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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Nov 2008
1.0	Released Version	Jun 2010

1. OVERVIEW

The 7780TG-ASI Test Signal Generator provides a cost-effective method of generating ASI test signals. The 7780TG-ASI is ideal for checking signal path integrity, or to determine system performance over varying cable lengths, or for providing slates for emergency broadcasting. The 7780TG-ASI generates custom test signals in DVB-ASI transport stream formats.

The 7780TG-ASI can store MPEG-2 TS files on the Flash Card provided with the card. When a file is played out it is transferred in non-real time to the RAM of the card. The 7780TG-ASI will playout in the real time of the selected file from the RAM.

Features:
- 4 identical ASI outputs
- H.264, MPEG-2 SD and HD wrapped in MPEG-2 transport stream
- Customized bit rates from files default to 210Mbits/s
- 8 GB of removable flash storage
- 374MB of Playout RAM (2,089,999 MPEG-2 packets)
- Output Bitrate configurable by user
- Load multiple MPEG-2 TS via FTP or directly on Flash
- *Vista*LINK® control
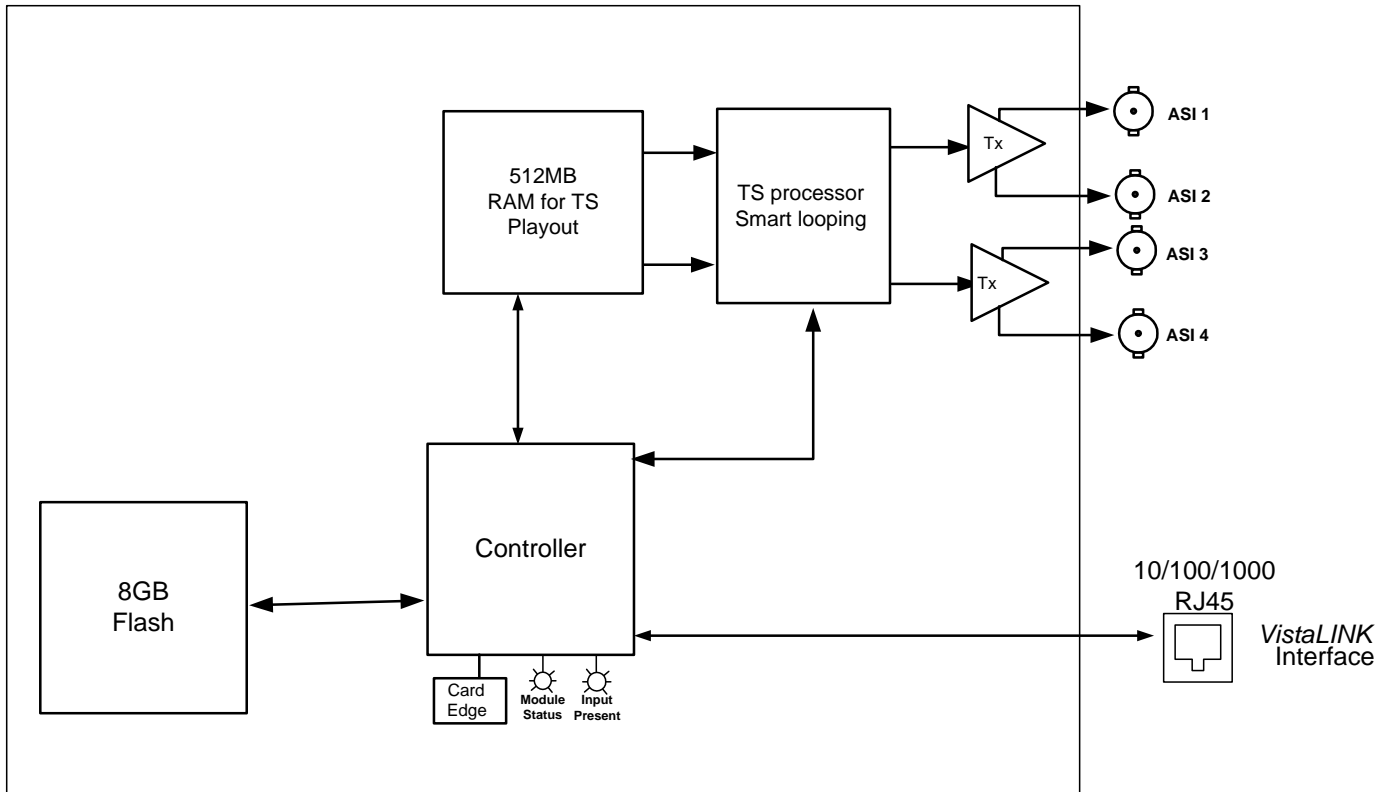
Figure 1-1: 7780TG-ASI Block Diagram

2. INSTALLATION

The 7780TG-ASI module comes with a companion rear plate that has 4 BNC connectors and 2xIP RJ45 connectors. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3.
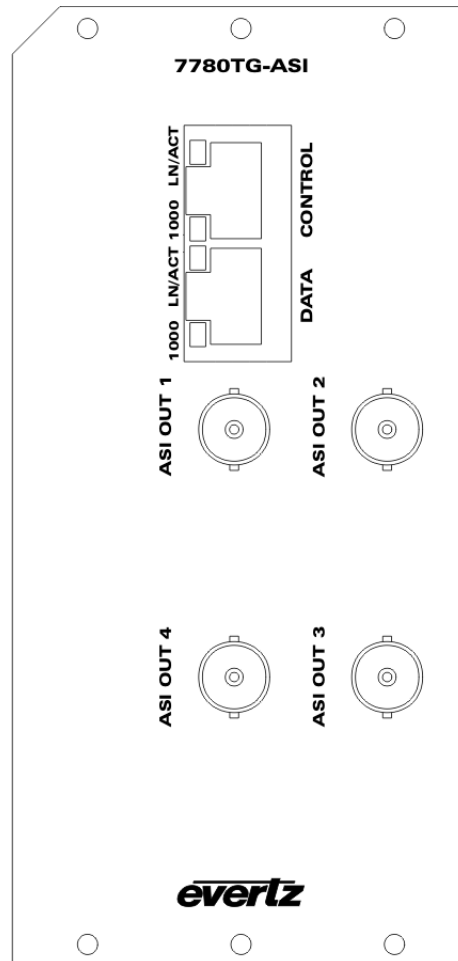
Figure 2-1: 7780TG-ASI Rear Panel

CONTROL: RJ45 Ethernet port I/O for control via SNMP agent such as *Vista*LINK® PRO.

DATA: Ethernet port I/O. At this time, the DATA port is UNUSED.

OUTPUT: There are 4 BNC connectors that carry serial ASI transport stream outputs. The test signal output is selected using *Vista*LINK® PRO control.
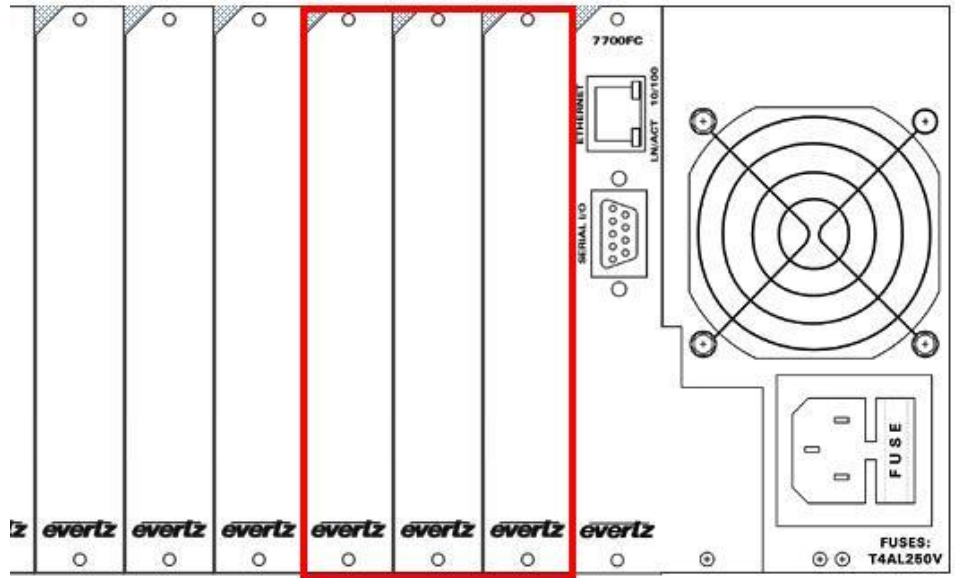
Figure 2-2: 7700 Chassis

Before inserting the card, make sure the Compact Flash is properly inserted in the front of the 7780TG-ASI as shown in Figure 2-3.
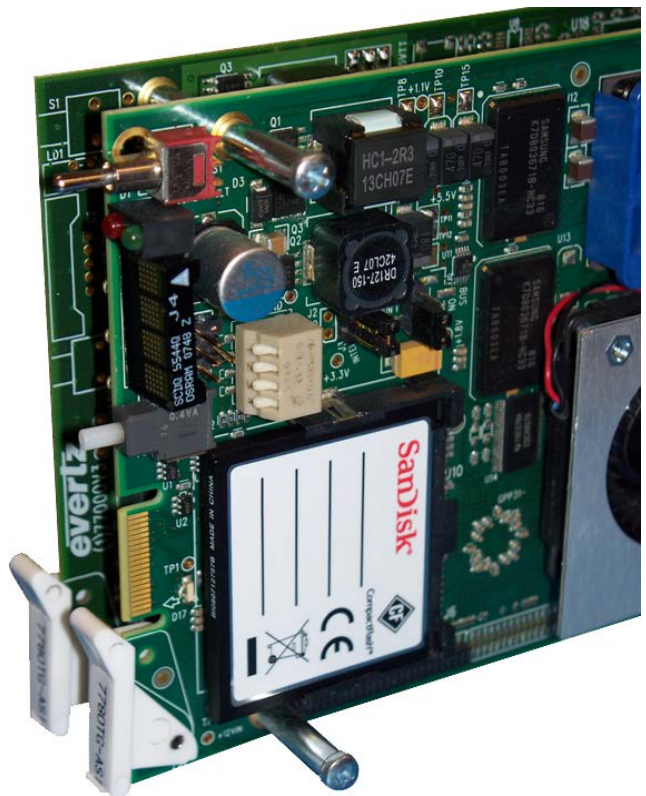
Figure 2-3: Compact Flash Card Installed

Before inserting the front card, connect the serial cable to the board using the rainbow coloured serial cable provided. Now insert the 7780TG-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 and make sure that when it mates with the rear card it has been pushed firmly 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).**

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:
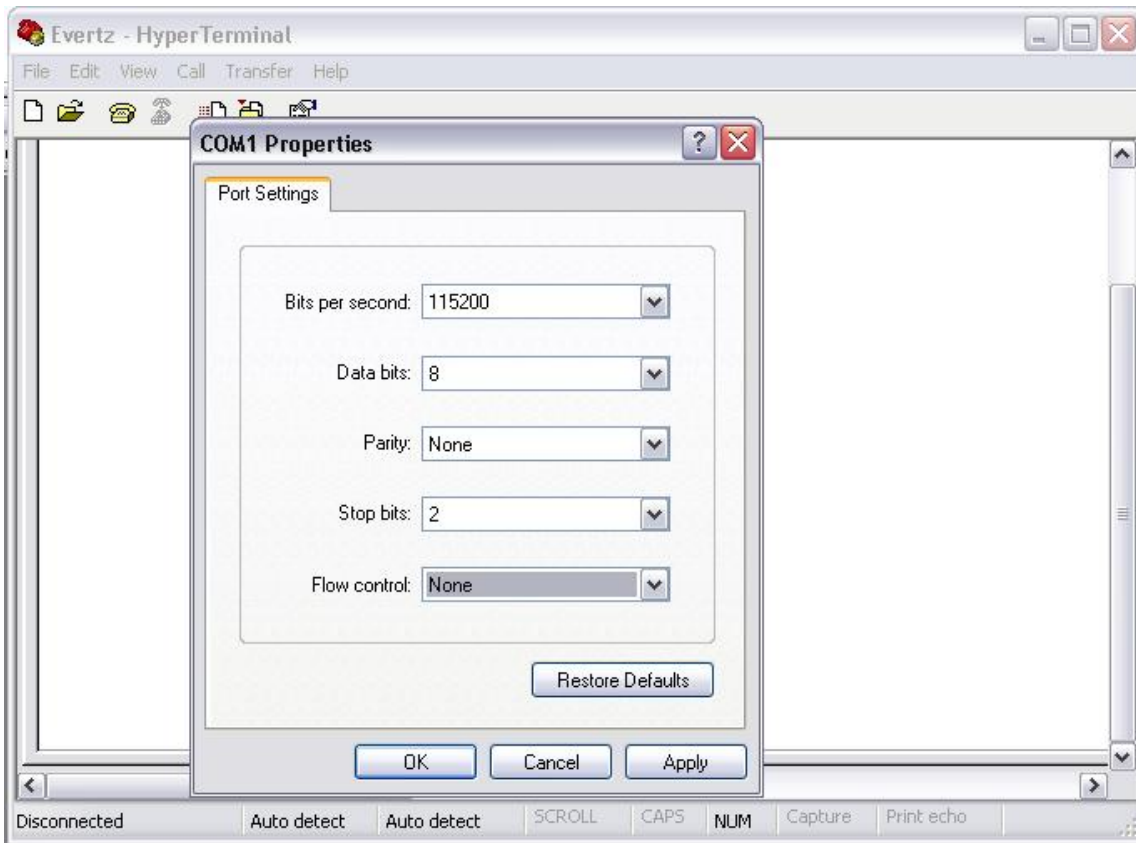
Figure 2-4: COM Port Properties Window

Bits per second	115200
Data Bits	8
Parity	None
Stop Bits	2
Flow Control	None

Click OK to apply these settings and press return. The session should respond with the 7780TG-ASI Main Menu as shown in Figure 2-5:

Figure 2-5: HyperTerminal Main Menu

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

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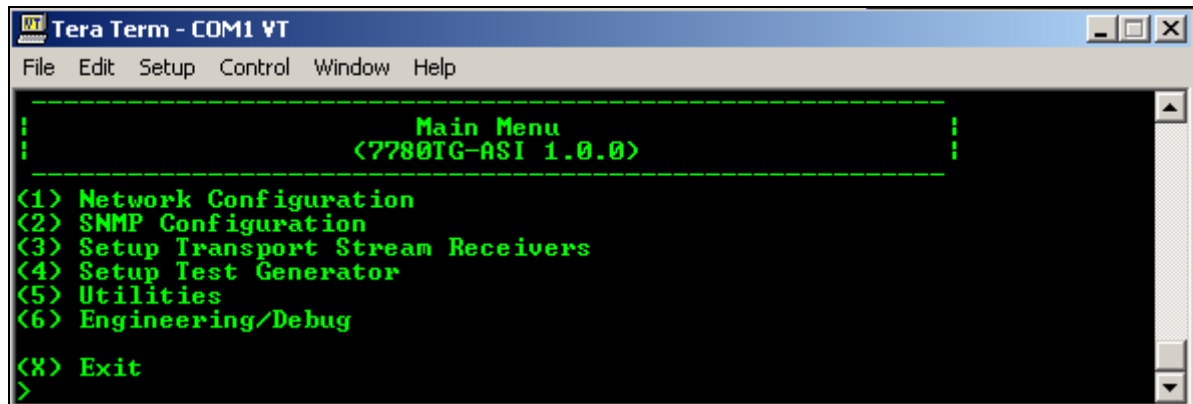This sub-menu enables the user to configure the Simple Network Management Protocol settings. In this menu you can set or remove the SNMP trap IP address and the SNMP Read and Set community strings.

(3) Setup Transport Stream Receivers
This sub-menu is not used for this product.

(4) Setup Test generator
This sub-menu can be used to configure the 7780TG-ASI. This configuration can also be performed via VLPro; consequently, the sub-menu for this item will not be covered in this section.

(5) 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.

(6) 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, this is covered in section 2.1.

2.1.   CONFIGURING THE BASIC NETWORK SETTINGS

Select option (1) *Network Configuration*, the Network Configuration menu will be displayed as shown in Figure 2-6. 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 7780TG-ASI ensuring that the IP address is not already in use on the network.

2. Now select option (2) *Set Netmask* from the Network Configuration menu 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 (S) *Save and Exit*, NOT (X) *Exit*.
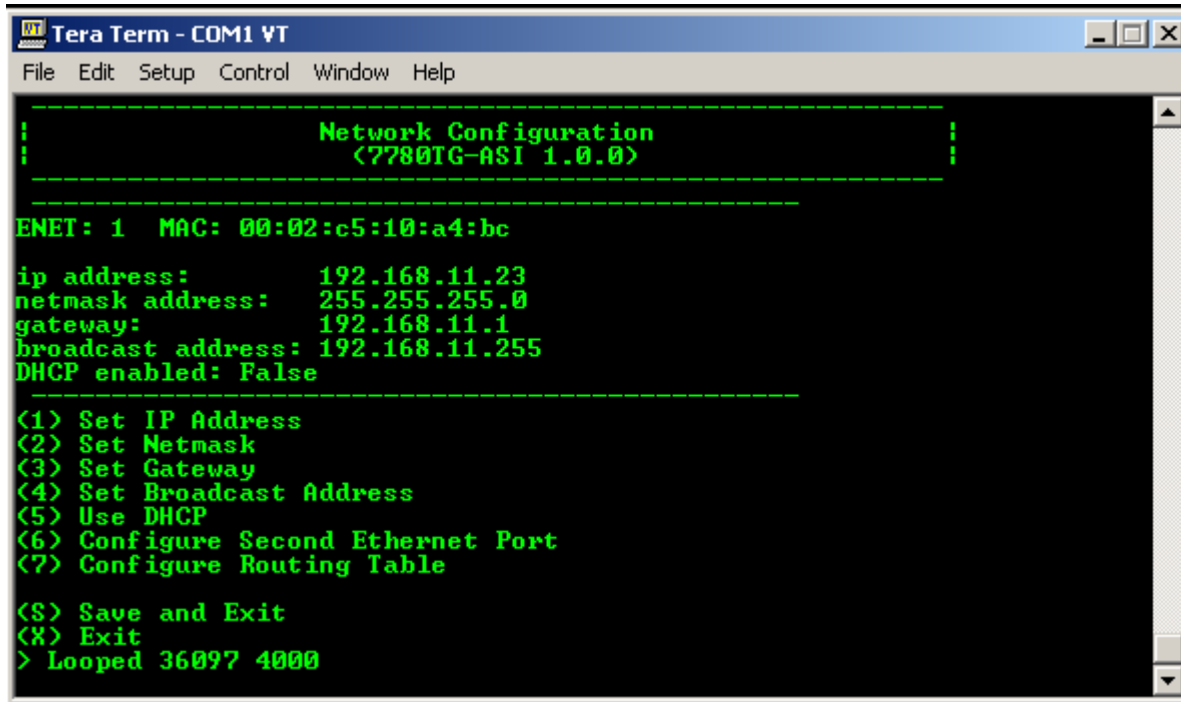
Figure 2-6: Network Configuration Sub-Menu

In the Main Menu, select option (2) *SNMP Configuration*. Then select option (1) *Set Trap IP Address* from the *SNMP Configuration* menu, and enter the IP address of your VLPro Server. Exit using option (S) *Save and Exit*. 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 card when ready.

> **Note: The firmware version number is displayed in the menu title.**

> **Note: If the unit is in DHCP mode and no DHCP server is found it will take about 3 minutes for the card to time out and boot.**

2.2. CONNECTING TO VLPRO

This chapter assumes that the VLPro server and VLPro client are already configured for your network and that you have basic knowledge of the VLPro interface. It also assumes that the user or network administrator has already added the 7780TG-ASI jar file to the server and both the client and server applications have been restarted.

Open VLPro and click on the refresh tree icon. Expand the hardware tree by clicking on the "+". Your 7780TG-ASI should appear as a newly listed device with the IP address used to configure the card (in Step 1 as previously mentioned). 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).
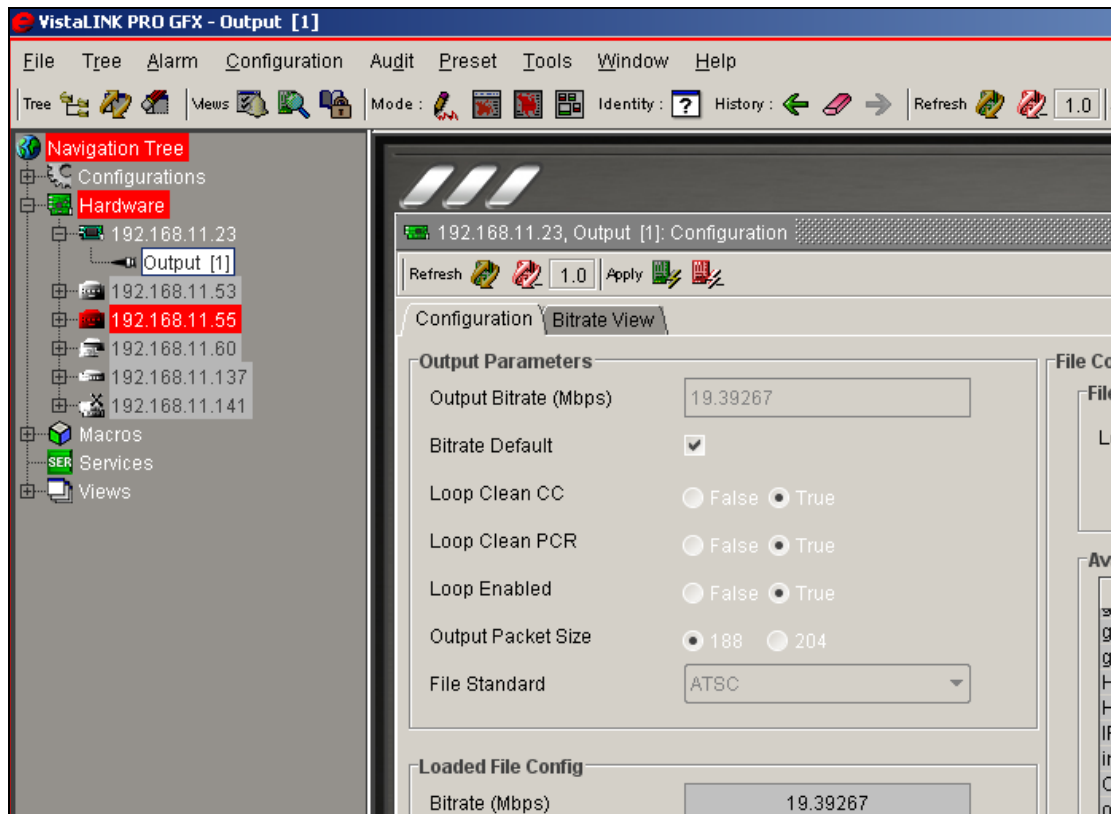
Figure 2-7: *Vista*LINK® PRO Hardware Configuration

> **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 but will remain greyed out for a moment while VLPro communicates with 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. CARD CONFIGURATION

3.1. FILES MANAGEMENT

Right-click the IP address of the 7780TG-ASI in the VLPRO Tree. Select *View Configuration*. The right window will display the 7780TG-ASI File management menus as shown in Figure 3-1.
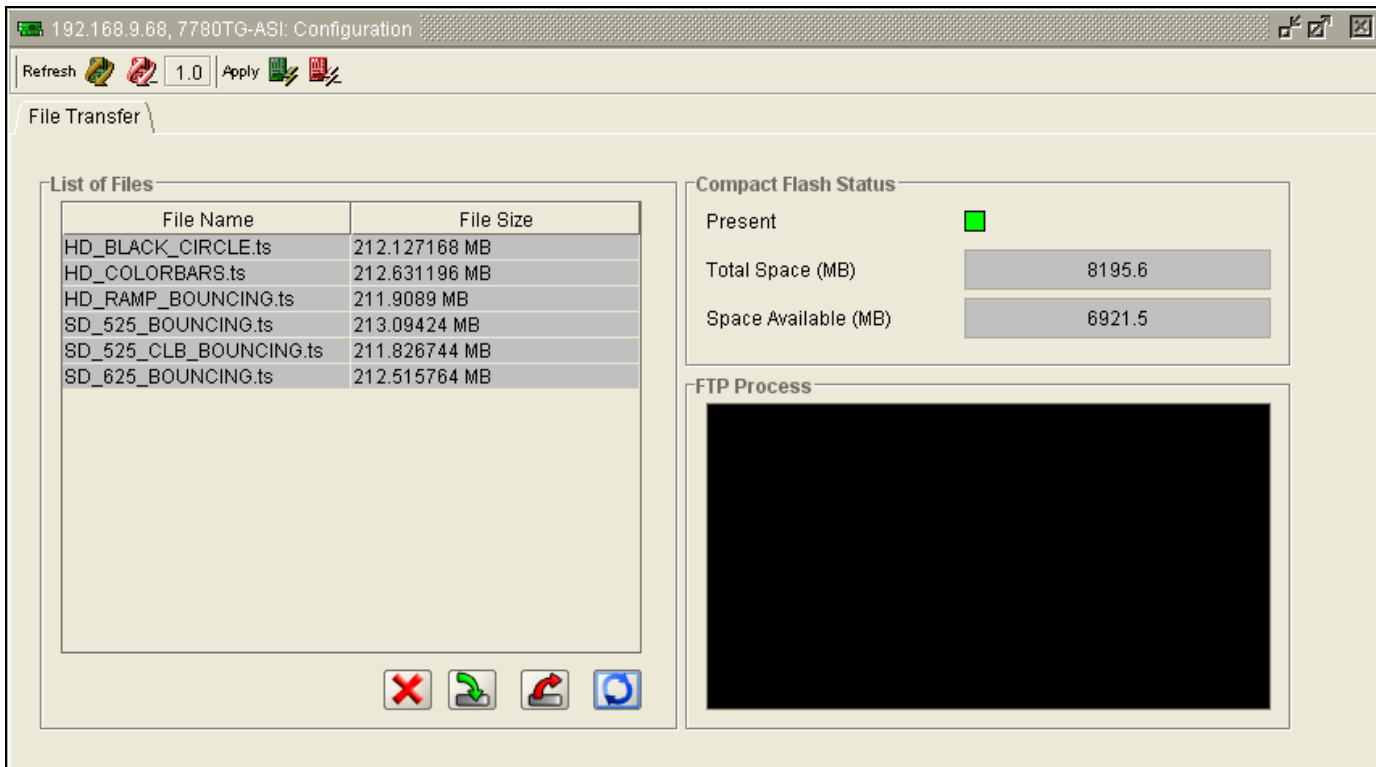

Figure 3-1: *Vista*LINK® PRO File Transfer Tab

This page allows the management of the MPEG-2 transport file on the compact flash. The 7780TG-ASI ships with an 8GB compact flash that is on the board. All playout files are stored on the compact flash. All file management from VLPRO is handled via FTP to the card.

- **File Transfer:** This page will display the list of the files available on the compact flash as well as the size of each file. Please note that the maximum file size that can be played out is 374MB. If the file is larger than 512MB the 7780TG-ASI will load and play the first 374MB of the file.

- **Delete:** The ![X icon] icon is used to remove a file from the Compact Flash. Select a file, click on the "X" icon and then follow the dialog to remove the file. Click on refresh to make sure the file has been deleted.

- **Import:** The icon shows an arrow pointing to the compact flash. It is used for importing a file to the Compact Flash from the local PC where VLPRO client is running. When clicking on this icon, locate the file to import and click the "import" icon. The Card will open an FTP process in the *FTP Process* window and will begin transferring the file. Depending on the size of the file it could take several minutes to import a file. Note that the Compact Flash will access any type of file so it is up to the user to make sure the uploaded files are MPEG-2 transport streams.

- **Export:** The icon is used for exporting a file from the Compact Flash to the local PC where VLPRO client is running. Locate the file to export, click on the "export" button and choose the location for the file on the local pc running VLPRO. The Card will open an FTP process in the *FTP Process* window and will begin transferring the file. Depending on the size of the file it could take several minutes to export a file.

- **Refresh:** The icon shows a double circular arrow. It is used for refreshing the view in the list of files on the compact flash.

> **Note: It is also possible to remove the Compact Flash from the card reader and manage the files using a compact Flash reader. The files are not encrypted and straight MPEG-2 Transport streams. Please power the card off before removing or inserting the Compact Flash. Note that a new Compact Flash has to be formatted using the 7780TG-ASI to be recognized.**

It is recommended to use less than 20 characters for file name and avoid *, /, . in the name.

- **Compact Flash Status:** This area displays the status of the Compact Flash and provides any necessary indications regarding the FTP process.

    - **Present:** When the Compact Flash is not detected, the PRESENT indicator will be red. When detected, it will be green.

    - **Total Space:** This represents the total space available on the Compact Flash card.

    - **Space Available:** This represents the space available for additional files on the Compact Flash card.

    - **FTP Process:** This window displays the progress of the FTP process when uploading, downloading, or deleting files. When an error occurs due to an FTP transfer failure it will be displayed in this window.

> **Please note that depending on the operating system and how the file size is reported, the file size may not be 100% accurate.**

3.2. PLAYOUT CONFIGURATION

Right-click the *ASI Output 1* under the IP address of the 7780TG-ASI in the VLPRO Tree. Select *View Configuration*. The right window will display the 7780TG-ASI *Configuration* and *Bitrate View* tab menus as shown in Figure 3-2.
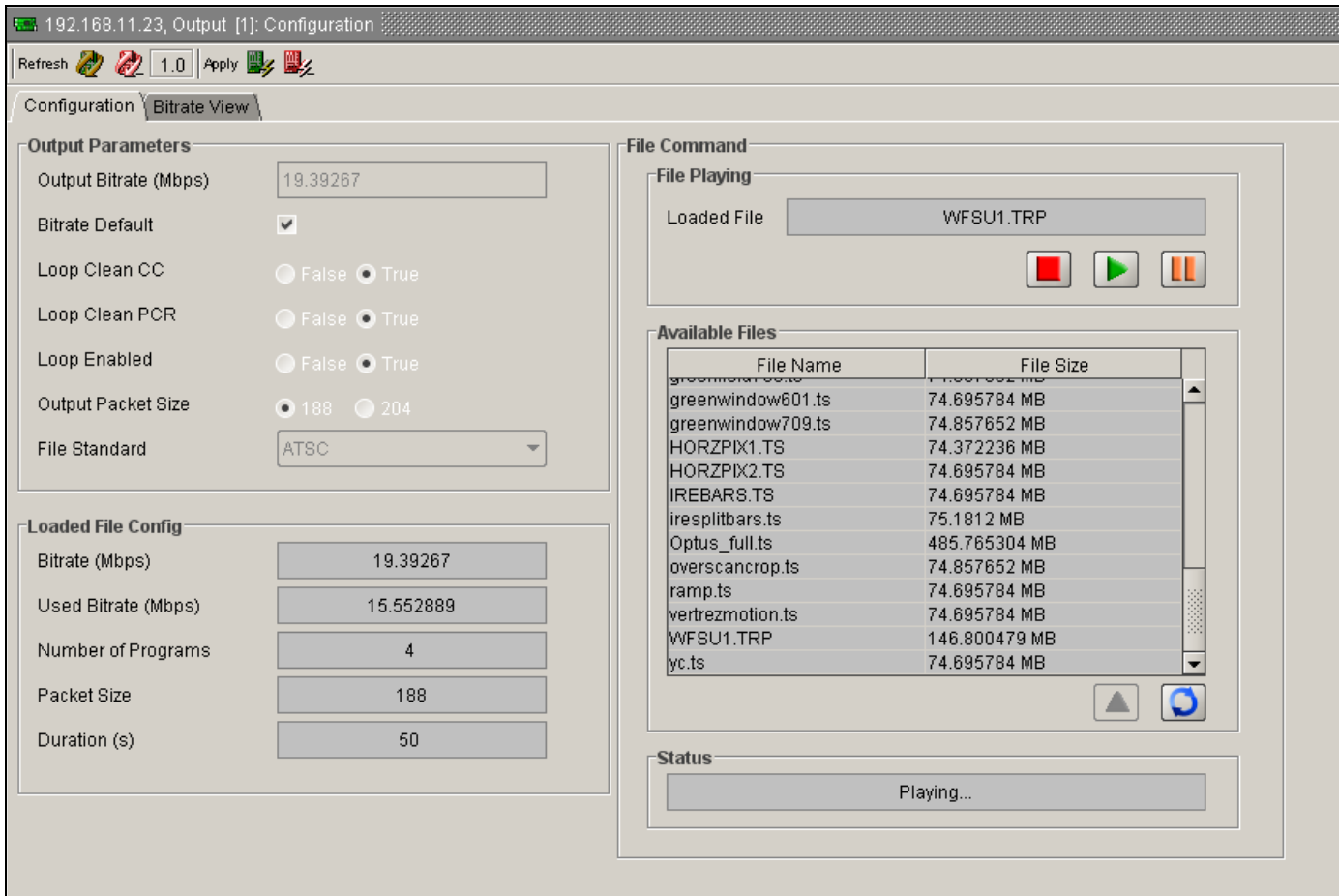

Figure 3-2: *Vista*LINK® **PRO Configuration Tab**

This tab is for configuring the playout mode and selecting the file to playout.

- **File command:** This area will display the list of the files available on the compact flash as well as the size of each file. It allows basic playout control such as load, play, stop and pause.

  - **Stop:** The red square [icon] icon is used to stop a playout. Click on this icon to stop the playout and allow the edit of the output parameters.

  - **Play:** The green arrow [icon] icon is used to start the playout of the loaded file into the RAM. When clicking this icon, it will initiate the loaded file playout at the start of the file. It will also disable the editing of the output parameters.

o **Pause:** The orange double-line [icon] icon is used to pause the playback. Clicking on this icon will stop the playout of the file loaded into the RAM. Selecting the Pause button again will resume the playout of the file, continuing from the point at which the playout was paused.

o **Load:** The blue triangle [icon] icon is used to load a selected file into the RAM. To load a file into the RAM, select a file from the *Available Files* list and click on the triangle icon. Depending on the size of the file it can take several minutes to load a file. A progress report will be displayed in the status window.

o **Refresh:** The [icon] icon is used for refreshing the view of the *Available Files* list on the compact flash.

- **File Playing:** This area displays the file loaded into the RAM for playout. Note that if the file size is larger than the 374MB of RAM, it will be truncated and will not play the complete file.

- **Status:** This area displays the status of the 7780TG-ASI. The status display includes playing, loading, stopped, and paused.

- **Output Parameters:** This area allows the user to change the streams parameters and the playback settings.

  o **Output Bitrate:** This displays the output Bitrate of the 7780TG-ASI and allows the user to modify the Bitrate while not in default Bitrate mode. Note that the Bitrate cannot be set lower than the default Bitrate. When increasing the output Bitrate, the 7780TG-ASI will add null packets to match the required Bitrate and restamp the PCR and PTS to reflect the new rate.

  o **Default:** The default Bitrate of the file is calculated based on PCR in the file.

  o **Loop Clean CC:** When this option is set to *True* and when looping is enabled, the 7780TG-ASI will recalculate the Continuity counts to avoid any Continuity Count errors upon looping. When it is disabled, the 7780TG-ASI will restart the Continuity count of the original stream after each loop.

  o **Loop Clean PCR:** When this option is set to *True* and when looping is enabled, the 7780TG-ASI will recalculate the PCR and PTS/DTS to avoid any PCR and PTS/DTS discontinuity upon looping. When it is disabled, the 7780TG-ASI will restart the PCR and PTS/DTS counters of the original stream after each loop.

  o **Loop Enabled:** This option will enable or disable looping. If the user selects *False*, the file will play once and then stop.

  o **Output Packet Size:** The Standard MPEG-2 packets are 188 Bytes long. The 7780TG-ASI can play 204 byte packets by adding 16 dummy RS (Reed-Solomon) bytes.

o **File Standard:**   The user can choose between MPEG-2, DVB, and ATSC standard. This field only affects what context is used to interpret the transport stream. This is only used to display the proper table under the Bitrate view and does not affect the playout.

- **Loaded File Config:**   Displays the key elements of the file loaded in the RAM.

  o **Bitrate (Mbps):**   This field displays (in Mbps) the nominal Bitrate of the file calculated using PCR in the file.

  o **Used Bitrate (Mbps):**   This field displays (in Mbps) the nominal average used bitrate of the file. Used Bitrate is defined by Total Bitrate minus null packets.

  o **Number of Programs:**   This field displays the number of programs declared in the PAT. Note that if a program is not present, this field may display inaccurate information if the PAT and the actual content of the file are not the same.

  o **Packet Size:**   This field displays the nominal packet size in the file. It can be 188 or 204 bytes per packets.

  o **Duration (s):**   This field displays the duration of the file calculated from the Bitrate (derived from PCR) and the number of packets loaded into the Compact Flash. The time is provided in seconds.

4. COMPACT FLASH MAINTENANCE

The 7780TG-ASI comes with an 8G Compact Flash. It has MPEG-2 TS files built in. If you want to replace the flash or add your own flash, make sure it is at least an Ultra II Compact Flash (for speed).

> **You also need to format the new flash <u>inside</u> the 7780TG-ASI for the file system to show.**

4.1. FORMATTING THE COMPACT FLASH

In order to format a Compact Flash, insert the new flash on the 7780TG-ASI and connect to the serial port menu of the card (See section 2).

Select menu (5) for *Utilities*. And then, select option (3) *Format Compact Flash* as shown in Figure 4-1.

> **Please note that all files will be erased from the Compact Flash.**

Figure 4-1: Formatting the Compact Flash

5. SPECIFICATIONS

5.1. SERIAL TRANSPORT STREAM OUTPUTS

Standards: DVB ASI (1 to 210 Mb/s)
Number of Outputs: 4 (Identical)
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 740ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB up to 270 Mb/s
Wide Band Jitter: < 0.2 UI

5.2. ELECTRICAL

Voltage: + 12V DC
Power: 45 Watts
EMI/RFI: Complies with FCC Part 15, class A and EU EMC directive

5.3. PHYSICAL

7700 or 7800 frame mounting:
  Number of slots: 3

6.   CARD EDGE CONTROLS

The 7780TG-ASI card edge simply provides information about the version number at this time.

For control and monitoring please use *Vista*LINK®

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