PDM II

PDM II User Manual

Front Panel Overview

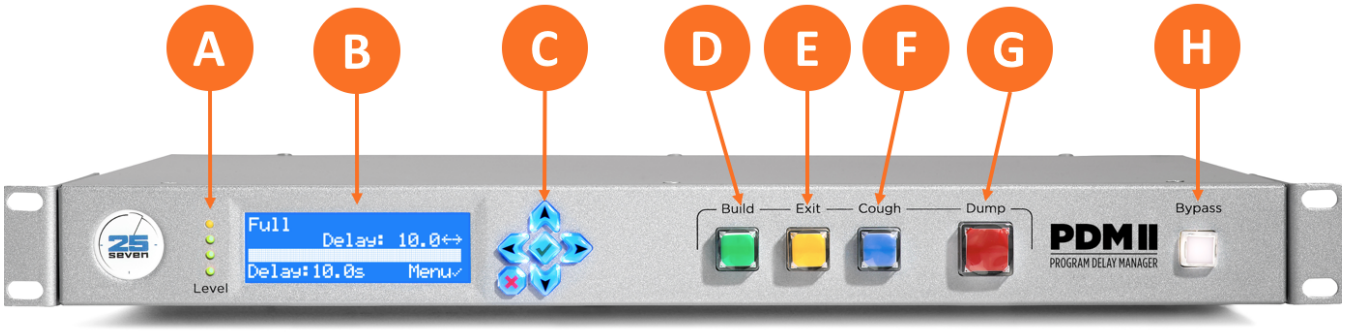


Figure 1 - Front panel controls

The **Input Level Meter** (A) monitors the signal going into PDM II's processing circuit. As they follow the A/D converter in the signal path, they will accurately monitor the input regardless of the Input Sensitivity setting.

Note that this is a peak meter to be used as a diagnostic tool for setting input levels; it does not display RMS voltage or a time-integrated level and is not intended to be a replacement for a more sophisticated loudness meter.

- **Four dark LEDs:** The input signal is below -36 dBFS.
- **One Green LED:** The input signal is above -24dBFS.
- **Two Green LEDs:** The input signal is above -18dBFS.
- **Three Green LEDs:** The input signal is above -12dBFS.
- **Four Green LEDs:** The input signal is above -6dBFS.
- **Top LED is Yellow:** The input signal is above -0.5dBFS.
- **Top LED is Red:** The input signal is above +0.5dBFS.
- **All LEDs are Yellow:** The unit is expecting a Livewire input but not seeing a valid signal, or there is an internal error.

The **LCD display** (B) shows a variety of information about the current status of the PDM II and provides a menu system for front-panel setup and configuration.

The **navigation cluster** (C) is made up of left, right, up, and down arrows plus a green "checkmark" button (generally used as an "Enter" button to confirm choices) and a red "X" button (used as a "Cancel" button to exit a menu without saving any changes).

The main color-coded operational buttons are grouped together and their use in actual operation is outlined in greater detail in the Front Panel Overview and Basic Operation sections, but in short:

- The green **Build button** (D) starts building a delay at the start of a program.
- The yellow **Exit button** (E) starts the process of exiting the delay to return to real-time audio.
- The blue **Cough button** (F) temporarily stops incoming audio from reaching the delay buffer
- The red **Dump button** (G) dumps the buffered audio or plays a pre-recorded audio file when a guest, caller. or even the talent (!) utters something objectionable that should not be aired.

The **Bypass button** (H) is used for emergencies or when you want to electrically remove PDM II from the signal path. Pressing it connects its outputs directly to its inputs with no processing or delay, and also clears the PDM II's delay memory.

> **Note:** PDM II also goes into electrical bypass - connecting the analog and AES/EBU RJ45 inputs to the corresponding RJ45 outputs - when power is removed. In this situation, the PDM II becomes a completely passive device with no level adjustment or A/D conversion taking place.

Rear Panel Overview

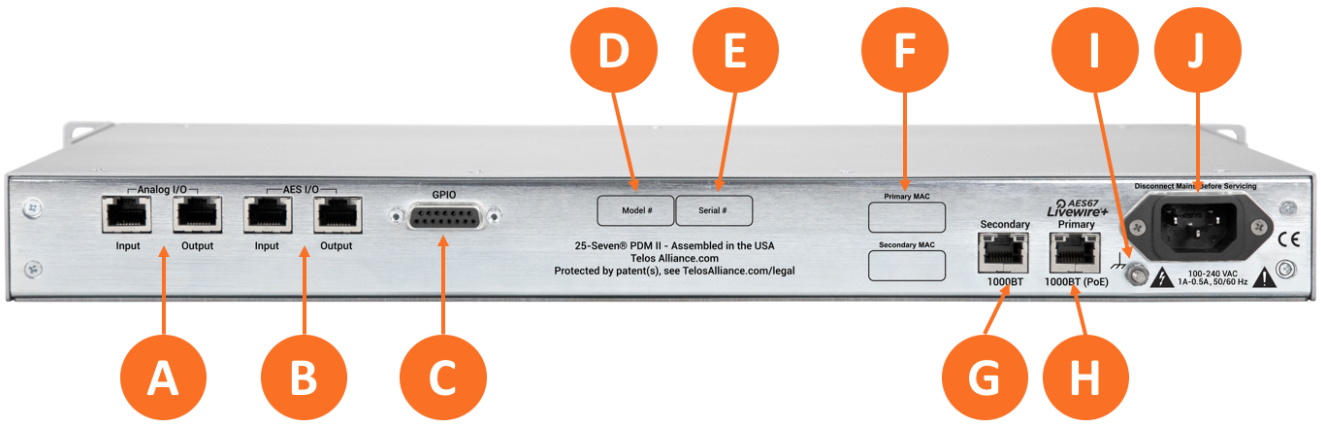


Figure 1 - Rear panel connections

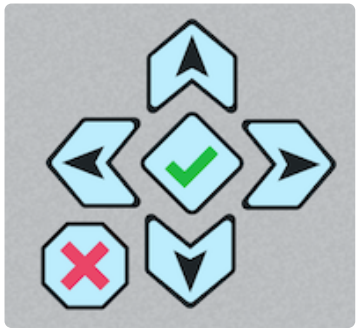
The rear panel of the PDM II contains the following connections and information:

- Analog Input and Output via RJ45 connector (A)
- AES3 Input and Output via RJ45 connector (B)
- GPIO on a standard DB15 connector (C)
- Model number (D)
- Serial number (E)
- Primary and Secondary MAC addresses (F)
- Secondary Ethernet port via RJ45 connector (G)
- Primary Ethernet port via RJ45 connector; PoE-ready (H)
- Chassis ground lug (I)
- IEC AC power inlet (J)

Front Panel Menus

While PDM II offers a comprehensive HTML5 browser-based user interface, most of the setup, configuration, and operation of the unit can also be accomplished via the front panel controls.

The front panel navigation cluster is made up of five buttons:



Navigation cluster

- **Left**, **Right**, **Up**, and **Down** buttons, for navigating through lists and adjusting values; holding down an arrow will generally repeat the action
- **Checkmark** button, for entering menus and confirming choices
- **X** button, to "Cancel" and exit a menu without saving any changes

To begin, press the **Checkmark** button to enter the top-level menu.

Configuration Menu

Pressing the **Checkmark** button from the normal status screen brings up the Configuration menu with sub-menus for Audio, Controls, System, Network, GPIO, and Information.

The Up/Down arrows scroll vertically through the current menu. The Right arrow is used to enter any

available sub-menus.

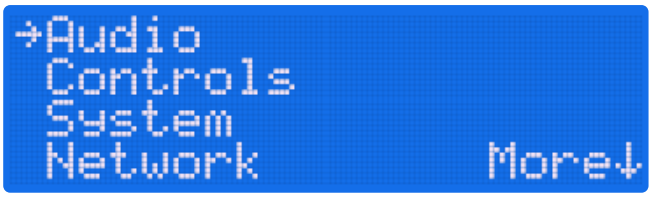


Figure 1 - Configuration menu

Many of the PDM II's menus contain more than four items, and so cannot be completely displayed on one screen. In this case, the extra items above or below the visible items (as indicated by the word "More") can be seen by scrolling with Up/Down arrows.

For illustration purposes throughout this user manual, the screens will be merged into a single image so that all information can be displayed at once.

The full configuration menu is below; the sections that follow will describe each sub-menu.

Figure 2 - Complete Configuration menu

Audio Menu

The Audio Menu is used to select and configure various audio I/O parameters and values.

> **Note -** Some of the options displayed in the Audio Menu are contextual and will change depending upon the type of audio input selected. Therefore, the figures below may not exactly match what is available on the front panel of your unit.

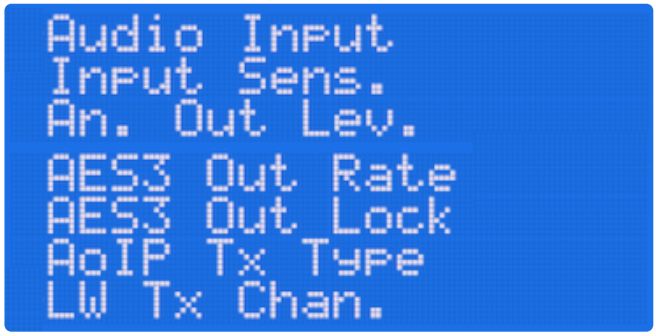


Figure 1 - Audio menu

Audio Input

Audio input options include Analog, AES67, Livewire, and AES3. The up/down arrows scroll through the options. In this and in subsequent edit screens, the Checkmark button accepts and applies any changes while the X button cancels without saving.

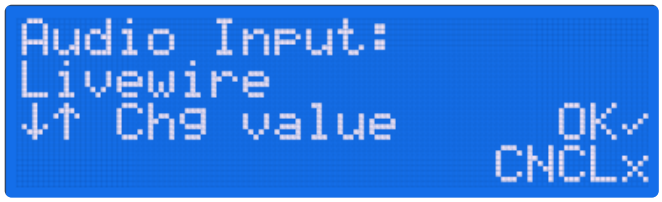


Figure 2 - Audio input screen

AES67 Receive Channel

When using an AES67 audio source, the multicast address of the receive channel is set here. The up/down arrows change the number by a value of 1, and the left/right arrows navigate between fields.

Figure 3 - AES67 receive address

Livewire Receive Channel

When using a Livewire audio source, the receive channel is set here. The up/down arrows change the number by a value of 1, and the left/right arrows change the channel number by a value of 100.

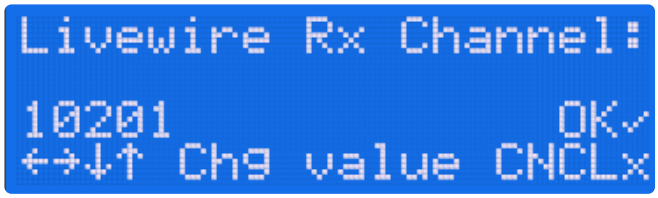


Figure 4 - Livewire receive channel screen

Input Sensitivity

When using an analog audio source, this value should be set to the absolute loudest level PDM II will see in your installation. The up/down arrows change the value. The "L" and "R" values represent the resulting digital levels for the incoming analog signal and can be used along with an externally generated test tone to adjust the sensitivity settings.

Figure 5 - Input sensitivity screen

For most installations where 0 VU = +4 dBu, the recommended setting is +14 dBu = 0 dBFS.

> **Note: Don't confuse dBu with dBFS!**
>
> dBu - an analog measurement - is a comparison to an arbitrary voltage. When a console's VU meter reads 0, the output is typically +4 dBu, or 1.228 volts when using a sine wave. However, actual audio levels are typically much higher due to audio peaks in the waveform. Analog audio is very forgiving of such peaks, but digital audio is not.
>
> A digital level of 0 dBFS (decibels in reference to full scale) is an absolute ceiling, and audio that exceeds that level will result in audible distortion. PDM II has a built-in limiter to prevent levels from exceeding 0 dBFS, but the recommended setting of 14 dBU = 0 dBFS provides 10dB of headroom while still maintaining an 84dB signal-to-noise ratio. Lower settings can be used when dealing with heavily processed input content, while higher settings may be necessary for content with very wide dynamic range.

Analog Output Level

The Analog Output Level screen displays how the analog output level reflects digital audio levels within PDM II's processor. With the setting as shown below, 0 dBFS within PDM II will yield a +14 dBu analog output. The output levels should generally be set to match the Input Sensitivity level, though levels can be adjusted to create a gain or loss at the analog outputs. Note that in Bypass mode, any such gain changes are also bypassed and the output levels will equal the input levels.

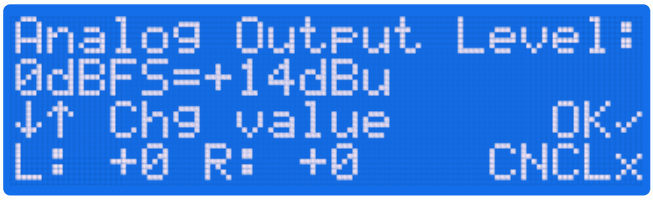


Figure 6 - Output level screen

AES3 Default Output Rate

The default sample rate of the AES3 output can be set to 32, 44.1, or 48kHz.

Figure 7 - AES output rate screen

AES3 Output Lock

The sample rate of the AES3 output can be locked to the sample rate of the AES3 input, even if the unit is not configured for an AES3 input. If there is no valid clock at the AES3 input, the output will revert to the rate set in the AES3 Default Output Rate screen above.

Figure 8 - AES output lock screen

AoIP TX Type

Audio over IP (AoIP) audio can be sent from PDM II as either a standard AES67 stream or as a Livewire stream. It can also be disabled if desired.

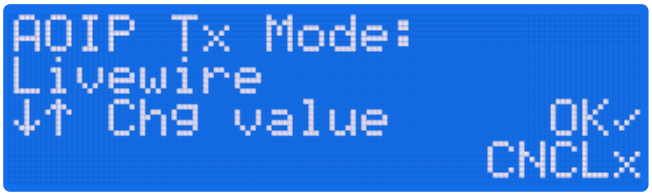


Figure 9 - AoIP Tx mode screen

AES67 Tx Address

The multicast address of the AES67 transmit channel is set here. The up/down arrows change the number by a value of 1, and the left/right arrows navigate between fields.

Figure 10 - AES67 Tx address

Livewire TX Channel

The Livewire channel number for PDM II's audio output is set here. The up/down arrows change the number by a value of 1, and the left/right arrows change the channel number by a value of 100.

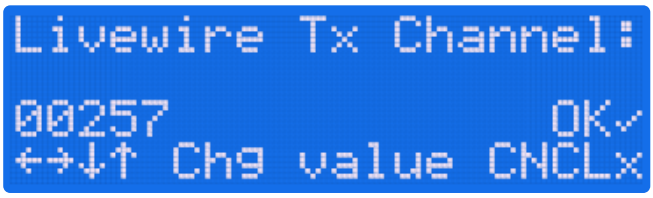


Figure 11 - Livewire Tx channel screen

Controls Menu

The Controls menu is used to configure parameters and settings that determine how a delay is built, what happens when the delay is dumped, and what happens when you exit the delay and return to passing real-time audio.

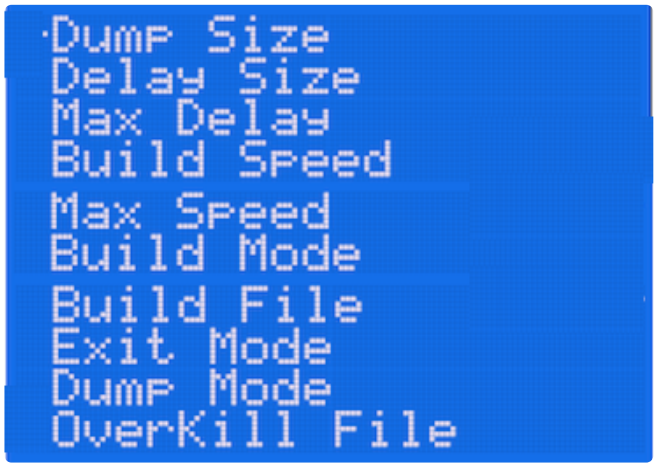


Figure 1 - Controls screen

Dump Size

The Dump Size screen sets the amount of audio deleted when the **Dump** button is pressed. The up/down arrows set a value between 1.0 and 60.0 seconds in 0.1 second increments.

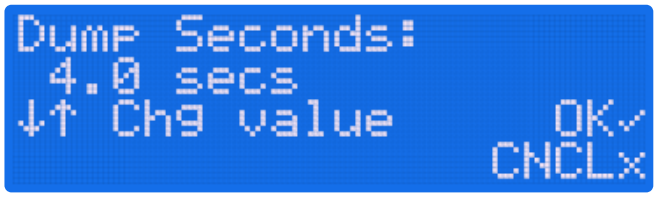


Figure 2 - Dump size screen

> **Note -** The Dump Size and Delay Size screens are not visible when the Dump Mode is set to "OverKill."

Delay Size

The Delay Size control determines how much delayed audio PDM II will store in its buffer. The up/down arrows set a value between a minimum of 1.0 second and the maximum as determined by the setting of the Max Delay menu below.

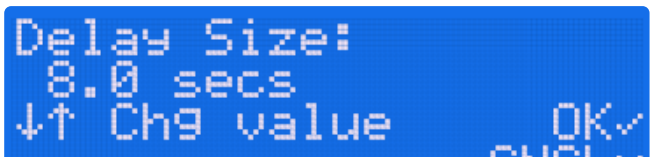


Figure 3 - Delay size screen

> **Note:** The Delay Size can also be temporarily set from outside of the menu system any time PDM II is in Delay mode by pressing the left/right arrow keys to decrease/increase the value.

Max Delay

The Max Delay setting determines the upper limit of the Delay Size range described above to help prevent operators from accidentally setting unrealistic delays. The maximum value is 90 seconds.

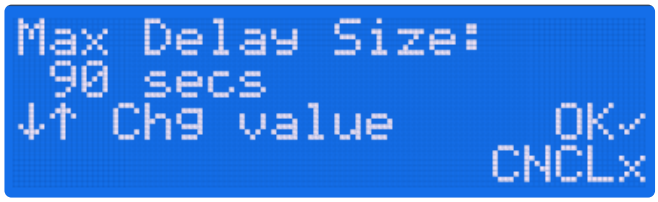


Figure 4- Max delay screen

Build Speed

The Build Speed screen sets how quickly PDM II can build up to and exit from its delay memory. The default value is 7. Higher values will build the delay more quickly but may cause audible artifacts depending on the type of programming.

As a rule, content with more density (such as highly-produced music) will better tolerate higher speeds without audibly compromising the audio. More sparse material (such as speech) will more easily reveal artifacts.

We recommend starting with the default value, carefully listening to your on-air audio during the build and exit process, and making adjustments that balance the need to build a delay buffer quickly with your tolerance for any variation in the audio quality during that time.

Figure 5 - Build speed screen

Max Speed

The Max Speed screen sets a limit for how quickly PDM II can build or exit a delay. The Build Speed setting cannot be set faster than the value set here.

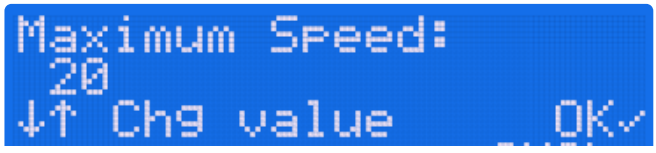


Figure 6 - Maximum speed screen

Build Mode

Build Mode determines the method PDM II uses to build its delay.

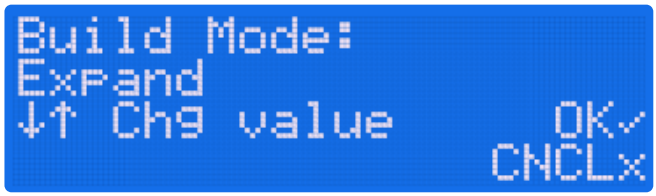


Figure 7 - Build mode screen

- **Expand -** PDM II will send the incoming audio to the transmitter but at a subtly slowed-down rate, taking more time until the delay memory is filled.
- **Insert -** PDM II will play a station jingle, ID, or other fill material from its internal memory.
- **Pre-roll -** PDM II will mute its output while you play material from another source, or while it signals your automation system to play audio.

Build File

The Build File menu allows you to choose which audio file will play out from PDM II's internal memory when building a delay using the "Insert" mode.

Figure 8 - Build file screen

> **Note:** PDM II can store multiple audio files in its internal library. Files can be uploaded and managed on the Audio Files page of the web-based user interface.

> **Note:** The audio files should be stereo (or 2-channel mono) 16-bit WAV files with a 48kHz sample rate to match the sample rate of PDM II's internal clock and ensure proper speed and pitch during playback.

Exit Mode

The Exit Mode determines how PDM II behaves when transitioning between delayed and real-time audio.

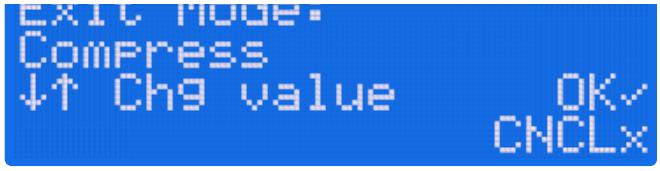


Figure 9 - Exit mode screen

- **Compress -** PDM II will play any remaining audio using time compression, subtly speeding up what's in memory to rejoin real-time faster.
- **Roll Out -** PDM II will stop adding audio to its buffer and play what's left in memory with no speed changes. This sometimes referred to as the "wait and exit" mode.

Dump Mode

When the **Dump** button is pressed, PDM II can respond in one of two ways.

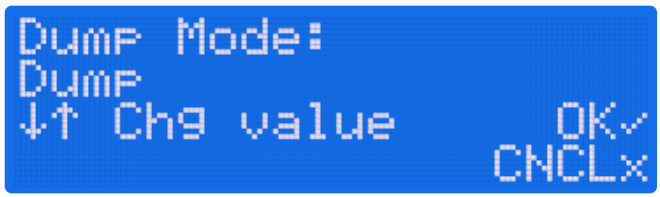


Figure 10 - Dump mode screen

- **Dump -** In this mode, PDM II deletes the objectionable audio and "jumps ahead in time", then immediately begins to rebuild its delay buffer.
- **OverKill™ -** This mode plays a pre-selected file in place of the objectionable audio. In this mode, the delay buffer is maintained and does not have to be rebuilt.

OverKill File

This menu allows you to select which previously uploaded audio file will play during a dump event when the Dump Mode has been set to "OverKill."

Figure 11 - OverKill file screen

> **Note -** When using OverKill mode, the Delay and Dump times are automatically adjusted to match the length of the selected OverKill file and their corresponding controls will disappear from the Control menu.

System Menu

The System Menu includes global system settings such as the date, time, and password as well as hardware-specific settings such as the front panel brightness, contrast, and screensaver controls.

Figure 1 - System menu

Time Zone

When Network Time Protocol (NTP) is enabled, the Time Zone control selects a specific time offset for your location. Four specific U.S. time zones (with and without Daylight Savings Time) are included along with all internationally-supported offsets from Greenwich Mean Time (GMT).

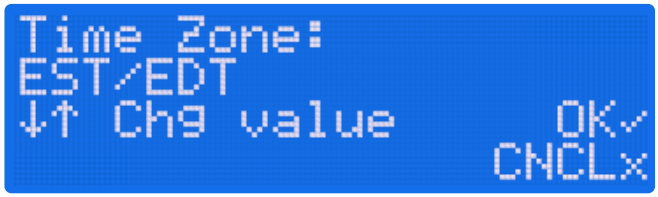


Figure 1- Time zone screen

Time and Date

The current time and date can be set manually when NTP is not used. The left/right arrows change the field while the up/down arrows change the value.

Figure 2 - Time and date screen

> **Note -** Having an accurate clock is important when using PDM II's PD-Alert function which uses date and time stamps to identify events and audio log files.

Time Format

Time format toggles between 12-hour (with AM/PM designations) and 24-hour ("military time") formats.

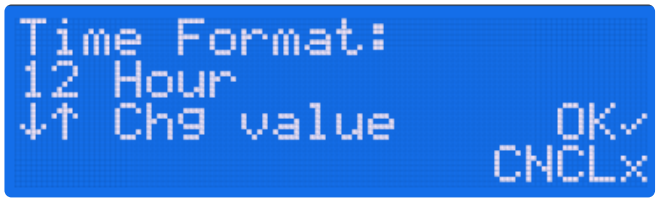


Figure 3- Time format screen

Password

The Password menu allows you to set and change the password required to access the web-based remote control. The PDM II ships with no default password. **You must set a password via the front panel in order to access the unit remotely.** The left/right arrows change the field while the up/down arrows change the value. Valid characters include upper and lower case letters, numbers, and space between characters. Note that spaces at the end of a character string are automatically removed.

Figure 4 - Password screen

If there is no password, the display will show a flashing "Web UI Disabled" message.

> **Note -** PDM II passwords are designed to prevent unauthorized access via the remote network interface and are visible from the front panel.

Brightness

The Brightness control adjusts the overall brightness of the front panel LCD.

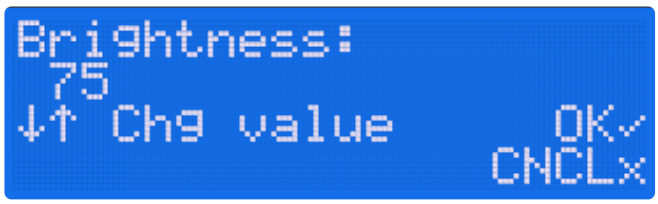


Figure 5 - Brightness screen

Contrast

The Contrast control adjusts the contrast of the front panel LCD.

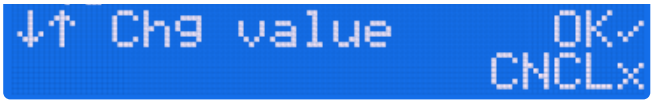


Figure 6- Contrast screen

Screen Saver

The Screen Saver control determines the length of time the front panel display stays on after the most recent button press, from 1 to 100 minutes. Setting it to "Never" will keep the display on continually, although this is not recommended due to the finite life of the LCD backlight.

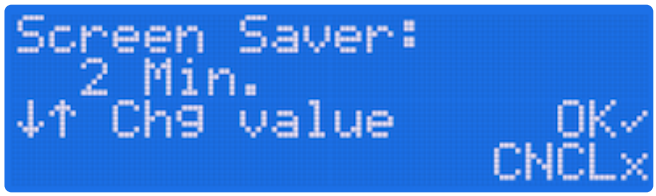


Figure 7 - Screen saver screen

Network Menu

The Network Menu contains the controls necessary for configuring PDM II's two network ports. Note that not all menu items will be visible with all configurations.

Figure 1 - Network menu

Networking Overview

PDM II contains two network interface controllers with rear-panel RJ45 Ethernet ports labeled "Primary" and "Secondary".

The Primary port supports Power over Ethernet (PoE) and Livewire+/AES67. The Secondary port does not.

The Primary port is always active. The Secondary port can be disabled if desired.

Using DHCP v. Manually Assigning an IP Address

Only one port can support DHCP, DNS, and a specific Gateway at a time according to the table below:

Secondary Port Enabled?	DHCP Enabled?	Primary Port Configuration	Secondary Port Configuration
Yes	Yes, on Secondary	User specifies IP address and subnet mask; no gateway or DNS	DHCP server specifie IP address, mask, gateway, and DNS
Yes	No	User specifies IP address and subnet mask; no gateway or DNS	User specifies IP address, mask, gateway, and DNS
No	Yes, on Primary	DHCP server specifies IP address, subnet mask, gateway, and DNS	(Disabled)
No	No	User specifies IP address, mask, gateway, and DNS	(Disabled)

By default, the Secondary port is disabled and the Primary port has DHCP enabled.

Separate Ports v. Using a Single Port

Generally speaking, and when two separate Ethernet ports are available, it is preferable to connect the Primary port to the dedicated Livewire or AES67 network and the Secondary port to the "office" network for remote access.

- **Separate Ports -** In this scenario, both ports are enabled. The Primary port is used for AoIP (as the Secondary port is not capable of handling Livewire or AES67 traffic). A user-specified IP address and subnet mask are used, but there is no need for a gateway or DNS entries. The Secondary port is used to establish a remote connection with an IP address and subnet mask either assigned manually or through DHCP. Specific gateway and DNS settings can be entered. The two ports must be connected to different networks.
- **Single Port -** In this scenario, only the Primary port is enabled. Both AoIP traffic and the remote connection are present on one port.

Primary DHCP Menu

If the Secondary port is disabled, DHCP on the Primary port can be toggled on or off in the Primary DHCP menu.

Figure 1 - Primary DHCP enabled screen

When DHCP is disabled on the Primary port, its fields for manually setting the IP address, subnet mask, and gateway are visible.

Secondary DHCP Menu

The Secondary port is disabled by default but can be toggled on in the Secondary Net Enable menu.

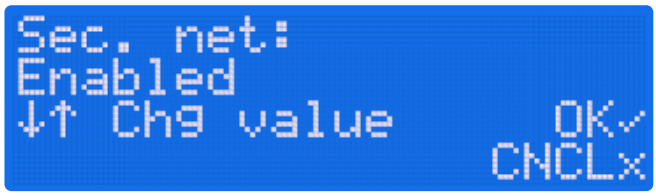


Figure 2 - Secondary DHCP enabled screen

When the Secondary port is enabled, it can be set to have DHCP enabled or disabled. When disabled, its fields for manually setting the IP address, subnet mask, and gateway are visible.

NTP Enable Menu

NTP (Network Time Protocol) can be enabled or disabled in this menu.

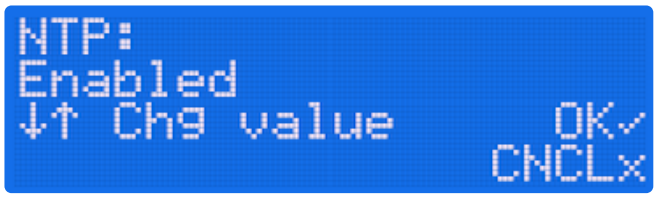


Figure 3 - NTP enable screen

NTP Server Menu

This menu allows you to enter the IP address of a local NTP server. If no address is entered (the server is set to 0.0.0.0), PDM II defaults to using "pool.ntp.org" servers.

Figure 4 - NTP server screen.

GPIO Menu

The GPIO menu allows you to program the hardware parallel inputs and outputs used to remotely control certain PDM II functions. Livewire GPIO is configured in the Configuration page of the web-based user interface.

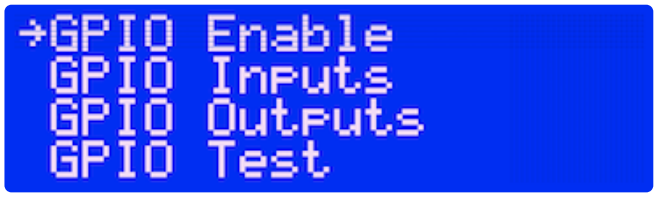


Figure 1 - GPIO menu

The inputs and outputs are opto-isolated to easily interface with external equipment. A +5V supply and ground are available on the DB-15 connector for simple remote controls using pushbuttons and LED status readouts with a maximum total current draw of 200 mA. The supply is protected by an internal, self-resetting thermal circuit breaker; should the breaker trip, power the unit off for several minutes to reset it.

Inputs require at least 6mA from the input common pin and the individual input circuit pin. Outputs can carry up to 25 mA and up to 30VDC per channel between the output common pin and the individual output circuit pin.

If the output signal is a pulse, its opto-isolator will turn on for 250ms. This can be adjusted to between 100ms and 1000ms in the Configuration tab of the web GUI.

The pin-out of the DB-15 connector is as follows:

Pin Number	Function
1	GPO 1
2	GPO 2
3	GPO 3
4	GPO 4
5	GPO 5
6	Not used
7	GPO Common
8	GPI Ground
9	GPI Power

10	GPI Common
11	GPI 1
12	GPI 2
13	GPI 3
14	GPI 4
15	GPI 5

GPIO Enable

Hardware GPIO can be enabled or disabled in the GPIO Enable menu. When enabled, the rear panel DB-15 port is active.

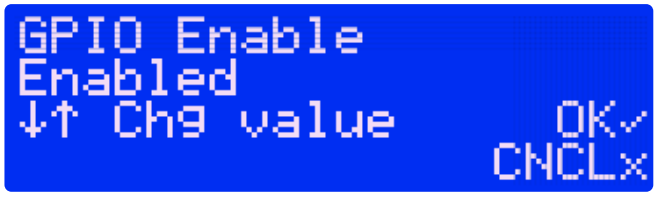


Figure 2 - GPIO Enable menu

GPIO Inputs

Each of the five input pins can be assigned a PDM II function. The same function can be assigned to multiple input pins.

Figure 3 - GPIO inputs

GPIO inputs can either be triggered or level-sensitive. Triggered (or edge-sensitive) inputs cause something to happen when the input becomes active. Level-sensitive inputs cause a state to be true as long as the input is active. The CueX and Bypass inputs are triggered; all others are level-sensitive.

Input functions include:

- **None:** No function assigned.
- **Build**: Front panel Build button.
- **Exit:** Front panel Exit button.
- **Cough:** Front panel Cough button.
- **Bypass:** Front panel Bypass button.
- **CueX:** Applies to Cue 1 through Cute 8 functions.
  - Cues are linked to incoming audio samples and stay with the sample regardless of how much time

manipulation is being applied, allowing them to be passed along to other devices.
    - Cue marks generate a 250ms trigger when they are reached.
    - Cues typically indicate important programming events such as commercials or news breakaways. For example, if the network provides a contact closure to trigger a local break and its input is assigned to a Cue function, PDM II will generate a corresponding Cue output when that sample is reached in order to trigger external equipment to start the break.
- **Flag:** Applies to Flag 1 through Flag 8 functions.
    - Like cues, flags also indicate an important programming event.
    - Flag marks record a continuous logic input, and their output reflects that logic state when the appropriate audio sample reaches the PDM II's output
    - Flags can be used to activate a skimmer or logging recorder by connecting a mic's tally signal to the input and using its output to keep the recorded turned on whenever the mic is open, regardless of how much delay is used.
- **Utility:** Applies to Utility 1 through Utility 4 functions. Allows you to have input closure immediately cause and output closure with no delay. This is useful for implementing or diagnosing end-to-end relay logic when connecting PDM II to other devices.
- **Pause:** Suspends delay or exiting when active.

GPIO Outputs

Each of the five output pins can be assigned a PDM II function.

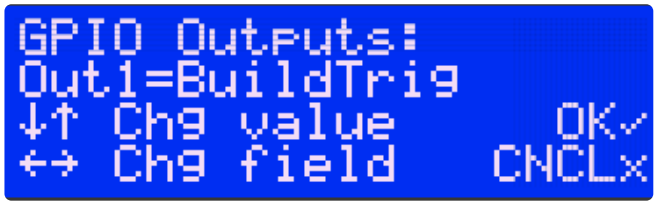


Figure 4 - GPIO outputs

GPIO outputs can either be triggered or level-sensitive. Triggered (or edge-sensitive) outputs emit a pulse when something happens (the default pulse length is 250ms, but can be adjusted in the "Hardware GPIO" section of the web UI Configuration page). Level-sensitive outputs indicate that a state is true as long as the output is active. The CueX and various XXXTrig outputs are triggered; all others are level-sensitive.

Output functions include:

- **None:** No function assigned
- **BuildTrig:** A pulse indicating the delay has started building
- **FullTrig:** A pulse indicating the delay buffer has become full.
- **DumpTrig:** A pulse indicating a Dump has occurred.
- **EmptyTrig:** A pulse indicating the delay buffer has been emptied.
- **Cue:** Pulse from Cue 1 through Cute 8 functions. See the GPIO Inputs section for a full explanation of Cues.
- **BuildLamp:** Duplicates the front panel "Build" button lamp. Note that all "Lamp" pulses cause a "Low"

state when the lamp is on, a "High" state when the lamp is off, and cycles on and off when the lamp is flashing.

- **ExitLamp:** Duplicates the front panel "Exit" button lamp.
- **DumpLamp:** Duplicates the front panel "Dump" button lamp.
- **CoughLamp:** Duplicates the front panel "Cough" button lamp.
- **Bypass:** Indicates the unit is currently in bypass.
- **Building:** Indicates the unit is currently building a delay buffer.
- **Exiting:** Indicates the unit is currently exiting delay.
- **DelayFull:** Indicates the delay buffer is full and the maximum delay has been reached.
- **DelaySafe:** Indicates there is a sufficient buffer for at least one delay dump.
- **DelayUnsafe:** Indicates there is not enough audio in the buffer to perform a full delay dump.
- **DelayEmpty:** Indicates the delay buffer is completely empty.
- **Muted:** Indicates the unit is currently muted.
- **Flag:** Applies to Flag 1 through Flag 8 functions. See the GPIO Inputs section for a full explanation of Flags.
- **Util:** Applies to Utility 1 through Utility 4 functions. See the GPIO Inputs section for a full explanation of Utilities.
- **StreamFail:** Indicates the currently-selected digital input has failed.

GPIO Test

The GPIO Test screen lets you verify that hardware GPIO connections and external remotes are properly wired.

Figure 5 - GPIO Test menu

The "Ins" line shows the current input state of the five hardware GPIs. The "Outs" line allows you to set the five hardware GPOs to any desired value.

> **Note -** If the display shows "Disabled", then hardware GPIP is disabled. It can be enabled in the GPIO menu.

When you leave the Test screen, all outputs will be restored to their configured values.

Information Menu

The Information menu allows you to scroll through various screens displaying the status of the audio inputs and outputs, time and date settings (including the NTP server status), networking information (including the MAC addresses of both NICs), available buffer memory, and the unit's firmware version.

The NTP Status display shows one of three messages indicating the current connection with the remote time server:

- **Search:** PMD II is seeking a path to the remote NTP server. If this message persists and the unit is connected to an NTP server, it may indicate the address entered is not valid.
- **Query:** PDM II has contacted the remote server and calibrating its internal clock which may take a few minutes depending upon the connection and how much adjustment is required.
- **Sync:** PDM II's clock is synchronized with the remote NTP server.

Basic Operation

In short, the primary function of the PDM II is to create a buffer of delayed audio that ensures profanity or other objectionable audio doesn't make it to the air. Creating this buffer is called "building a delay."

When a guest or caller says something that shouldn't be aired, the audio is erased from the buffer. This is called "dumping the delay."

Depending upon the programming, a delay may not always be necessary and so some means of returning to real-time audio is required. This process is called "exiting the delay."

Initial Boot-up

When PDM II is first powered up, the Bypass button will flash. After about 10 seconds, the LCD will display a welcome screen:

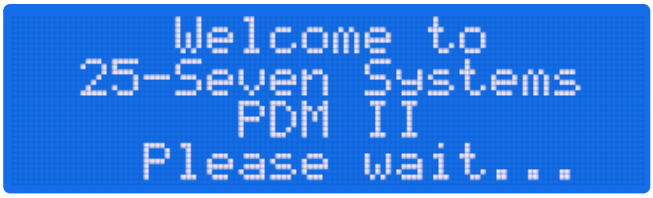


Figure 1 - Welcome screen

This is followed by a status screen. The unit will be in Bypass mode by default but can be set up to boot in Real-time or Building mode in the web GUI by navigating to the Control menu on the Configuration page. If the unit has been set to boot in Real-time or Building mode and there is audio present in the selected input, the input level meters will show activity.

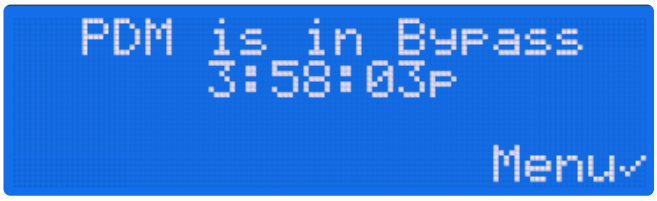


Figure 2 - Post-bootup status screen

Pressing the **Bypass** button brings up the Ready screen. PDM II has no delay at this point, which makes the transition from Bypass mode seamless.

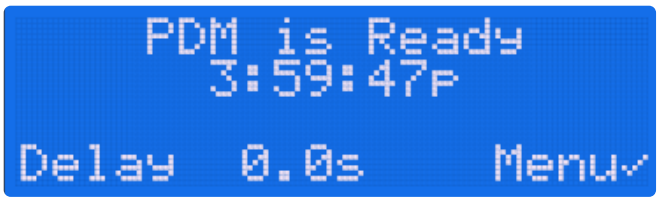


Figure 3- Ready screen

Pressing the **Build** button begins building a delay, and the length of the delay will increase as the buffer builds.

Figure 4 - Delay building screen

Building a Delay

Begin by pressing the green **Build** button, which will flash while the delay is building up. The talent should start talking immediately. Depending on how your system is set up, PDM II will either:

- **Build a delay by expanding.** PDM II will send the incoming audio to the transmitter but at a subtly slowed-down rate, taking more time until the delay memory is filled.
- **Build a delay by inserting content.** PDM II will play a station jingle, ID, or other fill material from its internal memory.
-

- **Build a delay by pre-rolling.** PDM II will mute its output while you play material from another source, or while it signals your automation system to play audio.

Regardless of which method is used, PDM II will be recording its input to the buffer for eventual transmission.

While the delay is building, the LCD will look like the example in Figure 1 below. Note the arrow and checkmark icons, which indicate how PDM II can be controlled from the front panel:

- The **Up/Down arrows** will temporarily adjust the build speed.
- The **Right/Left arrows** will temporarily adjust the length of the target delay.
- The **Checkmark** will take you to the Configuration menu.

Figure 1 - Delay building screen

The horizontal bar will fill and the Delay counter on the bottom line of the display will count how many seconds of audio are in PDM II's delay memory. As soon as there's enough audio in memory to dump programming smoothly, the **Dump** button will light.

The delay memory can hold more audio than is needed for a single dump event. When it reaches a limit you've previously set, the **Build** button stops flashing while the **Dump** button remains lit.

You can choose how long PDM II takes to build a delay. Choose a setting based on how quickly your talent talks, how subtle you want the time manipulations to be (slower speaking styles can work with higher speed settings), and how long you're willing to wait for the delay memory to fill.

Speed Setting	Minutes:Seconds Needed to Build an 8-second Delay
7 (Default)	2:00
10	1:30
15	1:00

Dumping Objectionable Content

"Dumping" is the process of eliminating the last few seconds of audio heard in the control room before it can reach the transmitter or network feed and is activated by tapping the red **Dump** button. The number of seconds that get dumped depends upon how PDM II is set up, and on how much delay memory has been stored.

- The size of each Dump event is determined when the unit is initially set up but can be changed at any time, even while you're on the air.

- When there is enough audio in memory to smoothly dump the full amount of time you've preset, the **Dump** button will light.
- You can also press the **Dump** button when it's not lit. While PDM II won't have enough audio stored to dump all of the seconds you've designated for a dump event, it will dump whatever it has available.
- As long as the **Dump** button is held down, incoming audio will be discarded, which can be useful if the buffer is empty but a guest or caller continues to generate objectionable material.
- When the **Dump** button is released, PDM II will start rebuilding its memory with incoming audio using subtle time expansion so that programming is never disrupted.

You can also tap the **Dump** button again while PDM II is building. Each subsequent tap will add the preset dump size's seconds to the current dump event, assuming enough audio is available in the buffer. For example, if the dump size is 4 seconds, tapping twice will dump 8 seconds of audio (provided 8 seconds of audio is available in the buffer).

Overkill™ Mode

PDM II also lets you dump incoming material by playing an internal audio file instead of collapsing and rebuilding the delay. For example, a comedy show might want to cover objectionable comments with a string of cartoon sound effects. The normal delay doesn't get depleted and therefore doesn't have to be rebuilt. We call this "Overkill Mode".

- The Controls Menu selects whether PDM II uses Normal or Overkill mode when you press the **Dump** button. You can change this setting as needed for different program formats.
- The same menu also lets you select which stored audio file will play during Overkill.
- PDM II's Dump Size and Delay Amount automatically adjust to the length of the selected Overkill file. For example, if you want an 8-second delay, create a replacement audio file that's 8-seconds long. After the file finishes playing, PDM's output switches back to delayed audio.

When using Overkill Mode, tapping the **Dump** button while PDM II is dumping starts playing the specified audio file from the beginning. Note that this can create a "stutter" effect or longer dumps.

The COUGH Button

When the blue **Cough** button is pressed and held, PDM II will continue to send delayed audio from its buffer to the transmitter but won't store any new audio arriving at the input. Anything said will be heard only in the studio and control room and will not be aired. When the **Cough** button is released, PDM II starts to rebuild the delay.

The obvious use of the **Cough** button is to prevent coughs and sneezes from making it to air, but it can also be used to allow short comments between the talent and the producer or guests.

Panic Mode

Panic Mode is activated by pressing and holding the blue **Cough** button as described above, but for a length of time exceeding the available buffer. When the buffer is empty, PDM II will mute the output and flash the **Cough** button light to warn you of dead air.

When the **Cough** button is released, PDM II immediately begins to rebuild the delay.

> **Note:** Panic Mode works only when PDM II is set to the Normal dump mode as is not needed for Overkill Mode where the buffer does not get depleted.

After a Dump Occurs

Whenever you press the **Dump** button, program audio gets dumped as you'd expect, but PDM II also does other things when you press that button.

- PDM II starts writing a pair of audio files, one of that audio that was actually broadcast and another of the audio from the studio. This provides indisputable records of both what the listeners heard and what they *didn't* hear because of the dump.
- It then adds a few seconds of extra audio to these files that preceded and followed the dump event to make it easier to identify the context.
- The files are stamped with the current date and time, then stored in non-volatile memory.
- A notification that the files have been created or the complete files are sent to the e-mail addresses set up in your PD-Alert System. Instructions for setting up this list are provided in the PD-Alert section of the Configuration menu in the web GUI.

Exiting Delay

To exit the delay, press the yellow **Exit** button.

- If the Exit Mode is set to "Compress", PDM II will play any remaining audio using time compression, subtly speeding up what's in memory to rejoin real-time faster.
- If the Exit Mode is set to "Roll Out", PDM II will stop storing new audio and play what's in memory with no speed change. Some operators call this function "roll out" or "wait and exit".

> **Note:** Even if you've set things up to exit by compression, you can access the "roll out" mode at any time by pressing and holding the **Cough** button and observing the LCD screen. When the delay is close to 1.0s, release the **Cough** button and resume programming. PDM II will smoothly transition to real-time mode.

Whichever method you choose, PDM II tells you where you are in the exit process as shown below in Figure 2.

Figure 2 - Delay exit screen

When Delay equals 0 seconds, PDM II will return to Real-Time mode and feed the input signal directly to its output.

Detailed Operating Modes

A Visual Note

PDM II is an advanced time-manipulation tool for radio broadcasters. Since we can't play audio in this manual, we'll use graphics to explain how it operates.

These drawings might also help you visualize what PDM II is doing when you press its buttons.

- The top line (pink background) shows what's happening in the studio and what's heard by the talent and producer.
- The bottom line (blue background) shows the resulting audio that PDM II sends to the transmitter or network feed.
- The white slash through the blue line beneath the DUMP button shows where PDM has smoothly deleted material from the on-air program.

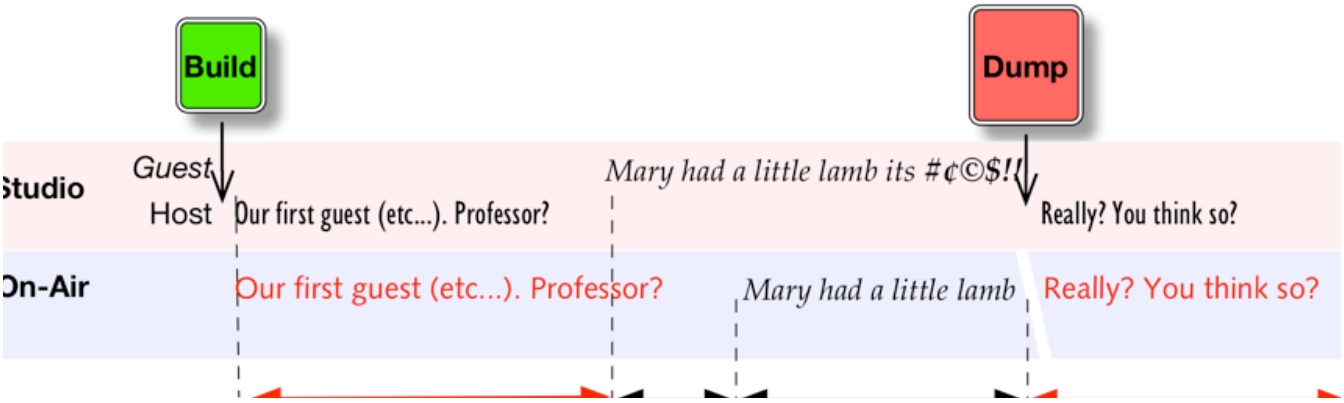
Note that we exaggerate and stretch the text to better illustrate how PDM II adjusts audio speed. In actual use, PDM II's functions are a lot more subtle and most listeners won't be able to tell they're in use. They're also user-adjustable, so you can fine-tune the sound to your programming and station's style.

Building and Dumping

"Building" is the process of recording incoming audio to PDM II's delay memory to create enough of a buffer to cover the gap during a Dump event. There are several ways to build as described below.

Primary Build Mode - Expanding

In this mode, the talent starts the program at the usual time, presses the **Build** button, and starts talking. PDM II will subtly slow down the signal it sends to the transmitter (shown in red in Figure 1 below) while storing the real-time signal in its delay memory.



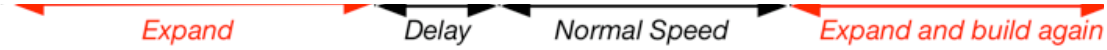


Figure 1 - Buidling by expanding

When the delay memory reaches a pre-set limit, PDM II's output returns to normal pacing (shown in black), but the output is delayed by that pre-set amount to give you protection from objectionable material.

When the talent or a producer hears something unacceptable, they press the **Dump** button. PDM II mutes the delayed signal before the obscenity and instantly jumps back in its memory by a pre-set number of seconds. The talent can continue talking and the audience doesn't hear dead air.

PDM II then automatically starts building up its delay again, and speed changes are virtually undetectable thanks to the algorithms we first developed for 25-Seven's groundbreaking Audio Time Manager that intelligently splice individual soundwaves so that pitch isn't affected and pauses aren't unnaturally clipped.

> **Note:** PDM II uses advanced time manipulation algorithms that don't affect pitch, add harmonic distortion or frequency limitations, or rely upon deleting pauses in the audio. As a result, it can be used on audio with continuous energy (such as music or live events with background crowd noise) and will never degrade your talent's delivery.
>
> Using lower speed numbers causes the least amount of tempo change and are usually imperceptible but take longer to fill the delay memory or return to real-time.
>
> Using higher speed numbers fills the memory more quickly but may cause noticeable speed changes on fast-paced material or cause an occasional doubling of fast consonant or drumbeats while the delay is building.

Alternate Build Mode 1 - Inserting an Audio File

Setting the Build Mode to "Insert" and pressing **Build** plays a pre-selected audio file from its internal storage.

In this mode, the talent begins talking as soon as **Build** is pressed. PDM II sends the studio signal to its delay memory while the audio file plays out to the transmitter. When the audio file finishes playing, PDM II begins playing the delayed audio and the **Dump** button can be used as needed as shown below in Figure 2.

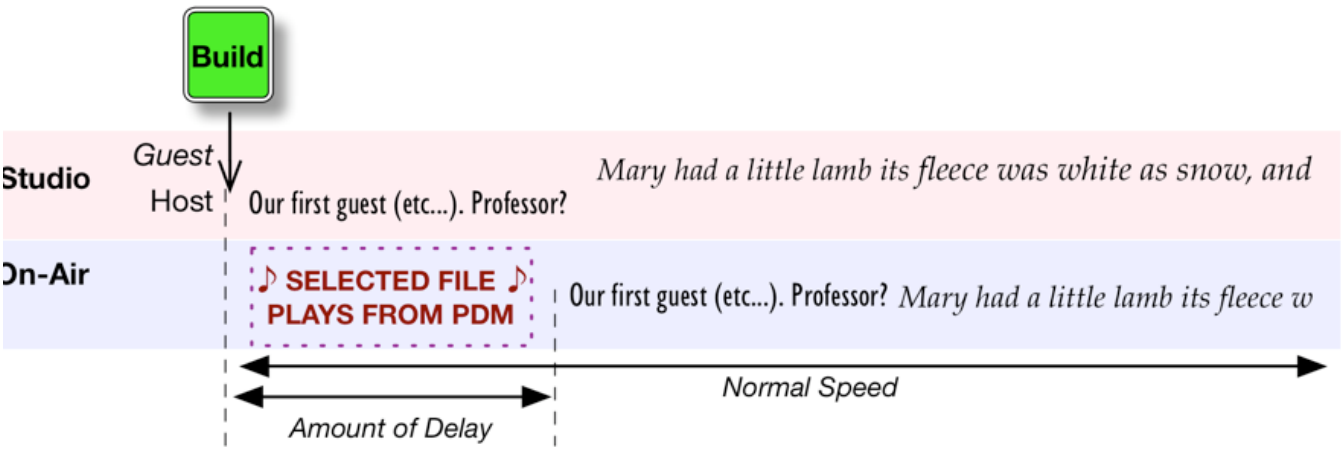


Figure 2 - Insert build mode

Audio files can be uploaded to PDM II from a networked computer via the web GUI in the Audio Files page. Multiple build files can be stored and selected as needed from the front panel or remote user interface. If the selected build file is exactly as long as the Delay Size, PDM II will smoothly join delayed audio at normal speed when the file finished playing. If the file is not the same length as the Delay Size, it will still join delayed audio when the file finishes but will subtly speed up or slow down the output as needed to achieve the specified pre-set delay.

Alternate Build Mode 2 - PreRoll

In some instances, you may wish to build your delay without changing speed or playing an insert file. PreRoll Mode lets your talent start their introduction *before* the scheduled program time and is often used by studios feeding a network rather than a local transmitter.

Set the Build Mode to "PreRoll" and press **Build**. The talent should begin talking earlier than program air time, specifically by the same number of seconds as the Delay Size. This early start will be heard in the studio only.

For example, if you feed a network at 12:00 Noon and use a 10-second delay, you would back-time and start the PreRoll at 11:59:50, 10 seconds before Noon. PDM II begins delivering the delayed content at 12:00:00.

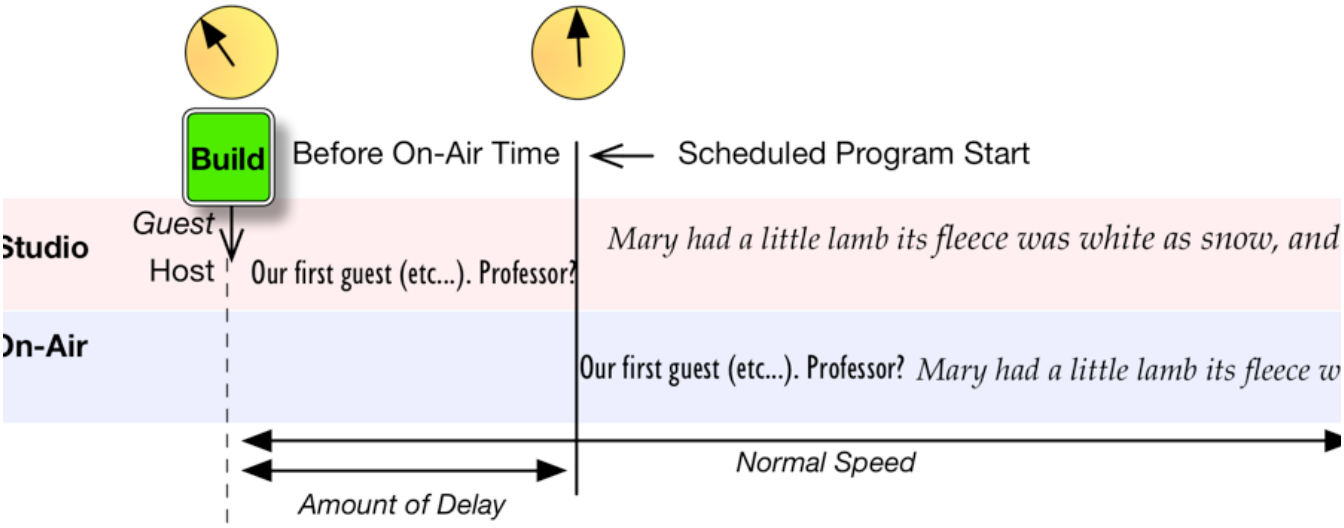


Figure 3 - PreRoll mode

As soon as **Build** is pressed, the front panel LCD will begin to count up with numbers and a bar graph as shown below in Figure 4.

Figure 4- Delay building screen

While PDM II is counting, studio audio is being sent to the internal delay memory and output audio is muted. When the full delay time is reached and the solid bar fills the display, it will begin playing delayed audio to the air chain.

Cough Mode

Pressing and holding the blue **Cough** button stops audio from being routed to the delay memory, and the talent audio is heard in the control room only, not on-air. Audio already stored in the memory (prior to the **Cough** button being pressed) continues to the transmitter. As soon as the **Cough** button is released, PDM II immediately begins to rebuild the delay.

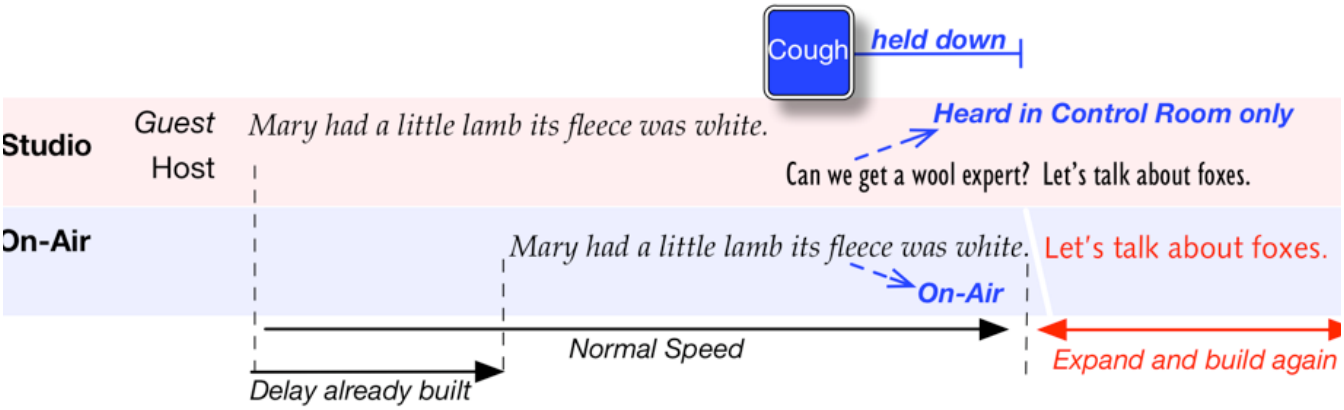


Figure 5 - Cough mode

Exit Modes

When it is no longer necessary to delay program audio, PDM II can exit and return to real-time programming by Rolling Out or Compressing.

Exit by Roll Out

This is the traditional method of exiting delay, not dissimilar to the method used by old-fashioned tape delays.

- The talent finishes speaking then presses **Exit**.
- PDM II continues to play delayed audio at normal speed until the delay is empty, then passes the incoming audio through to the output with no delay.

> **Note:** The COUGH button has no effect while exiting by roll out.

In this mode, nothing is recorded after the talent presses **Exit**. It's as though the talent's mic automatically gets turned off during roll-out then turned back on when the delay reaches zero.

Exit by Compress

This mode allows exiting delayed mode without the need for the talent to pause.

- The talent presses **Exit** and keeps talking.
- PDM II keeps recording audio into its memory.
- PDM II plays out everything in its memory at a slightly faster speed until it is empty and the output catches up with the input, at which point it drops into non-delay mode.

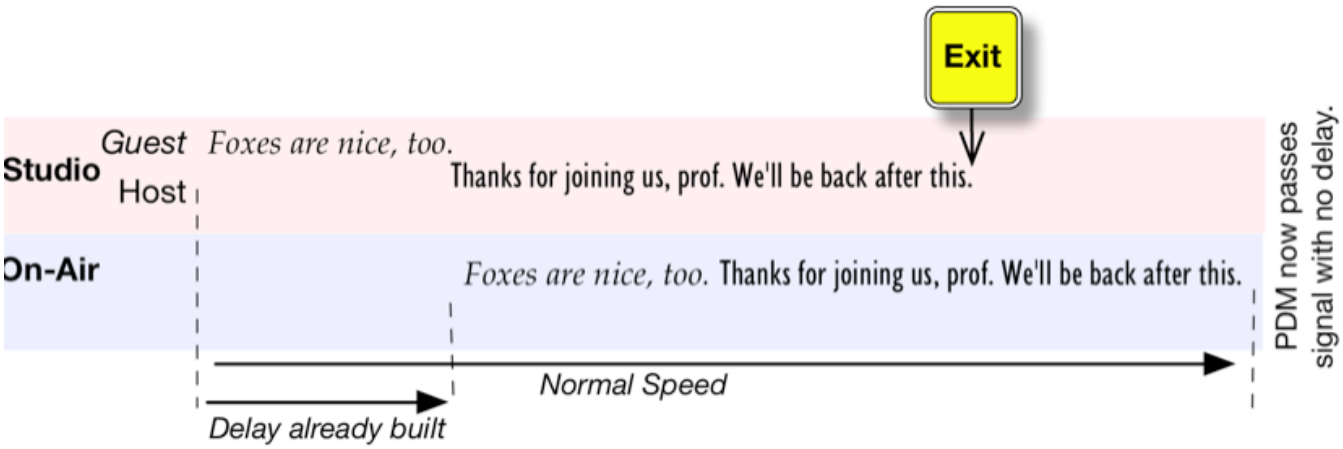


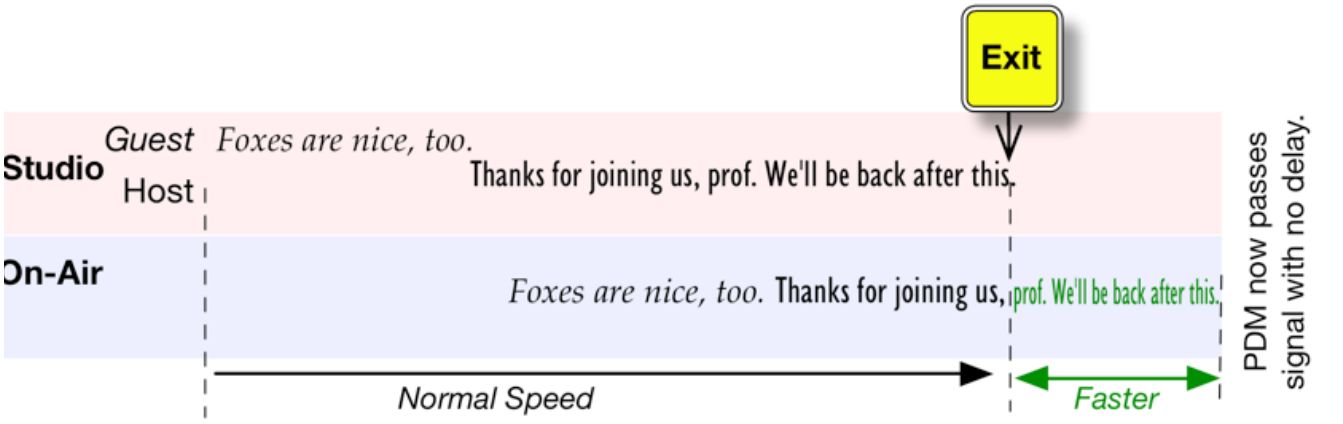
Figure 6 - Exit by compression

The time it takes to exit a delay using time compression depends on the size of the Delay and the Speed setting. As a general guide, choose a Speed appropriate for your talent's style of delivery so that listeners won't notice the time compression. Hosts who speak very quickly usually sound better with lower Speed settings.

Quick Exit with Compressed Roll Out

This mode is faster than using either the Compress or Roll Out modes by themselves. To use it, PDM II should be set to Compress mode.

- The talent presses **Exit** and stops talking.
- PDM II plays out the buffered audio from its memory at a slightly faster rate than normal.
- The producer listens to the output of the PDM II and presses **Bypass** after the talent's final word, then goes to the next program element.



Important: Because PDM II is still recording during a Compressed Roll Out, there is a possibility that anything the talent says after the segment is "over" may get passed to the transmitter and end up on air. Pressing **Bypass** instantly switches PDM's output to real-time and erases its memory, so pressing **Bypass** immediately after the talent's last word reaches the output.

Web-Based User Interface

Any menu or function available from the front panel controls of a PDM II unit can also be remotely accessed from any computer on the same network using a web browser. There are, however, certain features that are available only through the web GUI.

Note - To avoid duplication, only the items unique to the web GUI will be explained in this section.

Logging Into PDM II from a Connected Computer

- Launch your preferred web browser on any Windows, Mac, or Linux computer.
- Enter "http://xxx.xx.x.x" where the "x's" are the IP address of the PDM II.

Note - You must set a password in order to access the unit remotely. If you haven't set a password via the front panel, then you will be required to set your password on the initial web page. Enter the password twice, click "Set Password", click "OK" on the dialog that appears, and then continue with the instructions.

- Once connected, you will be prompted to enter a Name and Password. Enter "pdmweb" as the user name, and the password that you have set via the front panel or the initial web page. Passwords are case-sensitive.

Port Forwarding and GUI Communication

PDM II's web server connects at the standard http port 80. Once the connection is established, port 5444 is used for the WebSocket connections from HTML5. Both ports must be open and available for the remote GUI to function.

If you are trying to connect to your PDM II over a WAN or across the Internet, you will need to use a NAT router to route ports 80 and 5444 to the unit's local IP address.

If your facility has more than one PDM II, you may want to connect to each of them on the same network using a single external IP address. This can be accomplished with your NAT router and PDM II's built-in port offset feature. The key is to forward pairs of port numbers. For example, using two units we'll call "A" and "B" and using an example IP address of 10.11.12.100:

- Configure the ports on your router so that inbound browser traffic on port 81 forwards to port 80, and traffic on port 5445 forwards to port 5444 on unit "A".
- Configure the router so that inbound browser traffic on port 82 forwards to port 80, and traffic on port 5446 forwards to port 5444 on unit "B".
- To access unit "A" from the outside, enter http://10.11.12:100:81. To access unit "B", enter http://10.11.12.100:82.

Because the ports operate together in pairs, it is only necessary to specify the http port; the WebSocket connection for HTML5 will follow along. The browser will always contact the WebSocket at a port 5360 less than the web page's port.

Be sure to also set any necessary permissions in your firewall.

Front Panel GUI Page

PDM II can be operated remotely in exactly the same way as you would from the physical front panel by selecting the Front Panel tab.

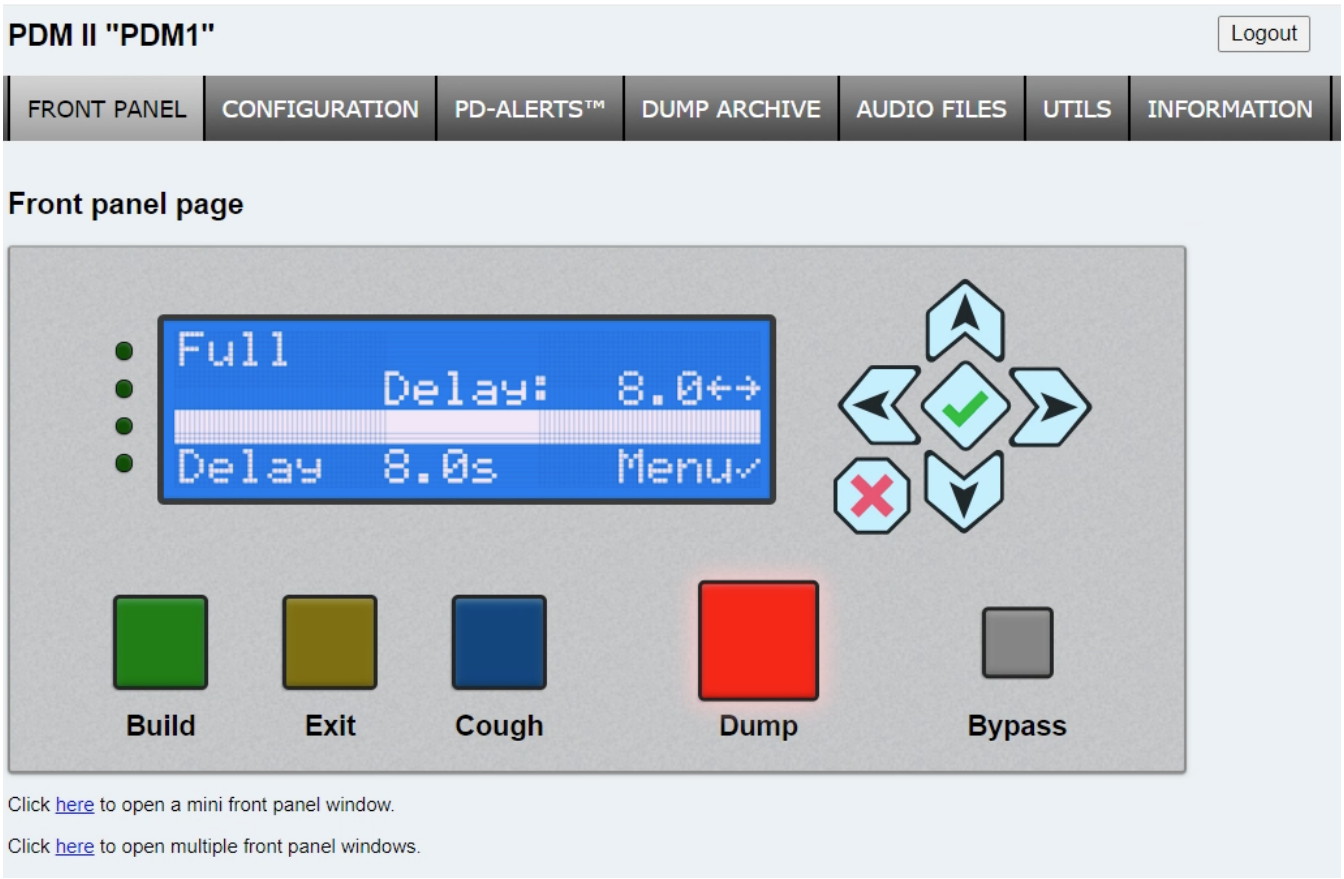


Figure 1 - Front panel tab

Important - When using the web GUI to control a PDM II in another studio, always check to make sure the unit isn't in use and feeding audio to your program bus to avoid accidentally disrupting on-air programming.

Note - Changes made at the PDM II's front panel while the web GUI is open will not be automatically reflected on the remote computer; it is necessary to refresh the page to see any changes. To avoid confusion, we recommend against making changes on both the front panel and web GUI at the same time.

The display will match that of the physical front panel, and all lights and buttons will be in sync. This page is fully interactive, and the on-screen buttons can be activated with a mouse click. The following keyboard shortcuts are also supported:

- The Left, Right, Up, and Down keyboard arrow keys correspond to the front panel arrow buttons.
- The keyboard "Enter" key corresponds to the green "Checkmark" button.
- The keyboard "Escape" key corresponds to the red "X" button.
- The letters "B", "E", "C", "D", and "Y" respectively correspond to the **Build**, **Exit**, **Cough**, **Dump**, and **Bypass** buttons.

Front Panel "Mini Windows"

Clicking on the "Mini Front Panel" link at the bottom of the page just beneath the **Build** and **Exit** buttons opens a smaller version of the front panel in its own window. It can be re-sized as needed by clicking and dragging the lower right corner.

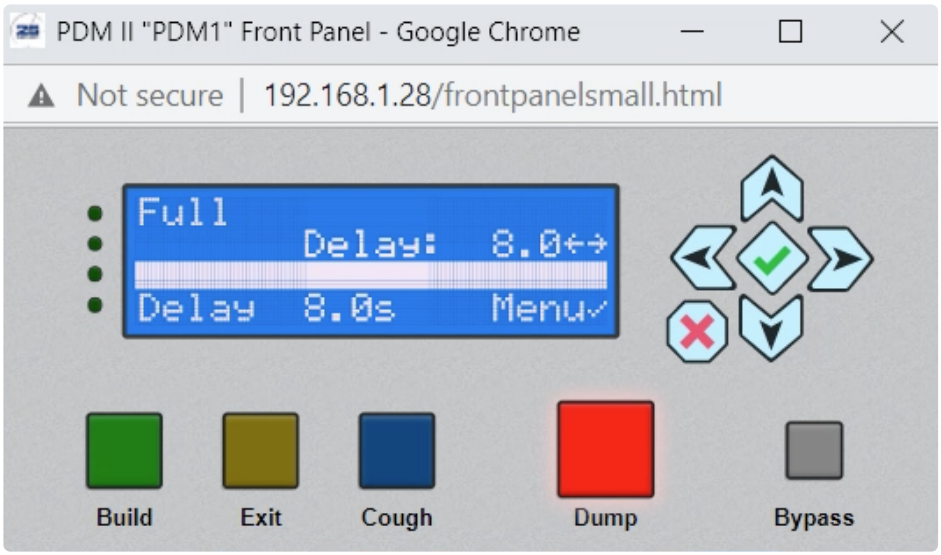


Figure 2- Mini front panel

You can also simultaneously connect to multiple PDM II units from the same computer by clicking on the

"Multiple Front Panel" button, which opens an "Add PDM II" dialog box in a new tab.

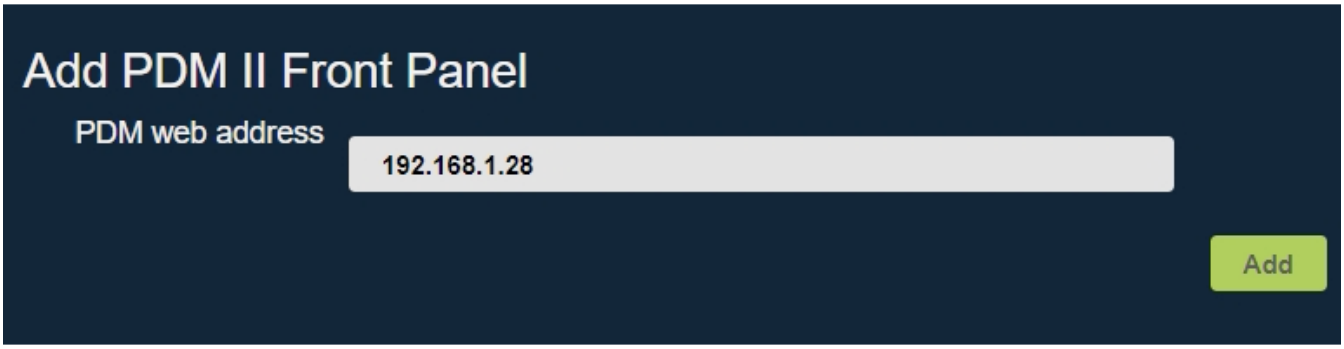


Figure 3- Add PDM II dialog box

By default, the IP address of the unit to which you are already connected appears in the web address field. Click the "Add" button to open a Mini Front Panel for this unit. Enter the IP addresses of any additional PDM II's as desired, click "Add", and enter the user name and password when prompted.

As many as 20 panels can be displayed at once. The name of each PDM II (as set in the "Configuration" menu) will be displayed to help identify each specific unit.

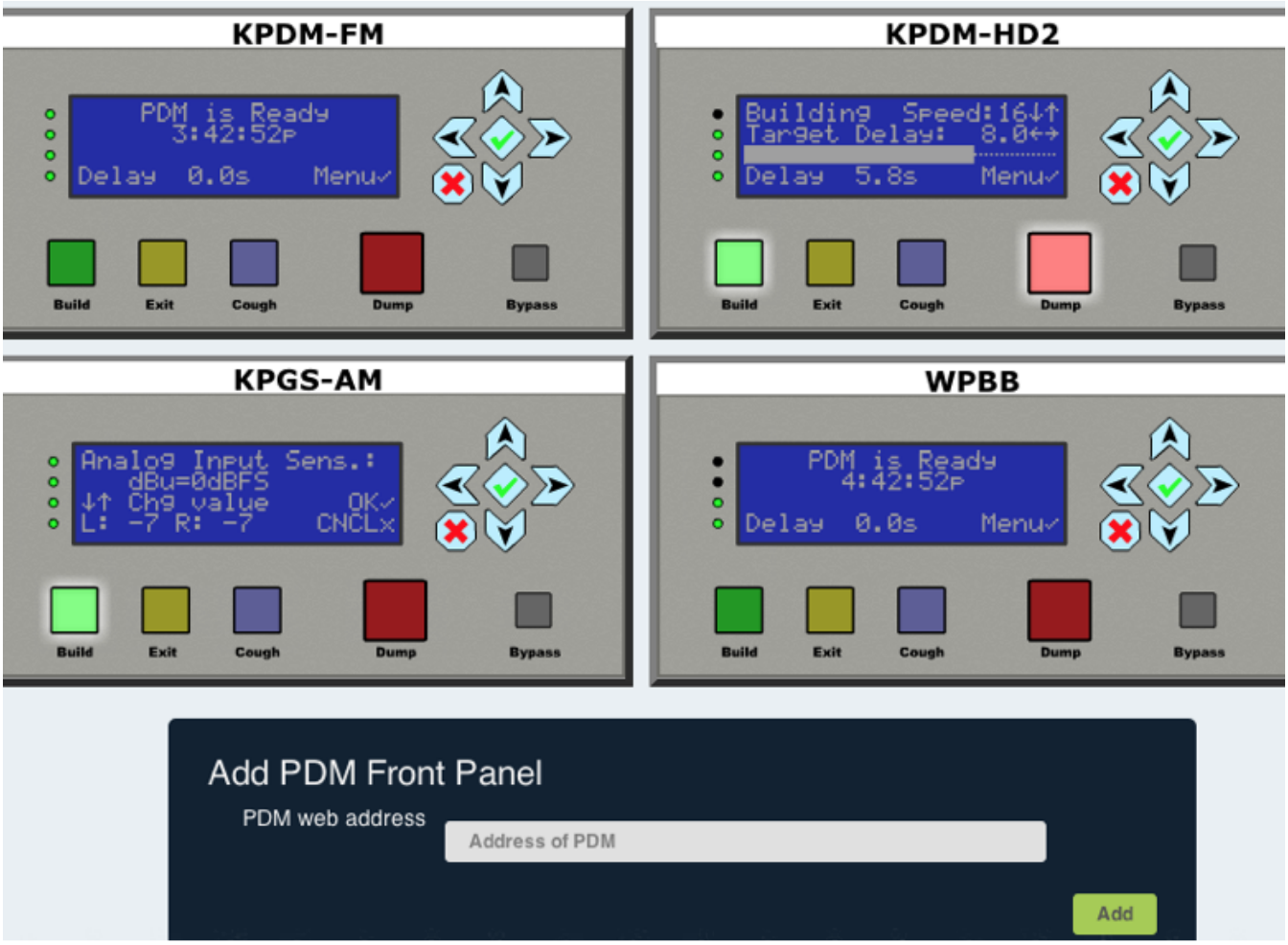


Figure 4 - Multiple mini windows

Note - The Mini Front Panels are displayed in the order in which you entered them; once displayed, they cannot be re-ordered without closing the multi-display window and starting over in the desired order.

Configuration Page

The web GUI's Configuration Page lets you edit most of the PDM II's settings. It groups the settings into seven sections, each of which will be described below.

Whenever you change a value, it will be highlighted, and the "Revert" and "Apply" buttons will become available. Clicking "Apply" saves the edited settings back to the unit and causes them to take effect; clicking "Revert" restores the edited settings to their last saved values.

> **Note -** To avoid duplication, only the items unique to the web GUI will be explained in this section.

Identification Section

Each PDM II can be given a unique name of up to 19 characters including upper and lower case letters, numbers, and dashes. Spaces and special characters may not be used.

The name will be displayed on the Mini Windows when connecting with the web GUI. It will also be used when creating log file names and PD-Alert e-mails.

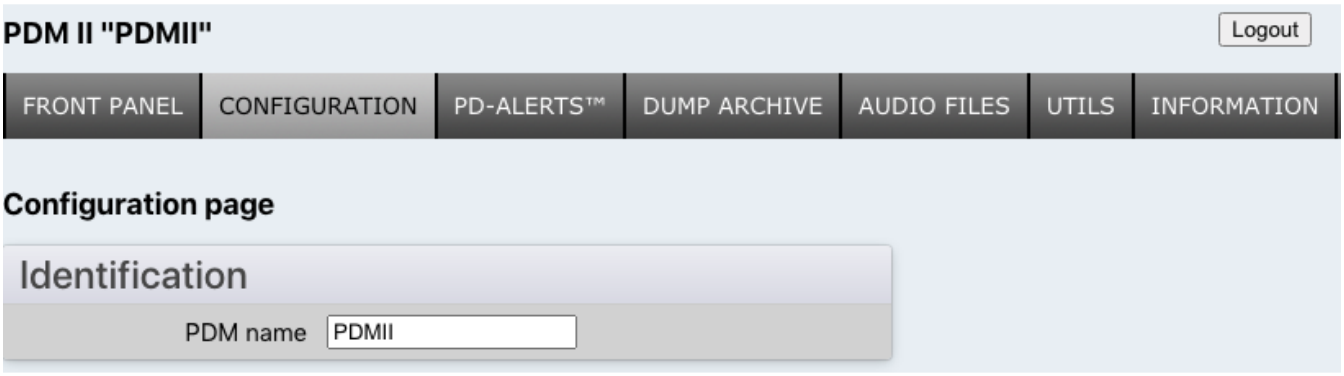


Figure 1 - PDM name

Control Section

By default, PDM II boots in Bypass mode, but this behavior can be changed from the "Boot mode" dropdown in the Control section.

- **Bypass:** Effectively connects the analog and AES3 outputs to their corresponding inputs and routes audio around the delay buffer. A delay cannot be built when the unit is in Bypass mode. The front panel will show "PDM II is in Bypass" and the **Bypass** button will be illuminated.
- **Real-time:** PDM II is active and capable of building a delay when the **Build** button is pressed. The front panel will show "PDM II is Ready."
- **Building:** PDM II begins building its delay immediately upon powering up. The front panel will first indicate that a delay is building followed by the "Full" message and the length of available delay time.

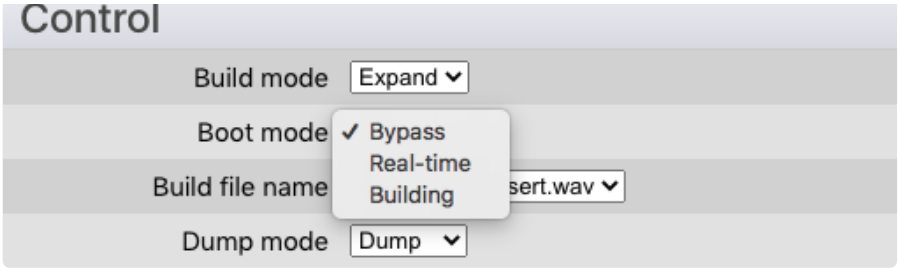


Figure 2 - Boot mode

Hardware GPIO Section

Although hardware GPIO settings can be set from the front panel as described in the GPIO Menu section, the duration of the pulse for momentary output closures can only be set in the Hardware GPIO section of the Configuration page.

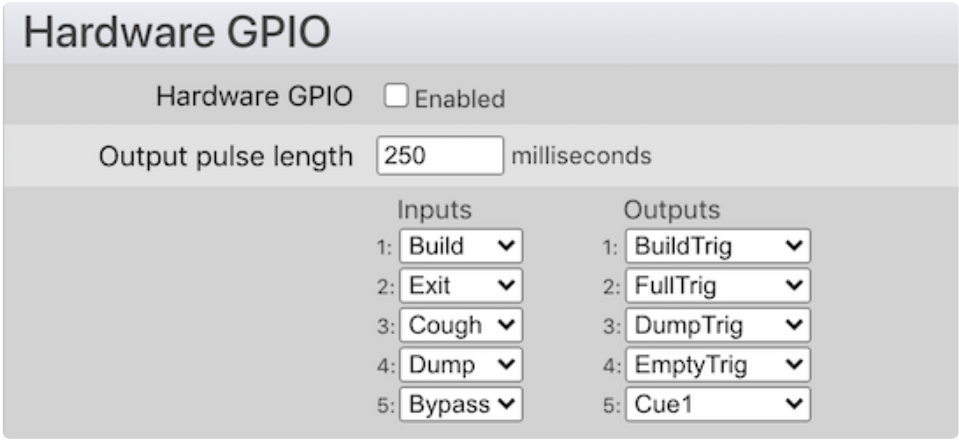


Figure 3- Hardware GPIO

Livewire GPIO Section

GPIOs can be controlled via Livewire by first checking the "Enable" box, then entering a Livewire channel number or a valid multicast address. You may also enter an IP address and port number (such as 192.168.2.114/2) to reach out to another device on the network using a TCP connection (sometimes referred to as "snake mode" as it creates a GPIO "snake" between the two devices).

Use the dropdown menus to set the function of each Input and Output.

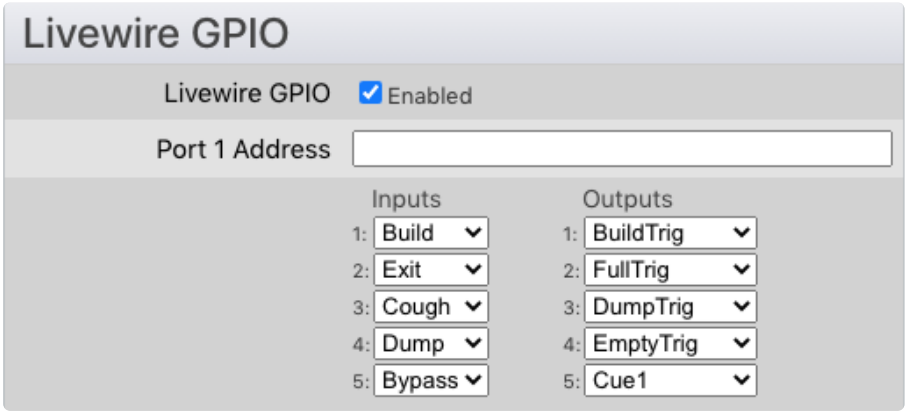


Figure 4 - Livewire GPIO

Delayed Data Streams Section

PDM II can delay two serial data streams such as PAD (Program Associated Data) to keep "now playing" or other information on RDS receives or web streams in sync with program audio. When this feature is turned on, incoming data is stored for exactly the same amount of time that PDM II is delaying audio before sending it out.

As the audio delay is slowly built or collapsed to return to real-time, each data delay is automatically changed to match. If PDM II is put into Bypass mode, data passes straight through. Pressing **Dump** while Data Delay is on sends the stored data out immediately to prevent important information from being lost.

Two separate delays, Data Stream A and Data Stream B, are provided to handle both internal cueing information and PAD for listeners. Inputs and outputs are available via network, can have different addresses and ports, and can be configured to function as client or server. Multiple devices can feed input data and listen to delayed output data on each stream.

Each stream has four input options:

- Disabled: input disabled
- Local TCP port: awaits incoming TCP socket connections, and then adds any incoming data from these sockets to the stream.
- Local UDP port: awaits incoming UDP packets, adding the packets' data to the stream
- Remote TCP port: makes a TCP socket connection to the specified remote address and port, and then adds any incoming data from those connections to the stream. If the connection fails it will reconnect.

The "Local TCP" and "Local UDP" options will accept input from multiple devices; the PDM II will merge all the incoming data into the delay stream. With these options, Stream A accepts data on port 5445, and Stream B accepts data on local port 5447.

Each stream has four output options:

- Disabled: output disabled
- Local TCP port: awaits incoming TCP socket connections, and then transmits delayed data from the stream to the sockets.
- Remote TCP port: makes a TCP socket connection to the specified remote address and port, and then sends delayed data from the stream to the connection. If the connection fails it will reconnect.
- Remote UDP port: sends UDP packets with any delayed data to the specified remote address and port.

The "Local TCP" option will accept connections from multiple devices; the PDM will send all delayed data to each of the connected device. With this option, Stream A sends data via port 5446, and Stream B sends data via port 5448.

To configure the delays:

- Choose Disabled, Local TCP port, Local UDP, or Remote TCP port from the Input dropdown menu. When using Remote TCP, enter the remote IP address and port number in the appropriate fields.
- Choose Disabled, Local TCP port, Remote TCP port or Remote UDP port from the Output dropdown

menu. When using Remote TCP or Remote UDP, enter the remote IP address and port number in the appropriate fields.

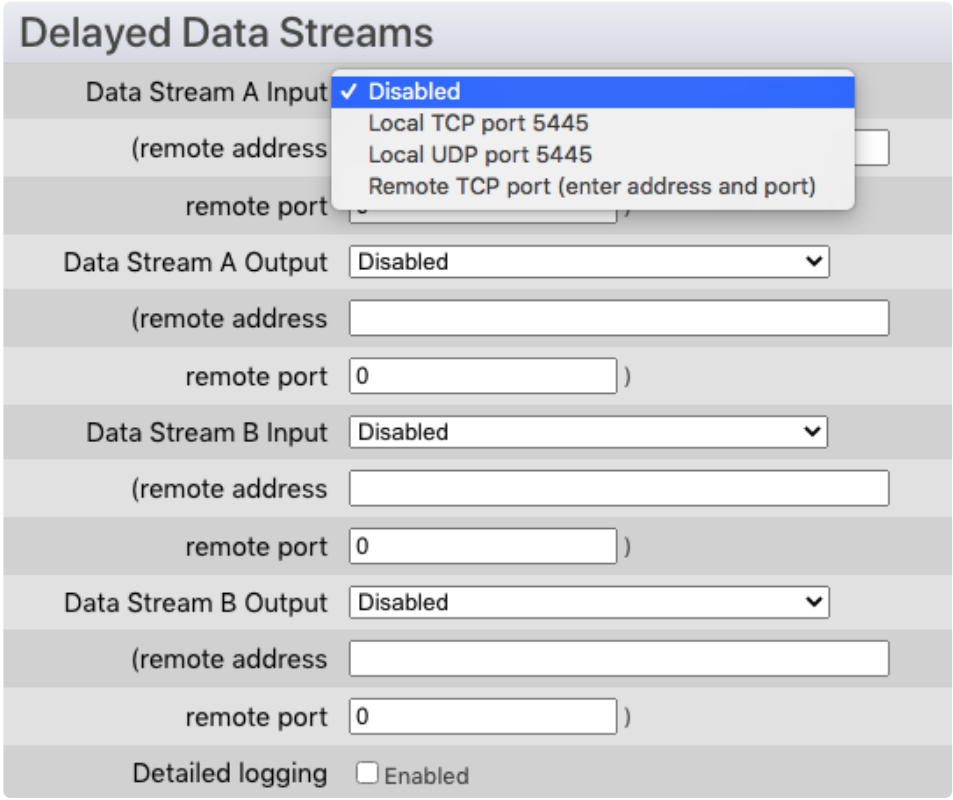


Figure 5 - Delayed data streams input

PD-Alert Section

When the operator presses the **Dump** button, PDM II can automatically e-mail text alerts or actual audio files to anyone you designate. For security purposes, configuration of the PD-Alert settings must be done from the web GUI.

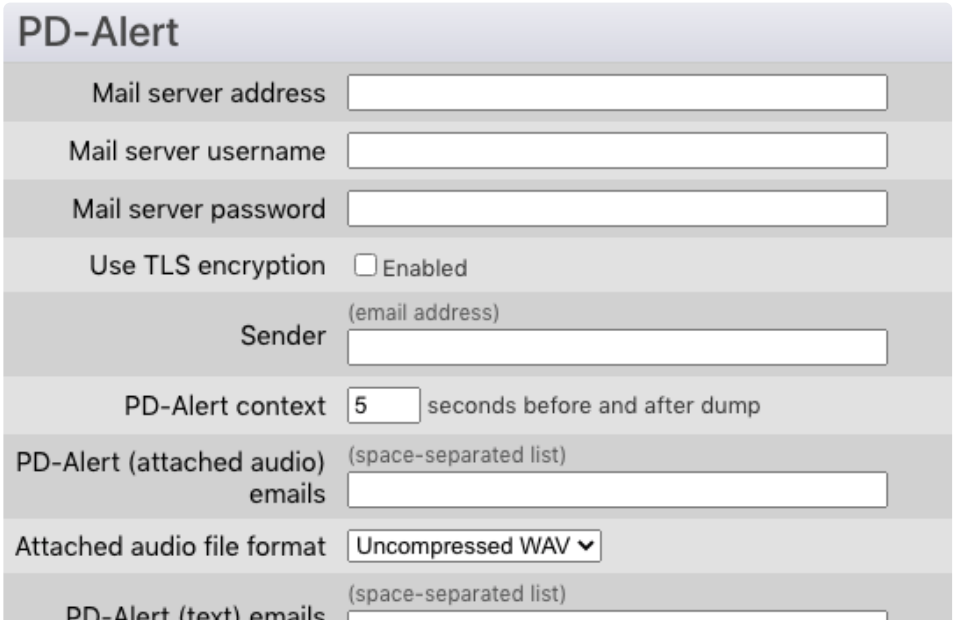
As PD-Alert uses standard Internet e-mail protocols, it is configured like a standard e-mail account with an outgoing server address, valid user name, and password. Any existing e-mail account can be used, but most users find it most beneficial to establish a dedicated address for these alerts. Since PDM II doesn't receive e-mails, it does not require an incoming POP server.

- **Mail server address:** Enter a valid SMTP server address, typically "smtp.yourdomain.com". With TLS disabled, the default mail server port is 25. With TLS enabled, it is 587. If your mail server uses a different port, specify it by adding a colon and the port number after the address (e.g. "smtp.yourdomain.com:465").
- **Mail server username:** Enter a valid e-mail account user name *without the @ sign and domain name* (e.g. "PDMStudio1").
- **Mail server password:** Enter the password associated with the user name. A password is required by the SMTP server. If your internal mail server doesn't require authentication, leave both the username and password blank.
- **Use TLS encryption:** Check to enable TLS encryption.
- **Sender:** Enter the complete e-mail address for the username (e.g. "username@yourdomain.com"). Even though PDM II can't receive replies at that address, mail servers use this data to verify the

legitimacy of addresses.

- **PD-Alert context:** This value sets the amount of additional audio just before and after each Dump event saved in the log files. Include enough additional time to help identify the context of the Dump event, typically 5 or 6 seconds. If you are running very long delays, we suggest setting the context to its maximum value of 10 seconds.
- **PD-Alert (attached audio) emails:** Enter the e-mail addresses only of individuals or servers who should receive PD-Alerts *with attached audio files.* For more than one recipient, separate each address with a space.
- **Attached audio file format:** Choose the audio quality and data compression for the e-mailed log files. Regardless of your selection here, PDM II always keeps its internally-stored files in uncompressed WAV format.
  - **Uncompressed WAV**: Delivers the highest quality but also the largest files which may be inconvenient on mobile devices or with e-mail servers that cannot handle large file attachments.
  - **High Quality MP3:** 160 Kbps.
  - **Voice Quality MP3:** 40 Kbps.
- **PD-Alert (text) emails:** Enter the e-mail addresses of people who should receive text-only PD-Alerts, that is, alerts that a Dump event has occurred but without the corresponding audio files (which can be retrieved from the PDM II log files as needed). For more than one recipient, separate each address with a space.
- **Retain dump files:** PDM II purges old audio files to make room for new ones when more space is needed in its internal storage. The unit includes a generous amount of storage and dump files are typically kept for a very long time, so if your station's policy is to delete airchecks on a regular schedule, you can choose 30, 60, or 90 days instead, at which point PDM II will automatically delete files as they reach that age.
- **Test PD-Alerts:** This feature is used to verify that the PD-Alert feature is properly set up and working. A test message will be sent to the addresses in both PD-Alert e-mail fields. If one of the addresses is invalid, your ISP will relay an error message to the mail account set up for PDM II.

Note: To prevent tampering, the audio files saved on PDM II by the PD-Alert system cannot be edited or manually deleted. They can, however, be copied to your computer and be saved, forwarded, or deleted just like any other locally-saved file.



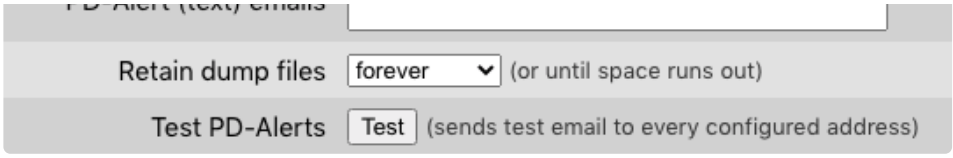


Figure 6- PD-Alert menu

AoIP Synchronization

When using a Livewire clock as the clock source, choose "Livewire slave" from the dropdown menu.

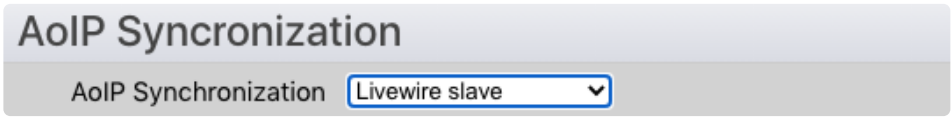


Figure 7 - AoIP sync using Livewire clock

When using an external PTP clock for reference, choose "PTP/IEEE 1588 slave" from the dropdown menu, which reveals several additional fields:

- **PTP Domain:** Valid values are 0 - 127. The AES67 PTP profile uses 0, which is the default setting.
- **PTP Delay Mechanism:** Both E2E (end to end) and P2P (peer to peer) are supported.
  - E2E calculates the latency directly between the master clock and the slave. It is generally recommended for networks using transparent clocks, non-PTP-aware switches, or both.
  - P2P calculates the delay between two slaved devices rather than the entire network. It is typically more accurate and efficient than E2E.
- **PTP Clock Priority1:** Priority 1 is the most significant of the six factors used by devices in the selection of a master clock. Acceptable values range between 0 and 255, with lower values representing a higher priority. The default value is 128.
- **PTP Clock Priority2:** Priority 2 is the fifth most significant of the six factors used by devices in the selection of a master clock. As with Priority 1, lower values represent a higher priority. The default value is 128.
- **PTP Sync Interval:** Sets the interval at which synchronization messages are sent.
- **PTP Announce Interval:** Sets the interval at which a PTP announce messages are sent.

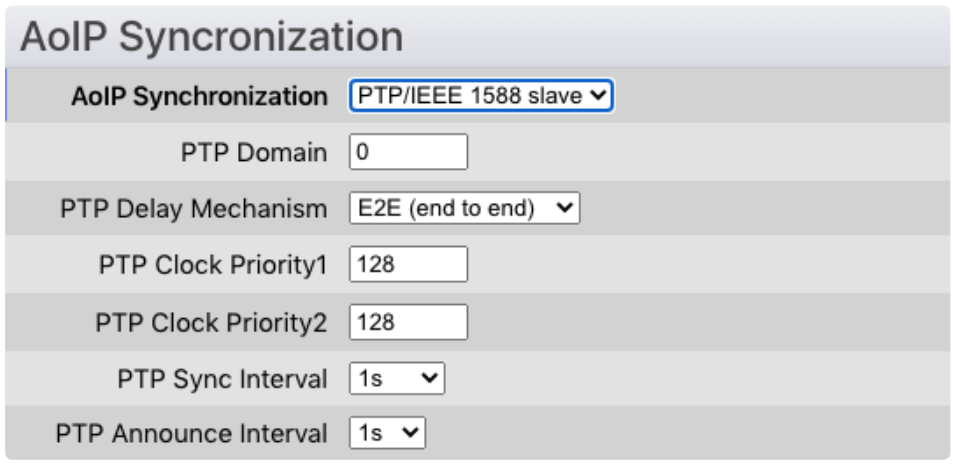


Figure 8 - AoIP sync using PTP clock

PD-Alerts Page

Clicking on the PD-Alerts tab will display the PD-Alerts e-mail log.

This log lists PDM II's recent attempts to send PD-Alert e-mails. If the message has been successfully sent, it displays the date and time it was sent, the recipient's address, the type of alert, and the size of the e-mail including any attached audio files.

Clicking on a Date entry will display additional details about the events, including links to the OnAir and OffAir audio dump files.

If the e-mail couldn't be sent due to a setup or network error, a message to that effect will be displayed.

Date	To	Type	Size (bytes)
1Mar2013_15:34:12	gsteadman@25-seven.com	Text	1127
1Mar2013_11:44:09	gsteadman@25-seven.com	Text	1126
8Mar2013_23:36:03	gsteadman@25-seven.com	Text	1120

Figure 1 - PD-Alerts e-mail log

> If you need to configure PD-Alerts, go to the configuration page.

Dump Archive Page

Clicking on the Dump Archive tab lists all Dump files stored within PDM II. The most recent file is shown first. Files are built in pairs, one for the studio audio that got deleted (OffAir) and one for what the listeners actually hear (OnAir).

Clicking on any file name will play the corresponding audio through your browser. To download the files to your computer, right-click (Windows) or Control-click (Mac) and use your browser's "Save Linked File" command.

Files may not exceed 120 seconds in length. For stations running exceptionally long delays, the log file audio will start with the pre-context audio followed by as much of the delay buffer audio that will fit in the remaining available time.

Dumped Audio Clip Archive

This is a list of the most recently dumped **PD-Alert™** audio clips.

File name	File size	Date
PDMII_16Mar2021_12:11:14_OffAir.wav	3.05 MB	16Mar2021 12:11:14
PDMII_16Mar2021_12:11:14_OnAir.wav	2.31 MB	16Mar2021 12:11:14
PDMII_16Mar2021_12:10:35_OffAir.wav	3.32 MB	16Mar2021 12:10:35
PDMII_16Mar2021_12:10:35_OnAir.wav	2.58 MB	16Mar2021 12:10:35

Total file size: 11.28 megabytes

Figure 1 - Dump archive

As the OffAir file includes both the "safe" audio leading up to the Dump event plus the objectionable material itself. Unless you are using Overkill Mode (which covers the dumped material with an internal audio file of the same length), the OffAir file will be longer than the OnAir file. In the unlikely event that PDM II has zero delay available when the **Dump** button is pressed and you are not using Overkill Mode, both files will be identical in size and will contain only the pre- and post-Dump context audio.

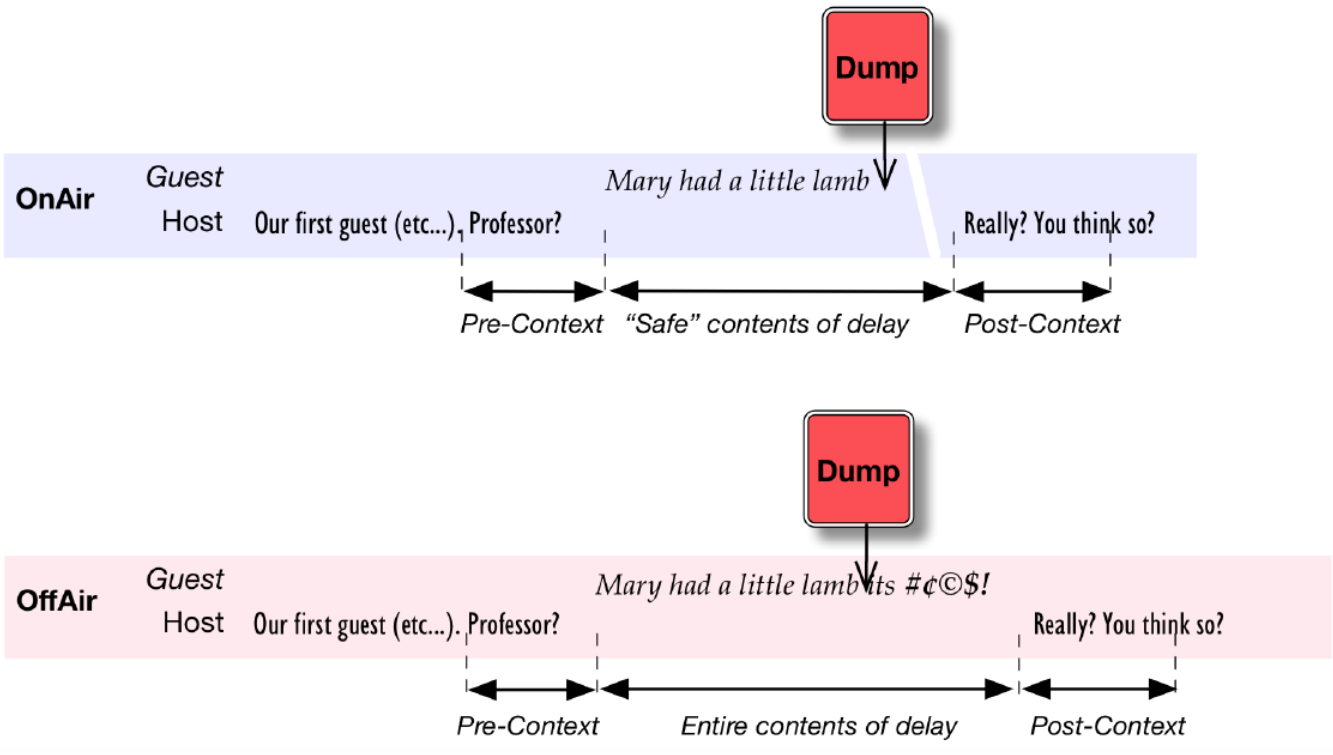


Figure 2- OnAir v. OffAir files

Audio Files Page

The Audio Files page manages which audio files will be played by PDM II during Insert Build Mode or Overkill Dump Mode.

Files can be uploaded using the 'Choose File" button. Once uploaded, they can be renamed or deleted with the corresponding buttons, or auditioned by clicking on the file name.

The included "pdm_demo_insert.wav" is for testing and cannot be renamed or deleted.

Uploaded files should be linear (non-compressed) 16-bit stereo or dual-channel mono .wav files. As PDM II cannot change the playback volume of the files, please make sure the uploaded files are normalized to match your station's standards.

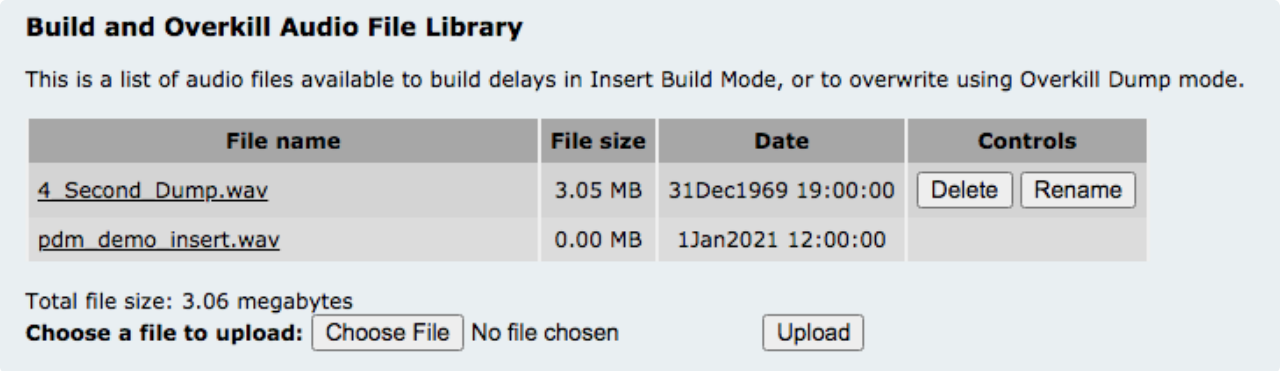


Figure 1 - Audio file library

The maximum supported file size is 6MB. Up to 150MB of audio can be stored in total.

> **Important:** The audio files should be stereo 16-bit WAV files with a 48kHz sample rate to match the sample rate of PDM II's internal clock and ensure proper speed and pitch during playback.

Utils Page

The Utils tab is used to upload and select firmware versions, to download logs when requested by customer support, and to reboot PDM II.

Upload and Switch Firmware

Two software banks, Bank 0 and Bank 1, are provided. The bank currently in use is indicated here.

To upload a new firmware version to the bank not currently in use, click on the "Choose File" button, navigate to the appropriate .pkg file, then click the "Install package on Bank" button to start the initialization.

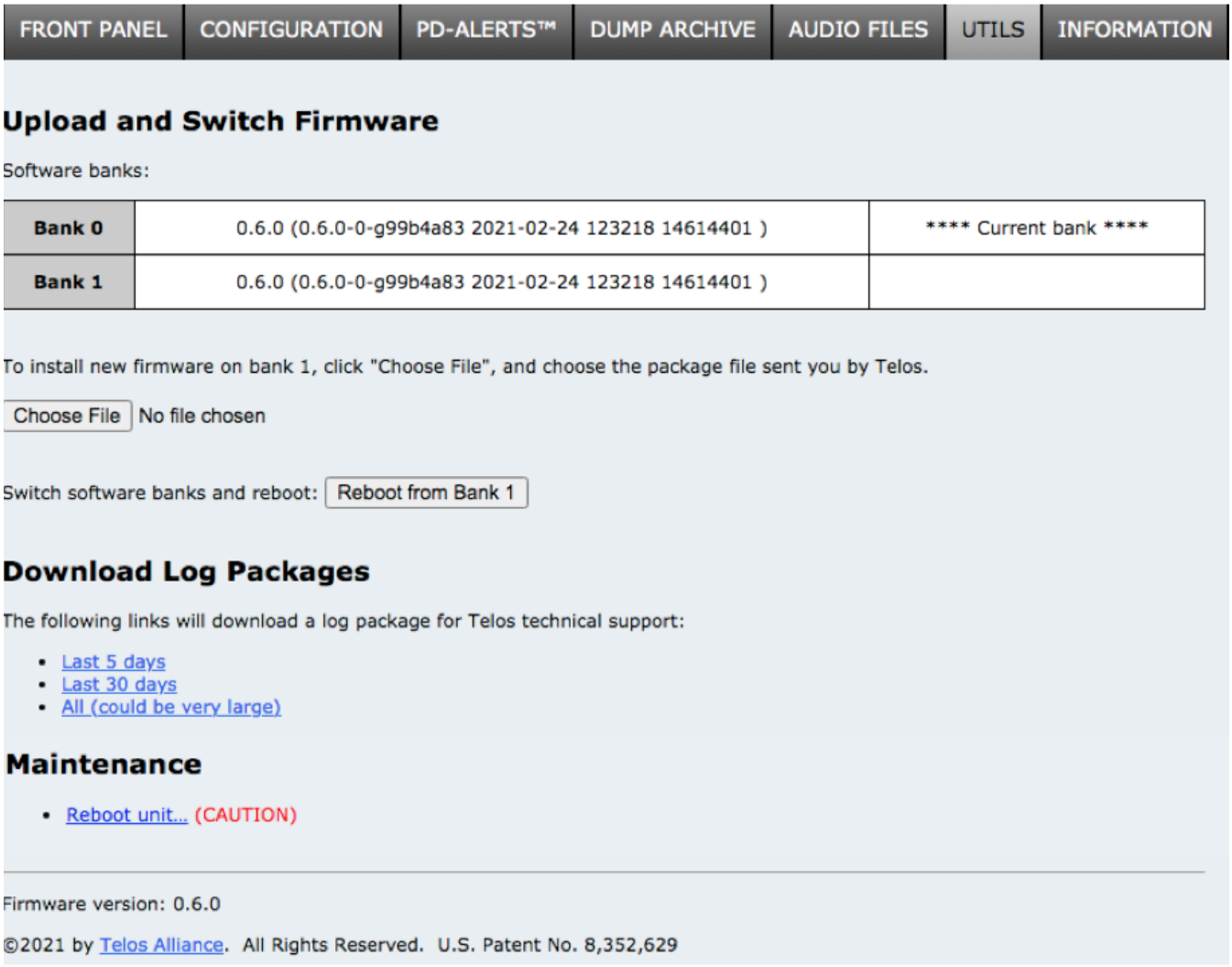
To switch the active software bank and reboot PDM II, click on the "Reboot from Bank" button.

Download Log Packages

When instructed to do so by Telos Alliance customer support, you may download log packages covering the last 5 days, last 30 days, or all stored logs.

Maintenance

PDM II can be rebooted remotely by clicking on the "Reboot Unit" button. An "Are you sure?" page will open for verification before the unit reboots.



Information Page

Clicking on the Information tab provides an abundance of data about PDM II including audio, networking, and time format statuses, hardware-specific information, and unique identification numbers.

This is a read-only page and does not update automatically once loaded. To see recent changes, refresh the page manually.

Parallel Remote Control

In addition to IP-based remote control, PDM II simultaneously supports traditional control systems for

maximum flexibility including GPIO or "Contact Closure".

PDM II supports five inputs and five outputs for remote control through its rear panel female DB-15 connector. Multiple inputs or outputs can be assigned to the same function when isolated circuits are required. Inputs and outputs are opto-isolated with low status being active.

Please see the GPIO section for detailed information.

Serial Remote Control

PDM II's serial control options permit custom interfaces for on-air or logging systems via a network connection. There is no hardware serial port.

Standard IP-based Connections

Commands and queries can be transmitted as TCP socket connections to the unit's network port 5443 when enabled in the Configuration screen's "Control" section.

Once enabled, port 5443 remains accessible to the entire network until it is specifically closed. There is no password checking. Therefore we recommend the use of a firewall or keeping your PDM II on a dedicated closed network.

Serial Language Structure

PDM II's serial remote control language is designed to be easily implemented from any terminal program, by macros in most automation systems, or by computer programming language.

Requests and responses are standard ASCII characters, based on plain English, using familiar PDM II “front panel” designations whenever possible.

- Requests - messages from the controller to PDM II - consist of a number of words followed by a Line Feed character <*LF*> (ASCII 10). Messages are case-sensitive. Note that Carriage Return (ASCII 13) is ignored.
- Responses - replies from PDM II back to the controller - consist of a single *Result* character, any appropriate *message*, and then <*LF*>. The Result character may be one of the following:
  - ! - Indicates a command has been received and acted upon
  - ? - Indicates a command isn’t understood or can’t be acted upon
  - @ - Indicates an event message that wasn't an immediate response to a command

Output Events can be sent by PDM whenever there’s a change in status, such as memory being filled or buttons being pressed, and are provided to design custom serial interfaces to other equipment. Use the enable command to specify which events generate a message.

Request Syntax

Requests consist of a *command* (something for PDM II to do), usually followed by *arguments* (what it should act upon), and then a Line Feed <*LF*>. Commands include:

- **down -** Start the event described by <argument>. Used for level-sensitive inputs
- **up -** End the event described by <argument>. Used for level-sensitive inputs.
- **trigger -** Momentary activation of <argument>, the same as tapping a button. Used for triggered inputs.
- **get -** Returns the status of <variable>
- **help -** Returns hints about PDM II's serial language
- **enable -** Turns on Output Event reporting for a specific PDM II condition
- **disable -** Turns off reporting for a specific condition

Arguments act the same as the identically-named GPIO inputs as described in the GPIO section. You may *enable* or *disable* Output Event reporting for just about every PDM II function. Arguments are also case-sensitive. They use internal capital letters and must be sent exactly as shown. Arguments include:

- **Build**
- **Exit**
- **Cough**
- **Dump**
- **Bypass**
- **Cue 1 - Cue 8**
- **Flag 1- Flag 8**

Variables include:

- **Depth -** Current audio delay length in seconds and tenths
- **PeakInput** - Peak input level, both channels, in dBFS
- **PeakOutput -** Peak output level, both channels, in dBFS
- **TemperatureC** or **TemperatureF** - Current internal temperature in whole degrees Celcius or Fahrenheit depending upon the request

Output Event messages sent by PDM II are *@nameOfEvent.[=1 or =0]* followed by <*LF*>. **NameOfEvent** can be any event reported by the GPIO. If an event is momentary (such as a button press) the Boolean does not appear.

=1 or =0 appear only if the event is an ongoing state, such as whether the system is currently in Bypass Mode. These numbers do not appear for triggered events such as Cues.

A typical Output Event might look like: *@DelaySafe=1<LF>,* which translates to "Delay Safe is now on" and PDM II's memory has enough audio buffered to cover at least one complete dump.

Examples

Remote Request	PDM Response	Notes

down Build<LF>	!<LF>	PDM starts building the delay
up Cough<LF>	!<LF>	PDM releases the COUGH button
trigger Dump<LF>	!<LF>	PDM starts a DUMP event
help<LF>	!down up(etc)<LF>	See Note 1 below
help down<LF>	! (text) <LF>	See Note 1 below
get Depth<LF>	!Depth-7.5	Current delay is 7.5 seconds
get PeakInput<LF>	!PeakInput= -19	Current audio input peak level -19dBFS
	@DelayFull=1	Delay has been fully built; see Note 2 below
	@EmptyTrig=1	Exit completed, Empty trigger asserted; see Note 2 below
	@DelaySafe=1	Dump increment achieved, delay is now safe; See Note 2 below
	@Bypass=0	PDM II removed from Bypass mode; see Note 2 below
DUMP GUEST!!!<LF>	?unknown command DUMP<LF>	PDM II doesn't understand this instruction; no action is taken

Note 1: Help does not require an <argument>. If you send *help<LF>* by itself, it returns a list of valid commands. If you specify any command as the argument, it returns a brief explanation along with a list of the command's arguments.

For example, if you send **help down<LF>**, PDM II replies with **!down: send Press signal for one or more space-separated events (None Build Exit Cough Dump Bypass Cue 1...** etc. through **Flag 8).**

Note 2: Output Event Messages (preceded by @) only appear after they have been specifically enabled for a type of event.

Output Event Messages

PDM II's Output Event messages can be used to build elaborate custom remote controls. Any event that can trigger a GPIO output can also be sent serially.

Each type of output event must be specifically enabled before PDM II will report it. This way, you can tell PDM II to report only those events that are important to your installation.

When a socket connection is made to port 5443, a *System Active* message is sent: @Welcome to PDM. This can be used as a handshake or as a signal to start your own routine for enabling those Output Events you want reported.

Events are enabled or disabled on a per-connection basis. You must send *enable* messages each time you establish a new connection. Otherwise, each connection to the PDM II defaults to having all of its event messages disabled.

enable Command

This command turns on PDM II's ability to report specific events.

- Use the form *enable* ***EventName<LF>***, where *EventName* is a change in PDM II's current status. For example, ***enable DumpTrig<LF>*** tells PDM II to send a message whenever DUMP has been activated.
- Two or more *EventNames* can be combined in the same command by separating them with a space. For example, ***enable DumpTrig Muted<LF>*** tells PDM II to report any time either DUMP or MUTE has been activated.
- Use *All* for *EventName* as a shortcut when you want to enable messaging for every PDM II event.
- When PDM II receives any valid *enable* command, it responds ***!<LF>***.
- If a function is active when you enable its message, PDM II reports its state immediately and then sends an updated report when the state changes. For example, if you send ***enable Muted<LF>*** and the unit is already muted, it will immediately respond with ***@Muted=1***. When Muting is turned off, PDM II will send ***@Muted=0.***

EventNames used in *enable* commanded include:

- **Building -** PDM II is building up a delay
- **BuildTrig -** The BUILD button has been pressed
- **Bypass -** PDM II is in a bypass state
- **Cue1 ... Cue8 -** Cue point *n* has been reached
- **DelayEmpty -** The memory is empty
- **DelayFull -** The delay is now full
- **DelaySafe -** A Dump increment has been reached in memory
- **DelayUnsafe -** The memory contains some audio but not enough to cover a full Dump event
- **DumpTrig -** The DUMP button has been pressed
- **EmptyTrig -** The memory has just been completely emptied
- **Exiting -** PDM II is exiting a delay
- **Flag1 ... Flag8 -** Flag point *n* has been reached
- **FullTrig -** The memory has just been completely filled
- **Muted -** PDM II's output is muted
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- **BuildLamp -** The BUILD button is flashing
- **ExitLamp -** The EXIT button is flashing
- **DumpLamp -** The DUMP button is flashing
- **CoughLamp -** The COUGH lamp is flashing
- **All -** Enables events for all of the above events

> **Note -** "Lamp" functions mimic the lamp state and report =1 or =0 every time a front panel button flashes on or off.

disable Command

The disable command turns off reporting of one or more output events and follows a similar syntax.

- *disable DumpTrig<LF>* tells PDM II to stop reporting that DUMP has been activated.
- *disable DumptTrig Muted<LF>* turns off reporting for both functions.
- *disable ALL<LF>* turns off any message reporting.
- PDM II responds to valid *disable* commands with ***!<LF>***.

> **Note -** The *disable* command affects only serial messages. Parallel GPIO functions on the DB-15 are not affected and remain as set on the front panel or via the web interface.