware in the TSMIP-10GE is contained on a FLASH EPROM. From time to time firmware updates will be provided to add additional features to the unit. The firmware update can be initiated using the VLPro.

For upgrading the firmware, new version of firmware supplied by Evertz is needed. Firmware comes as a .deb archive file.

Ensure that the TSMIP-10GE is running the latest firmware version. To check this, right click on the card address in VLPro client and select **Version Information**. (Figure 5-2)

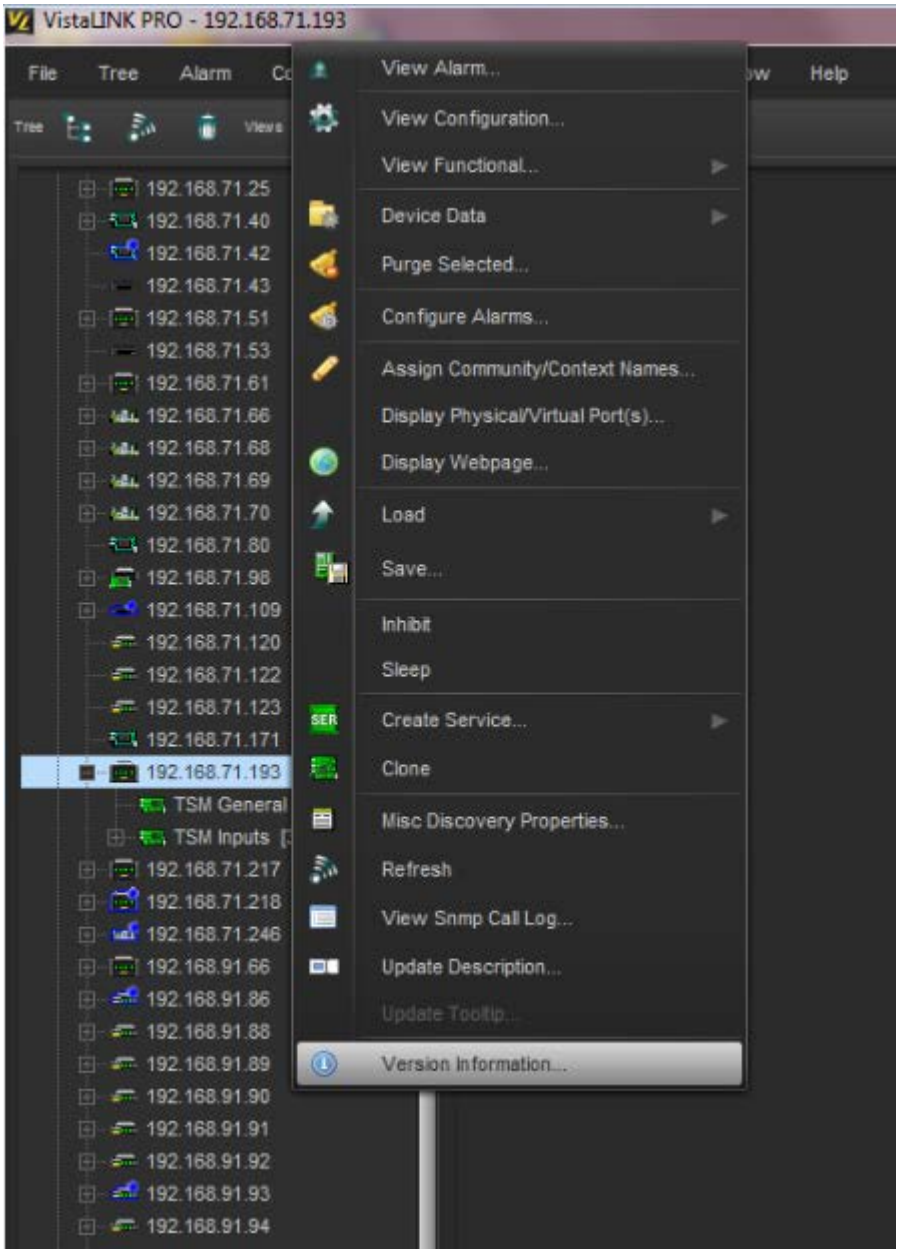


Figure 5-2 : VistaLINK® PRO - Selecting Hardware Version Information

By clicking version Information, a window will appear and it's possible to select the module for upgrade (Figure 5-3). Follow up the below steps in order to upgrade the firmware.

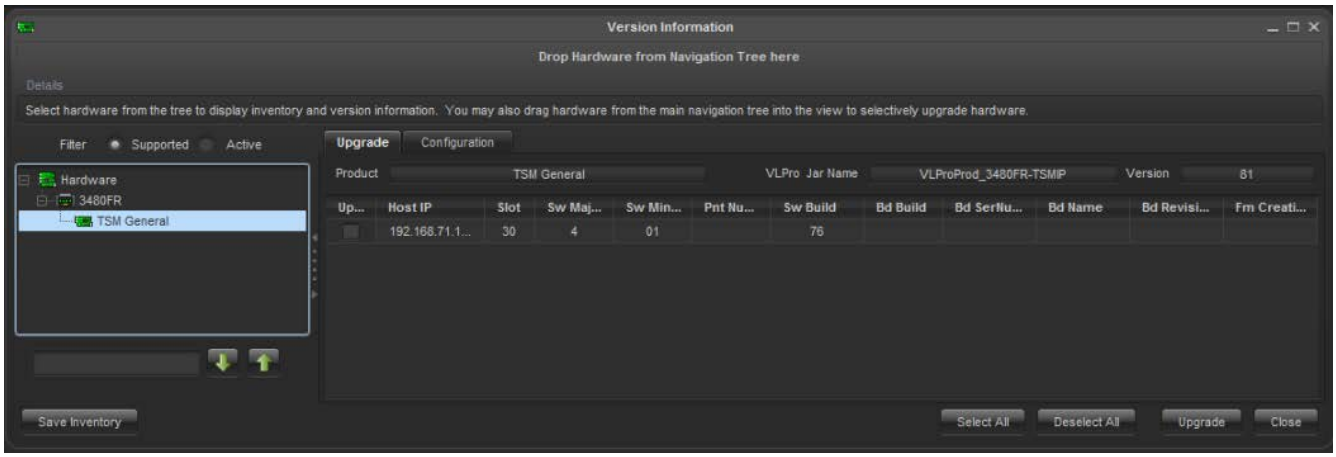


Figure 5-3 : VistaLINK® PRO - Version information window

- Open hardware tree and select the card for upgrade.
- **Check mark** the box beside the card for upgrade. (Figure 5-4)

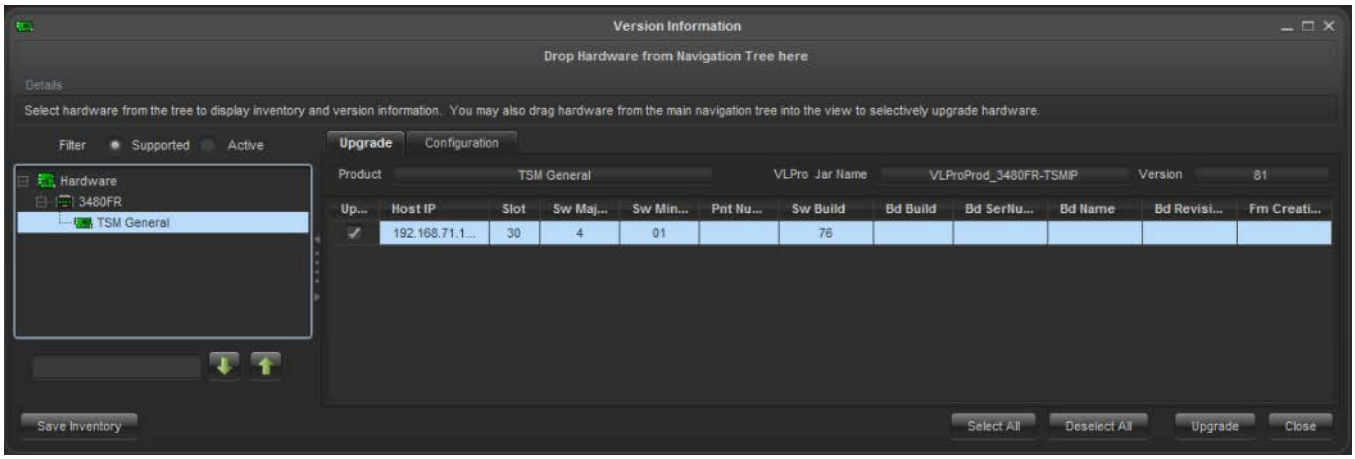


Figure 5-4 : VistaLINK® PRO - Check mark the hardware for update

- Click the **Upgrade** button on bottom right corner.
- Click the **Browse** button to select the TSMIP-10GE image file. (Figure 5-5)

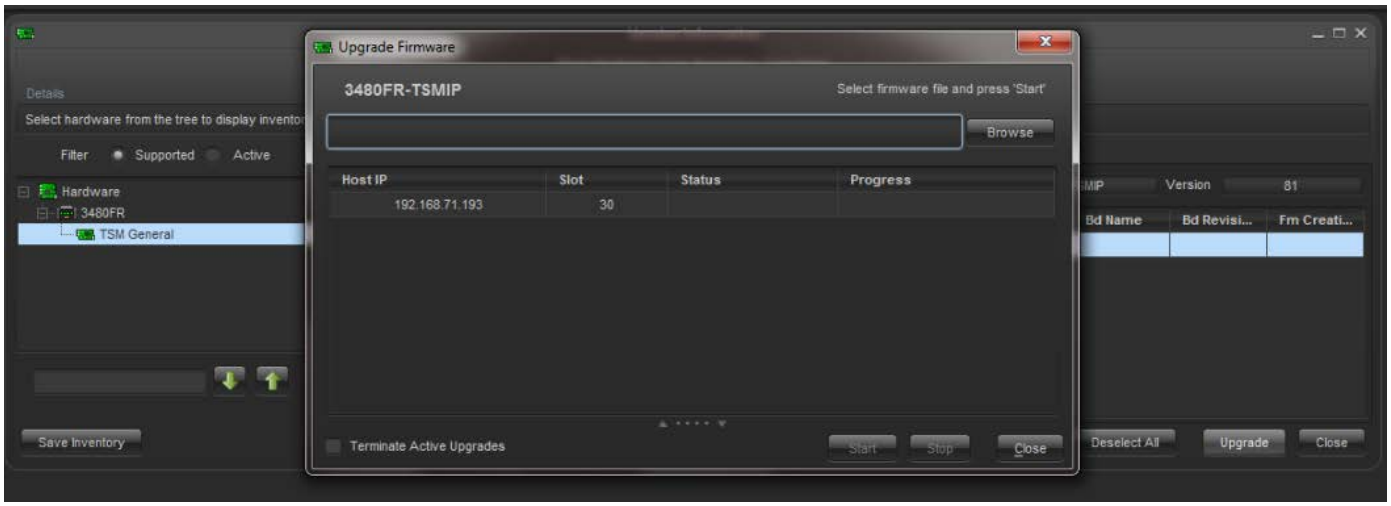


Figure 5-5 : VistaLINK® PRO - Browsing Firmware window

- Select the proper firmware file and click OK.

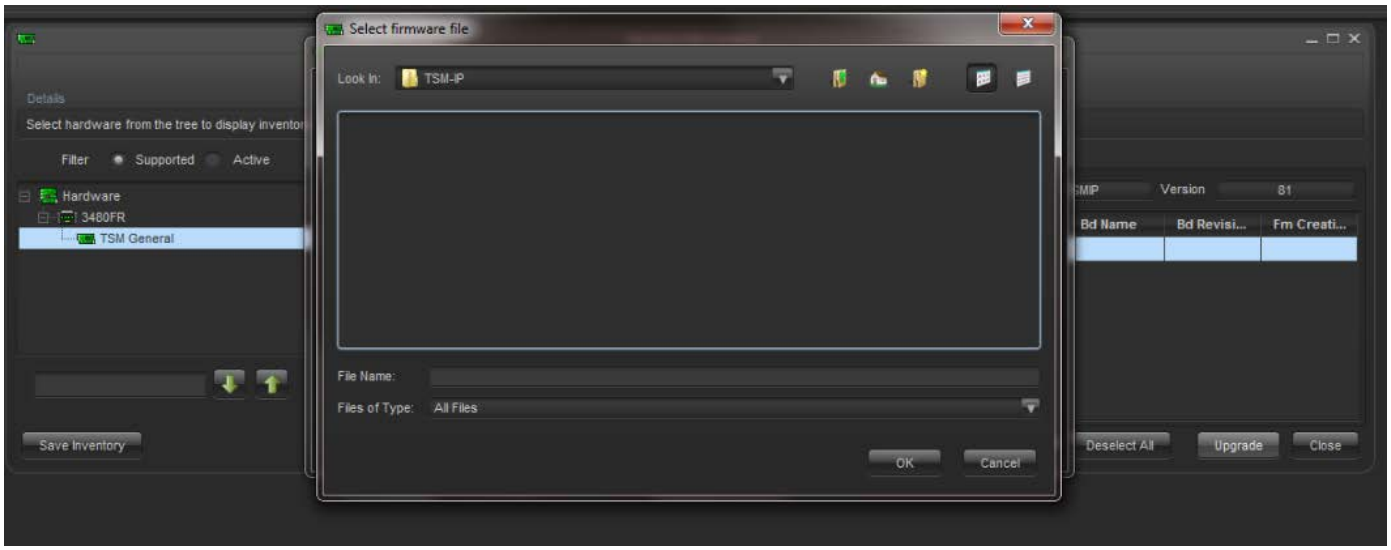


Figure 5-6 : VistaLINK® PRO - Selecting Firmware File

- Click the **Start** button and wait for completion. This will take some time.

After completion, the module will reboot automatically and return in normal mode.

6. ABBREVIATIONS

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

BAT Bouquet Association Table
BER Bit Error Rate
BW BandWidth
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
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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