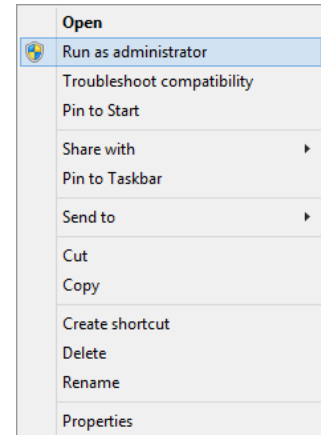


OPTIMOD-PCn Essentials v0.9.18

The OPTIMOD-PCn Installer **REQUIRES** Administrator privileges and must be Run as administrator. Failure to do so will result in an incomplete installation without any failure message, and the 1600PC Control Application will fail to connect to the Service in step 7 below.

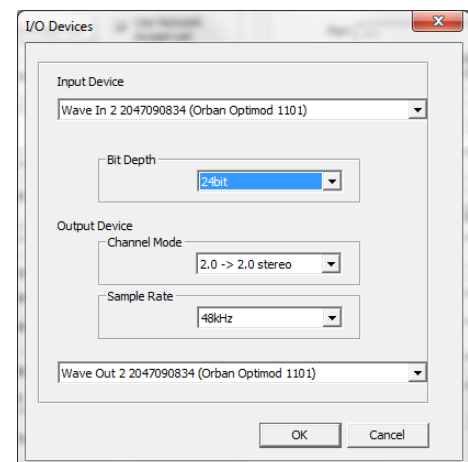
FOR THE *REALLY* IMPATIENT and EXPERIENCED:

To install OPTIMOD-PCn, right-click on the Installer and choose RUN AS ADMINISTRATOR. If your version is authorized via CodeMeter software, the installer will install the CodeMeter software and the document *Instructions to create license request file for Optimod PCn.pdf*. Follow these instructions to activate your license.



OPTIMOD-PCn uses Windows Audio for I/O, allowing it to be used with *any* Windows Audio devices and applications. It does not rely on proprietary plugin architectures that require special plugin support from within the audio applications. It supports real and virtual audio devices, including any Audio over Ethernet Drivers. To maintain a correctly peak-controlled audio signal, feed the output of OPTIMOD-PCn to any subsequent streaming encoders through a digital path, either hardware or virtual. When OPTIMOD-PCn, the playout system, and the streaming encoder (such as StreamS Live Encoder) are run on the same host computer, you may use Virtual Audio Cable (VAC) (<http://software.muzychenko.net/eng/vac.htm>) from the output of OPTIMOD-PCn to the Input of StreamS Live Encoder. *Do not use VAC if the input or output of any application is connected to a hardware sound device. All application sample clocks must be locked together, and VAC's internal sample rate cannot be exactly locked to the hardware device. Thus this connection causes slight sample rate mismatches between input and output that will cause delay build-up or audio glitches.*

A hardware sound device is unnecessary if the playout software is run on the same host computer as OPTIMOD-PCn and StreamS Live Encoder. VAC can be set up for two or even more audio devices to create the entire audio path. Use one virtual device to drive OPTIMOD-PCn's input and another to convey OPTIMOD-PCn's output to the downstream software.



Be aware that some primitive audio applications do not enumerate Windows Audio Devices, and therefore support only the Windows Default Audio Devices. In this case, the Record and Playback audio devices used with OPTIMOD-PCn must be set as Default in WINDOWS > CONTROL PANEL > SOUND. This limits the use of such applications to a single instance of OPTIMOD-PCn per host computer. These applications are not recommended for professional use.

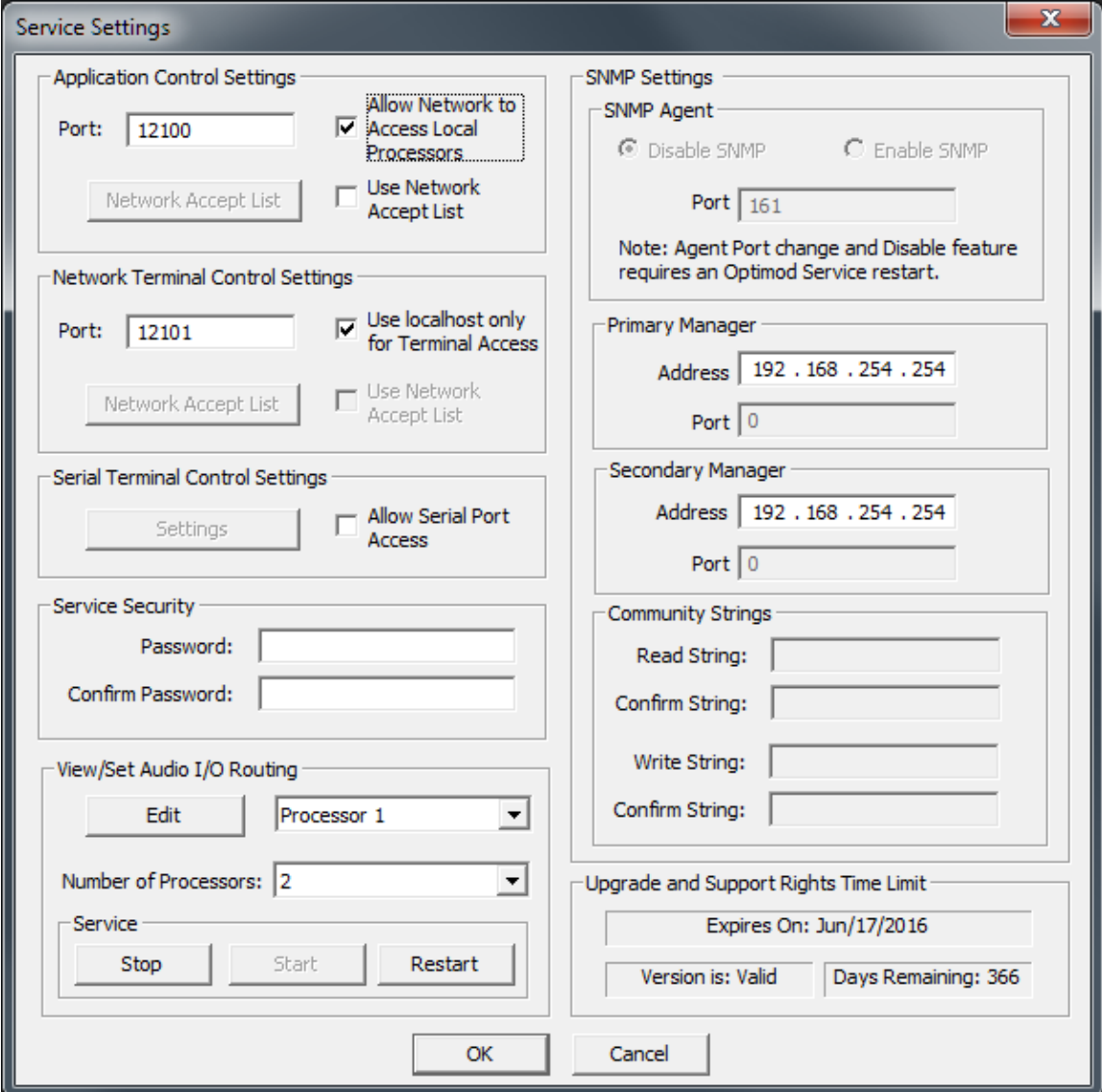
FOR THE IMPATIENT:

These instructions summarize what you must do to get OPTIMOD-PCn Processors up and running on one computer that hosts both the audio processing Windows Service and the control application. It does not explain how to set up networking. For fully detailed instruc-

tions, refer to *Software Installation and Setup* starting on page 2-3 of the OPTIMOD-PCn Operating Manual.

To run glitch-free, OPTIMOD-PCn requires a powerful host computer running Windows 7 or higher. It requires the Intel SSE4.1 instruction set, and will run on Intel Core2 (3 GHz or higher using Intel's 45 nm manufacturing process), i3, i5, and i7 CPUs, and on Xeons new enough to support the SSE4.1 instruction set. Refer to the separate document called *OPTIMOD PCn Hardware and Software Requirements*, or to page 1-3 in the OPTIMOD-PCn Operating Manual.

You must be logged into Windows via an account having Administrator privileges.



The image shows a 'Service Settings' dialog box with a title bar and a close button (X). The dialog is divided into several sections:

- Application Control Settings:** Includes a 'Port' field set to 12100, a checked checkbox for 'Allow Network to Access Local Processors', a 'Network Accept List' button, and an unchecked checkbox for 'Use Network Accept List'.
- Network Terminal Control Settings:** Includes a 'Port' field set to 12101, a checked checkbox for 'Use localhost only for Terminal Access', a 'Network Accept List' button, and an unchecked checkbox for 'Use Network Accept List'.
- Serial Terminal Control Settings:** Includes a 'Settings' button and an unchecked checkbox for 'Allow Serial Port Access'.
- Service Security:** Includes 'Password:' and 'Confirm Password:' text boxes.
- View/Set Audio I/O Routing:** Includes an 'Edit' button, a dropdown menu set to 'Processor 1', a 'Number of Processors' dropdown set to 2, and 'Stop', 'Start', and 'Restart' buttons.
- SNMP Settings:** Includes a radio button for 'Disable SNMP' (selected) and 'Enable SNMP', a 'Port' field set to 161, and a note: 'Note: Agent Port change and Disable feature requires an Optimod Service restart.'
- Primary Manager:** Includes an 'Address' field set to 192 . 168 . 254 . 254 and a 'Port' field set to 0.
- Secondary Manager:** Includes an 'Address' field set to 192 . 168 . 254 . 254 and a 'Port' field set to 0.
- Community Strings:** Includes 'Read String:', 'Confirm String:', 'Write String:', and 'Confirm String:' text boxes.
- Upgrade and Support Rights Time Limit:** Includes an 'Expires On:' field set to Jun/17/2016, a 'Version is: Valid' field, and a 'Days Remaining: 366' field.

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Figure 1: Service Settings

1. If you will be using Virtual Audio Cable, install it by running its installer application.

Appendix: Setting Up Virtual Audio Cable on page 9 is an abbreviated setup guide for VAC. Note that if OPTIMOD-PCn is already installed and running, you may have to stop the OPTIMOD-PCn Service (see *Figure 1: Service Settings*) to set up VAC.

Do not use VAC if the input or output of any application is connected to a hardware sound device. All application sample clocks must be locked together, and VAC's internal sample rate cannot be exactly locked to the hardware device. Thus this connection causes slight sample rate mismatches between input and output that will cause delay build-up or audio glitches.

2. Authorize the server computer.
 - *If your 1600PCn is authorized by CodeMeter software:* The software installer (step 4) will install the CodeMeter software and the document *Instructions to create license request file for Optimod PCn.pdf* and offer to open it. Follow these instructions to obtain your license authorization.
 - *If your 1600PCn is protected by a hardware key:* Plug the 1600PC copy protection key (supplied with your software) into an available USB port of the computer you will be using to do audio processing. Any computer running the OPTIMOD-PCn Service must be authorized.

The key does not require a Windows driver.

If the computer is already running without the key, inserting the key will not automatically start the Service. Do this from the 1600PC **TOOLS > SERVICE SETUP** window.

3. Defeat Windows Fast Startup (Windows 8 and higher) and Sleep mode.

To achieve most reliable startup, OPTIMOD-PCn Service is set for **DELAYED START** in Windows and starts after a 60-second delay. Windows 8 introduced Fast Startup, which overrides the delayed start during a power-on Windows boot. To ensure that OPTIMOD-PCn starts reliably on power-up, defeat Windows **FAST STARTUP**:

- A) Navigate to **CONTROL PANEL > ALL CONTROL PANEL ITEMS > POWER OPTIONS**.
- B) Click **CHANGE WHEN THE COMPUTER SLEEPS**. Set **Put THE COMPUTER TO SLEEP** to **NEVER**.
- C) Go back to **POWER OPTIONS**. Click **CHOOSE WHAT THE POWER BUTTONS DO** on the left side of the screen.
- D) Click **CHANGE SETTINGS THAT ARE CURRENTLY UNAVAILABLE**.
- E) Under **SHUTDOWN SETTINGS**, *uncheck* **TURN ON FAST STARTUP (RECOMMENDED)**, **SLEEP**, and **HIBERNATE**.

4. Install 1600PC software on the computer that will run the Service and perform audio processing.

- A) If the computer already contains an OPTIMOD-PCn installation, uninstall OPTIMOD-PCn before reinstalling or upgrading it. Uninstall is available from the Windows Start

menu in **PROGRAMS > ORBAN > OPTIMOD PCn 1600 > UNINSTALL OPTIMOD-PCn 1600**. The uninstaller will allow you to keep your current I/O configuration or to start fresh.

- B) Obtain the current version of Setup1600_x.x.x.x.exe from Orban.
- C) Run Setup1600_x.x.x.x.exe on its host computer by right-clicking its icon and choosing **RUN AS ADMINISTRATOR**. Follow the instructions the installer provides on each screen. In the **SELECT COMPONENTS** screen, choose **OPTIMOD APPLICATION AND SERVICE**.

If you are reinstalling over a previous OPTIMOD-PCn installation, the installer may generate an error message when it tries to close OptimodService3. If you see this message, click **RETRY** to proceed with the installation.

5. Set up the Service.

- A) Start up the 1600PC application on the computer running the Service.
- B) Open the **SERVICE SETTINGS** window from **TOOLS > SERVICE SETTINGS**. See Figure 1 on page 2.

If you did not previously insert the security key, inserting it will not automatically start the Service. Do this from **TOOLS > SERVICE SETTINGS** window by clicking the **START** button after you have inserted the key.

- C) In the **NUMBER OF PROCESSORS** drop-down, select the number of independent audio processors you wish to run. This is limited to the number of processors you purchased, which is encoded in your security key.

6. Set up audio I/O for each Processor.

Each Processor must have a Windows Recording sound device assigned to its input and a Windows Playback sound device assigned to its output. All devices must have their clocked locked together. You may use the same device for the input to more than Processor, but each output must be assigned to a different device. Before you configure OPTIMOD-PCn's I/O, you must first configure Windows to be consistent with the OPTIMOD-PCn set-up you are planning to use. Refer to Figure 2 on page 4.

- A) Set up the Windows Sound Devices you will be using.

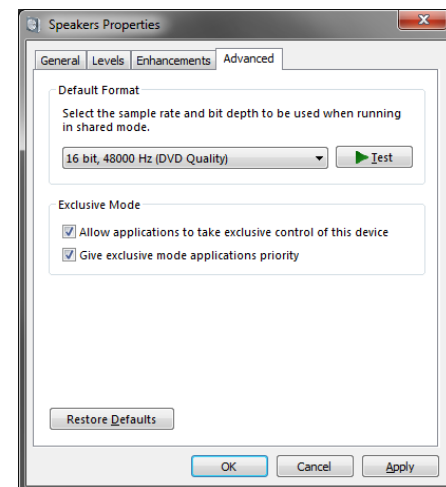
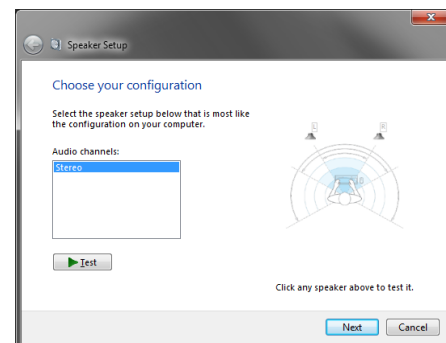
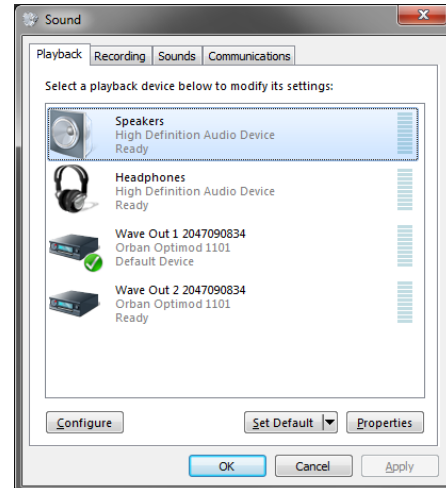


Figure 2: Windows Audio I/O Setup

- a) Go to Windows **CONTROL PANEL > SOUND > RECORDING > PROPERTIES > ADVANCED**. For mono or stereo operation, configure each Recording device for your choice of 44.1 kHz, 48 kHz, 96 kHz, or 192 kHz sample rate, 16-bit or 24-bit, 2 Channel.

We recommend 48 kHz, 24-bit. The processing always runs internally at 48 kHz. 44.1 kHz, 96 kHz and 192 kHz support embedding your Optimod in systems operating at one of these sample rates. Because the high-quality synchronous sample rate converters in your Optimod put additional load on your CPU, do not use 96 kHz or 192 kHz unless you have a good reason to do so.

- b) Go to Windows **CONTROL PANEL > SOUND > PLAYBACK**.

- c) Depending on whether or not you want to be able to send a stereo→5.1 upmix to a given Playback (output) device, highlight the device, set it for 44.1 kHz, 48 kHz, 96 kHz, or 192 kHz sample rate, 16-bit or 24-bit (in **PROPERTIES > ADVANCED**), and 2 Channel or 5.1 Channel (in **CONFIGURE**).

If a device supports multichannel playback, it normally does so via its **SPEAKERS** pin.

If you are using OPTIMOD-PCn with an Orban OPTIMOD-PC card, note that OPTIMOD-PC does not have surround output capability, so only stereo is available in **CONFIGURE**.

- d) If the **ENHANCEMENTS** tab is present for a given playback device, click it and check **DISABLE ALL ENHANCEMENTS**.

B) Set up OPTIMOD-PCn's inputs and outputs.

- a) In **SERVICE SETTINGS > VIEW/SET AUDIO I/O ROUTING**, choose the Processor you wish to set up.
- b) Specify the input device from the drop-down menu. This must be a device that you configured in step A)a) on page 5.
- c) Choose the processing and output channel mode:

- mono (Recording device=2.0; Playback device=2.0)
- stereo (Recording device=2.0; Playback device=2.0)
- stereo+upmix (Recording device=2.0; Playback device=5.1)
- 5.1-channel surround (Recording device=5.1; Playback device=5.1)
- 5.1-channel surround+downmix (Recording device=5.1; Playback device=7.1: the Lb and Rb outputs carry the stereo downmix output)

The specified Windows Recording and Playback devices must be set up to match the processing mode [step (A) on page 4] or OPTIMOD-PCn will issue an error message when you click OK.

- d) Click OK.

C) Repeat step (B) for each Processor you are setting up.

- D) Click OK to dismiss the SERVICE SETTINGS dialog box. *This will restart the Service and briefly mute the audio.***

7. Connect to an OPTIMOD-PCn Processor.

Connect to Processors via **CONNECT > LOCAL**. Controls and meters should appear, as shown in Figure 3 on page 6.

If controls do not appear, click the [AD] button in the upper left of the window. Controls will not appear if the Processor is in **BYPASS** mode; you must put it in **OPERATE** mode from **I/O > TEST**. [Refer to the note in step (9.A) on page 7.]

If you get an error message saying “Unable to Connect to Service,” the most likely causes are that OPTIMOD-PCn’s audio I/O configuration is inconsistent with its configuration in Windows [step (6.A) on page 4], that you have tried to connect more than one Processor to the same Windows Playback device, that the Service is not running, that you did not run the OPTIMOD-PCn installer as Administrator, or that you did not defeat Windows Fast Startup (step • on page 3).

If the Service is not running, the Service Stop button in **1600PC TOOLS > SERVICE SETTINGS** will be grayed-out. To start it, click the **START** button.

The Service will not start unless the security key is present. When the key is present, the Service starts automatically when Windows does, but does so after a 60-second delay so that Windows can finish its normal boot-up “housekeeping.” Inserting the key will not automatically start the Service; do this manually.

8. Set up networking and security. (optional)

If you wish to connect to OPTIMOD-PCn from another computer on your network, refer to the OPTIMOD-PCn Operating Manual starting with step 12 on page 2-10. This explains how to set up secure, password-protected connections to OPTIMOD-PCn from one or

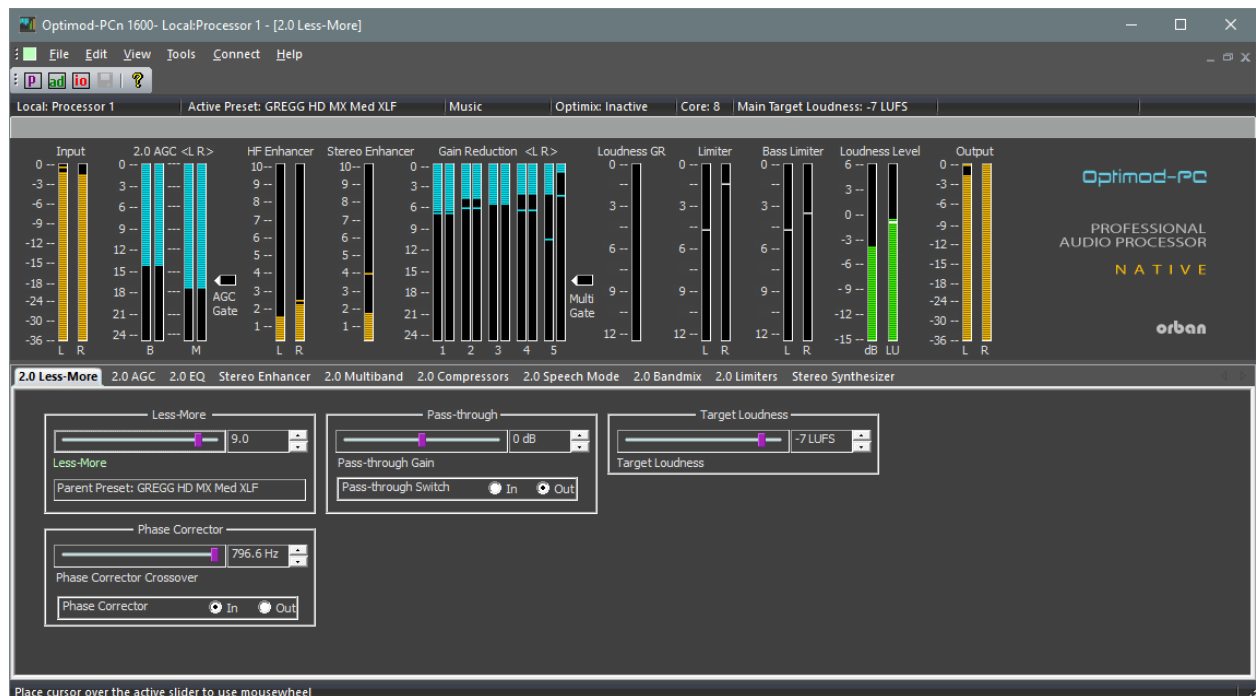


Figure 3: The OPTIMOD-PCn Control Application

more OPTIMOD-PCn Control Applications running on remote computers.

There are three password levels: a Service Security password for the Service, and Administrator and User passwords for each Processor. Set the Service password from **TOOLS > SERVICE SETTINGS**. Set the passwords for a given Processor by connecting to that Processor and then going to **TOOLS > ADMINISTRATION**. *There are no “backdoors” available for the passwords; if you forget them, to regain access you must completely uninstall and then reinstall OPTIMOD-PCn.*

9. Set up each Processor.

Refer to *Setup: The OPTIMOD-PCn Control Application* starting on page 2-15 of the OPTIMOD-PCn Operating Manual. A brief summary of the steps for each Processor follows.

You must be connected to a Processor to perform these steps.

- A) Click the Preset button [P] on the top left of the OPTIMOD-PCn Control Application and recall a Processing Preset. There are many presets available, some generic and some named according to common programming formats. The OPTIMOD-PCn Operating Manual has a discussion and table of the presets starting on page 3-33.

OPTIMOD-PCn provides test modes, including **BYPASS** and **TONE**. If you cannot recall a processing preset, check to see if OPTIMOD-PCn is in **BYPASS** mode. The active Preset field above the meters will indicate this. If the processor is in **BYPASS**, put it in **OPERATE** mode from the **I/O > TEST** page.

- B) Click the I/O button on the top left of the OPTIMOD-PCn Control Application.
- C) In **I/O > UTILITY**, activate or defeat processing blocks as needed. Doing so achieves minimum CPU usage and Recording/output delay for your specific application.
- D) Set **MAIN OUTPUT** properties. Normally, both **PRE-EMPHASIS** fields are set to **FLAT** and **DITHER** is turned on.
- E) Set the **INPUT REFERENCE LEVEL** control.

This step sets the drive level into OPTIMOD-PCn’s audio processing so that it operates in its preferred range. For most processing presets, we suggest setting this control so that the **AGC master gain reduction (the meter labeled “M”)** centers around 10 dB.

- F) Set the output and Target Loudness parameters to achieve the desired target loudness and output headroom.

OPTIMOD-PCn uses the contemporary concept of “target loudness” (using the ITU-R BS.1770 loudness measurement algorithm) to increase listener satisfaction by minimizing the need for listeners to readjust their volume controls when changing between different broadcast stations or netcast streams. If you specify the target loudness (via the **TARGET LOUDNESS** control), OPTIMOD-PCn will produce the desired loudness.

To maintain the desired target loudness, the **100% OUTPUT LEVEL** control (in **I/O > STEREO OUTPUT**) *does not change loudness*; it is a peak limiter threshold control that only sets the amount of headroom between 0 dBFS and the maximum peak output level that the audio processing produces. This allows you to adjust the processing to compensate for downstream overshoots from codecs *without changing loudness*. (Instead, the processing produces more peak limiting.) For

example, for the HE-AAC codec it is wise to allow 1.5 dB of peak headroom by setting the **100% OUTPUT LEVEL** control to -1.5 dBFS.

To set the OPTIMOD-PCn's output loudness, adjust its **TARGET LOUDNESS** value. This control is in the active processing preset in the **LESS-MORE** tab. If the processing preset's **TARGET LOUDNESS = GLOBAL**, then OPTIMOD-PCn instead uses the global **SURROUND TARGET LOUDNESS** value in **I/O > GLOBAL**.

FOR EVERYONE: THE OPTIMOD-PCn OPERATING MANUAL

Following the steps above should get you up and running. If you encounter problems, please refer to the detailed setup instructions in the OPTIMOD-PCn Operating Manual. Additionally, the manual has a list of problems and solutions in *Problems and Possible Causes* starting on page 2-26.

Reading the manual is worthwhile; it includes abundant tutorial material for audio processing novices, and even the experienced are likely to learn something new!

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Appendix: Setting Up Virtual Audio Cable

Because VAC's clock cannot be locked to a hardware sound device, you cannot use hardware sound devices and VAC together. See step 1 on page 3.

1. Install Virtual Audio Cable by running its installer application.
2. Set up each virtual cable.

From the Windows Start Menu, open the Virtual Audio Cable Control Panel application by right-clicking and choosing **RUN AS ADMINISTRATOR**. In general, you may use the defaults except as described below.

- A) Set **DRIVER PARAMETERS > CABLES** to the number of cables you need. Each cable connects the output of one application (like a playout system) to the Recording of another application (like OPTIMOD-PCn) without needing a hardware sound card.
- B) For each cable, click the cable in the list on the bottom of the VAC control panel and set it up in **FORMAT RANGE** according to the screenshot below.

CABLE PARAMETERS sets the maximum range of sample rates, bit depths (called **BPS** in the control panel), and audio channels (**NC**) that will be available in the Windows Sound Control Panel for that specific VAC Cable. An OPTIMOD-PCn installation typically requires 48 kHz and 24-bit. The number of channels depends on whether you need a stereo or surround connection; however, there is no downside to setting the maximum number of channels to 8 for convenience. Some applications can only use the Speaker pin to output surround: in VAC, check **ENABLE SPK PIN** for one and only one Cable, as Windows can only enumerate one Speaker device per driver.

- C) When you have set up the parameters a given cable, click **SET** to confirm for that cable. That cable will then appear in the Windows Sound Control Panel as a Recording and Playback device called **LINE [x] VIRTUAL AUDIO CABLE** or **SPEAKER VIRTUAL AUDIO CABLE** (Playback only). This is where you choose the specific sample rate, bit depth, and number of channels for a given VAC Cable, per step 6 on page 4.

The screenshot shows the Virtual Audio Cable Control Panel. The 'Driver parameters' section on the left shows 'Cables' set to 2, 'Clients' at 15, and 'Streams' at 0. The 'Cable parameters' section on the right shows 'Format range' settings: SR (48000 to 192000), BPS (16 to 24), and NC (2 to 8). The 'Stream buffer watermark control' section shows 'Enabled' with 'Low' at 50 ms and 'High' at 200 ms. The 'Connected source lines' section shows 'Line' selected. The 'Set' button is highlighted.

| Cable | MS | SR range | BPS range | NC range | Stream fmt limit | Vol ctl | Chan mix | PortCls | Wmk ctl | Current format | Rc stms | Pb stms | Signal | Oflows | UFlows |
|-------|----|---------------|-----------|----------|------------------|---------|----------|---------|---------|----------------|---------|---------|--------|--------|--------|
| 1 | 7 | 48000..192000 | 16..24 | 2..8 | Cable range | Off | On | Off | Off | | | | | | |
| 2 | 7 | 48000..192000 | 16..24 | 2..8 | Cable range | Off | On | Off | Off | | | | | | |