IntelliGain™ Demo System

User Manual

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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Jan 09
1.1	Updated VistaLINK® application main interface image	Feb 09

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1. OVERVIEW

IntelliGain™ is an audio processing technology developed by Evertz to control loudness of audio programs on the fly. More specifically, it calculates the perceived loudness of the input audio and modifies the audio to ensure that the long-term average loudness level is at the target level. IntelliGain™ works with mono, stereo and multi-channel audio per program and can handle up to 8 programs simultaneously. The objective loudness calculation is based on ITU Recommendation (ITU-R BS.1770), "Algorithms to measure audio program loudness and true-peak audio level". This recommendation provides equations for calculating loudness over mono, stereo and multi-channel audio programs. IntelliGain™ constantly calculates audio program loudness and when the loudness is over the target level, it reduces the gain; when the loudness is below the target level, it increases the gain. The gain adjustment smoothness is user-controllable by setting attack and release times.

Features:

- Consistent audio loudness levels within a channel and/or program
- Automatic detection and level adjustment
- Gain control within a program interval to preserve audio dynamic range
- Artifact-free transitions between program and commercial
- Elimination of drastic volume changes during commercials and interstitials
- Fully integrated Dynamic Range Processor, also referred to as a compander
- Ideal for aggregator applications and multi-channel playout facilities (DTH, Cables, IPTV, etc)
- VistaLINK® controlled and monitored!

The following sections will clearly define how to setup and use the IntelliGain™ demo system.

1.1. SETUP

The Evertz IntelliGain™ demo is a self-contained system designed to demonstrate effective loudness processing for your HD/SD-SDI signals with embedded PCM audio.

The IntelliGain™ demo system is shipped with the following equipment (refer to Figure 1-1):

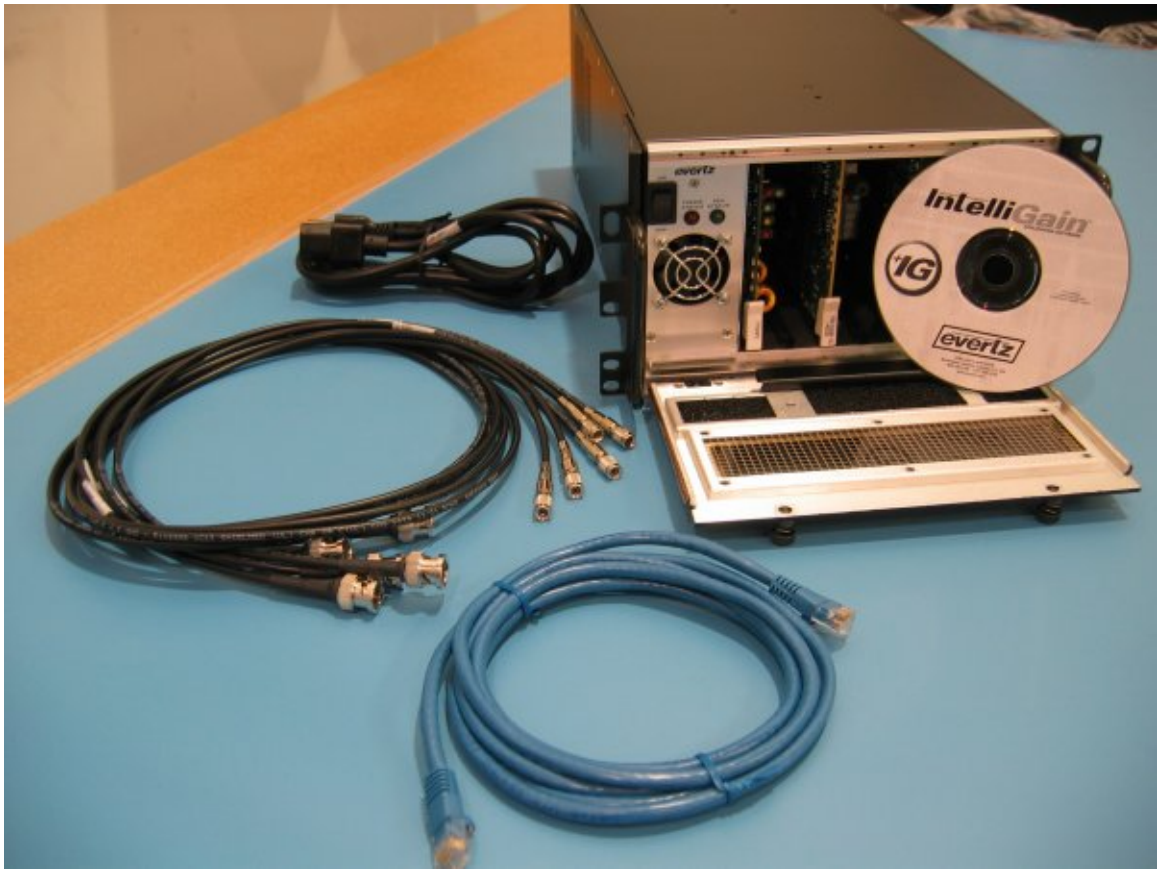

Figure 1-1: IntelliGain™ Demo System Contents

Equipment Requirements:

- 1 x 350FR Chassis with power supply and power cable
- 1 x 7700FC frame controller installed in slot 1 of the 350FR chassis
- 1 x 7800IDA8-3G+IG IntelliGain™ processor installed in slot 3 of the 350FR chassis
- 1 x 7821AD8-3G-AESD 3G/HD/SD-SDI Audio De-embedder installed in slot 5 of the 350FR chassis
- 5 x Coax cables terminated with BNC and mini-DIN BNC connectors (hybrid BNC cables)
- 1 x RJ-45 Ethernet cross-over cable
- 1 x IntelliGain™ Application Software CD with VistaLINK®

The only item that the user must provide is an HD-SDI or SD-SDI signal with either 2-channel stereo or 5.1 multi-channel surround audio embedded on the first 2 or 6 audio channels respectively; the system will take care of the rest. Now let's get started!

2. INSTALLING THE INTELLIGAIN™ APPLICATION SOFTWARE

Insert the IntelliGain™ application software into your PC's CD-ROM drive. The installation software should auto-play after a few seconds.

Note: Auto-play may be disabled on your PC in which case you can start the software by accessing your CD-ROM's drive (if the IntelliGain™ application software is detected successfully, your CD-ROM's drive should display "Evertz IG DEMO"). Double click the icon to start the installation.

When launched, you will see the main IntelliGain™ installation page appear, as shown in Figure 2-1.

Figure 2-1: IntelliGain™ Application Software Main Page

The installation procedure is designed to guide you sequentially through the necessary steps to easily install the control software. There are four easy steps to follow.

2.1. STEP 1: INSTALL VISTALINK® PRO SERVER

To install the VistaLINK® PRO server, click on step 1 of the IntelliGain™ interface. Read through the instructions as the pages appear. The *Install VistaLINK® PRO Server* page will display a "LAUNCH .EXE FILE" button. Click this button, as indicated in Figure 2-2, to launch VistaLINK® PRO server installation.

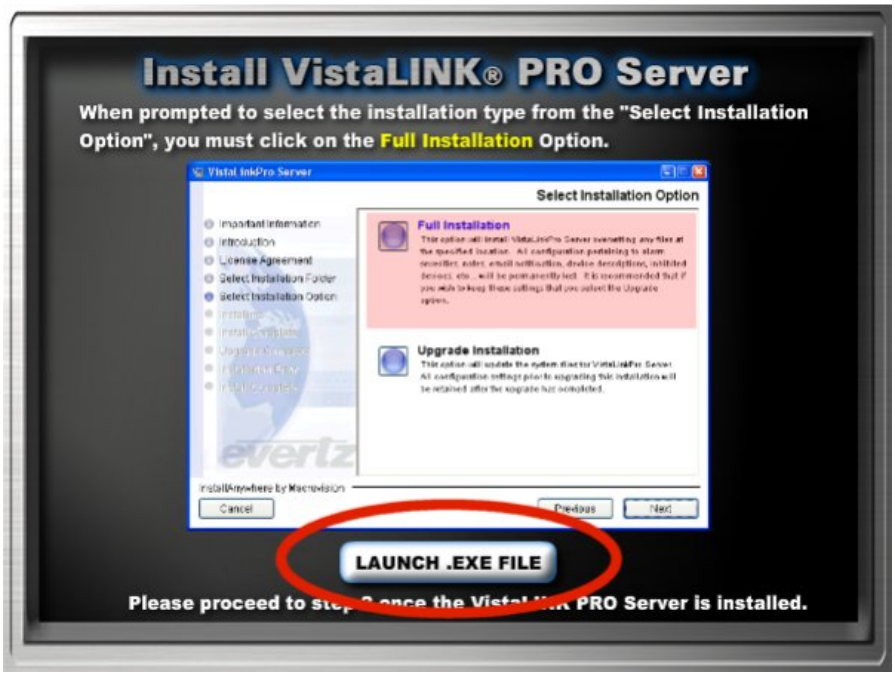

Figure 2-2: Install VistaLINK® Pro Server Step

NOTE: A warning page will appear alerting you that any previously installed VistaLINK® clients will be overwritten. Click OK to continue.

The server installation will begin. Click ***Next*** when prompted.

NOTE: If you have a previous version of VistaLINK® already installed on your system, you will be prompted with two options: FULL Installation or an Upgrade Installation. Select the ***FULL Installation*** by highlighting this option and then select ***Next***.

Once the server has ***Finished*** installing, proceed to step 2 (*Install VistaLINK® Pro Graphics*).

2.2. STEP 2: INSTALL VISTALINK® PRO GRAPHICS

To install the VistaLINK® Pro graphics client, click on step 2 of the IntelliGain™ Install Interface. The *Install VistaLINK® Pro Graphics* page will display a "LAUNCH .EXE FILE" button; click this option to install the program. Once the program is launched, the installation screen will appear.

When prompted with the "Select Product To Install" page, you must select the "***VistaLinkPro Graphics***" option and then click ***Next*** to proceed. Continue to select the ***Next*** button until the installation begins.

Once the Graphics client has ***Finished*** installing, proceed to step 3.

2.3. STEP 3: INSTALL CANNED DEMO

The "Canned Demo" is a custom graphical user interface (GUI) designed for the IntelliGain™ Demo System. This GUI exposes the most common controls and monitoring tools used by the IntellIGain™ system. Select option 3 (*Install Canned Demo*) to begin the installation. This page will display a "LAUNCH .EXE FILE" button; click this option to continue installing the canned demo.

The WinZip Self extractor will appear. Click the ***Unzip*** button to extract the canned demo files to the default location listed. Once the files have been successfully extracted, select the ***Close*** button (see Figure 2-3).

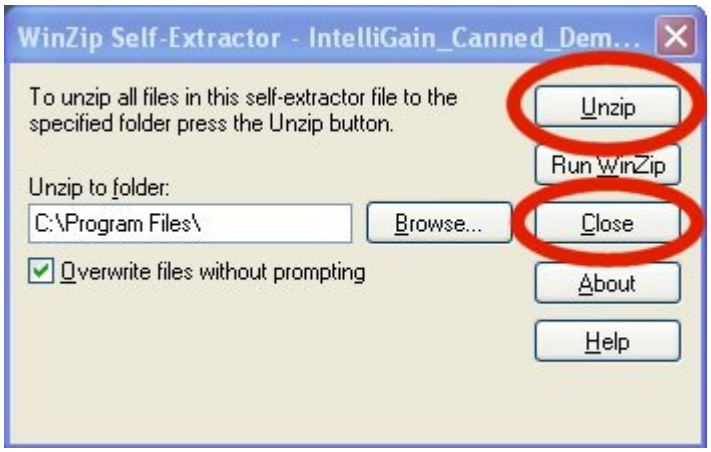

Figure 2-3: WinZip Self-Extractor Step

The IntelliGain™ and VistaLINK® PRO application software is now installed. Proceed to the final step to setup a temporary IP address that will communicate directly with the 350FR chassis.

2.4. STEP 4: SETTING YOUR IP ADDRESS

If you know how to change your IP address; set up your network according to the following network configuration shown in Table 2-1 and then proceed to **Section 3: Connections**.

IP Address:	192.168.10.1
Subnet Mask:	255.255.255.0
Gateway:	192.168.10.1

Table 2-1: Required PC Network Configuration

If you require instructions on how to configure your IP address, please follow the tutorial presented in step 4 of the IntelliGain™ installation interface. In the lower right-hand corner of the page you will notice a small arrow that will advance you to the next page, as shown in Figure 2-4.

Figure 2-4: Setting the IP Address Tutorial

NOTE: If you are already connected to an IP network, disconnect your IP connection before making changes to your IP address.

NOTE: Make note of your existing IP address settings before making any changes.

You are now ready to wire-up the IntelliGain™ Demo System!

3. CONNECTIONS

The following section explains how to wire the system connections in a few quick and simple steps.

3.1. STEP 1: CONNECTING THE 7700FC

Using the Ethernet cable provided with your system, connect the Ethernet port on your PC to the Ethernet port of the 7700FC frame controller installed in slot 1 of the 350FR chassis (see Figure 3-1).

Figure 3-1: Connecting the 7700FC Frame Controller to the PC

3.2. STEP 2: CONNECTING TO THE 7800IDA8-3G+IG INTELLIGAIN™ PROCESSOR

You will need to provide an HD or SD-SDI video signal with embedded PCM audio to the 7800IDA8-3G+IG. The 7800IDA8-3G+IG IntelliGain™ processor will internally de-embed the audio, apply IntelliGain™ patented loudness processing, re-embed the normalized audio signal and provide you with 8 identical signals on the output.

Apply your HD or SD-SDI video with embedded audio signal to the main input BNC located at the very top of the 7800IDA8-3G+IG rear plate (installed in slot 3). You should notice that the LED's on the front card edge will illuminate green.

3.3. STEP 3: CONNECTING THE OUTPUT OF THE 7800IDA8-3G+IG INTELLIGAIN™ PROCESSOR

The module provides 8 identical outputs via mini-DIN connectors. The normalized audio will be re-embedded on the outputs automatically. If you have a device that can monitor an embedded audio signal, then simply take any one of the 8 outputs and connect it to the input of your monitoring device using a hybrid BNC cable (see Figure 3-2). Hybrid BNC cables are provided with this demo system.

Figure 3-2: Connecting the output of the 7800IDA8-3G+IG IntelliGain Processor

If you have an audio monitoring device that only supports AES audio input, the IntelliGain™ demo system comes equipped with a 7821AD8-3G-AESD audio de-embedder which extracts the AES audio signals from the video. To use the audio de-embedder, connect one of the outputs from the 7800IDA8-3G+IG module to the input (PGM IN) of the 7821AD8-3G-AESD using one of the supplied hybrid BNC cables (see Figure 3-3). Once connected, the 7821AD8-3G-AESD should detect a valid video input signal and several LEDs on the front card edge should be illuminated green.

Figure 3-3: Connecting the Input of the 7821AD8-3G-AESD Audio De-embedder

3.4. STEP 4: CONNECTING TO THE AES OUTPUTS OF THE 7821AD8-3G-AESD

Towards the lower half of the 7821AD8-3G-AESD, you will notice 8 AES output mini-DIN BNC's. If the input video signal contains a 2-channel stereo program, then these 2 channels will be extracted and output from the AES 1 mini-DIN output. If the input video signal contains a 5.1 surround sound audio program, then the front left and front right will be output from AES 1, the center and LFE channels will be output from AES 2, and the left surround and right surround will be output from AES 3. Refer to the audio breakout mapping in Table 3-1 and use the hybrid BNC cables to connect the AES audio to your monitoring audio device, see Figure 3-4.

	2-Channel Stereo Audio	5.1 Surround Sound Audio
Left Channel	AES Output 1	AES Output 1
Right Channel	AES Output 1	AES Output 1
Center	n/a	AES Output 2
LFE (sub woofer)	n/a	AES Output 2
Left Surround	n/a	AES Output 3
Right Surround	n/a	AES Output 3

Table 3-1: Audio Breakout AES Audio Mapping

Figure 3-4: Connecting to the AES Outputs of the 7821AD8-3G-AESD

Once you have made all of your connections, the IntelliGain™ Demo system should look similar to Figure 3-5.

Figure 3-5: Complete Wiring Connection Diagram

NOTE: To remove a mini-DIN connector, simply pull back on the jacket of the connector and remove the cable from the device.

Connect the frame to a power source and turn on the frame from the front of the power supply.

3.5. STEP 5: TESTING THE ETHERNET CONNECTION

Once booted, you will need to verify a valid IP connection from your PC to the 7700FC. Ping IP address 192.168.10.5 and confirm a reply is sent back. If you are not sure how to do this, then follow the instructions outlined below:

a. Click ***Start->Run***
b. In the "open" text box, type "cmd" and hit enter. This will open a command prompt window.
c. Type "ping 192.168.10.5" and then hit the <enter> key. If you see a reply come back from the 7700FC, then move to step 6. If not, then you cannot move forward with the configuration, please check your connections and retry pinging the IP Address.

3.6. STEP 6: STARTING THE VISTALINK® APPLICATION SOFTWARE

Congratulations, you are ready to run the VistaLINK® application software. Click on ***Start->Programs->VistaLinkPro Server->VistaLinkProServer***. Once loaded the server will ask you to enter a *Username* and *Password.* Enter ***administrator*** for the Username and leave the Password blank, then click the ***Unlock*** button (see Figure 3-6).

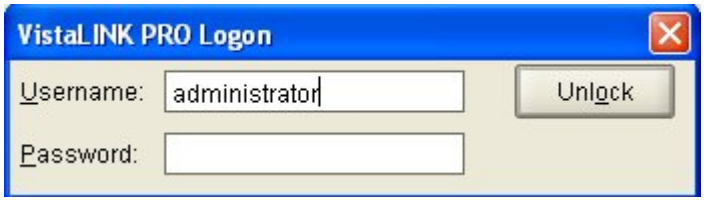

Figure 3-6: VistaLINK® Pro Logon Page

Now, launch the VistaLINK® PRO Graphics software by clicking on ***Start->Programs->VistaLinkPro Graphics->VistaLinkProGraphics***. To login, type ***administrator*** into the Username field and leave the Password field blank, then click the ***Unlock*** button (see Figure 3-6).

3.7. STEP 7: USING THE VISTALINK® INTELLIGAIN™ APPLICATION SOFTWARE

Once the VistaLINK® application has loaded, you will be prompted with an introduction page as shown in Figure 3-7. Select the video resolution that is applicable to your PC, by double clicking one of the options that are provided.

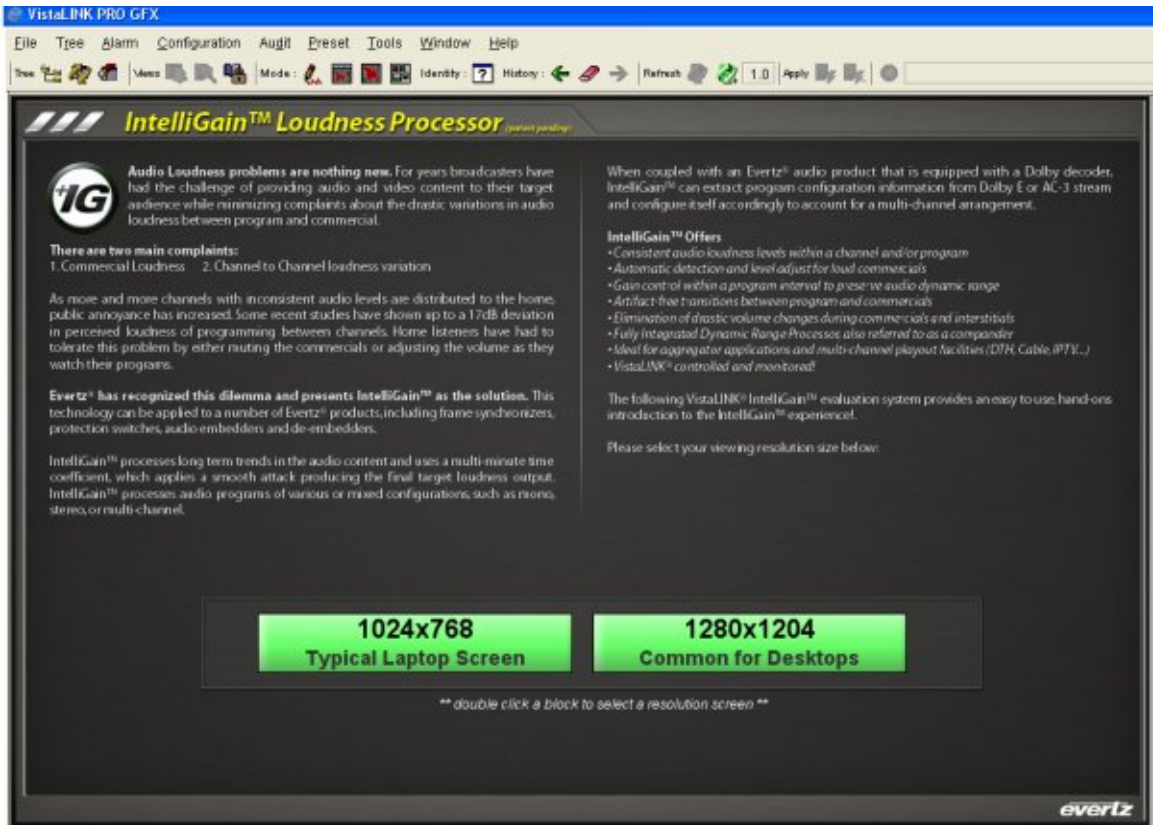

Figure 3-7: VistaLINK® Application Software Welcome Page

The main control interface, seen in Figure 3-8, has been designed specifically for this demo to demonstrate control and monitoring functionality with IntelliGain™.

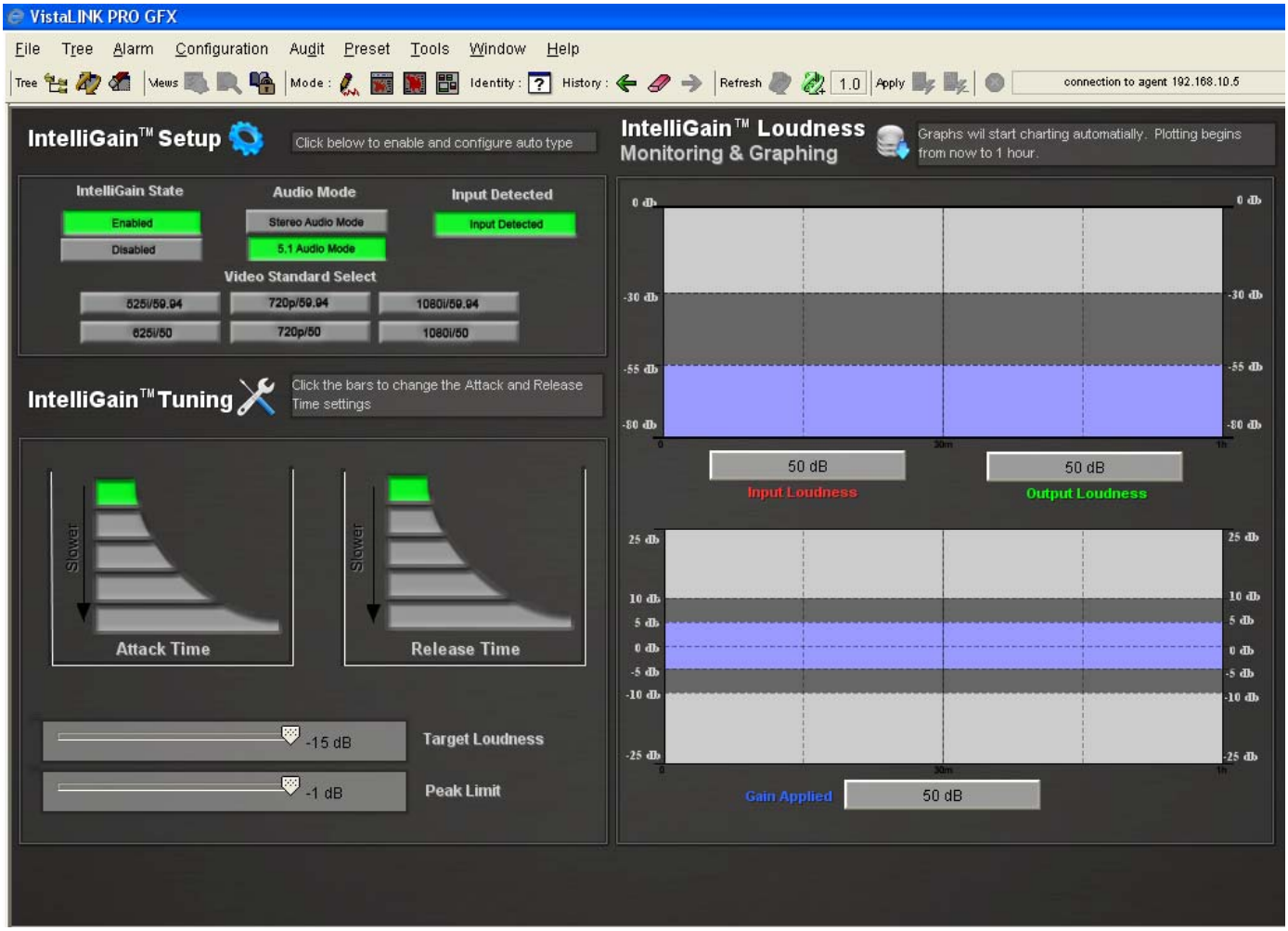

Figure 3-8: VistaLINK® Application Main Interface

The interface is broken up into three main sections:

- IntelliGain™ Setup
- IntelliGain™ Tuning
- IntelliGain™ Loudness Monitoring and Graphing

3.7.1. IntelliGain™ Setup

The IntelliGain™ Setup section has 4 parameters as shown in Figure 3-9 and listed below:

- IntelliGain™ State
- Audio Mode
- Input Detected
- Video Standard Select

Figure 3-9: IntelliGain Setup Controls

3.7.1.1. IntelliGain™ Setup: IntelliGain™ State

This control is the main switch that turns the IntelliGain™ processor on and off. To activate IntelliGain™ processing click the "Enabled" option. To deactivate IntelliGain™ processing click the "Disabled" option. This control may be used to demonstrate the effectiveness of the IntelliGain™ processor by toggling the control on and off.

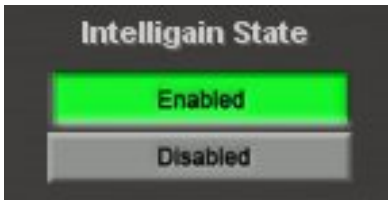

Figure 3-10: IntelliGain™ State

3.7.1.2. IntelliGain™ Setup: Audio Mode

This control selects the audio channel configuration. If you are applying a 2 channel stereo audio program, then select ***Stereo Audio Mode.*** If you are applying a 5.1 surround sound audio program, then select ***5.1 Audio Mode***.

Figure 3-11: Audio Mode

3.7.1.3. IntelliGain™ Setup: Input Detected

This is a non-configurable parameter and simply used for valid input source detection. If the 7800IDA8-3G+IG IntelliGain™ processor detects a valid signal, then this parameter will display green. This control is non-writeable.

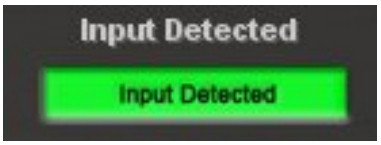

Figure 3-12: Input Detected

3.7.2. IntelliGain™ Tuning

The IntelliGain™ Tuning section has 4 controls as shown in Figure 3-13 and listed below:

- Attack Time
- Release Time
- Target Loudness
- Peak Limit

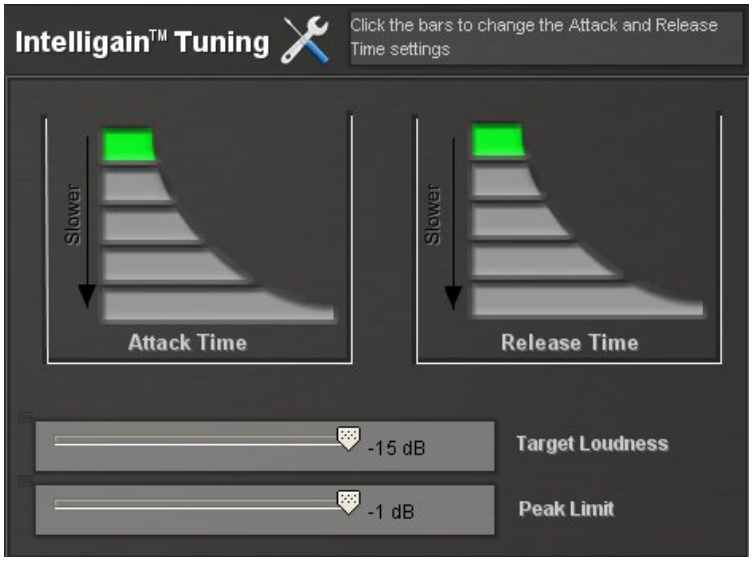

Figure 3-13: IntelliGain™ Tuning Controls

3.7.2.1. IntelliGain™ Tuning: Attack Time

The attack time control defines the integration time it takes to normalize the audio to the target level from the moment loud content is detected. For more responsive results set the attack time to a minimum. You can change the attack time by selecting the individual segments. The top segment will have the most aggressive attack; almost instantaneous correction. The bottom most segment will have the slowest attack, roughly equivalent to 10 seconds of attack.

Figure 3-14: Attack Time

NOTE: Most applications require a fast attack to quickly normalize those loud transitions from program to commercial.

3.7.2.2. IntelliGain™ Tuning: Release Time

The release time control defines the integration time it takes to normalize the audio to the target level from the moment quiet content is detected. For more responsive results set the attack time to a minimum. You can change the attack time by selecting the individual segments. The top segment will have the most aggressive release; almost instantaneous correction. The bottom most segment will have the slowest release, roughly equivalent to 10 seconds of release.

Figure 3-15: Release Time

3.7.2.3. IntelliGain™ Tuning: Target Loudness

The target loudness control is probably the most fundamental control of the IntelliGain™ Loudness Processor. This control allows you to configure the normalize output loudness level. If the input audio is calculated to be under the target loudness level, then gain will be added to the audio level to increase the overall level to meet the target loudness level. If the input audio is calculated to be over the target loudness level, then the gain will be reduced to decrease the overall level to meet the target loudness level. This is done in real time as the signal passes through the IntelliGain™ processor.

NOTE: As IntelliGain™ adds or removes gain to effectively meet the desired target loudness level; all channels will be equally affected. This is done in order to maintain the overall dynamic effect of the audio playback and therefore not altering the mix of the intended production.

Figure 3-16: Target Loudness Slider

3.7.2.4. IntelliGain™ Tuning: Peak Limiter

The Peak Limit is used within the audio program chain to provide an upper limit to peak program levels. This is sometimes referred to as a "brick-wall" limiter. This control is used to maintain the upper limit of the peak levels.

Figure 3-17: Peak Limit Slider

3.7.3. IntelliGain™ Loudness Monitoring and Graphing

As seen in Figure 3-18, this section is comprised of two visual charting elements that will plot the loudness calculations in real time.

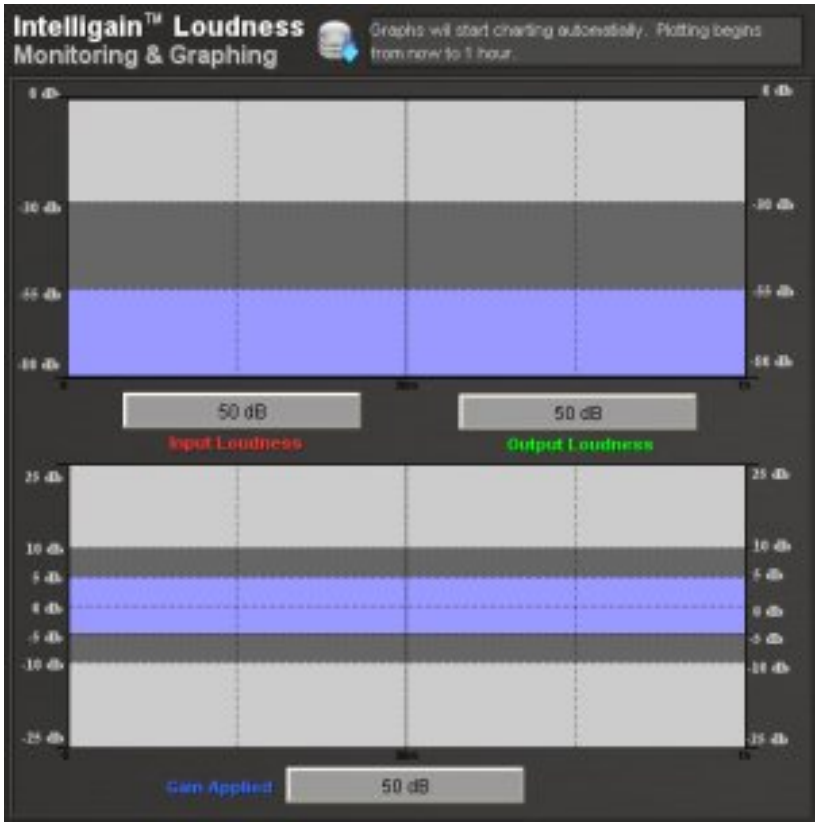

Figure 3-18: IntelliGain™ Monitoring & Graphing

The upper chart is designed to plot loudness values for both the calculated input loudness and also the normalized output loudness. The input loudness will be plotted in a red colour while the output loudness is charted in green. For this IntelliGain™ demo system, the charts have been arbitrarily set to plot the last hour's worth of data values. However, within the purchased version, these charts are fully customizable and can be set for multiple hours or days worth of logging and even include recall of data for user defined start and end times. Beneath the chart are two read-only values of the input and output loudness calculations that are currently being plotted.

The lower chart is designed to plot the amount of gain being added or removed from the input audio signal to achieve the target loudness. Similar to the upper chart, this chart has been set to plot the last hour's worth of calculated gain. Beneath the chart exists a read-only value of the current calculated gain entry being plotted.

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