

236

AM Audio Processor

Installation & User Guide



May, 2017 - Rev. 1 Firmware

TABLE OF CONTENTS

Section I - INTRODUCTION3

- Product Description
- Product Features
- Product Specifications
- 'Under the Hood'

Section II - GETTING STARTED7

- Unpacking and Inspection
- Warranty Registration
- Mounting
- AC Mains Power
- Radio Frequency Interference (RFI)
- Front-Panel Display and Controls
- Front-Panel vs. Web Interface Setup
- Navigating the Menu Tree
- Analog and Digital Program Inputs
- Stream Input
- Input Sources and Program Failover
- Audio Alarms
- Processor Output Characteristics
- Analog Processor Output
- Digital Program Output
- GPIOs
- The Network Port
- +12VDC Power I/O
- Password Protection
- Miscellaneous Administration Menus
- Headphone Monitoring

Section III - PROCESSOR SETUP16

- Metering
- Processing Presets
- Setting Input Levels
- AGC
- Leveling
- Equalization
- Multiband Processing
- Crossovers
- 'Master' and Band Drives
- Band Uncoupling
- Bass Punch
- Limiting
- WB Release
- HF Limiting and Clipping
- Positive Peak Modulation
- Dayparting
- Processor Bypass
- Test Oscillator

Section IV - NETWORKING THE NOVIA 236.....24

- The Web Interface
- DHCP IP Assignment
- Manual IP Setup
- Assigning a Hostname
- Remote Listening
- Remote Access
- Dynamic DNS
- Timekeeping
- SNMP
- Network Status
- Alarm Notifications
- The Alarm Log
- Backup: The Hardware Profile
- Firmware Updates

WARRANTY(inside back cover)

Section I

INTRODUCTION

Product Description

Inovonics' NOVIA 236 is a compact and versatile airchain processor for monaural AM broadcasting. A wide range of transmission bandwidth choices and audio processing options makes the NOVIA 236 well suited to standard medium wave, shortwave and specialized AM broadcast services.

The NOVIA 236 features gain-riding AGC, leveling, parametric EQ, 3-band dynamic range compression, and asymmetrical wideband and independent high-frequency final limiting. Programmable from the front panel or through its cross-platform Web interface, the NOVIA 236 also supports 2-way program streaming and SNMP.

Product Features

Features of the Inovonics NOVIA 236 include:

- Comprehensive audio processing with factory and user presets; internal scheduler for dayparting
- Accepts analog, AES-digital and streaming program inputs
- Analog and AES-digital outputs; out-streams source and processed audio for remote monitoring
- Failover feature can switch to an alternate program feed when primary audio is lost
- Easy setup using the OLED screen and jog-wheel navigation of the processor's menu tree
- Full-function Web interface works with any browser
- Self-logging alarms for audio loss; alarm 'tally' for remote indication; dispatches email or text message alerts
- Accurate front-panel LED metering; all processing functions metered with OLED display and Web interface

Product Specifications

Frequency Response (processing bypassed):

50Hz-20kHz, ± 0.25 dB

Output Cutoff Response:

Nominal Frequencies: 5kHz, 6kHz, 7kHz, 8kHz, 9kHz, 10kHz
Filter Characteristic: 143-coefficient FIR filter with phase and overshoot compensation; ± 0.5 dB, 50Hz to 95% of nominal cutoff frequency; approx. -15 dB at cutoff, > -50 dB at 104% of cutoff

Pre-Emphasis:

None (flat response) or 'truncated' US NRSC pre-emphasis curve scaled to the selected cutoff frequency

Distortion (processing bypassed):

Analog I/O: $< 0.02\%$ THD (ref: +24dBu I/O)
AES Digital I/O: $< 0.002\%$ THD (ref: 0dBFS I/O)

Signal-To-Noise (processing bypassed):

Analog I/O: > 105 dB (ref: +24dBu I/O)
AES Digital I/O: > 120 dB (ref: 0dBFS I/O)

Program Line Inputs:

Analog: active-balanced (XLR) monaural input accepts nominal '0-VU' line levels between -15 dBu and $+15$ dBu; $+24$ dBu clipping
AES Digital: transformer-balanced (XLR) accepts peak line levels between -30 dBFS and 0dBFS at sampling rates from 32kHz to 96kHz; select mono-left, mono-right or L+R program audio
IP Streaming: accepts Icecast/SHOUTcast MP3, Ogg and AAC streams

Program Line Outputs:

Analog: active-balanced (XLR) delivers -12 dBu to $+18$ dBu for 100% symmetrical modulation; $+24$ dBu clipping, 200-ohm source
AES Digital: transformer-balanced (XLR) delivers -30 dBFS to 0dBFS at 100% symmetrical modulation; sampling rate follows input or may be fixed at 32kHz, 44.1kHz, 48kHz, 96kHz

Positive Peak Enhancement:

Intrinsic asymmetrical, positive-going peaks may be selectively limited in 1% steps from 100% to $+130\%$

Program Signal Latency (Delay):

1.5ms in Bypass, approx. 3.7ms in normal operation

Network Port:

TCP/IP network connection (RJ45) for remote setup/operation and in/out audio streaming; full SNMP support

GPIO Ports:

3 GPI, 3 GPO with assignable functions and logic polarity

Headphone Jack:

3.5mm (TRS) on front panel; low-Z or high-Z headphones

Internal Test Tone Generator:

20Hz-20kHz; variable frequency and level

Alarms:

Local GPO closures, browser interface, SNMP and SMS/email alarms for audio loss; maintains daily, weekly, monthly logs

Scheduler:

Accommodates 'dayparting' with an onboard real-time clock and preset-selection programming

Audio Processing:

AGC: ±15dB capture range; gated with dual-rate 'windowed' operation

Leveling: variable 'syllabic' 2:1 compression

EQ: 4 cascaded sections of parametric equalization

Bass 'Punch': variable bass-attack enhancement

Compression: 3 bands with selectable crossovers; variable master and individual drive controls; r.m.s./peak 'density' adjustment

Final Peak Control: no-clip feed-forward asymmetric wideband limiting with independent high frequency pre-emphasis protection

Processing Presets: 10 factory, 10 user-defined

Power Requirement:

12VDC at 240mA (2.1mm x 5.5mm coaxial); an inline 'universal' 100/240VAC switchmode power supply is included

Mounting Options:

An optional rack adapter mounts one or two NOVIA or other Inovonics half-rack units in a standard 19-inch 1U rack space

Size and Weight:

1.6"H x 8"W x 6"D; 5 lbs shipping weight

Certifications:



Rear View:



'Under the Hood'

The NOVIA 236 processor is very compact with a major utilization of surface-mount (SMD) technology. Some components are 'application-specific' and/or pre-programmed at the factory, but all of them are impossibly tiny. This makes servicing the unit in the field a difficult proposition at best. For these reasons, and also because of the small format of this manual, we have dispensed with schematic diagrams, servicing instructions and a listing of component parts.

Nevertheless, our policy has always been one of 'full disclosure.' We feel that, unless we are doing something deceitful, there should never be a reason to hide information from the user. With a clear conscience, and upon request, we will cheerfully provide additional documentation and divulge all but the very darkest secrets concerning any Inovonics product.

Because it is so small and lightweight, returning the NOVIA 236 for factory servicing is an option that we encourage. Inovonics has never depended on factory repair charges as a significant source of revenue, and we are confident that you will be astonished at how reasonable our rates actually are!

Section II

GETTING STARTED

Unpacking and Inspection

Immediately upon receipt of the NOVIA 236, inspect for possible shipping damage. If damage is found or suspected, notify the carrier at once, and then contact Inovonics.

We recommend that you set aside the original shipping carton in the event that return for Warranty repair is required. Shipping damage sustained as a result of improper packing for return may invalidate the Warranty!

Warranty Registration

Please complete the Warranty Registration process. Not only does registration assure coverage of the equipment under terms of the Warranty (printed inside the back cover of this manual), but the user is assured of receiving specific service and modification instructions, including software or firmware updates. Register online at:

www.inovonicsbroadcast.com/product-registration

Mounting

The NOVIA 236 is packaged in a compact, half-rack format. We supply stick-on rubber feet so the unit may sit on a desktop or atop an existing piece of rack-mounted equipment, as long as at least 1U of panel space is left open to access the NOVIA 236 front panel.

An optional rack-mount kit is available that can accommodate a single or a pair of Inovonics half-rack products. The kit comes with a blanking panel for unused space and with a ‘daisy-chain’ power cable so that two devices may share a single supply.

AC Mains Power

The NOVIA 236 comes with a ‘universal’ outboard ‘brick’ type switching power supply that accepts mains voltages between 100VAC and 240VAC. The actual power consumed is 240mA at 12 volts DC. A second DC connector on the

rear panel of the unit allows the user to ‘daisy-chain’ two or more units to share a common mains supply, thus cutting down on cord clutter. Do make sure that the total power consumption does not exceed the DC current rating noted on the power supply label.

Radio Frequency Interference (RFI)

Although we anticipate the NOVIA 236 finding a home in radio broadcasting environments, please do practice reasonable care in locating the unit away from *abnormally* high RF fields.

Front-Panel Display and Controls

LED bargraph meters monitor the processor input and output. These are peak-responding meters with a floating ‘peak hold’ above the bouncing display.

The input meter dB markings should be considered relative as the meter comes after the input level control in the signal path. For the output meter, 0dB at the top of the scale corresponds to 100% carrier modulation.

The input meter display range and activity will depend very much on the dynamics of the program material. Heavily compressed music will generally peak (and ‘hang’) at about -6dB on the meter scale; material with greater dynamic range will show more variation.

The green LED to the right of the level display indicates AGC gating. It will be lighted most of the time, going dark only during pauses in speech. The audio loss alarm lights the red LED.

The front-panel OLED graphic display screen presents the setup/operate menu tree in an easy-to-read format, and all setup can be done with jog-wheel knob entry. The display does employ a screen saver, so when the screen goes dim or completely dark, simply push the jog-wheel knob or Back button once to bring the screen back to life. No selection or change is made with this wake-up call.

Front-Panel vs. Web Interface Setup

The NOVIA 236 may be set up and operated either by using the front-panel menu and jog-wheel knob, or by using the Web interface. Doubtless you’ll find the Web interface fast-

er and easier, but we do advise gaining some familiarity with the front-panel approach. You will need to set up a network connection initially from the front panel.

Having said that, if you are adventurous do feel free to jump-in, set up a network connection and do all your setup over your network. The Web interface is organized so much like the OLED Menu Tree that separate sets of instructions would be redundant. Here in Section II we'll concentrate on front-panel setup. But anything in the Menu Tree can be found in the Web interface pages. Check Section IV for matters that are specific to networking the NOVIA 236.

Navigating the Menu Tree

In a nutshell, you *turn* the jog-wheel knob to cycle among and to highlight menu items, and then *push* the knob to select, edit or adjust the highlighted item. To further clarify:

- 1) If you land on a menu item that requires a text or numerical entry, a text-entry screen appears when you enter that submenu. *Turn* and *push* the knob to select alphanumerics, punctuation, backspace, etc. After text entry, select Save and *push* the knob to commit to entry, or press the Back button next to the knob to cancel the operation.
- 2) If the submenu has a checkbox or 'radio button,' bracket the option and *push* the knob to toggle it.
- 3) If the screen shows an adjustment 'slider,' *turn* the knob to bracket the slider, *push* the knob to enable adjustment, and then *turn* it to change the value. Finally, *push* the knob or press the Back button to commit to the adjustment.

You may always press the Back button repeatedly to return to the Main Menu screen shown here.



Analog and Digital Program Inputs

As one might well expect, the rear-panel ANALOG IN XLR connector accepts only a single channel of program audio. But the stereo-capable AES IN digital input may be config-

ured as required, offering 'split' use of the channels to feed a separate program to a co-located service.

From the Main Menu, navigate to Setup/Inputs/Digital Input Mono Mode. This is where you select your AES-digital program feed, either from internal combining of Left + Right stereo channels, or for input audio from *only* the Left or *only* the Right channel of the AES-digital stereo pair.



Stream Input

Just as described for the AES-digital input, The NOVIA 236 can accept monaural or stereo streamed audio. Navigate to Setup/Inputs/Stream Input/Stream Input Mono Mode to select a Left + Right stereo feed, or for input audio from *only* the Left or *only* the Right streamed channel.

Under Stream URL, manually enter the Internet address of the streamed program audio source. When the Only connect when stream is source box is *not* checked, the NOVIA 236 will connect to a valid stream automatically and remain connected. When the Only connect when stream is source box is checked, as shown above, the unit will connect to the stream either when the stream has been manually selected as the primary input source or 'failover' has switched-over to the stream as the backup source. The Connect button simply forces a re-connection.



Input Sources and Program Failover

From the Main Menu, go to Input Sources to select your Primary Source and failover Backup Source(s) for program audio.

Under the Primary Source submenu, set your default, first-choice source for program Audio: . This can be any of the three program inputs: Analog, Digital or Stream.



Second, and even third, 'failover' Audio: choices are set up in a very similar manner. In the example above, an audio loss

alarm on the primary Analog program source can be programmed to switch the processor input over to a Digital or Stream input.

Audio Alarms

The Audio Loss alarms for analog, digital and streaming inputs are each programmed independently, but follow the same procedure. As a typical example, we'll program the alarm for the analog input.

From the Main Menu go to Setup/Inputs/Analog Input/Analog Audio Loss.

NOTE: The Alarm box must be checked for the alarm to function at all. If left unchecked, the alarm will not trigger!



There will be no program audio failover, no front-panel or Web interface alarm indication, no 'tally' output, no email or text notifications, no SNMP trap.

Threshold On is the audio level that the program must drop below to trigger an alarm. Moreover, the audio level must stay below this point for the number of seconds programmed into the Time On box. Similarly, Threshold Off is the audio level that the program must come back to, and stay above for Time Off seconds, to reset the alarm.

The current level of the program audio shows as a shaded bargraph behind the Threshold On/Off boxes. This makes it easier to set the trip-point mark with reference to the program audio. Of course, no audio will show unless that input is connected. Be sure to set up the backup input source alarm(s) when the program failover feature is used.

Processor Output Characteristics

Traditional medium wave AM broadcasting was historically considered a 'flat response' system. Nevertheless, over the years a good many AM broadcasters elected to boost the higher audio frequencies to compensate for the declining performance of inexpensive AM radios. Beginning in the 1980s, the U.S. NRSC (National Radio Systems Committee) proposed a standardized pre-emphasis characteristic, plus a 'brick-wall' cutoff function. Both measures addressed reduction of man-made electrical noise and adjacent-channel

'monkey chatter' interference. The proposal was subsequently mandated by the U.S. FCC (Federal Communications Commission).

NRSC pre-emphasis is a 'truncated' 75µs curve, up about 1dB at 1kHz, and +10dB at 10kHz. The NRSC cutoff is very steep. Response is flat to about 9.6kHz, -15dB at 10kHz, and -50dB or more at 10.4kHz.

Characteristics common to both NOVIA 236 outputs, the ANALOG OUT and the AES OUT, are selected under Setup/



Outputs/Pre-Emphasis & LPF. The example above is the U.S. NRSC choice, but alternative cutoffs are available for European 9kHz channel spacing, and for short-wave, TIS (road-side assistance) and similar services. Cutoffs are detailed in the Specifications on Page 4. Pre-emphasis maintains the same general curve shape of the 10kHz NRSC standard, but is scaled to the selected cutoff frequency in all instances.

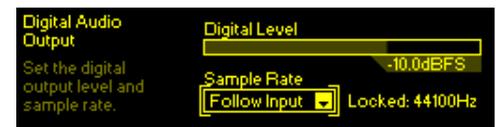
Analog Processor Output

The Setup/Outputs/Analog Audio Output menu controls the balanced analog level at the rear-panel ANALOG OUT XLR connector. Analog Level adjusts the peak level of a symmetrically-limited program signal from -12dBu to +18dBu. The +24dBu clipping point of the NOVIA 236 maintains sufficient headroom for positive program peaks to +130%.

Digital Processor Output

The rear-panel digital AES OUT is controlled from Setup/Outputs/Digital Audio Output. Here you adjust the peak level of a symmetrically-limited program signal from -30dBFS to 0dBFS. As positive program peaks may exceed the Digital Level noted below the slider, your maximum setting should never exceed -3dBFS.

Also under this menu, the Sample Rate of the output may be set to Follow Input (the same sampling rate as the input, as indicated on the screen), or to a fixed 32kHz, 44.1kHz, 48kHz or 96kHz rate.



GPIOs

Three rear-panel GPO (General Purpose Output) terminals present alarm “tally” connections for remote indication of program audio loss. The plastic connector body may be unplugged from the chassis to make connection easier and for quick disconnect.

GPOs are programmed from the Setup/Outputs/General Purpose Outputs menu. The Polarity: of each Output: 1, 2 or 3 may



be programmed as an Active Ground (the terminal goes to ground for an alarm) or Active Open (the terminal normally sits at ground and opens on an alarm). Type: may be assigned to Analog Audio Loss, Digital Audio Loss or Stream Audio Loss. None inhibits the alarm terminal closure or open. Alarms have the programmable parameters explained on Page 11.

Alarm GPO ‘tally’ outputs are the collectors of NPN transistors that saturate to ground. Up to 100mA may be ‘sunk’ by each of these outputs to operate relays or LED indicators using an external voltage source up to 24VDC. The negative side of the external power source must be returned to the GND (Ground) terminal on the rear panel; a 10mA current-limited +5V source is provided as a convenience.

The three GPI terminals have no application at present, but have been included for future use.

The Network Port

The rear-panel RJ-45 jack connects with your local network (LAN), and from there through your network router to the Internet. A network connection is required for the Web interface, for 2-way audio streaming, and for SNMP functions.

+12VDC Power I/O

Two paralleled ‘coaxial’ connectors allow ‘daisy-chaining’ two half-rack units that share a common rack adapter. A short ‘pigtail’ cable is provided with each rack adapter for power loop-through.

The NOVIA 236 draws 240mA. Check the rating on the label of the power supply to make sure it has capacity for the modules it must support.

These power connectors are not a locking type. A Ty-Wrap® will secure power cables to the plastic anchor above the connectors if this becomes a problem.

Password Protection

You may protect NOVIA 236 settings with a password, which thereafter must be entered before any subsequent changes can be made. Either the same or separate passwords may be assigned to lock out the front-panel and Web interface access.

From the Main Menu, navigate to Admin/Security. Enter either or both boxes to manually enter a password for Front Panel: or Webpages:. Highlight Save and push the knob to set the password in memory. Once the password is saved, the Now Playing screen will be the only menu item available.

Press the Back button to sign-in. You will be prompted to enter the password before any menu can be accessed and any adjustments made. Similarly, the Webpages: password must be entered on a Web-enabled computer or other connected device.

To recover a lost password, you must perform a “hard reset.” This deletes not only the passwords, but will also return the NOVIA 236 to factory-default values. *All User settings and presets will be lost!* Initiate a hard reset by holding down the Back button as you power-cycle the unit (disconnect and then reconnect power). Always keep an up-to-date Hardware Profile to back up your settings (see Page 29).

Miscellaneous Administration Menus

The Admin/Display menu offers a Brightness adjustment for the OLED menu screen. We don’t recommend a higher setting than the 60% default setting, as it doesn’t look that much brighter and may shorten the life of the display.

Timeout sets the interval between the last use of the knob and the screen going Dim (dim) or Dim (dark). You can set this between 5 min and 60 min. Test the screen-saver by holding-down the Back button.

About shows the current Firmware Rev: and Serial #: of your unit, the Ethernet: port status and Uptime:, or how long the NOVIA 236 has been running since power was last applied.

Headphone Monitoring

The front-panel headphone jack will accommodate either low- or high-impedance stereo headphones with a 3.5mm plug. When you plug headphones in, the display automatically opens the Headphone Volume screen where the slider will adjust the listening level. After you set Volume, push the Back button twice to return to the menu you were on. You can also reach the Headphone Volume screen anytime from the Main Menu.

The default Headphones Source: selection is Proc. Out, which monitors the processor output. De-emphasis is introduced in the monitor path when pre-emphasis is turned on. Other monitoring options are the three 'raw' program inputs to the NOVIA 236. This allows you to preview the incoming, unprocessed audio, including the failover source, without putting it on air.

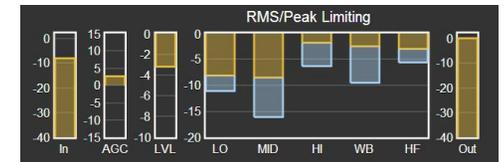
Section III

PROCESSOR SETUP

All adjustments discussed here appear under Processor in the Main Menu.

Metering

Meters gives an overall picture of audio processing action. The Web interface gives a 2-color display that additionally provides audio level and gain reduction annotation. The two examples here reflect the same program, but not quite at the same moment.



Processing Presets

The NOVIA 236 comes with ten factory-programmed processing presets and ten empty registers where you can save your own, customized ones. We recommend that you start with one of 'ours' and nurse it into 'yours,' something that sounds best for your programming and market demographics.

In this contrived example, 'Bob,' the station's P.D., has developed his own version of our factory (F) Country preset, and has renamed it Country-2 (Bob's). All processing parameters are saved in each preset, and presets are saved along with all other user settings when you download a Hardware Profile backup (see Page 29).



Creating presets is easy. After you have nursed-in just the right sound for your station, scroll to the top of the Presets menu to Save Preset. Push the knob and, as instructed,

Name Your Preset. Finish with a Save. You'll find your new preset at the bottom of the list.

To delete a custom preset, scroll to the bottom of the list and select Delete. Navigate the flashing X to the preset to delete and push the knob. Factory presets cannot be deleted.

Setting Input Levels

Adjust the appropriate Input Level under Setup/Inputs/... (whichever input: Analog, Digital or Stream applies).

Setting the level of the program source involves matching the dynamics of the incoming program audio to those of the 'gain-riding,' slow-AGC function. It's best to use program audio for this, rather than tones. With moderately processed off-air feeds and contemporary music releases, program peaks should consistently reach -3dB on the front-panel LED meters. Heavily processed music may need to be backed-down so peaks don't go above -6dB . Material with a wide dynamic range may occasionally reach 0dB . For a definitive measurement, go to Setup/Processor/Meters and check AGC meter action. The aim is to keep this meter hovering right around 0dB (center-scale) most of the time.

AGC

AGC is a slow, wideband 'gain-riding' function that presents subsequent processing stages with a uniform level based on both the peak and the average content of the audio program. AGC is 'gated' to prevent 'gain runaway' during silent periods.

The front-panel AGC indicator lights when the gate is open. The AGC designation below the OLED and Web interface meters is at normal brightness under this condition. The LED goes off and AGC grays-out during pauses in the program.

AGC is 'windowed' as well. This means that when AGC gain drifts outside its $\pm 5\text{dB}$ 'sweet spot,' accelerated 'makeup gain' brings it back inside more quickly.

AGC is enabled AGC by default, but may be turned off for classical or jazz music to preserve *pianissimo* passages.

Leveling

The AGC feeds a 2:1 compressor that has 'syllabic' response (like a 'VU' meter) to program dynamics. It gives gentle, unobtrusive dynamic range compression that actually makes very little difference in program loudness. Leveling decreases the overall long-term dynamic range of music programming without 'pumping,' and can normalize dialog among several speakers in a roundtable discussion. Think of leveling as a fast, ungated AGC.

With Leveling Drive turned all the way down to 0dB , this stage is essentially out of the circuit and seldom gives any meter action. Increased Leveling will 'collapse' fades at the end of songs, and extraneous noise in the studio may be more noticeable in the background during pauses in speech.

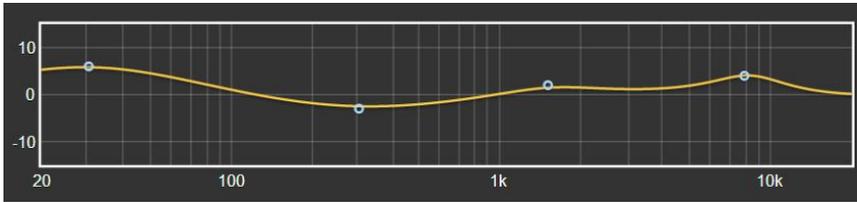
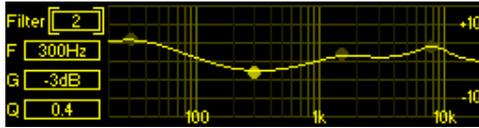
Equalization

The NOVIA 236 has a four-section parametric equalizer that can offer quite a lot of control over 'sonic signature.'

Parametric EQ is not as well-known in the broadcast environment as it is in the recording studio. This type of EQ affords variable gain or loss at a selected frequency, not unlike a single section of the more common graphic equalizer. Not only are frequency and gain adjustable here, but the 'Q' (bandwidth) at the selected frequency may also be varied. Lower 'Q' (wider bandwidth) values are most useful for program equalization. Sharp peaks or nulls are usually reserved for fixing dedicated-channel problems, ahead of the final mix, with specific instruments, voices or room resonances.

To illustrate the overall effect of the 4-section equalizer 'bank,' the frequency and gain of each section are graphically presented on the front-panel and Web interface menu screens, and the overall, combined effect of the four sections is plotted as a graph.

Each section is programmed independently for frequency, 'Q' and gain. The screen shots at the top of the next page show this from front-panel and Web interface perspectives. The ubiquitous bass boost is centered at 30Hz with a low 'Q' of 0.4. The next EQ point reduces 'tubbiness' at 300Hz by 3dB . A hint of a 'presence lift' at 1.5kHz aids speech articulation without sounding 'screechy,' and a few dB of 'sparkle' at 8kHz rounds out this profile.



If you are not familiar with parametric EQ, do spend some time listening to various samples of representative program material as you put the EQ bank through its paces. Unlike the more intuitive graphic equalizer, a parametric takes some getting used to.

Multiband Processing

The multiband processing section of the NOVIA 236 provides both r.m.s. compression and peak limiting in three frequency bands. Some multiband setup controls spill-over from the Multiband header into Limiting to keep each menu from getting too cluttered.

Crossovers

Crossovers are the frequencies that divide the audio spectrum into the three processing bands. Filter skirts are second-order functions offering subtle differences from one selection to the next. ‘Bass’ frequencies are generally considered those below 100Hz, so choose the low crossover to best fit your programming. A high crossover of 2kHz complements the US NRSC pre-emphasis characteristic, although a 3kHz choice may give a better-balanced midrange in general studio processing applications.

‘Master’ and Band Drives

Adjust ‘master’ Drive to the triband section under Limiting/Triband Drive & RMS/Peak. This also is where you’ll find the RMS/Peak slider that establishes the ratio of r.m.s. to peak limiting in the three bands. r.m.s G/R (gain reduction) is shown by the solid or yellow portion of the LO/MID/HI G/R meters, and peak limiting by the floating segment or blue portion of the bar.

Drive and RMS/Peak will have greatest effect over how ‘busy’ the program sounds. Multiband processing action fills voids in the program spectrum. r.m.s. control (0 to -10) will give a smoother sound and peak-based control (0 to +10) a greater spectral density.

Under Multiband/Band Drive, independent sliders at the input to each band yield a certain degree of static equalization, plus an ability to normalize compression and limiting among the three bands.

Band Uncoupling

With most program material, the mid band contains the most energy and is thus considered the ‘master’ band of the multiband section. Band Uncoupling allows slaving the action of the low and high bands to that of the mid band. When fully coupled (0% Uncoupling), mid-band G/R will also reduce gain in the slaved bands, acting more like a single-band processor. The slaved bands will still be able to reduce gain beyond the midband G/R level as needed, but will not release to a value less than the G/R level established by the mid band. Advance Uncoupling to get a ‘busier’ multiband sound.

Bass Punch

This is a bass-enhancement feature that accentuates the initial impact of drums or the pluck of a bass guitar string. This is a dynamic function and will have no effect on sustained bass material. Bass Punch bypasses the multiband section, so its action will not be evident in multiband metering.

Limiting

In addition to the Triband Drive and RMS/Peak adjustments above, the Limiting submenu has a few more user controls found under Final Limiter.

WB Release

WB Release establishes a dual release function and will have the greatest effect over perceived loudness in the broadcast program.

The time-averaged value of final limiting establishes a release ‘platform.’ Program peaks quickly release to this plat-

form, which itself then releases at a slower rate. WB Release sets the platform level with relation to peak gain reduction. The platform is the solid or yellow portion of WB metering; fast peak release is seen as the hovering segment or blue section of the display. A default value of '0' is a safe compromise between 'smooth' (-10) and 'loud' (+10). Your station programming and personal preference will dictate a proper setting for your purposes.

HF Limiting and Clipping

As discussed on Pages 11-12, today's AM broadcasting employs complementary pre-emphasis and de-emphasis, requiring an independent high-frequency limiter to avoid overmodulation. The NOVIA 236 uses both HF limiting and distortion-cancelled HF clipping to meet this requirement.

NOTE: The independent high-frequency limiter is active only when Pre-Emph is turned On under Setup/Outputs/Pre-Emphasis & LPF.

HF Limit-Clip covers the range between full limiting (-10) to mostly-clipping (+10) with '0' as the default compromise. Full HF limiting can sound somewhat dull. But even with distortion-reduction techniques, HF clipping can put an 'edge' on vocals and other familiar sounds. Be sure to listen to a representative sample of your programming before settling on an adjustment here.

Positive Peak Modulation

Unlike the symmetrical headroom limitations of FM broadcasting, digital audio signal handling and the cutting of lacquer masters for vinyl records, there is no theoretical limit to the positive excursion of a modulating waveform in AM radio. An AM carrier cannot be modulated to a level below carrier cutoff, of course, but the 'sky (or the power supply) is the limit' in the positive direction.

Speech and music waveforms are asymmetrical by nature. Broadcasting practices in the U.S. and many other countries allow the AM carrier to be asymmetrically modulated, up to +125% in the U.S. and most other locations.

From the Main Menu, navigate to Processor/Positive Peak Amplitude. Here the level of Positive Peaks may be set in 1% increments between 100% and +130%. Please keep in mind that this technique gives a slight modulation advantage only

for program material that has naturally occurring asymmetry. The NOVIA 236 does not perform negative peak clipping, 'phase-flipping' or DC-offset shenanigans. Thus it does not introduce nonlinearity or signal distortion, it merely passes it.

Dayparting

NOTE: The daypart scheduler relies on at least an initial network connection to sync with Internet time, and with the proper time zone and other options selected. See the notes on timekeeping on Page 27.

As many as 20 'dayparts' (changes in a station's programming) may be scheduled by this built-in feature of the NOVIA 236. Audio processing presets may be called-up for scheduled deviations in the station's format during the broadcast day. A station might depart from jazz music to a big-band segment, for example, or from music to regularly scheduled talk programming, or take a 5-minute satellite-delivered news feed on the hour.

From the Processor/Daypart menu, enter a processing Preset that you have selected for the scheduled programming



segment. You may select one or more Days of the week that the segment will air, and the Hour and Min (minute) it begins, AM or PM. In this example, the station airs a religious roundtable discussion on Sunday at 11:00AM. A second daypart, to return to the station's music format, will have been set for noon.

Once a programmed daypart begins, it will continue indefinitely. This makes it important to set up your 'normal' processing as a daypart as well, programming the scheduler to switch back when the other daypart ends.

Processor Bypass

The Bypass mode simply removes the entire audio processing function from the program signal path.

Test Oscillator

Engaging the Test Oscillator disconnects program audio from the input of the audio processing section and allows you to

feed this point with a tone. Default is Off, of course; select On to feed the oscillator tone to the processor input.

The Frequency and the Level of the tone are both adjustable from this menu. A Level setting of -10dB is equivalent to a console 'zero-VU' level and will center the gain-riding AGC function. Depending on the processor setup you may see little or no meter action with a tone, as subsequent stages respond primarily to program peaks.

Section IV

NETWORKING THE NOVIA 236

Section II stressed setup of the NOVIA 236 using front-panel 'knob and button' data entry. As soon as you have a network connection, feel free to 'graduate' to Web interface operation. Although the OLED Menu Tree will continue to be referenced here, the Web interface menu is nearly identical, quite intuitive, and much faster.

The Web Interface

The 'responsive' design of the NOVIA 236 Web interface provides an optimal viewing experience across a wide range of devices. A minimum of resizing, panning and scrolling is required between desktop computer monitors, tablets and mobile phones.

DHCP IP Assignment

With the rear-panel LAN PORT connected to your network, navigate from the Main Menu to Setup/Network/IP Settings. Here you may select: DHCP to have your router automatically assign an IP address to the NOVIA 236. A DHCP connection will populate the fields on the right-hand side of the screen automatically.



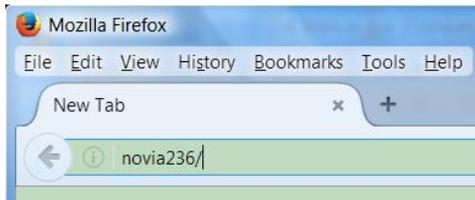
Manual IP Setup

For any of several reasons you may need to set the IP address of the NOVIA 236 manually. Select Static IP, and then bracket the various network options shown on the right to enter the proper decimal-delineated numbers. Use Backspace to make corrections and, when finished, Save the new entry. Consult a competent IT professional if you need help with this.

Assigning a Hostname

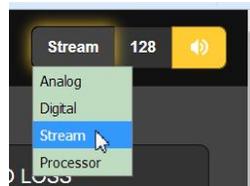
Setup/Network/Hostname lets you assign a unique name to a particular NOVIA 236 to identify it on the network. The factory-default name is NOVIA236. You might change this to differentiate one processor from another on a common network.

Use the knob to assign a new name and Save the name when finished. Although Hostnames must be entered in all-capital letters, you don't have to use all-caps when addressing the processor. Under the Windows® operating system, bring up the NOVIA 236 with a Web browser that's on the same network simply by typing the Hostname and a forward-slash into the browser address bar as shown here. Non-Windows browsers will require entering the entire IP address of the unit.



Remote Listening

Click the loudspeaker icon at the top of the screen to listen to the audio program through your browser. The 128 box to the left of the icon sets the audio monitor streaming rate. 128kbps is default, but you can drop this to 64kbps or even 32kbps if your network connection is very slow. The box marked Processor, a bit more to the left, selects the source you are actually listening to. The processor output is the default, but you can listen to the incoming 'raw' (unprocessed) program sources without changing or interrupting the on-air program.



Remote Access

To address your NOVIA 236 from outside your LAN (from the Internet) the unit must have a static IP address. If your router makes DHCP assignments for other equipment on the network, simply assign the NOVIA 236 a static IP that is outside the router's DHCP range. Use the router's Help utility with this.

You also need to open a specific port on the network router. From the router's Port Forwarding utility, you will be able to enter your static IP address for the NOVIA 236, followed by a colon and a port number. The port number may be any number in the range indicated by the router. If your Internet Service Provider (ISP) assigns you a static IP address, then it is a simple matter to address the NOVIA 236 from anywhere. Just type the IP address and port number into your browser as shown here.



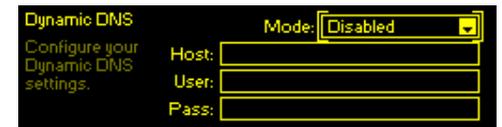
But if your ISP issues you a *dynamic* IP, which is most often the case, then you must utilize the services of an IP-forwarding provider.

Dynamic DNS

It would be impossible to address equipment behind a dynamic IP address if it were not for IP-forwarding providers available on the Internet. Their service, either free or at a very modest charge, allows the NOVIA 236 to keep that provider apprised of its reassigned IP address each time your ISP reassigns it. The IP-forwarding provider intercepts data attempting to connect with your unit and converts the IP address to the updated one.

There are three popular forwarding service providers. You may find that their basic forwarding service (all you really need) is free of charge, but advanced features may command a nominal annual fee. All services require registration on the appropriate Website.

From the Main Menu, navigate to Setup/Network/Dynamic DNS. Disabled is the default Mode:



selection, but here you may choose among the three popular providers. Write down these provider names and do an Internet inquiry for each to learn more about their services and to register with whichever one seems best suited to your needs.

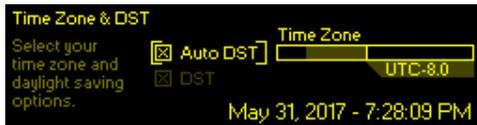
The DNS provider will issue you a Hostname, Username and Password. Enter these into each of the three fields. Your screen will look similar to this example when finished.



Timekeeping

The internal daypart scheduler and time stamps for alarm notification and logging require setting the built-in real time clock (RTC) to an Internet time standard.

Under the Setup/Network/Time/Time Zone & DST, use the Time Zone slider to select your local zone with respect to UTC. If you have already established an Internet connection, today's date and the local time will appear at the bottom of the screen. Auto DST is the default setting for Daylight Saving time. Force DST by checking the DST box, or uncheck both boxes to ignore DST completely.



An accurate, default Internet Time Server has been pre-programmed into the NOVIA 236 at the factory. You may change this if there is a reason to do so.

SNMP

SNMP (Simple Network Management Protocol) allows other TCP/UDP/IP equipment on the same Local Area Network (LAN) to communicate directly with the NOVIA 236, and for the unit itself to initiate an alarm to other equipment on the network. Setup instructions here are abbreviated; please consult other literature for an explanation of SNMP terms and protocols.

Under Setup/Network/SNMP/Mode & Communities, the default Mode: setting is Disabled. Reset this to Read Only to allow the NOVIA 236 to be interrogated by the SNMP Manager, or set Mode: to Read & Write so that the SNMP Manager can send commands to the NOVIA 236.

Communities are actually passwords for security purposes. SNMP Ports have typical settings that may be changed as required. 'Traps' are SNMP alarms initiated by the NOVIA 236. Enter the local network IP addresses of associated

SNMP equipment under Trap Destinations so that they can receive alarms.

A MIB file is a small text file required by the SNMP Manager. Using the Web interface SNMP menu, click: Download MIB to save this file in the usual Windows manner. The MIB file is in plain text with a .mib extension that may be read with Windows Notepad.

Network Status

Setup/Network/Status brings up a screen that gives full particulars of the network connection. This screen is useful for troubleshooting or for verifying connection parameters.

Alarm Notifications

Audio-loss alarm setup appears on Page 11. Page 13 details rear-panel alarm 'tallies.'

You must first program the NOVIA 236 to send mail under the Setup/Email Preferences menu. You need to set up an actual SMTP email account, following guidelines set by the mail provider you choose.

NOTE: As of initial product release, some email servers may not support SMTP mail dispatch from the NOVIA 236. This situation is in a state of flux at present. The TLS1.2 standard is supported, STARTTLS is not. A simple and free Gmail account would be a good choice if your in-house mail system fails to send mail due to this issue.

Under SMTP Server, enter the provided outgoing mail SMTP Server info (e.g. smtp.gmail.com), the specified Port: number and whether or not to Use SSL.

Under Sender, From: is the 'friendly' name that will identify the NOVIA 236 to the email or SMS/text recipient. User: is the full email address of the unit, and Pass: is the password you've assigned to the account.

Next enter email recipients separately under the Setup/Email Preferences/Recipients menu. Use Recipients/Select: fields 1. through 10., entering up to ten separate email addresses.

Then from the Main Menu open Alarms & Notifications/Email Notifications. In the top box you can pull-up any recipient from the list you've created, and select which alarm or alarms sends an email alert to that person. From that same

list you may also send that same person a complete log of all alarms. Scroll down and check ✓ your preference of a Daily, Weekly or Monthly Alarm Log.

Use the Send Test Email utility to ensure that the NOVIA 236 is set up to send mail properly to all recipients.

The Alarm Log

Under Setup/Alarm Log Settings you'll find a Status: notation of how close the log is to its maximum capacity, about 2000 events. Enter the Email When: box and set a number for an alert. A setting of 10% equates to about 200 log entries.

The Alarm Log continues to accumulate entries, but you may manually clear it at any time. Under Alarm Log Settings, go to Clear Log at the bottom of the screen. Bracket and select the box, and when prompted push the knob again to delete all alarm history. The NOVIA 236 Web interface provides means of downloading the alarm log for study and analysis if desired.

Backup: The Hardware Profile

The entire NOVIA 236 setup, which includes input source choices, factory and user processing presets, alarm notification preferences and SNMP options... all may be saved to your computer as a small text file. A Hardware Profile is useful for restoring a previous processor setup or for 'cloning' a second unit for backup service.

On the Admin Webpage, click: Download Hardware Profile to save the profile to your system.

Your browser and version of Windows may ask whether to Open or Save the file. Click the Save button and the file will be saved to a Downloads folder, and from there may be moved to a convenient location. Other browsers may ask you directly to specify a 'Save as:' location. The file carries a default name of 236settings.ini.

Upload a Hardware Profile backup file to the NOVIA 236 by clicking Select Hardware Profile.... Navigate to the folder where you saved the file and double-click it. The filename, File: 236settings.ini, should replace Select Hardware Profile... on your screen. At that point, simply click Upload Hardware Profile.

NOTE: Uploading a Hardware Profile reboots the NOVIA 236. After the reboot, an information screen pops up to remind you of important operating procedures and to guide you through any rough spots that might have surfaced during reboot. Restoring factory default settings is another option.

Firmware Updates

It's an easy matter to upload NOVIA 236 firmware updates to the unit when we issue them.

NOTE: Make sure that your Hardware Profile is up-to-date. A firmware update could affect some user settings.

Updates are distributed as small .bin files that may be downloaded to your computer Desktop or placed in any convenient folder. From the Firmware Update utility at the bottom of the Admin screen, click Select Firmware File... and then navigate to the downloaded file and double-click it. This will transfer the file name to the updater. Finally, click Update Firmware to complete the process.

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INOVONICS WARRANTY

- I **TERMS OF SALE:** Inovonics products are sold with an understanding of “full satisfaction”; that is, full credit or refund will be issued for products sold as new if returned to the point of purchase within 30 days following their receipt, provided that they are returned complete, and in “as received” condition.
- II **CONDITIONS OF WARRANTY:** The following terms apply unless amended *in writing* by Inovonics, Inc.
- A. Register the Warranty online at www.inovonicsbroadcast.com, within 10 days of delivery.
 - B. The Warranty applies only to products sold “as new.” It is extended only to the original end-user and may not be transferred or assigned without prior written approval by Inovonics.
 - C. The Warranty does not apply to damage caused by misuse, abuse, accident or neglect. This Warranty is voided by unauthorized attempts at repair or modification, or if the serial identification tag has been removed or altered.
- III **TERMS OF WARRANTY:** Inovonics, Inc. products are warranted to be free from defects in materials and workmanship.
- A. Any discrepancies noted within THREE YEARS of the date of delivery will be repaired free of charge, or the equipment will be replaced with a new or remanufactured product at Inovonics’ option.
 - B. Parts and labor for factory repair required after the three-year Warranty period will be billed at prevailing prices and rates.
- IV **RETURN OF GOODS FOR FACTORY REPAIR:**
- A. Equipment will not be accepted for Warranty or other repair without a Return Authorization (RA) number issued by Inovonics prior to its return. An RA number may be obtained by calling the factory. The number should be prominently marked on the outside of the shipping carton.
 - B. Equipment must be shipped prepaid to Inovonics. Shipping charges will be reimbursed for valid Warranty claims. Damage sustained as a result of improper packing for return to the factory is not covered under terms of the Warranty and may occasion additional charges.

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