

QUICK START GUIDE

OPTIMOD- PC17-1600

Digital Audio Processor Software
for X86 PC Based Environments



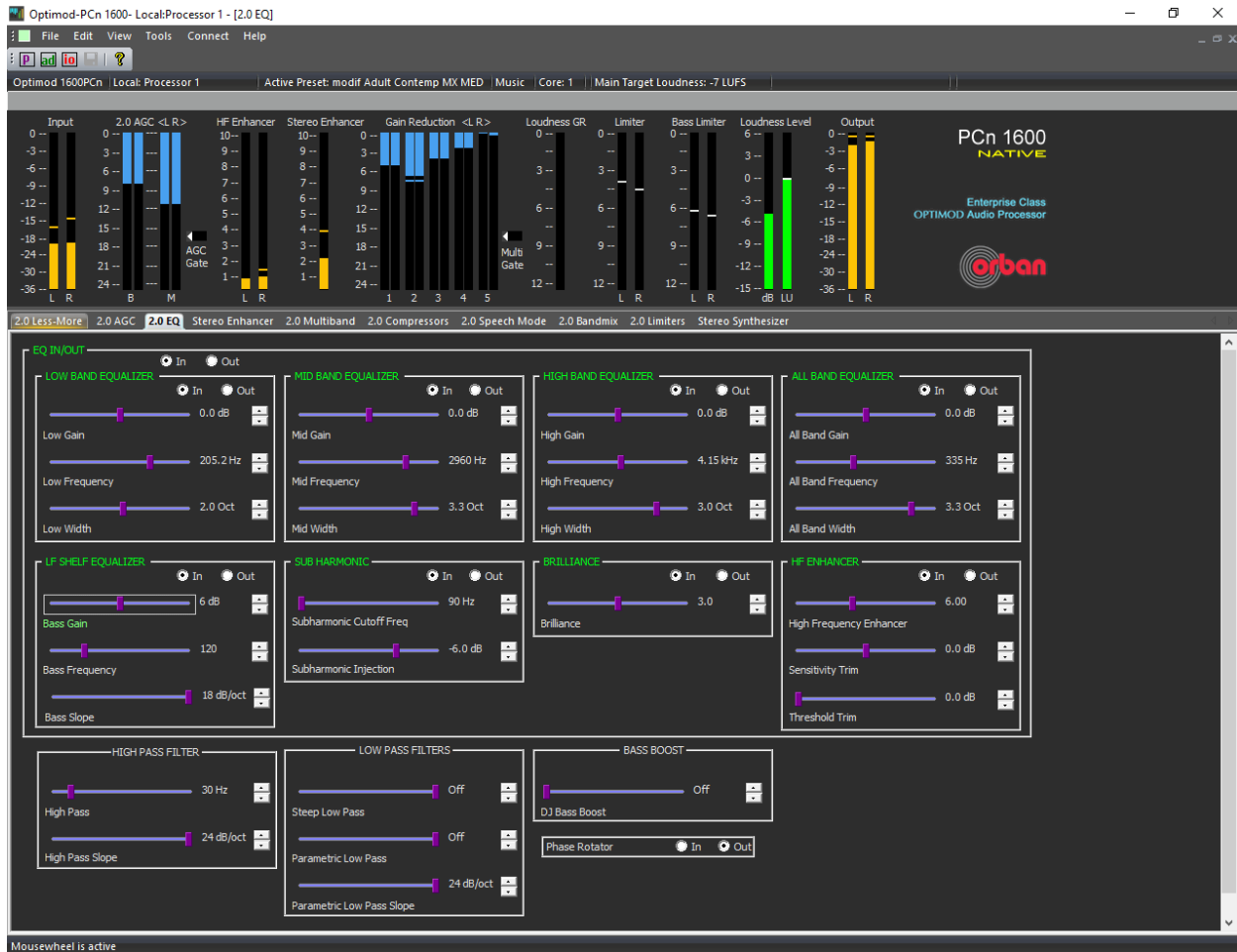
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The OPTIMOD PCn-1600 Control Application

The OPTIMOD PCn-1600 control application allows the user to select a preset which closely matches the desired sound of the broadcast, then lets the end user tweak key aspects of the preset to create a sound that is truly unique to the broadcast.

When selecting a preset for your needs, don't always go by the names of the preset. While they are good guides, some people may find, for instance, a jazz preset to work well with an Adult Contemporary format. The best rule of thumb is to listen to all of the presets until you find one that is close. The controls in the application will take you the rest of the way. They're easy to use and are explained in detail here. This manual also covers the best way to monitor the processed audio, as well as what type of gear to use to monitor it on.

BUT... before we get to the controls, it's important to get to know a few things that set the Optimod PCn-1600 apart from previous streaming processors offered by Orban. Most important is that even though its user interface looks like the hardware-based soundcards previously offered by Orban, the PCn-1600 is X86 based vs DSP on a physical sound card.

- **Current Preset** shows the active factory or user preset that is selected. Clicking on OPEN PRESET will open a dialogue box that shows a list of presets for you to choose from.
- **AGC** meter shows the gain reductions of the “Master” (above-200 Hz) and “Bass” (below-200 Hz) bands in the slow AGC processing that precedes the multiband compressor. Full-scale is 24dB gain reduction.
- **Gate indicators** show gate activity. They light when the input audio falls below the threshold set by the gate threshold controls. (There are two gating circuits—one for the AGC and one for the multiband compressor/limiter—each with its own gate threshold control.) When gating occurs, the AGC and compressor’s recovery times slow drastically to prevent noise rush-up during low-level passages.
- **Stereo Enhancer meter** shows the amount of extra gain, in dB, being applied to the stereo difference signal (L-R) to increase the apparent width of the stereo soundstage. The amount of enhancement is encoded into a particular preset.
- **HF Enhancer meter** shows the amount of dynamic 4 kHz first-order high frequency shelving equalization, in dB, being applied to the signal. The amount of HF enhancement is encoded into a particular preset.
- **Multiband gain reduction meters** show the gain reduction in the multiband compressor. Full-scale is 25 dB gain reduction. In a stereo instance, each meter is split vertically to show the gain reduction in the left and right channels
- **Input Meters** show the peak input level applied to the audio processing, in units of dBFS. Higher levels call for higher settings of the INPUT REFERENCE LEVEL control. If the meter indicates “0,” this indicates that the input peak level has reached 0 dBFS. This is common if the program material applied to PCn-1600 was aggressively mastered and there is unity gain between the playout system and the input of the PCn-1600

IMPORTANT: The main input reference level sets the input ceiling of the processor. While lowering the control WILL increase level, you are also decreasing the headroom available. This will lead to distortion on some program material.

- **Output Meters** show the peak level of the processed samples at the PCn-1600’s output, in dBFS. They will clearly show the effect of the 100% OUTPUT LEVEL CONTROL. (For example, setting this control to -2.0 dBFS will cause the meters to peak at -2.
- **Limiter** meters show the amount of peak limiting (dB) in the various audio channels, which we chose not to couple because the fast release time of this circuit would otherwise cause elements in one channel to modulate the opposite channel objectionably. Full-scale is 12 dB gain reduction.
- **Bass Limiter** meters show the amount of peak limiting applied to the bass energy in the various audio channels. Full-scale is 12 dB gain reduction.

- **Loudness** meters shows the subjective loudness of the output, measured using the 1981 Jones & Torick CBS Technology Center algorithm and by the ITU. BS.1770 algorithm+
- **Loudness Gain Reduction** shows the amount of gain reduction that the Loudness Controller and BS.1770 safety limiter are producing. The CBS controller gain reduction appears in blue, while the BS.1770 safety limiter gain reduction appears in cyan. The two indications are stacked, so the edge of the meter shows the total gain reduction produced by both algorithms. Full-scale is 12 dB gain reduction. These meters will only show gain reduction if the LOUDNESS THRESHOLD and BS.1770 SAFETY LIMIT THRESHOLD are not off (MULTIBAND tab in the active processing preset), and both loudness controllers are activated in I/O MIXER > UTILITY.
- **Info Bar shows:**
 - The OPTIMOD PCn-1600 Processor to which you are currently connected
 - The preset that the Processor is running
 - The state of the automatic Music/Speech detector
 - The CPU core in which the Processor is running
 - The active TARGET LOUDNESS value.
- **Toolbar** contains icons that implement common functions, like recalling and saving presets.

Software Installation and Setup

1. Defeat Windows Fast Startup (Windows 8 and higher).

A) 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, you must defeat Windows Fast Startup:

- Navigate to Control Panel > All Control Panel Items > Power Options.
- Click Choose what the power buttons do on the left side of the screen.
- Click CHANGE SETTINGS THAT ARE CURRENTLY UNAVAILABLE.
- Under SHUTDOWN SETTINGS, *uncheck* TURN ON FAST STARTUP (RECOMMENDED).

2. Install 1600PC software on the computer that will control the 1600.

A) Orban will furnish a link to download the Optimod PCn-1600.

B) Run Orban-Optimod-PCn_1600_x.x.x.x.exe on its host computer by right-clicking its icon and selecting RUN AS ADMINISTRATOR. The installer will start up. Follow the instructions it provides on each screen. In the Select Components screen, choose Optimod Application and service

This program installs the necessary files and adds an Orban/Optimod 1600 folder to your computer's Start Menu. This folder contains shortcuts to the PC Remote application and to the documentation. If you accepted the option during installation, there is also a shortcut to the PC Remote application on your desktop.

3. Authorize the Server Computer

If your 1600PCn is authorized by CodeMeter software: The software installer 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

4. If needed, install Virtual Audio Cable on the server computer.

If you need to connect audio from one application to another (such as the output of a playout system to the input of OPTIMOD-PCn), we recommend using Virtual Audio Cable. It is available for purchase from its vendor:

<https://vac.muzychenko.net/en/>

Be aware that some primitive audio applications do not enumerate Windows Audio Devices, and therefore only support the Windows Default Audio Devices. In this case, the Record and Playback audio devices used with OPTIMOD-PCn must be set as Default in W I N D O W S > C O N T R O L P A N E L > S O U N D. This limits the use of such applications to a single instance of OPTIMOD-PCn per host computer. These applications are not recommend-ed for professional use.

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 instructions, 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.

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

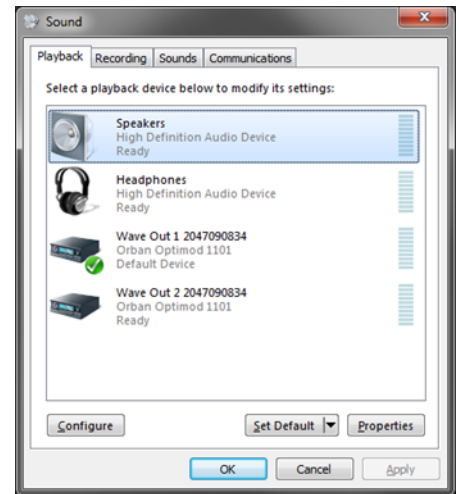
Each Processor must have a Windows Recording sound device assigned to its input and a Windows Playback sound device assigned to its output. You may use the same device for the input to more than Processor, but each output must be assigned to a different device. Before you configure OPTI-MOD-PCn's I/O, you must first configure Windows to be consistent with the OPTIMOD-PCn setup you are planning to use.

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

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

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

- a) Go to CONTROL PANEL > SOUND > RECORDING
- b) Select the input device from menu. Set as default
- c) Click PROPERTIES and then ADVANCED to choose the number of channels and sample rate.
- d) Go to the LEVELS tab and adjust the recording gain so that the PCn-1600 has an average level of -20dBfs
- e) Click OK
- f) For outputs, repeat step a) except choose PLAYBACK
- g) Find the output device you want to use and select it. You should also set it as the default device.
- h) Select PROPERTIES and ADVANCED to choose the number of channels and sample rate
- i) Click on ENHANCEMENTS and make sure all enhancements are OFF!
- j) Click on SPATIAL SOUND (if an option) and make sure it is also turned OFF.
- k) Click OK and exit out of the system sound.



6. 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 .
- 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 license.

7. Connecting to an OPTIMOD-PCn Processor.

If 1600PCn software is running on the same computer that runs the Service, connect to Processors via Connect > Local.

Customizing OPTIMOD PCn-1600's Sound

The subjective setup controls on OPTIMOD PCn-1600 give you the flexibility to customize your station's sound. Nevertheless, as with any audio processing system, proper adjustment of these controls consists of balancing the trade-offs between loudness, density, and audible distortion.

When you start with one of our Factory presets, there are two levels of subjective adjustment available to you to let you customize the Factory preset to your requirements: Basic Control and Advanced Control.

PLEASE NOTE: You will notice all the control names are in green when you highlight it with the mouse. Changing the control with the mouse wheel turns it red. However, if you need to go back to where you started from, simply move the control and the name will return to green once you have reach the initial start point. Once you save your work, the new adjustment will be green where you saved it the next time you make a change.

Basic Control

The single LESS-MORE control changes many different subjective setup control settings simultaneously. The higher the number in the LESS-MORE control, the more aggressive the processing will be, adding loudness and density to the audio. The range of the LESS-MORE control is 1 (least aggressive) to 10 (loudest, most aggressive).

You need not (in fact, cannot) create a sound entirely from scratch. All User Presets are created by modifying Factory Presets or by further modifying Factory Presets that have been modified previously. It is wise to set the LESS-MORE control to achieve a sound as close as possible to your desired sound before you make further modifications at the Advanced Modify level. This is because the LESS-MORE control gets you close to an optimum trade-off between loudness and artifacts, so any changes you make are likely to be smaller and to require resetting fewer controls.

LESS-MORE affects only the dynamics processing (compression and peak limiting)—the PCn-1600 equalization is decoupled from LESS-MORE. You can therefore change EQ and not lose the ability to use LESS-MORE. When you create a user preset, PCn-1600 will automatically save your EQ settings along with your LESS-MORE setting. When you recall the user preset, you will still be able to edit your LESS-MORE setting if you wish.

Gain Reduction Metering

Because it uses floating point processing, PCn-1600 has essentially unlimited amounts of available gain reduction, unlike Orban's DSP-based processors. However, the meter should never exceed 25 dB gain reduction if PCn-1600 has been set up for a sane amount of gain reduction under ordinary program conditions. If any AGC or compressor gain reduction meter reads full-scale, this is usually a sign that you are using too much gain reduction, which can cause unpleasant compression artifacts.

Target Loudness

The advantage of enforcing target loudness is that it causes the loudness of various program elements in a broadcast or netcast to be roughly consistent with each other, so that it is less likely that users will need to adjust their volume controls between program segments. The effects of this control are most apparent when a setting is chosen and one listens over a long period of time (minutes or longer).

A good starting point is between -10 and -7 LUFs.

Peak Limiter

A bass pre-limiter stage controls low frequency peaks ahead of the main peak limiter, while a “true-peak”-aware look-ahead limiter (equivalent to the look-ahead limiter in Orban products like OPTIMOD-PC 1101) implements final peak control. This limiter typically constrains the true peak overshoot (i.e., the maximum peak value that would appear after an ideal digital-to-analog converter) to 0.2 dB or less

MB Final Limit Drive control adjusts the level of the audio driving the peak limiter, thereby adjusting the peak-to-average ratio of the processed audio. The MB FINAL LIMIT DRIVE control primarily determines the loudness/distortion trade-off.

QUESTIONS AND SUGGESTIONS

Please feel free to reach out with any questions about the Orban PCn-1600 audio processor. This manual is a quick start guide only. For more detailed information on the PCn-1600 audio processor, please download the full manual at www.orban.com