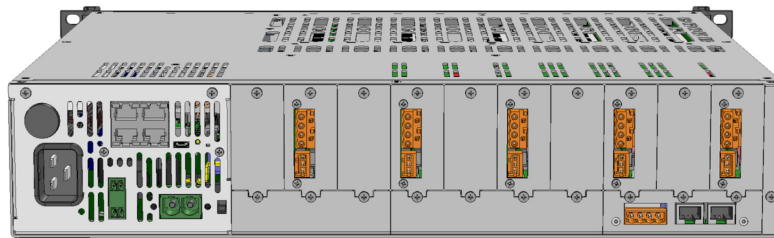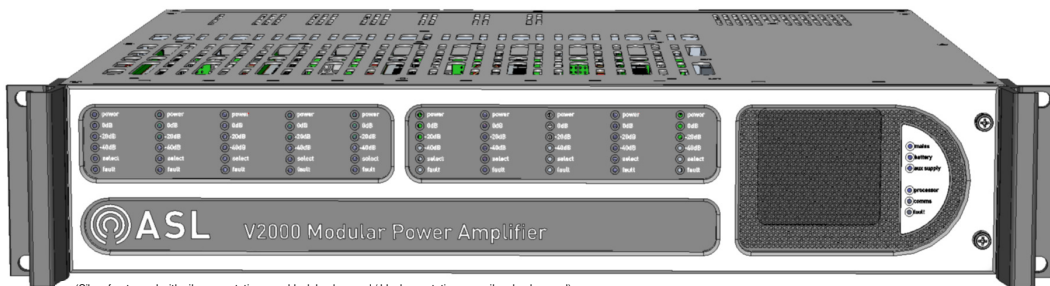# V2000

Modular Amplifier Mainframe

(LSZDC and V2000-STBY Interface Cards shown as example.)

(Silver front panel with silver annotation on a black background / black annotation on a silver background)

User's Manual

This product must be disposed of in accordance with the WEEE directive.

Contents

1   Introduction

This guide provides guidance on the configuration, basic operation, and troubleshooting of the V2000 Amplifier Mainframe.

This guide will also provide some basic information on VIPEDIA-12 Router configuration, required for full V2000 functionality.

The term 'PAVA system' will be used when referring to the system as a whole (VIPEDIA-12 + V2000 + other related hardware).

The diagram below provides an overview of the configuration and commissioning process.

	Summary of Task	Section	Page
Safety and Precautions	Read the safety and precautions instructions and guidelines	2	6
Requirements	1. Gather documentation, software tools, and set up PC	3.2	10
	2. V2000 installed		10
	⚠️ No installation instructions are provided in this document. Refer to V2000 Installation Guide (U-0623-0291)		
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V2000 IP Configuration	1. Ensure all V2000 Ethernet connections are removed.	5	12
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V2000 static configuration	1. Load the VIPEDIA-12 PAVA static configuration into the **System Configuration Tool**	6	15
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Upload static configuration	Upload the static configuration to all V2000s and VIPEDIA-12s using the **ASL Transfer Tool**	6.1.3	17
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Rack Power (BATTERY)	1. Power up the rack BATTERY power	4.2.2	10
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2   Safety and Precautions

Observe all safety information both on the equipment and in this section.

Environmental

Always ensure adequate ventilation is provided for the equipment by following the rack design rules and guidelines provided in the ASL System Design Guide.

The temperature and humidity ranges shown in the specifications for this equipment must not be exceeded.

This equipment must not be installed in an area that is subject to a corrosive atmosphere, excessive moisture or may allow water or other liquids to come into contact with the unit or its external connections.

Objects filled with liquids should not be placed upon it.

Weight Safety

The V2000 mainframe with amplifier and interface cards fitted is heavy (max. 15 kg). Move and handle with care to avoid strain or impact injuries. Install amplifier modules after mounting mainframe into the equipment rack.

Do not use the handles to lift or carry the mainframe. The handles are designed for sliding the unit into and out of the equipment rack, and not to support its weight.

Use the underside edges of the mainframe to lift and carry it.

The supporting rails must be capable of safely bearing the weight of the equipment (max. 15 kg).

ESD Precautions

The V2000 mainframe, interface cards and amplifier modules contain static-sensitive devices. Observe ESD precautions when handling the mainframe with the lid removed, the interface cards or amplifier modules.

Battery Handling

Work on the batteries should be carried out by qualified personnel only.

Always use insulated tools.

Batteries shall not be exposed to excessive heat such as sunshine, fire etc.

EMC

In the close proximity of some radio frequency transmitters, the signal to noise ratio of this equipment may be reduced. If this occurs, re-location of the equipment or the signal cables is recommended.

Electrical Safety

⚠ The V2000 is designed for professional use only and must be installed in a restricted access location such that there is no operator access to the V2000 equipment, wiring or battery.

⚠ Ensure power supply cabling is adequately rated for the unit's operating current and temperature, and is protected against short-circuit by a correctly rated fuse or circuit breaker. This is particularly important for supply feeds from the 24 V backup batteries which can deliver short-circuit currents exceeding 1000 amps.

Using too thin a cable can cause a safety hazard and will give excessive voltage drop and operational failure.

⚠ Always ensure that the equipment is correctly earthed by connection to an AC mains supply with a protective earth connection.

⚠ Note that if the V2000 is connected as a system which is permanently connected to the mains, then an all-pole mains isolator with a separation of 3 mm in each pole shall be incorporated in the electrical installation.

⚠ Always replace blown fuses with the correct type and rating.

⚠ This equipment contains wiring that is energised to 230 V AC mains and 100 V RMS audio signals at up to 20 kHz.

Terminals marked with the ⚡ symbol are hazardous, and the external wiring connected to these terminals requires installation by instructed personnel.

⚠ External 24 V DC batteries connected to this unit can deliver very high currents that could cause fire or burns.

Take care to avoid short-circuits of the battery supply by tools or jewellery.

Do not allow tools or unconnected cables to rest on top of batteries.

⚠ The V2000 may be energised after operation of a fuse or power off by the front panel MAINS and BATTERY supply switches.

Always isolate the mains and battery supplies by switching off the rack mains and battery supply isolation switches before installation, servicing or maintenance. In installations where the rack mains and/or battery supply isolation switches are not accessible, unplug the power supply cables from the V2000.

⚠ The V2000 may still be energised after isolating the mains and battery supplies.

After the 'processor' LED has stopped flashing leave the V2000 for another 5 minutes before attempting internal servicing.

⚠ The D150 and D500 amplifier modules may be plugged or unplugged with power still connected.

To protect against electric shock and damages to the equipment:

• Always use the ejector lever and the slot guides (bottom and top of mainframe) to plug or unplug an amplifier module.

• Do not touch the circuit board, any component or adjacent hardware.

• Do not allow the amplifier module to come in contact with adjacent hardware.

The LSZDC Surveillance Card may be plugged or unplugged with power still connected if necessary. Wherever possible, to avoid the risk of short-circuit with adjacent hardware, disconnect the power supply to the V2000 backplane before plugging or unplugging the LSZDC card.

Disconnect power supply to the V2000 backplane by switching off the MAINS and BATTERY switches on the mainframe front panel behind the removable front panel.

Fire / Burn Safety

Batteries contained within the rack can deliver very high currents that could cause fire or burns.

Take care to avoid short-circuits of the battery terminals by tools or jewellery.

Do not allow tools or unconnected cables to rest on top of batteries.

Use caution when working with the V2000 mainframe. The mainframe case temperature can exceed 70°C.

Ground Loops

It is possible to form a ground loop (earth loop or hum loop) when connecting pieces of audio equipment using unbalanced connections that provide alternative earth connections via their cable screens.

Such ground loops result in audible 'hum' from the system.

Never disconnect the mains earth from the plug to attempt to cure a ground loop. In the event of a fault, the equipment casing could become live.

Blanking Plate Disposal

Any blanking plates removed from the V2000 as part of the installation process ideally should be recycled as metal or otherwise responsibly disposed of by following WEEE protocols.

3 V2000 Controls and Indication

3.1 Front View – front panel fitted
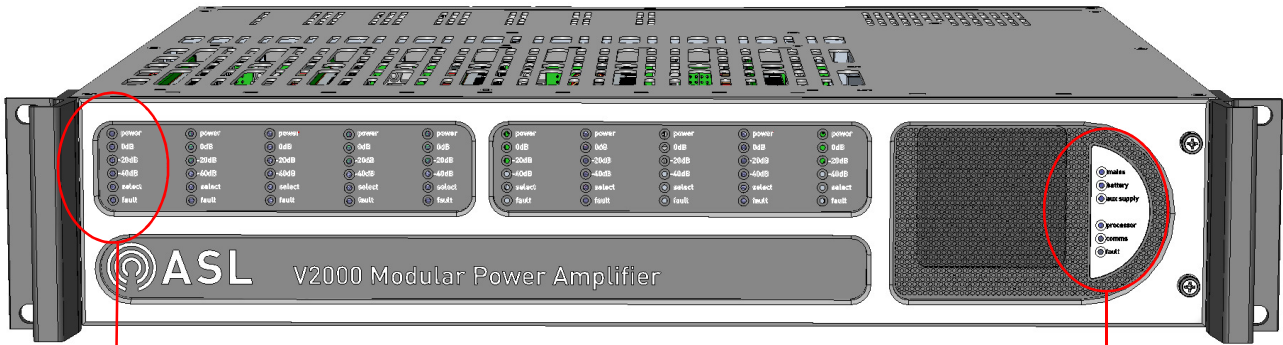
Amplifier LED indications

- **power –** lights when power is in the amplifier
- **0dB –** lights at approx. 90V RMS
- **-20dB –** lights at approx. 10V RMS
- **-40dB –** lights at approx. 1V RMS
- **select**:
    o if standby: flashes when switched in
    o if working: flashes when taken over by a standby
    o either: flashes when selected for audio monitoring
    o either: flashes when DSP firmware is being updated
- **fault**:
    o flashing: fault
    o steady on: critical fault with the amplifier hardware (low voltage, over temperature)

Frame LED indications

- **mains –** lights when mains power present at rear and front MAINS switch on
- **battery –** lights when battery power present at rear and front BATTERY switch on
- **aux supply –** lights if aux supply is available at the rear aux output, and that the aux fuse is intact
- **processor**:
    o flashing: healthy
    o off: internal processor fault
- **comms**:
    o flashing: healthy
    o off: Internal comms fault
    o steady on: ethernet comms fault
- **fault –** lights for power supply or frame controller faults

Note: The MAINS and BATTERY switches are located underneath the front panel.

3.2 Rear View

control ports – *dual for daisy chaining*

mains fuse

ethernet ports – *dual for daisy chaining*

mains input

internal backplane voltage error LED - *Lit when internal voltage too high or low*

audio outputs – *dual A/B to speaker lines*

aux supply

battery input

Temperature sensor input

earth lift switch

audio inputs – *from Vipedia or other devices*

standby 100V input – *for connection to another frame. Dual for daisy-chaining*

standby low level input – *for connection to another frame. Dual for daisy-chaining*

4   Requirements

4.1   Documentation

- V2000 Installation Guide (ASL document U-0623-0291)
- VIPEDIA-12 User's Manual (ASL document U-0641-1605)
- VIPEDIA-12 System Configuration Tool User's Manual (ASL document U-0701-0110) (optional)
- EOL10K Installation Guide (ASL document U-0398-0656) (optional)
- Firmware and Configuration Load Procedures (ASL document U-0641-2585) (optional)
- Site specific system documentation with all V2000 IP addresses

4.2   V2000 Hardware

- V2000 mainframe(s)
- D500 (or D150) amplifier(s)
- LSZDC surveillance card(s) (one required for each amplifier used)
- Standby Interface card(s) (optional)
- A RS485 data connection to PC (optional, for troubleshooting)

All hardware is to be installed in the rack and ready to use. Use the **V2000 Installation Guide** for guidance.

⚠️   1.   There are two power switches on the front of the V2000: MAINS and BATTERY. Ensure these are both switched **OFF** for all units.

2.   These two power switches are NOT isolation switches. For correct power isolation always use the rack fitted isolation switches, or unplug the Mains and Battery input cables. (Note the V2000 may take a few minutes for all power to be dissipated after power isolation. Observe front LEDs).

4.2.1 Rack MAINS Power

Switch the **MAINS** rack power ON, by operating the **MAINS** isolation switch installed onto the rack.

⚠️   **Do not switch the rack BATTERY power on at this point**. If a battery backup system is used, make sure the **rack BATTERY isolation switch is OFF** until a static battery configuration is uploaded into the V2000. Details are in section 6.1.2 - V2000 Configuration.

For all V2000s in the rack:
- The **Processor** LED will now flash at an interval of about 1 second.
- The **Comms** LED will be off.
- The **Fault** LED will now light.

4.2.2 Rack BATTERY Power

Frames require a battery configuration before the rack **BATTERY** isolation switch can be switched on.

Use the V2000 **BATTERY** front power switch after the frame is fully configured and commissioned.

4.3 VIPEDIA-12

4.3.1 Firmware

The V2000 is compatible with VIPEDIA-12 firmware V2.0.0.0 or later.

4.3.2 IP address configuration

Configure all VIPEDIA-12 IP addresses first before moving on to the V2000s. Refer to the **VIPEDIA-12 User's Manual** for guidance.

4.3.3 Static configuration .xml file

A static configuration file containing all VIPEDIA-12 configuration is required. V2000 configuration will be added to this existing file.

4.3.4 No Learn Check

The V2000 does not use the learn feature found on VIPEDIA-12. In order to prevent the no learn fault to be continuously reported the feature needs to be disabled. Refer to the **VIPEDIA-12 User's Manual** for guidance. Note in later versions of VIPEDIA-12 host CP firmware, this is disabled by default if no V400 or X400 frames are found in the configuration.

4.4 PC

A PC with Ethernet connection to the PAVA system with the **System Configuration Tool** installed.

These tools are included with the System Configuration Tool:
- ASL Transfer Tool
- VIPEDIA-12 Dynamic Configuration tool
- V2000 Dynamic Configuration Tool

They are launched from within the System Configuration Tool.

⚠️

1. All software tools need to be V2.0.0.0 or later.

2. Note that this document is valid for software tools up to these versions:

   - ASL Transfer Tool – V2.1.2.3

   - System Configuration Tool – V2.1.2.3

   - V2000 Dynamic Configuration Tool – V2.1.2.0

3. When first launching software a firewall message may appear. Ensure all checkboxes are ticked, then click 'Allow access'.

4. The PC needs networking configuration before beginning. Refer to section 11 - PC Requirements.

5. The PC needs to be on the same subnet as the V2000 in order to communicate. The factory default IP address of the V2000 is 192.168.1.101 and the subnet mask is 255.255.255.0.

---

5   V2000 IP address configuration

> ⚠️   **Ensure all Ethernet connections are disconnected.**
>
> All V2000s are factory set with the same default IP address. If multiple V2000s are powered up on the same network with the same IP address this can cause problems.
>
> Until the IP addresses for all V2000s have been properly set, only connect the Ethernet of the particular V2000 under configuration, and leave all other units disconnected.

5.1   V2000 Power Up

1. Switch the MAINS switch of the first V2000 to be configured to ON.

    Mainframe LEDs:
    - The **Mains** LED will light.
    - The **Processor** LED will continue to flash.
    - The **Comms** LED will light.
    - The **Aux** LED will light

    Amplifier LEDs:
    - All **Power** LEDs will light.
    - The **Select** LED will flash rapidly.

    NOTE: **Fault** LEDs may light during the configuration and commissioning stages. This is normal.

2. Wait for the unit to fully power up.

    The V2000 will be fully powered up when the amplifier **Select** LEDs stop flashing. This can take up to a minute, depending on the number of amplifiers fitted.
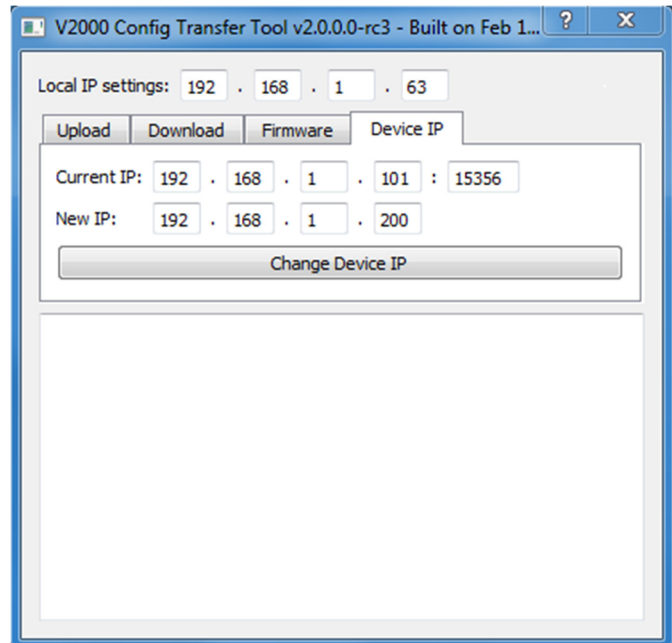
> ⚠️   Never power off the unit whilst the amplifier green **Select** LEDs are flashing **rapidly**. This could corrupt the LSZDC firmware.

3. Connect the Ethernet connection to this V2000. The **Comms** LED will now flash at an interval of about 1 second. This indicates healthy Ethernet comms.

5.2 ASL Transfer Tool – V2000 IP Configuration

The V2000's IP settings are configured using the **ASL Transfer Tool.** The tool is launched from within the **System Configuration Tool** or as standalone.

1. Select the 'Device IP' tab - see **Figure 1**

   a) Set the PC IP address at the top.
   b) Enter the current IP and port address of the V2000. The default is **192.168.1.101: 15356.**
      NOTE: If the current IP address of a V2000 is unknown, refer to the troubleshooting guide near the end of this document.
   c) Enter the desired new IP address.
   d) Click 'Change Device IP'.
   e) The operation is successful when *"IP update: Setting IP address to ###"* is displayed - see **Figure 2**.

2. Reboot the V2000.
3. The new IP address will now be set.
4. Repeat the IP configuration process using the **ASL Transfer Tool** for each of the remaining V2000s.

> ⚠️ Ensure only the particular V2000 under configuration is Ethernet connected and powered up.

5. Once the IP address of all V2000s have been set correctly:

   a) Ensure all units are connected to the network.
   b) Switch all MAINS switches on.

Figure 1   ASL Transfer tool – Device IP
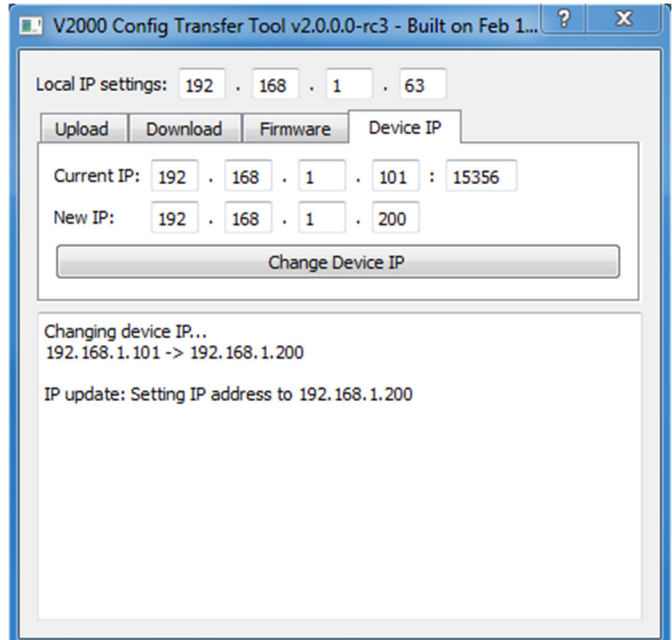
Figure 2   ASL Transfer tool – Device IP Complete

6   PAVA System Configuration

V2000 and VIPEDIA-12 configuration is split into two sections. Static and Dynamic.

Static:

- It is configured using the **System Configuration Tool. Figure 3** shows the tool open on a V2000 configuration page as example.
- Contains the static configuration for the whole ASL PAVA system (including V2000s), and is unlikely to change frequently.
- It is saved to a file (.xml format) and uploaded to all V2000's and VIPEDIA-12's.
- Defines which V2000 features will be available for dynamic configuration.

Dynamic:

- The dynamic VIPEDIA-12 settings are configured using the **VIPEDIA-12 Dynamic Configuration Tool**.
- The dynamic V2000 settings are configured using the **V2000 Dynamic Configuration Tool**.
- Both tools are launched from the **System Configuration Tool** or as standalone.
- The dynamic configuration contains the settings for audio and system surveillance that are likely to be accessed and adjusted quite frequently, especially during the commissioning stage.
- The settings are applied live so that changes can be monitored and fine-tuned.
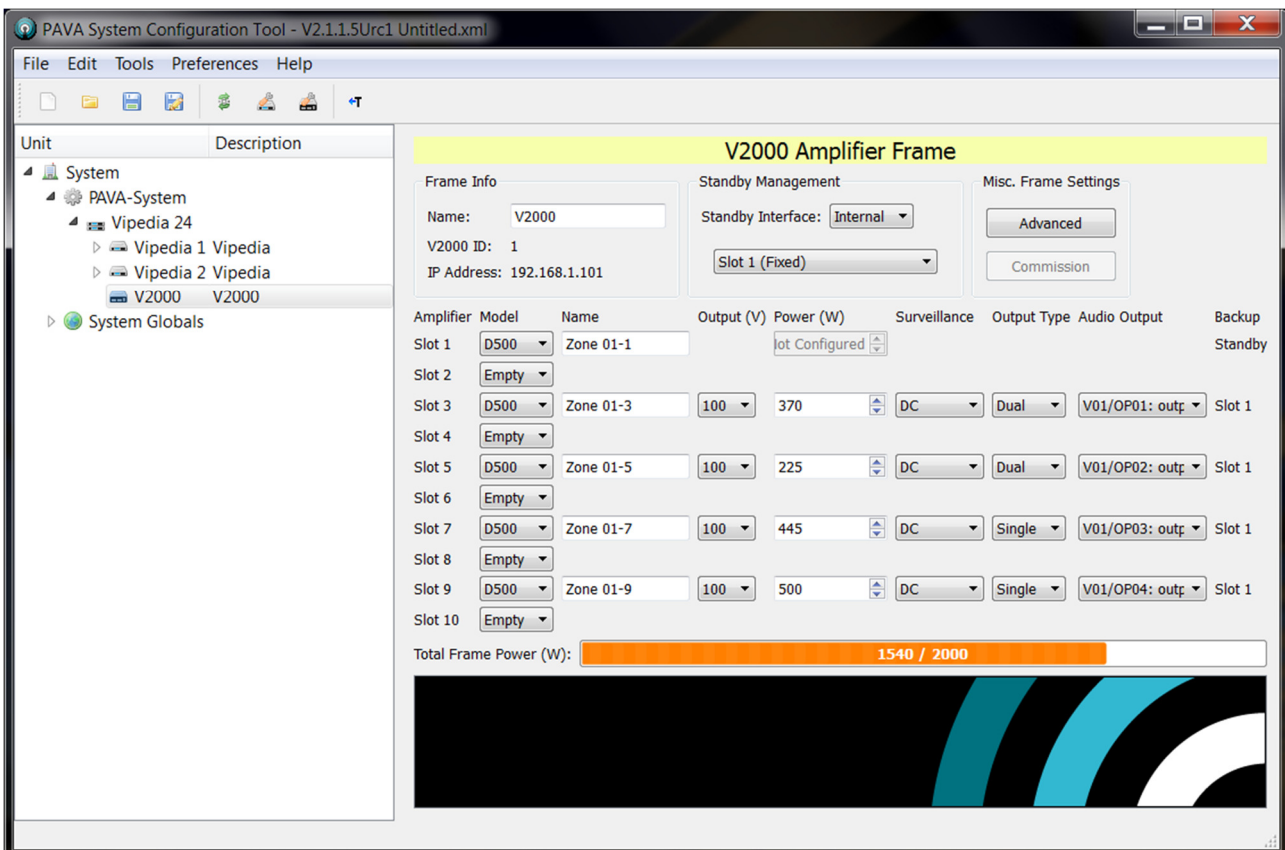
Figure 3   System Configuration Tool – Example, with V2000 configuration

6.1 PAVA Static Configuration

6.1.1 VIPEDIA-12 Static Configuration

Refer to the **VIPEDIA-12 System Configuration Tool User's Manual** for guidance.

6.1.2 V2000 Static Configuration

1. Add V2000s to VIPEDIA-12 DBB groups.

    a) Right-click the VIPEDIA-12 DBB group in the left-hand navigation pane.
    b) Click 'Add' and then 'V2000'.
    c) Add as many V2000s as required

2. Add V2000 batteries (if a battery backup system is used).

    a) Right-click the V2000 in the left-hand navigation pane.
    b) Click 'Add' and then 'Battery'.

> ⚠️ Ensure a battery added to every V2000 that uses a battery backup system. An incorrect configuration could cause damage to the V2000 hardware.

3. Configure the V2000 Frame Settings:

    a) Select the V2000 frame to be configured in the left-hand navigation pane.
    b) Under 'Misc. Frame Settings' click the 'Advanced' button to open the 'Advanced' dialog box.
    c) Select the 'Frame Settings' Tab (see **Figure 4**)
    d) Enter the desired settings for 'General Information'

    Default settings:
    • Frame ID: **1**
    • Frame Address and Port: **192.168.1.101 : 15356**

    e) Enter the desired settings for 'Surveillance Settings' and 'Engineering Surveillance Settings'.

    Recommended Surveillance Settings:
    • Temperature Alarm (°C): **70**
    • Earth Leakage Detection: **Enabled**
    • Amplifier Input Surveillance: **Enabled**
    • Amplifier Output Surveillance: **Enabled**
    • Output/Loop Return Frequency: **Low**

    Recommended Engineering Surveillance Settings:
    • Tone Interval: **85 s**
    • First Tone Duration: **3 s**
    • Second Tone Duration: **3 s**
    • Residual Current Threshold: **20 mA**
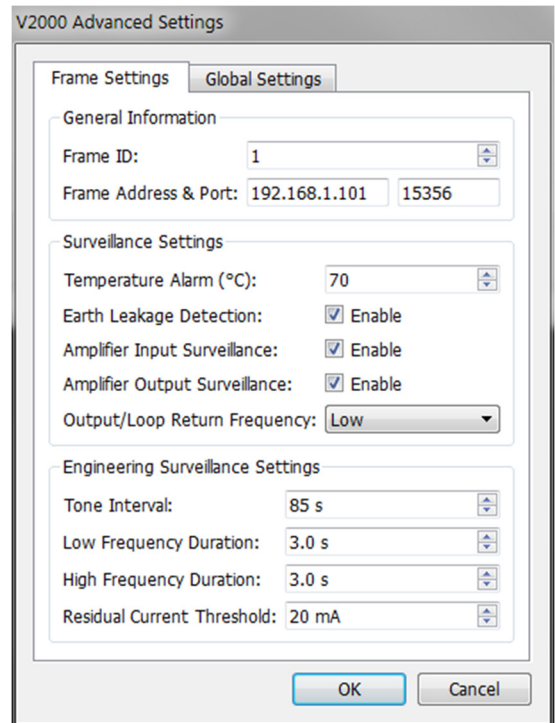
Figure 4   PAVA System Configuration tool - V2000 advanced frame settings

f)   Select the 'Global Settings' Tab (see **Figure 5**)
g)   Enter the desired settings for 'Multicast Address and Port', 'Battery Mode', and 'Global Surveillance Timers'.

Recommended for Global Settings:
(Applies to all V2000s)

- Audio output – **239.0.1.1 : 16080**
- VIPEDIA-12 Control – **239.0.0.254 : 15356**
- V2000 Control – **239.239.0.254 : 16356**
- Route Priority Limit – **64**
- Route Class Limit – **All Classes**
- Surveillance Tone Ramp Time – **600ms**
- DC EOL Delay – **4000ms**
- DC EOL Window – **2000ms**

h)   Click 'OK' to save any changes and close the window.

Figure 5   PAVA System Configuration tool **-** V2000 advanced global settings

4.   Configure the V2000 amplifier slots:

Configuration is different depending on the type of amplifier (working or standby):
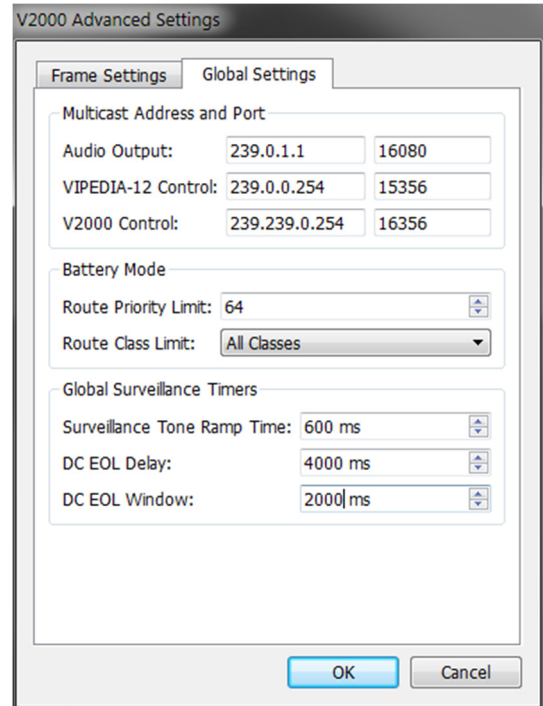
Figure 6 shows the amplifier slot and the standby interface configuration sections.

Working:
a)   Select the V2000 frame to be configured in the left-hand navigation pane.
b)   Add a D500 or a D150 to the desired working amplifier slot.
c)   Configure the **Output Voltage**, **Output Power**, **Line Surveillance** method, **Output Type** and the VIPEDIA-12 **Audio Output**.

Standby:
a)   Select the V2000 frame to be configured in the left-hand navigation pane.
b)   Add a D500 or a D150 to the desired standby amplifier slot.
c)   Select the type of standby interface used under the 'Standby Management' section.
d)   Select the slot that contains the standby amplifier.
e)   The amplifier will now convert to a standby.

> ⚠️ The V2000 only allows a maximum of 2000W power to be configured and saved. The Total Frame Power bar is displayed on the tool to assist with configuration. The bar will turn red and a warning icon will appear on the left if the power is over-allocated
>
> Note: If the frame is used as an external standby for another frame, the power bar will reflect this.

5.   Save the System Configuration.

The configuration file will be saved in an .xml format.
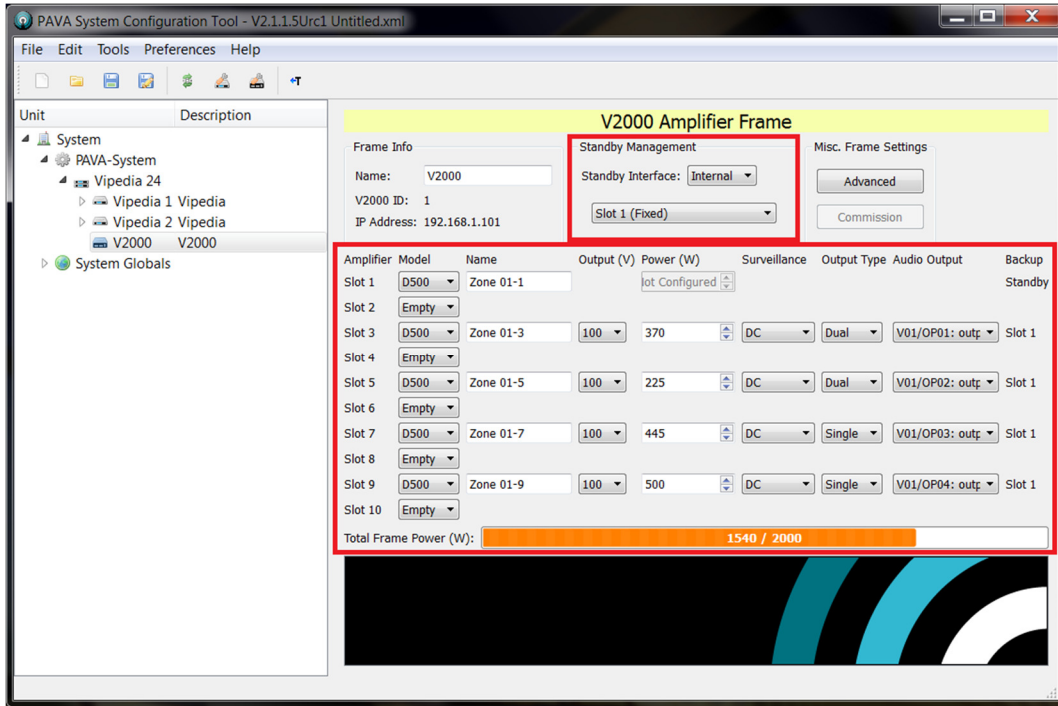
Figure 6   System Configuration tool **-** V2000 amplifier slots and standby interface configuration

6.1.3 System Static Configuration Upload

The **ASL Transfer Tool** is used to upload the static configuration to all VIPEDIA-12 and V2000 units.

To upload the system configuration file to PAVA devices:

a) Launch the **ASL Transfer Tool.**
    Note: The PC IP address at the top should be automatically set. If not correct, check the **System Configuration Tool** settings.
b) Select the Upload tab.
c) Click 'Select File', then navigate to and select the correct PAVA system configuration file (.xml).
d) The drop down box will now display all PAVA units in the system configuration.
e) Select 'All devices'.
f) Alternatively the configuration can be sent to just VIPEDIA-12's, V2000's, or individual units.
g) Click 'Send Config'.
h) The tool will now upload to selected PAVA units.
i) Upload will be successful when the following text is displayed:

"Config upload successful: Config transferred successfully.

Finished transfer to ###"

(### being the device(s) selected)
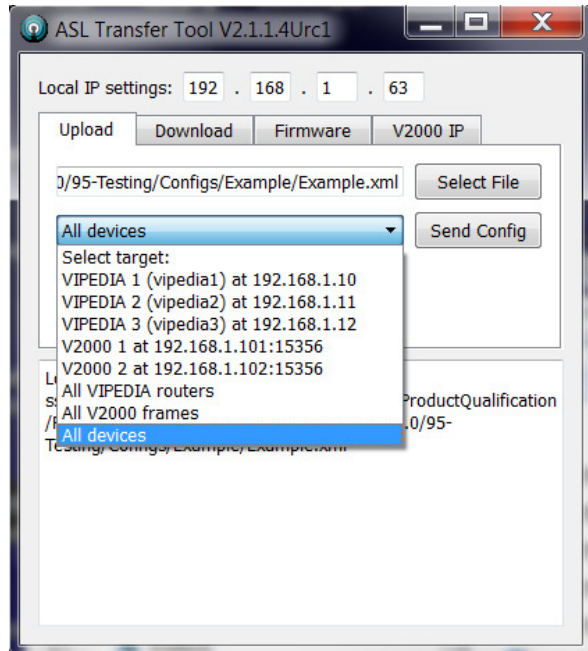
Figure 7   ASL File Transfer Tool – Upload Configuration

NOTE: It is now safe to use the BATTERY power switch on all V2000's using a battery backup system.

6.2   PAVA Dynamic Configuration

6.2.1   VIPEDIA-12 Dynamic Commissioning

Two areas of the **VIPEDIA-12 dynamic configuration** need to be commissioned for V2000 compatibility:
- Audio outputs.
- Surveillance Generators.

The VIPEDIA-12 dynamic commissioning is done using the **VIPEDIA-12 Dynamic Commissioning Tool**. The tool is launched from within the **System Configuration Tool** or as standalone.

6.2.1.1   VIPEDIA-12 Audio Output Commissioning

The V2000 requires VIPEDIA-12 output **Limiter** and output **Clipper** to be enabled on all V2000 connected outputs. This is to ensure VIPEDIA-12 output audio does not overload the V2000 inputs.

To set the VIPEDIA-12 output limiter and clipper:
- a)   Launch the **System Configuration Tool.**
- b)   Open the system configuration file (.xml).
- c)   Go to 'Preferences' → 'Network Connections' and confirm the correct network adapter is selected.
- d)   Click the 'Launch Dynamic Configuration Tool' icon in the toolbar.
- e)   The **VIPEDIA-12 Dynamic Configuration Tool** will launch after a few seconds.
- f)   Select the VIPEDIA-12 to be commissioned using the drop down box in the bottom left of the tool.
- g)   Select the 'Outputs' tab.
- h)   The spanner icon at the bottom of each output opens the output properties window.
- i)   Enable the limiter using the **Limiter** checkbox.
- j)   Apply these settings:
    Threshold: 0dB**, Attack:** 1ms**, Hold:** 100ms**, Release:** 250ms**, Make Up Gain:** 0.0dB.
- k)   Enable the clipper using the **Clipper** checkbox.
- l)   Set **Level** to +2.0dB**.**
- m)   Click the 'OK' button.
- n)   Repeat for all VIPEDIA-12 outputs in the PAVA system that have connection to V2000.
- o)   Once all VIPEDIA-12's have been commissioned, click 'Commit Settings'.
- p)   This will permanently save the commissioned values into all Vipedias.

Figure 8   VIPEDIA-12 Dynamic Configuration Tool – Output Limiter and Clipper

6.2.1.2 VIPEDIA-12 Surveillance Generator Commissioning

The V2000 requires a continuous low level 20Hz surveillance tone from the VIPEDIA-12 outputs. This tone is used for input surveillance detection.

To commission the 20Hz VIPEDIA-12 surveillance tone:
a) Launch the **PAVA System Configuration Tool.**
b) Open the system configuration file (.xml)
c) Go to 'Preferences' → 'Network Connections' and confirm the correct network adapter is selected.
d) Click the 'Launch Dynamic Configuration Tool' icon in the toolbar.
e) The **VIPEDIA-12 Dynamic Configuration Tool** will launch after a few seconds.
f) Select the VIPEDIA-12 to be commissioned using the drop down box in the bottom left of the tool.
g) Select the 'Global Settings' tab.
h) Under 'Surveillance Generator 1' select '20Hz'.
i) For each V2000 connected output, enable the surveillance tone generation by selecting 'On'.
j) Set the Send Level of each of these outputs to -30dB.
   Figure 9 highlights the relevant sections, with outputs 1 – 3 commissioned as an example.
k) Repeat for all VIPEDIA-12 outputs in the PAVA system that have connection to V2000.
l) Once all VIPEDIA-12s have been commissioned, click 'Commit Settings'.
m) This will permanently save the commissioned values into all VIPEDIA-12s.
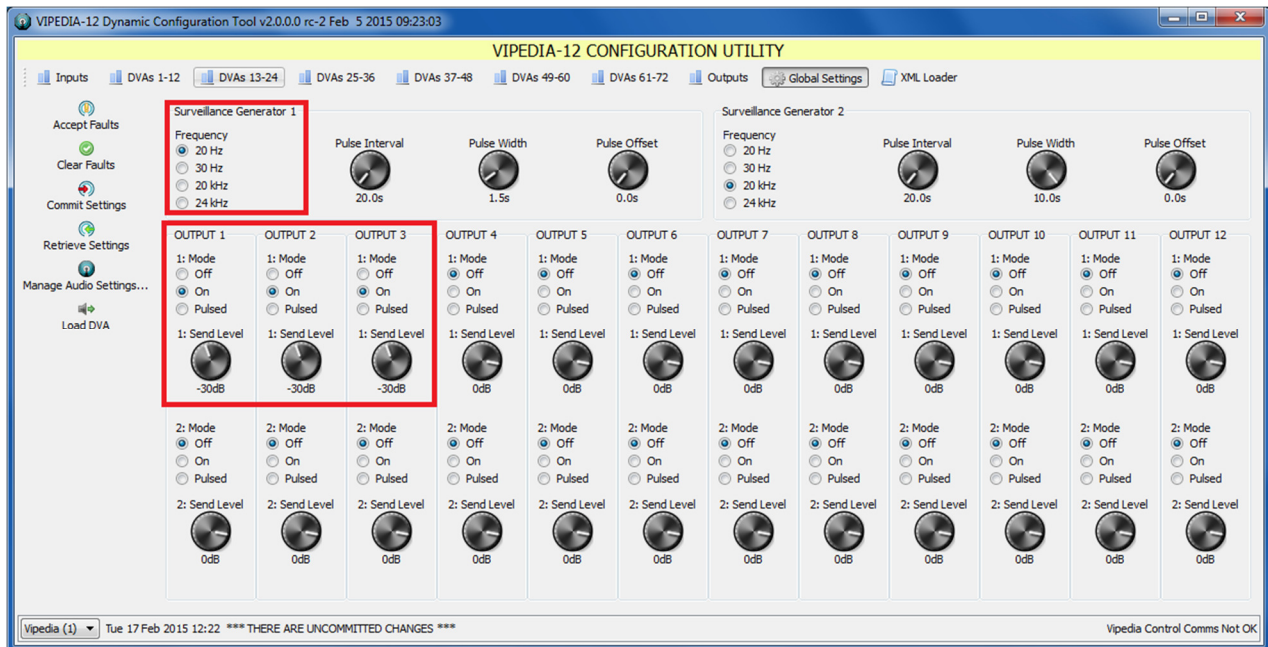
Figure 9   VIPEDIA-12 Dynamic Configuration Tool – 20Hz surveillance tone commissioning

6.2.2 V2000 Dynamic Commissioning

All V2000 dynamic commissioning is done using the **V2000 Dynamic Configuration Tool.** The tool is launched from within the **System Configuration Tool** or as standalone.

### 6.2.2.1 V2000 System Surveillance

Overview:

- **Input Surveillance** – Monitors the audio connection between VIPEDIA-12 and V2000 units by detecting a tone generated from Vipedia.

- **Amplifier Output Surveillance** – Monitors amplifier health by detecting a configurable internal tone.

- **Loudspeaker line monitoring:** (one of three possible methods)

  o **DC End of Line (DC-EOL)** – Detects resistors fitted at the end of each loudspeaker spur.

  o **Impedance Line Monitoring –** Monitors the impedance of the loudspeaker line. A configurable internal tone is sent from the V2000 down the speaker line to provide the voltage required for measurement. (High frequency tone only) (Feature not yet available).

  o **Loop Return Line Monitoring –** Detects a configurable internal tone sent out the amplifier's A output which is looped back to the B output. (Feature not yet available)

- **Earth Leakage** – Monitors the loudspeaker line's connection to ground. A configurable internal tone is sent from the V2000 down the speaker line to provide the voltage required for measurement. (Low frequency tone only)

Surveillance Tone Types:

- **VIPEDIA-12 audio output tone** – Configured using the **VIPEDIA-12 Dynamic Configuration Tool.** (See Section **6.2.1.2** VIPEDIA-12 Surveillance Generator Commissioning**)**

  Required for **Input Surveillance.**

- **Internal V2000 tone** (Low or High frequency) – Configured using the **PAVA System Configuration Tool** and the **V2000 Dynamic Configuration Tool.** (See Section **6.2.2.2** V2000 System Surveillance Commissioning**)**

  Required for:
  o **Amplifier Surveillance**
  o **Impedance Line Monitoring** (High frequency only) (Feature not yet available)
  o **Loop Return Line Monitoring** (Feature not yet available)
  o **Earth Leakage** (Low frequency only)

- **V2000 DC offset** is an automatic feature.

  Required for **DC End of Line.**

6.2.2.2 V2000 System Surveillance Commissioning

1. Connect to a V2000 using the **V2000 Dynamic Configuration Tool:**
   a) Launch the tool.
   b) Select a frame and click 'Connect'.
   c) Connection will be successful when the red connection status indicator in the top right of the tool turns to, and stays, green.

2. Select the desired slot tab.

3. Select the 'Surveillance' tab.

4. Configure the two surveillance tone generators:
   a) Enable the appropriate generator by clicking the 'Generate' checkbox.
   b) If the low frequency (LF) 20 Hz generator is used, set to a level of **1.5V**.
   c) If the high frequency (HF) 20 KHz generator is used, set to a level of **4V**.
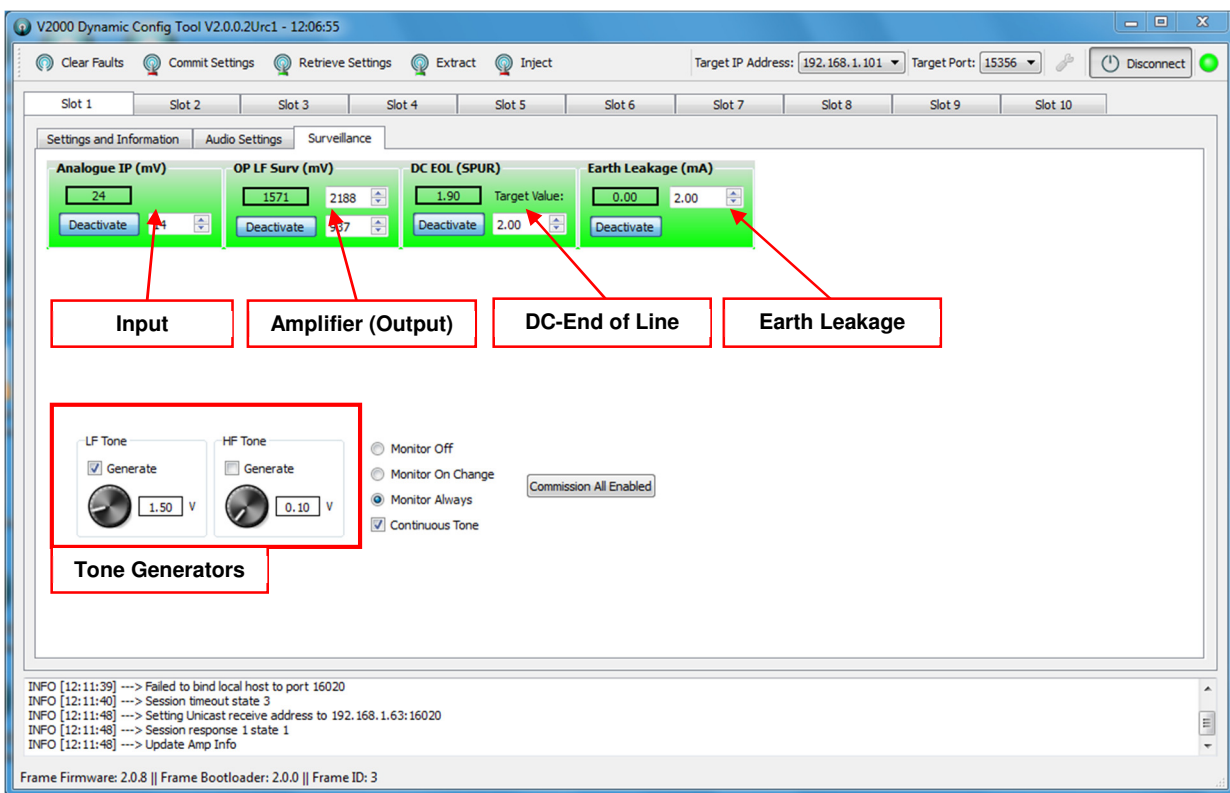
Figure 10   V2000 Dynamic Configuration Tool – Surveillance Example

5. Commission the surveillance features.

NOTE:

For all **working** amplifiers the following is required:
- Input surveillance
- Amplifier output surveillance
- Earth Leakage detection
- Loudspeaker line monitoring, either one of three options:
  o DC- End Of Line (DC-EOL)
  o Impedance (Feature not yet available)
  o Loop Return (Feature not yet available)

For all **standby** amplifiers the following is required:
- Amplifier output surveillance

| Static setting	Dynamic feature
Frame settings – Earth Leakage Detection	Earth Leakage
Frame settings – Amplifier Input Surveillance	Analogue Input
Frame settings – Amplifier Output Surveillance	Analogue Output (Low or High Frequency)
Slot – Surveillance – DC	DC End Of Line
Slot – Surveillance – Z(LF)	Impedance (Low Frequency)
Slot – Surveillance – Z(HF)	Impedance (High Frequency)
Slot – Surveillance – Loop	Loop Return (Low or High Frequency)
Frame settings – Output/Loop Return Frequency	Selects frequency used for Output and Loop Return

The static configuration determines which dynamic features are available for commissioning. If an expected feature is not available, confirm the static configuration is correct before continuing.

d) **Input Surveillance**: (Working amplifiers only)
   • Click the 'Analogue IP' checkbox to enable this feature.
   • Click 'Commission'.
   • In the pop-up window set the tolerance percentage – **Recommended: 40%.**
   • Click 'Auto Commission'. Wait for the process to be completed.
   • The Analogue IP section will now turn green.
   • Commissioning is now complete for this feature.

e) **Amplifier Output Surveillance**: (Working and standby amplifiers)
   • Click the 'OP LF Surv' checkbox to enable this feature.
   • Click 'Commission'.
   • In the pop-up window set the tolerance percentage – **Recommended: 40%.**
   • Click 'Auto Commission'. Wait for the process to be completed.
   • Wait for the process to be completed.
   • The OP LF Surv section will now turn green.
   • Commissioning is now complete for this feature.

f) **DC-EOL Surveillance**: (Working amplifiers only)
   • Click the 'DC EOL' checkbox to enable this feature.
   • Enter the expected number of spurs (refer to the site system design documentation).
     Refer to the **EOL10K Installation Guide** if assistance is required with setting up the EOL devices on the loudspeaker lines.
   • Click 'Commission'.
   • The DC EOL section will now turn green. (If the correct number of EOL devices are fitted.)
   • Commissioning is now complete for this feature.

g) **Earth Leakage Surveillance**: (Working amplifiers only)
   • Click the 'Earth Leakage' checkbox to enable this feature.
   • Enter the threshold value (refer to the system design documentation or use **2mA** as recommended).
   • Click 'Commission'.
   • The Earth Leakage section will now turn green.
   • Commissioning is now complete for this feature.

NOTE: The threshold values for all surveillance features can be adjusted if required after commissioning
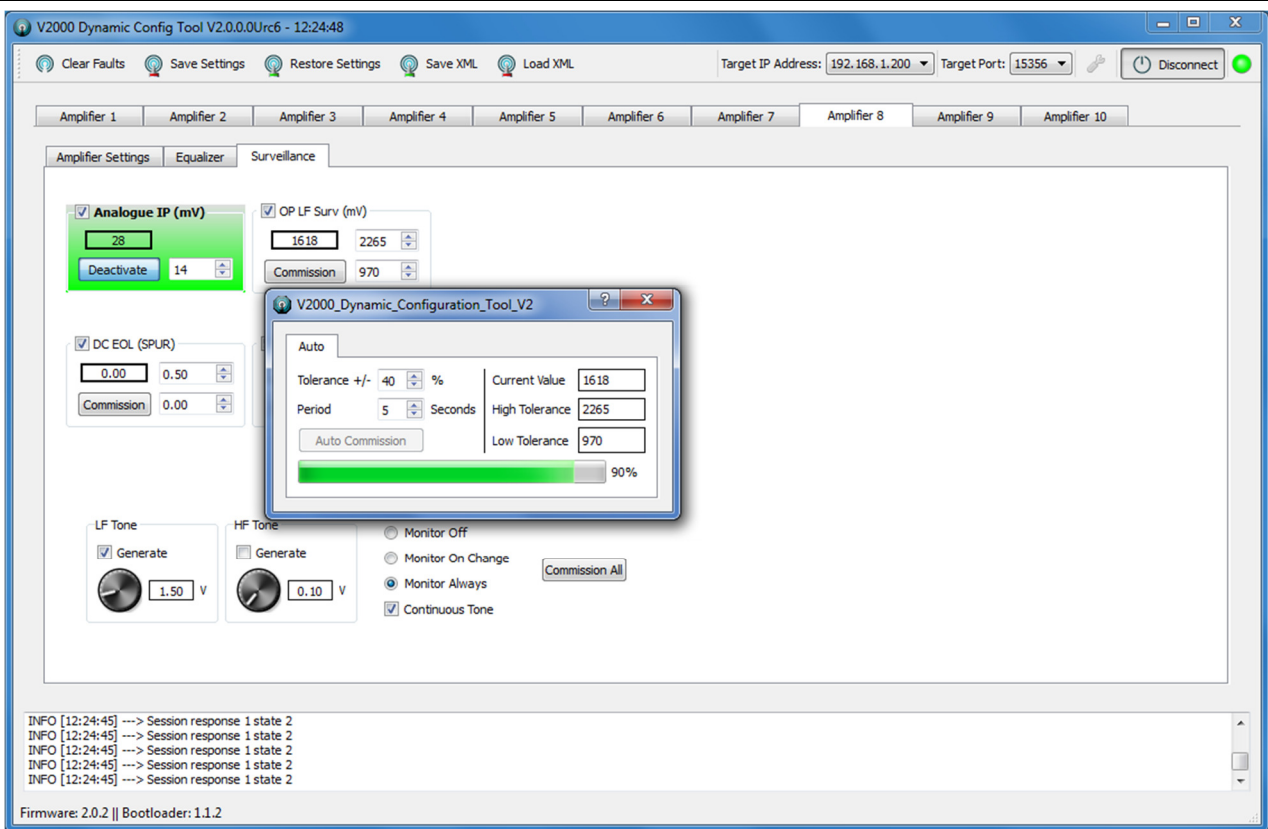
Figure 11   V2000 Dynamic Configuration Tool – Surveillance Commissioning

Table 1 below gives example readings and threshold settings for input and amplifier output surveillance for reference.
The readings in this table are examples using these surveillance tone settings:
- V2000 Low Frequency = **1.5V**
- V2000 High Frequency = **4V**
- VIPEDIA-12 output = **20Hz, -30dB, continuous.**

Note the input surveillance reading is affected by the **voltage** setting of the amplifier (set in static configuration) and amplifier output surveillance differs slightly between D500 / D150.

Surveillance Feature	Low Threshold	Nominal Value	High Threshold
Input (@100V)	14mV	**25mV**	N/A
Input (@70V)	10mV	**18mV**	N/A
Input (@50V)	7mV	**12mV**	N/A
Amplifier Output - low frequency (D500)	960mV	**1600mV**	2240mV
Amplifier Output - low frequency (D150)	840mV	**1400mV**	1960mV
Amplifier Output - high frequency (D500)	2400mV	**4000mV**	5600mV
Amplifier Output - high frequency (D150)	1800mV	**3000mV**	4200mV

Table 1   Expected Input and Amplifier Output readings using recommended tolerance

6. Surveillance commissioning is now complete for that amplifier slot. Repeat the process for the other working and standby amplifiers in the V2000.

7. Click 'Commit Settings' in the toolbar. This will permanently save the configuration for all amplifier slots into the V2000.

> ⚠️ 1. Be careful not to disconnect the tool before committing settings, otherwise the new configuration may be lost.
>
> 2. The V2000 Dynamic Configuration Tool shows the current health of each surveillance feature. Green indicates the feature is heathy, orange indicates faulty (i.e. the feature has fallen out of threshold range.)

6.2.2.3 Backup / Restore Dynamic configuration

After commissioning is complete for the unit it is recommended to back up the system.

To backup and restore each V2000's dynamic configuration use the **Extract** and **Inject** feature of the **V2000 Dynamic Configuration Tool.**

The extracted dynamic configuration will be saved in an .xml file format.
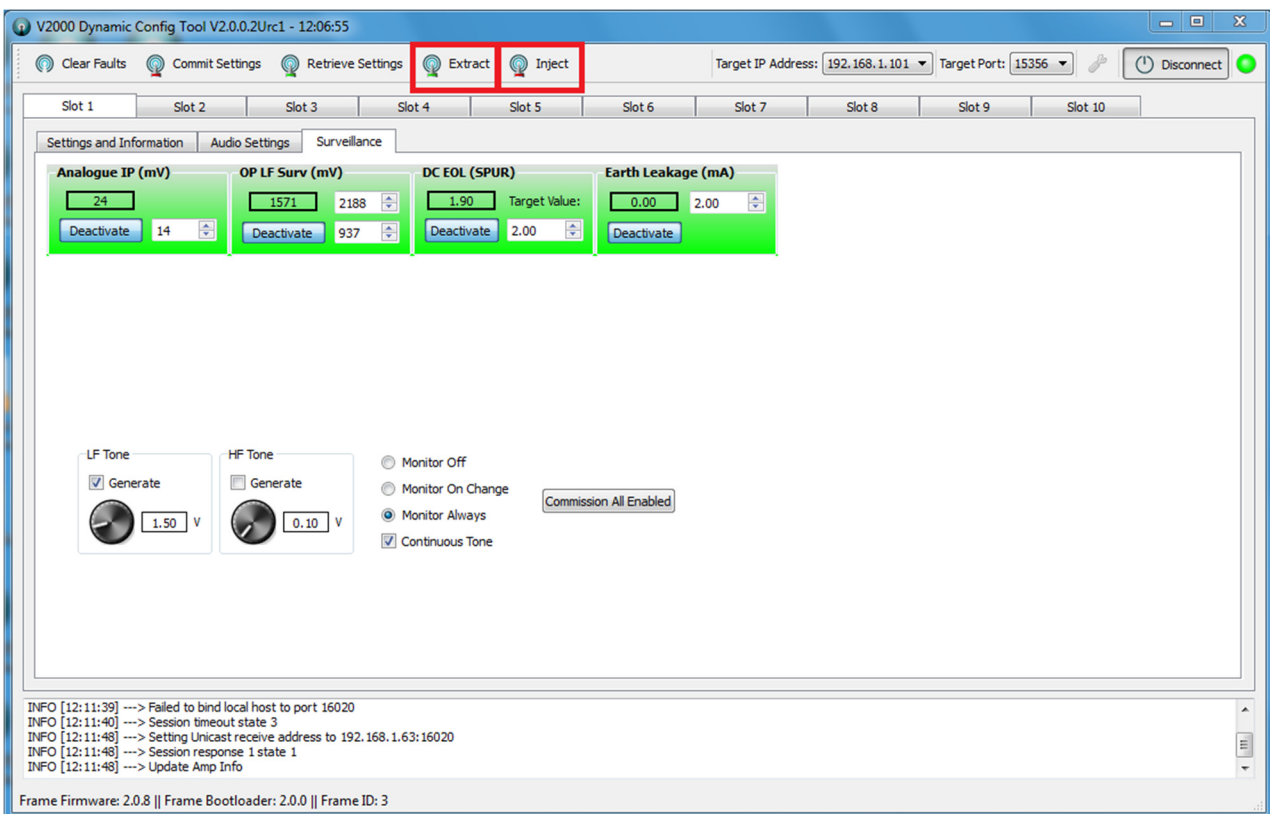
Figure 12   V2000 Dynamic Tool – Extract and Inject

7   Audio settings

The V2000 features a 10-band equaliser, gate, and gain for each slot.

Note: These settings do not normally need to be adjusted if the unit is used as part of a VIPEDIA-12 system as the router features the same settings, and will be set as desired. The exception would be if an ILP01 Induction Loop panel is used on a V2000 output. Instructions for this are in section 7.3.1 – Induction Loop below.
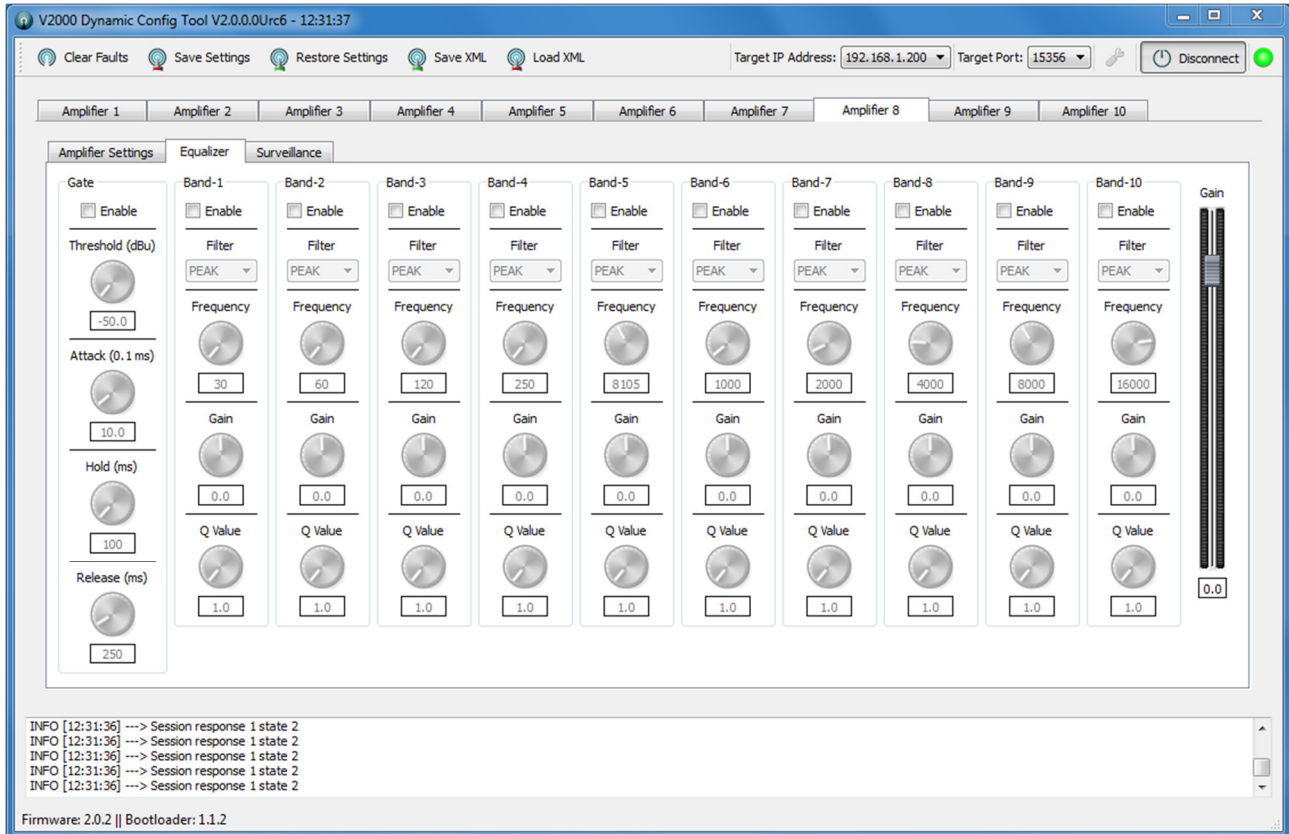
Figure 13   V2000 Dynamic Tool – Equaliser Tab

7.1   Gain

This sets the output level of the slot. **Default: 0dB**

7.2   Gate

This setting is used to prevent low level input noise reaching the output. This is **enabled** by default.
Default: **Enabled, Threshold = -50dBu, Attack = 10.0ms, Release = 250ms**

7.3   Equaliser

Each band can be independently enabled / disabled. All are **disabled** by default.

Note: Only **PEAK**, **HSHELF** (High Shelf), and **LSHELF** (Low Shelf) filters are currently functional.

7.3.1 Induction loop

Use the following EQ settings when configuring a V2000 output for an ASL **ILP01** induction loop:

- **Band 1:**
  Filter = **Peak**, Frequency = **300Hz**, Gain = **-2dB**, Q = **1**

- **Band 8:**
  Filter = **Peak**, Frequency = **2000Hz**, Gain = **+1dB**, Q = **1**

- **Band 9:**
  Filter = **HShelf**, Frequency = **5000Hz**, Gain = **+18dB**

- **Band 10:**
  Filter = **Peak**, Frequency = **5000Hz**, Gain = **+6dB**, Q = **1**

8 VIPEDIA-12 Fault Codes for V2000

Table 2 V2000 Frame Faults

Fault Code(s) (VIPEDIA-12 front panel Faults menu)	System Fault LED	PATH/POWER/EARTH/FUSE (bottom line of LCD display)	Fault Description	Suggested Action
FRMXX AC POWER XX=Frame ID	OFF	POWER	Indicates a fault with the Mains power. • MAINS front panel switch turned off • Mains power lost	Check mains power supply. Check front MAINS switch.
FRMXX BATTERY XX=Frame ID	OFF	POWER	Indicates a fault with the Battery power. • BATTERY front panel switch turned off • Battery power lost • Battery voltage out of range • Battery high temperature • Battery high impedance	Check battery power supply. Check correct batteries fitted. Check front BATTERY switch. Check battery connection cables are the correct length and diameter.
FRMXX PSU XX=Frame ID	OFF	POWER	Indicates a fault with the PSU PCB board. • Aux voltage out of range • PSU high temperature • PSU comms fail • PSU fan fail	Fully power down the V2000, remove the lid, and check the internal cabling. Check the rack ventilation / cooling and spacing above and below V2000 unit is correct. Check audio load. Check the fan is not obstructed. If all seems ok, there may be an internal fault with the unit's power supply.
FRMXX AUX OUTPUT XX=Frame ID	OFF	POWER	Indicates a fault with the auxiliary DC output.	Check the auxiliary supply is not overloaded (2A limit).
FRMXX CONFIG XX=Frame ID	OFF	-	The V2000's static configuration is missing or corrupted or the V2000 frame controller memory is faulty.	Re-upload the static configuration to the V2000. Replace the V2000 if repeated occurrences.
FRMXX NETWORK XX=Frame ID	OFF	-	The V2000 lost Ethernet connection to one or more VIPEDIA-12 units that feed audio to the V2000.	Check the Ethernet network connections of both units. Check the DBB master VIPEDIA-12 is operational (serdes member = 1)
FRMXX OFF LINE XX=Frame ID	OFF	-	The DBB master VIPEDIA-12 has lost Ethernet comms to a FRXX frame	Check the Ethernet network connections of both units. Check the V2000 frame is operational.
FRMXX RESET XX=Frame ID	ON	-	An unexpected reset of the V2000 frame controller CPU has occurred (i.e. reset without power cycling).	A one off occurrence may be experienced due to EMI or transients. Repeated occurrences indicate faulty electronics. Replace the V2000 if repeated occurrences.

Table 3   V2000 Amplifier Slot Faults

Fault Code(s) (VIPEDIA-12 front panel Faults menu)	System Fault LED	PATH/POWER/EARTH/FUSE (bottom line of LCD display)	Fault Description	Suggested Action
FRMXX / AMPYY AMP FAIL XX=Frame ID YY=Slot number	OFF	PATH	Indicates a fault with the amplifier • Loss of audio input • Faulty amplifier • Amplifier temperature alarm	Check input connection from VIPEDIA-12 to the amplifier slot. Check VIPEDIA-12 output surveillance tone. Check the rack ventilation, spacing above and below V2000 unit is correct, and amplifier audio load. Replace amplifier.
FRMXX / AMPYY SURV CARD XX=Frame ID YY=Slot number	OFF	-	Indicates a fault with the LSZDC surveillance card. • Comms fail • LSZDC CPU reset • LSZDC CPU memory	Check the LSZDC is fitted correctly. A one off occurrence may be experienced due to EMI or transients. Repeated occurrences indicate faulty electronics. Replace LSZDC.
FRMXX / AMPYY LINE A XX=Frame ID YY=Slot number	OFF	PATH or EARTH	Indicates a fault with speaker line A • Open circuit • Short circuit • Earth leakage	If PATH: DC-EOL: O/C – One or more spurs have been lost. DC-EOL: S/C – The number of spurs has increased, indicating a short circuit. Impedance: O/C – Detected impedance has decreased, indicating an open circuit. Impedance: S/C – Detected impedance has increased, indicating a short circuit. Loop Return: O/C – The received tone has decreased, indicating an open circuit. Loop Return: S/C – The received tone has increased, indicating a short circuit. If EARTH: Indicates an earth leakage path exists between line A of the speaker circuit and ground. In all cases check speaker wiring and loudspeakers.
FRMXX / AMPYY LINE B XX=Frame ID YY=Slot number	OFF	PATH or EARTH	Indicates a fault with speaker line B • Open circuit • Short circuit • Earth leakage	If PATH: DC-EOL: O/C – One or more spurs have been lost. DC-EOL: S/C – The number of spurs has increased, indicating a short circuit. Impedance: O/C – Detected impedance has decreased, indicating an open circuit. Impedance: S/C – Detected impedance has increased, indicating a short circuit. If EARTH: Indicates an earth leakage path exists between line B of the speaker circuit and ground. In all cases check speaker wiring and loudspeakers.
FRMXX / AMPYY RCD XX=Frame ID YY=Slot number	OFF	EARTH	RCD fault on either A or B speaker lines.	Check speaker wiring and loudspeakers. Replace amplifier.

9   Troubleshooting Guide

If any problems are encountered during the setup, configuration, or commission of the V2000 systems check the following for advice on troubleshooting:

> ⚠ The V2000 takes a long time to fully discharge after power is removed. Wait at least **5 minutes** before removing the lid. Ensure **ALL** LEDs are **OFF** before accessing the internal of the unit.

9.1   ASL Software to V2000 Communication Issues

If any problems are encountered with communication between the ASL software tools and V2000 there are a number of troubleshooting steps that should be checked first.

- **Ethernet cable connectivity** – Check there is comms LED activity on all Ethernet connected devices, including the Host PC, V2000s, Vipedias, network hubs etc.
- **Windows network adapter connection** – confirm the steps in section 11 have been performed.
- **Close any other software tools** – It is possible that another software tool is interfering with the communication to V2000. Close all other open tools.
- **V2000 ping test** – Check the V2000 can be pinged using Windows tools (confirms Ethernet comms).
    - o Open a command prompt (Start → All Programs → Accessories → Command Prompt).
    - o Type 'ping' and then the target IP address (e.g. 'ping 192.168.1.101').
    - o The command prompt will display if ping is successful or not.

9.2   RS485 Monitor Connection

To assist with configuration or troubleshooting, a RS485 monitor connection can be used.

- Connect the Host PC to CTRL1 or CTRL2 via a RS485 connection.
- The relevant pinout for CTRL1 and CTRL2 is: pin7 = Data+, pin8 = Data-, pin3 = 0V.
- Use a tool such as Tera Term. The baud rate is 38400.
- Type '?' and press enter to display a list of available commands.

9.3   ASL File Transfer Tool

Device IP:
If the '**Change Device IP**' operation fails:
- Check the IP address and port of the target V2000. The factory default is **192.168.1.101: 15356.**
- If performing the initial configuration, check no other V2000s are connected to the PAVA network. Another V2000 connected with the same IP address will cause problems.
- You may be attempting to change a device IP to a different IP network to the host PC. The tool will display 'IP update time out' even if the operation is successful. This is because the Host PC can no longer communicate with the V2000. To confirm the new IP address has been applied correctly, use the monitor connection command 'get-ip'.
- Confirm the windows firewall settings are correct. If in doubt, re-install the tool in another location to cause the firewall pop-up to appear when launching. Or else disable the firewall completely.

If the current V2000 IP address is unknown:
- Use a RS485 monitor connection to check the IP address. Command: 'get-ip'.
- Or use the use the monitor command 'set-ip' to set the ip address.

Upload:
If the '**Send Config**' operation fails:
- Check the IP address of the host PC. It needs to be on the same subnet as the target V2000.
- Try sending the configuration to individual units, instead of to all V2000s.
- Use a RS485 monitor connection to check the IP address. Command: 'get-ip'

9.4 V2000 Dynamic Configuration Tool

If the tool fails to connect to V2000:
- Check the IP address of the target V2000 by using the RS485 monitor connection, command 'get-ip'.
- Check the IP address of the host PC. It needs to be on the same subnet as the target V2000
- Confirm the windows firewall settings are correct. If in doubt re-install the tool in another location to cause the firewall pop-up to appear when launching, or else disable the firewall completely.

9.5 Clear V2000 static and dynamic configuration

If the V2000 is not behaving correctly, then as a last resort the static and dynamic config can be completely cleared using a dipswitch on the host controller board.

In order to access this switch power down the V2000 using the front panel power switches, and remove the surveillance cards / blanking plates from slots 9 and 10.

The dipswitch is visible on the left about halfway up the unit, down = on, up = off.

DIP-4 needs to be pushed down. This is the switch that is furthest away from the back of the V2000.

Set this switch down, power on the V2000, wait about 20 seconds, and then set switch up. This operation can be monitored on the RS485 connection.

Note this will not affect the IP address setting.

9.6 Wiring Issues

The VIPEDIA-12 and V2000 can be used to help track down any wiring issues that may be present in the system.
- Use the VIPEDIA-12 output tone generators to check wiring between router and frame. Set each output levels to different levels and confirm the levels look correct on the V2000 dynamic tool.
  - Alternatively use a suitable meter to measure the signal on the lines.
- The V2000 tone generators can be used to check speaker line wiring. Set a generator to a specific known level and measure this tone using a suitable meter. It may also be possible to hear the tones on speakers if set to a high level.
- If DC-EOL is configured, the V2000 can be used to detect a certain number of EOL devices. Add additional EOL10K's to specific speaker lines, or speakers, and check the readings on the dynamic tool to confirm wiring is correct.

9.7 Power Issues

If the frame, amplifiers, or surveillances cards are not powering up correctly, there are a number of power status LED's that can help identify the issue.
- **MAINS and BATTERY front panel LED's:** Software controlled. These light when power is present on inputs **AND** front switches are on.
  - If the conditions are correct, but the LED's are off this could indicate a problem with the software / firmware.
- **Internal backplane voltage LED:** Software controlled. This lights when the voltage of the backplane (which feeds the amplifiers and surveillance cards) is too high or too low.
  - This could light if an amplifier or surveillance card is faulty and affecting the internal voltage, or because of a power supply software or hardware error. Note: this will normally be lit if the unit is switched off, with power present.
- **Two LED's on the power supply PCB:** Hardware controlled. These are located between the mains and thermistor inputs. The closest one to the rear of the unit (D1) lights when auxiliary power is available. The other LED (D2), further into the PCB lights when battery power is on.
  - In normal operation this would copy the front LED's status. If they are different it could indicate a problem with the software / firmware.

10 Firmware

10.1 V2000 Hardware Firmware

Hardware components and their related firmware are as follows:

V2000 Amplifier Mainframe:
- Host Firmware
- Host Bootloader (Factory programmed)
- PSU (Factory programmed)

LSZDC Surveillance Cards:
- DSP Firmware
- DSP Bootloader (Factory programmed)
- CPLD (Factory programmed)

To check the V2000 firmware versions use the **V2000 Dynamic Configuration Tool**. Refer to section 6.2.2 – V2000 Dynamic Configuration Tool. (**Figure 19** shows an example of the dynamic tool, with the firmware versions displayed.)

The Dynamic tool displays:
- Frame Host Firmware
- Frame Host Bootloader
- LSZDC DSP Firmware
- LSZDC DSP Bootloader
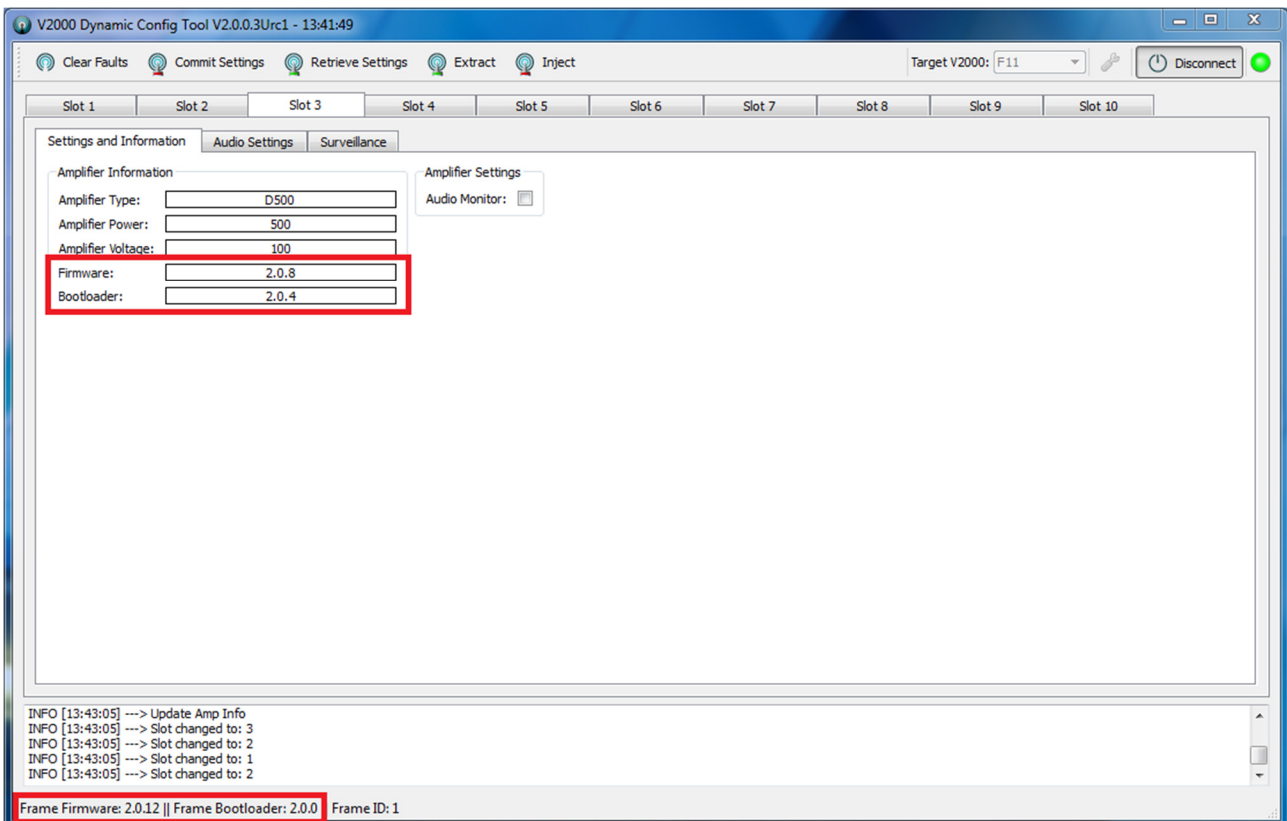
Figure 14   V2000 Dynamic Tool – V2000 firmware versions

10.2 V2000 Host and LSZDC DSP firmware update

If instructed by ASL to update the firmware of the V2000 frame controller Host, or the LSZDC DSP, refer to ASL document:

Firmware and Configuration Load Procedures (ASL document U-0641-2585)

| ⚠	**Never** update firmware unless instructed by ASL

11   PC Requirements

- The PC requires Windows XP or later.
- Ensure the host PC has an Ethernet connection to the network containing the target PAVA units.
- Alternatively, the host PC can be directly connected to either Ethernet ports on the rear of the units.
- The host PC must have an IP address in the same subnet as the target PAVA units.

If the host PC has multiple network interfaces, ensure the network interface used has the highest priority by changing the binding order and metrics; see below. Alternatively, the other network interfaces can be temporarily disabled.

To change the Binding Order:
a)   Run "ncpa.cpl" using Run command on Start menu of Windows XP or Search on Start menu of Windows 7.
b)   The **Network Connections** window will be displayed.
c)   For Windows 7, press the ALT key to enable the top-level menu.
d)   Select **Advanced>Advanced Settings** from the top-level menu.
e)   The **Advanced Settings** window will be displayed; see example on the right.
f)   Select the **Adapters and Bindings** tab.
g)   In the **Connections** section, select the connection used and move it to the top of the list using the up arrow button.
h)   Click on **OK** to apply the changes.
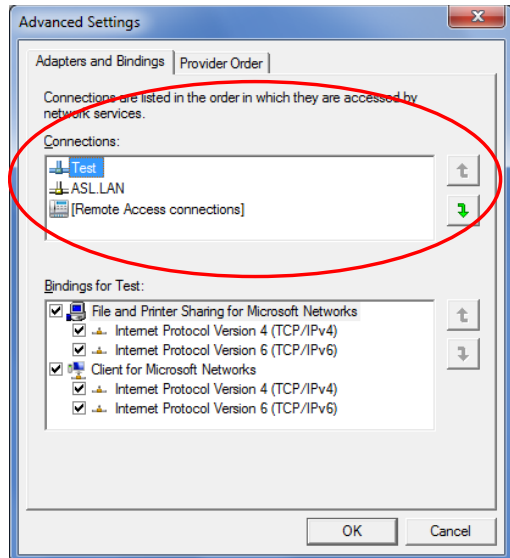
To change the Interface Metrics:
a)   In the **Network Connections** window, right-click the network interface used, and then select **Properties** from the popup menu.
b)   The **Properties** window for the interface card will be displayed.
c)   On Windows XP, select the **General** tab and then select **Internet Protocol (TCP/IP)**.
d)   On Windows 7, select the **Networking** tab and then select **Internet Protocol Version 4 (TCP/IPv4)**.
e)   Click on **Properties**.
f)   The **TCP/IP Properties** window will be displayed.
g)   Click on **Advanced**.
h)   The **Advanced TCP/IP Settings** window will be displayed; see example on the right.
i)   Select the **IP Settings** tab.
j)   If checked, uncheck the **Automatic metric** check box.
k)   Set the **Interface metric** to 1.
l)   Ensure all other network interfaces are set to a lower priority, and not set to automatic.
m)   Click **OK** to apply the changes.
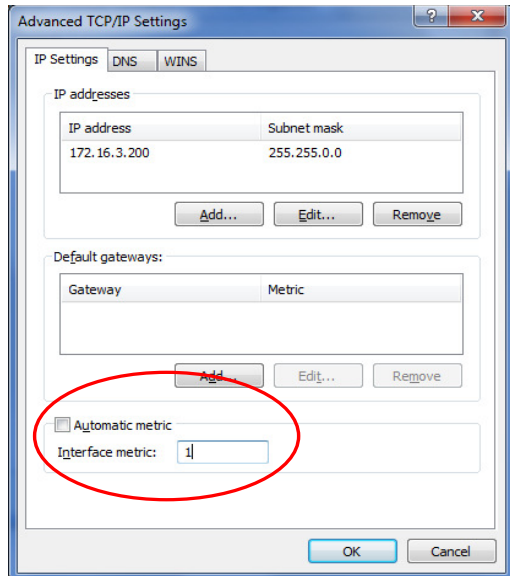
12 Maintenance

⚠	Please read and observe the instructions and guidelines in section 2 – Safety and Precautions before carrying out any maintenance task. Failure to follow these instructions and guidelines may cause personal injury and/or damage to the equipment.

The V2000 should be tested with the PA/VA (Public Address / Voice Alarm) system for correct operation, at maximum intervals of three months, and as part of the system maintenance schedule.

There are no routine maintenance tasks for the V2000 except for operational testing and battery checking.

12.1 V2000 Host and DSP firmware version

The V2000 Host and DSP firmware determines the features of the V2000. They can be found using the **V2000 Dynamic Configuration Tool.**

It is important to know the V2000 Host and DSP firmware versions for maintenance purposes, and to ensure that the unit has the correct functions. These firmware versions should be quoted in all enquiries regarding the unit.

12.2 Battery Resistance Measurement

The V2000 charger monitors the resistance of the batteries, related cable and connections. It reports a fault when the combined resistance exceeds 60 mΩ so must not be relied upon as a measure of battery health.

The resistance of each battery should be measured at maximum intervals of three months, as part of the system maintenance schedule. The battery resistance can be measured with appropriate battery tester (Yuasa Battery HiTester 3554).

Battery	Resistance		
	New Value (mΩ)	Warning Zone (mΩ)	Critical Zone (mΩ)
NPL65-12	3.5-5.4	8.40	9.50

12.3 Visual Inspection

A visual inspection of the V2000 and batteries (if used) should be carried out at maximum intervals of three months, as part of the system maintenance schedule.
Carry out a thorough visual inspection looking for signs of corrosion on or around the unit and batteries for signs of leakage, a cracked case or top, missing protective caps etc.

12.4 V2000 Equipment Replacement

If any of the V2000 equipment such as amplifiers, LSZDC, standby interface card, or the V2000 frame itself needs replacing refer to the V2000 Installation Guide (ASL document U-0623-0291) or the relevant individual equipment installation guides. Note that installation guides should be used as a guideline only as they may not contain all the steps required for equipment replacement.

12.5 Battery Replacement

If the any of the battery equipment needs replacing refer to the BDIST - V2000 Installation Guide (ASL document U-0456-0199).

Notes

Notes