



HD Radio™ SiteStreamer™

Installation & User Guide

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WARRANTY(inside back cover)

Section I

INTRODUCTION

Product Description

The INOmini 638 SiteStreamer™ is a Web-enabled FM and HD Radio™ receiver for remote signal monitoring. Installed at a broadcast transmitter/translator site or any remote location with an Internet connection, the unit streams audio from the off-air signal (or a hard-wired AES3 program audio feed) back to any computer, tablet or mobile device. The browser interface enables remote tuning and source switching, and displays audio levels, RDS data that accompanies the FM program, and PAD data associated with HD Radio programming. Alarms are logged, and may be dispatched by email or SMS/text messaging.

Product Features

Features of the SiteStreamer™ include:

- Monitor the off-air analog-FM or digital HD Radio signal (HD1 through HD8) from anywhere.
- BandScanner™ utility displays a spectrum plot.
- ‘StationRotation’ monitors multiple signals.
- AES digital AUX input for monitoring hardwired audio program feeds (A/B between source and air).
- Full dynamic browser support of all operational features, including audio streaming through the dynamic Web interface.
- Sends instant error messages via email or SMS texts; logs RSSI, audio loss and RDS errors (hijacking).
- Accurate front-panel and Web interface program audio level display.
- Easy setup and operation; full SNMP support.
- Front-panel headphone jack.

Product Specifications

Tuning Range: 87.5MHz-108.0MHz in 100kHz steps

Antenna Input: 75-ohm (F)

Receiver Sensitivity: ≤10µV for 50dB monaural FM SNR

Audio Response:

FM: ±1dB, 30Hz-15kHz; 75µs/50µs de-emphasis

HD Radio: ±0.25dB, 20Hz-20kHz

Program Line Input: AES3 (XLR) digital AUX input; menu-selectable scaling for a ‘0-VU’ reference at digital signal levels of 0dBFS, -18dBFS, -20dBFS, -24dBFS.

Headphone Jack: front-panel (TRS) 3.5mm

Network Connection: LAN (RJ45) jack accepts universal TCP/IP connection to Local Area Network, and via router to the Internet.

Alarms: Low Signal, Audio Loss, Pilot Loss, HD Loss, RDS Loss or PI Mismatch

Power Requirement: 12VDC at 115mA (2.1mm x 5.5mm coaxial); a universal inline switchmode power supply is provided.

Mounting Options: An optional rack adapter accepts up to three INOmini modules in a 1U, 19-inch rack space. The SiteStreamer™ may also be fastened to any convenient surface with two small screws.

Size and Weight: 1.6”H x 5.5”W x 5.5”D; 4 lbs. shipping weight.

Section II

INSTALLATION AND CONNECTION

Unpacking and Inspection

Inspect for shipping damage immediately upon receipt of the equipment. 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 should return for Warranty repair become necessary. 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 this assure coverage of the equipment under terms of the Warranty (printed inside the back cover of this manual), but the user will receive any specific service and modification instructions, including software and firmware updates. Register online at:

www.inovonicsbroadcast.com/product-registration

Mounting

The INOmini 638 is packaged in a compact 'clamshell' chassis that defines the standardized module in this series of Inovonics products. The INOmini 638 may simply be set on top of an existing piece of rack-mounted equipment, as long as at least 1U of panel space is left open above the rack-mounted 'host' to access the unit. Alternatively, a pair of mounting holes on the chassis base allows the INOmini 638 to be fastened to any flat surface with two #4 screws.

An optional rack-mount kit is available for the INOmini 638. The rack kit can hold up to three INOmini modules and comes with blanking panels for unused spaces, and with two 'daisy-chain' power cables so that two or three INOmini modules may share a single power supply.

AC Mains Power

All Inovonics INOmini modules are supplied with a 'brick' switching-type power supply compatible with any mains voltage. The actual power consumed by the SiteStreamer™ is 115mA at 12 volts DC. A second DC connector on the rear panel allows 'daisy-chaining' INOmini modules. This means that two or more units may be fed from the same AC supply, but with the obvious caution that the total input power specification of a given assortment of INOmini modules must not exceed the current rating noted on the power supply label.

Radio Frequency Interference (RFI)

Although we have anticipated that the SiteStreamer™ will be used in the vicinity of broadcast transmitting equipment, please do practice reasonable care in locating the unit away from *abnormally* high RF fields.

The Front-Panel Display and Menu Knob

The front-panel MENU knob scrolls the LCD through the various viewing and programming options. Section III of this manual explains the easy setup and various operating options of the INOmini 638.

Headphone Jack

The front-panel PHONES jack will accommodate stereo headphones of virtually any impedance with a 3.5mm stereo plug. When headphones are plugged in, the LCD menu will automatically go to the **HeadPhone Vol** screen so that you can adjust the listening level with the knob. When the volume has been set to a comfortable level, push the knob to return to the previous menu.

Rear Panel Connections

ANTENNA

The 531N antenna input is a US-standard 75-ohm F connector. Inexpensive, ready-made cables of various lengths are common in this format, and adapters for other RF connector types are readily available.

AES DIGITAL
AUX INPUT

This XLR female input accepts AES3 stereo digital audio at any sampling rate, 48kHz and below. Built-in programmable gain can scale the “Zero-VU” reference for digital audio inputs to various levels, as explained on Page 12.

LAN PORT

This RJ45 jack accepts traditional TCP/IP connections to a router or server, and from there to the Internet.

+12VDC
POWER I/O

These two connectors are in parallel to allow ‘daisy-chaining’ INomini modules. This allows one DC supply to power up to three modules mounted in a single rack adapter, provided that the rating of the supply is not exceeded. Two short ‘pigtail’ cables are provided with each rack adapter.

The Model 638 draws 115mA. Check the rating on the label of the power supply to make sure that it is rated to accommodate all the modules it must support.

These power connectors are not a locking type, and the mating plugs do pull out rather easily. A Ty-Wrap® will secure the cables to the plastic anchor above the jacks if this is deemed necessary.

Section III

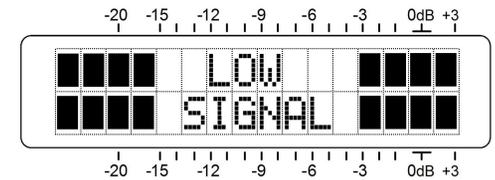
SITESTREAMER™ SETUP

SiteStreamer™ setup is explained in this section using the front-panel LCD screen and MENU knob. All menu functions are available through the Web interface as well, along with some additional features. But we recommend using local control first to get familiar with the product.

Flashing Alarm

The SiteStreamer™ has several alarms that indicate and log transmission fault conditions, and can dispatch email or SMS/text-message notifications. All alarms utilize the Web interface and are detailed in Section IV. One alarm, however, shows up on the front panel as well, and you may encounter this as soon as you power-up the unit.

If the SiteStreamer™ is not receiving a broadcast, the LOW SIGNAL alarm will begin to flash soon after the unit is powered-up. The alarm is held off once the unit is operating normally.

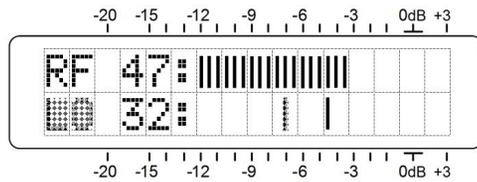


If you push or turn the knob, you’ll get a brief respite from the flashing so that you may navigate among menus and complete unit setup.

Menu Navigation Basics

You may already have figured-out the menu tree for yourself. Quite simply: 1) *turn* the knob to navigate from one menu to the next, 2) *push* the knob to enter any menu associated with setup, 3) *turn* the knob to choose an option or to set a value, and then 4) *push* the knob again to accept the selection and commit it to memory, and return you to normal menu navigation.

Menu items that can be edited will ‘blink’ at a rapid rate when you push the knob. Don’t confuse ‘blinking’ menu callouts, such as the one illustrated here, with the ‘flashing’ alarm discussed above.

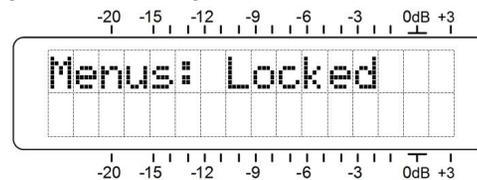


To recap: in setup menus, any parameter that can be edited will begin blinking as soon as the knob is pushed. Blinking indicates that a different option or value may be selected. Turn the knob to make your choice, and then push it once again to accept the selection.

Each SiteStreamer™ menu screen will be discussed separately and in order, except that the last menu is discussed first, as it could constitute a show-stopper!

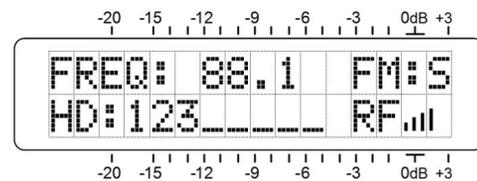
Locked Menus (Menu Screen 13)

To guard against inadvertent menu editing or casual tampering, the very last menu in the sequence lets the user lock the knob out of the editing mode. If you find that when you push the knob you can’t enter a setup menu to change a parameter, scroll all the way to the very last menu screen. Push the knob and the word **Menus** will start to blink. Turn the knob to select **Menus:Unlocked**. Push the knob again to set this selection, and then navigate back to whichever screen you were trying to edit. You can re-lock the menu when you’re finished.



Setting the Frequency and Mode (Menu Screen 1)

When power is applied to the SiteStreamer™, a ‘splash screen’ with the product ID pops up immediately on the LCD. Within a few seconds this will revert to Menu Screen 1, shown here.



The top line of Menu Screen 1 shows the frequency of the station and whether it is broadcasting in FM/stereo: **FM:S**, a

blended, noise-reducing mode for FM: **FM:B**, FM/monaural: **FM:M**, or HD Radio: **HD:1** through **HD:8**.

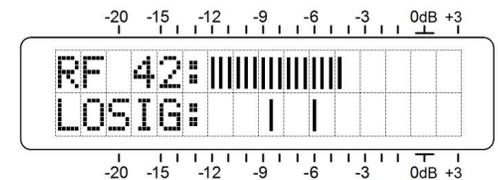
The second line in this menu always shows which, if any, HD Radio channels are being broadcast at this particular frequency. If none is broadcast, **HD:None** will be indicated. **HD:Sync...** is displayed as the receiver acquires lock. Once locked, all HD Radio channels received will be listed as shown in the example.

When receiving FM, the **RF** bargraph is a rough measurement of incoming signal level. **DQ** (Digital Quality) is an indication of digital reception integrity in the HD Radio reception mode.

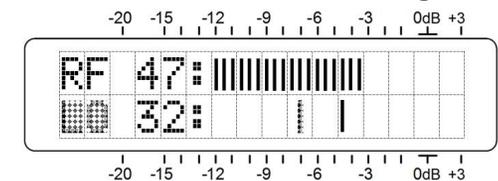
Push the knob once and **FREQ** will start to blink. Turn the knob to set the receive frequency. Push the knob a second time and **FM** will begin blinking. At this point you can turn the knob to switch to HD Radio reception (if available), selecting **HD:1** through **HD:8**. The SiteStreamer™ does not blend between reception modes, nor does it default to FM when the digital HD Radio signal cannot be acquired or simply is not there. What you select is what you get.

Carrier Strength and Alarm (Menu Screen 2)

The upper line of this screen displays incoming signal strength. The **RF** numerical value is the level at the antenna input in dBuV, and defines a range between 0dBuV (1 microvolt) and 75dBuV (about 5 millivolts). The bargraph readout gives an analog display of levels from 12dBuV to 70dBuV at 2dB per segment. The signal strength display does not refer to the dB scaling above the display, which is used only for audio level measurements in Menu Screen 5.



The lower LCD scale is labeled **LOSIG:** and has a pair of tic marks off to the right. Push the knob and **LQ** will begin to blink, along with the left-hand tic mark. Turn the knob to position the left tic mark anywhere beneath the **RF** bargraph. The tic mark level in



dBuV is also displayed.

When the RF bargraph falls below this tic mark during normal receiver operation, it initiates a carrier-loss alarm and causes LOW SIGNAL to flash on the LCD screen.

As a starting point, you might set the carrier-loss trigger point about half the way down from the top of the RF bargraph as shown in the illustration. This should allow for typical signal fading over the receive path, but will still alert the user to a valid carrier loss or transmitter power problem.

Push the knob again and the right-hand tic mark will blink. Turn to knob to set the tic mark (and its numerical value) to a point that the carrier level must attain to reset the alarm, maybe a few segments above the left tic mark. Push the knob again to set these points in memory and release the menu.

LOW SIGNAL alarm settings relating to delays and intervals are accessed with the Web interface, along with the setup of other fault alarms that can dispatch email and SMS/text messages. This is detailed beginning on Page 23.

Signal-to-Noise and Multipath (Menu Screen 3)

This screen displays two additional signal-quality measurements. Numerical values are assigned to each of these readouts as well, but these numbers are relative and arbitrary and do not relate to any fixed measurement parameter.

SN is a first-order approximation of the signal-to-noise quality of the received signal. This measurement takes several signal quality factors into account, but is strictly a relative indication. No hard-and-fast rule can be derived from this display, except that “more is better.”

Likewise, MF gives a relative indication of multipath (signal reflection) effects that the transmission encounters on its trip to the receiver. Multipath effects introduce noise and distortion into FM programs, and causes errors in digital signals that can translate into dropouts and echoes. The object here is to keep MF as low as possible. 00 is ideal and should be attainable when receiving a solid signal.

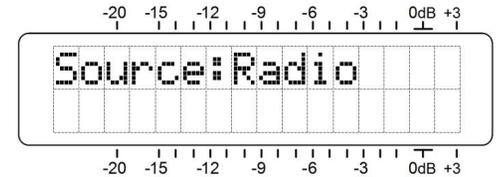
The RF, SN and MF numerical values are handy metrics when installing a rooftop antenna. In locating and aiming the an-

tenna, do everything you can to maximize RF and SN, and to minimize MF.

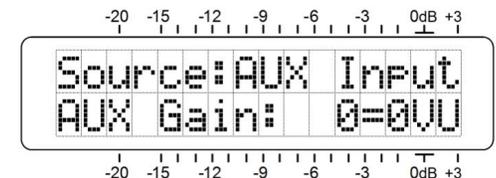
Monitor Source Switching (Menu Screen 4)

The SiteStreamer™ normally monitors the FM or HD Radio off-air broadcast, but it can also switch to an external audio feed applied to the rear-panel AES3 DIGITAL LINE INPUT jack. This allows, for example, an A/B comparison between the air signal and the program audio feed to the exciter.

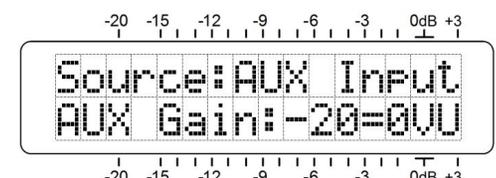
This snapshot shows the primary, default monitoring mode, the off-air Radio signal. Push the knob and turn it to select AUX Input.



Now, with SOURCE:AUX Input showing, press the knob a second time to highlight AUX Gain: setup. Input sensitivity is normally ‘unity’: a digital 0dBFS tone will take the front-panel meter to 0dB. You can turn the knob to introduce gain, however, so that the front-panel meter reading of 0dB (or ‘zero-VU’) can equate either to 0dBFS, or to -18dBFS, -20dBFS or -24dBFS.



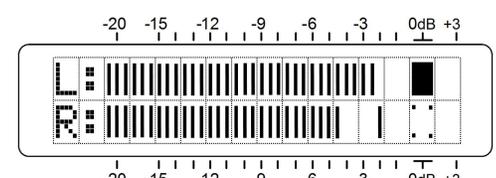
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Program Audio Levels (Menu Screen 5)

Menu Screen 5 presents accurate bargraph metering of program audio levels. This is a peak-responding meter with a floating peak-hold function.

100% modulation is denoted by the large block opposite the 0dB marking on the panel. The meter resolves +1, +2 and +3dB above 0dB, and from 0dB down it is calibrated in 0.5dB steps to -15dB, and then in 1dB steps to -21dB.

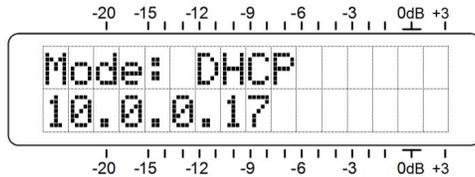


For FM reception, the 0dB panel marking represents $\pm 75\text{kHz}$ carrier deviation. A 400Hz monaural test tone would take the meter to exactly 0dB. Receiver de-emphasis must necessarily be factored into the reading at higher frequencies, and of course the 19kHz pilot consumes the top 1dB of stereo broadcast modulation. Aggressively-processed program audio should consistently peak the bargraphs to -1dB or so.

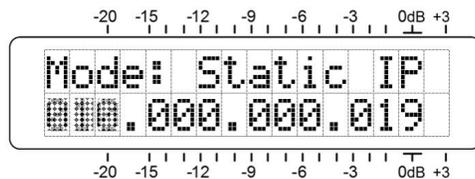
When HD Radio broadcasts are being received, 0dB corresponds to the recommended -3dBFS absolute limit for program peak excursions.

Networking Mode and IP Address (Menu Screen 6)

The IP networking mode and address are set on this Menu Screen. Push the knob and Mode: will blink. Select either DHCP or Static IP as dictated by your network configuration. When DHCP is selected, the IP address is automatically assigned by the router/server and cannot be changed manually.



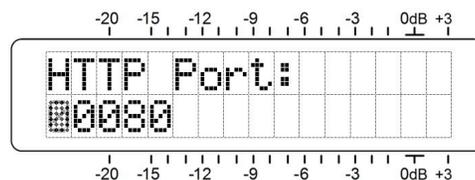
With Mode: Static IP selected, push the knob again to enter a fixed IP address manually. The first address group will begin to blink. Turn the knob to dial-in the required number. Continue to press the knob and dial-in numbers until all four IP address fields are filled. Push the knob a final time to commit all selections to memory and to release the menu.



HTTP Port (Menu Screen 7)

The default IP port assignment is commonly-used Port 80, which will show on the second line of Menu Screen 7.

To change this assignment, push the knob to enter the setup field. Leading zeroes will display and each digit must be set independently.



Push the knob repeatedly to reach the digit you need to re-set, starting on the left and proceeding to the far-right units digit. When all digits are set, press the knob one final time to commit the selection to memory.

Gateway, Subnet Mask, Primary DNS (Menu Screens 8, 9, 10)

It's really not within the scope of this manual to cover the intricacies of network configuration. Often an IT professional will need to get involved in this. These three screens relate to a static IP address and are available only when Mode: Static IP is selected under Menu Screen 6. The Gateway:, Subnet Mask: and Primary DNS: are entered manually in exactly the same manner as Static IP addressing was described under Menu Screen 6.

MAC Address (Menu Screen 11)

The MAC (Media Access Control) address of any piece of hardware with IP connectivity is a fixed value unique to that particular piece of gear. Menu Screen 11 displays the MAC Address: of your specific SiteStreamer™ and cannot be changed.

Headphone Monitoring (Menu Screen 12)

A front-panel PHONES jack offers a convenient monitoring point for SiteStreamer™ setup and casual listening. When a pair of headphones is plugged into the front-panel jack, the LCD screen automatically goes to Menu Screen 12. Head-Phone Vol will begin blinking and the panel knob may be adjusted for a comfortable listening level.

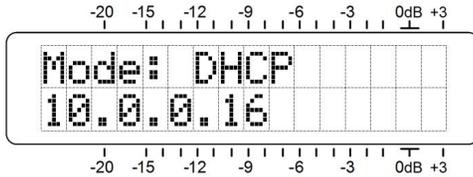
The LCD shows an arbitrary numerical value and a bargraph representation of the headphone volume. Once volume is set, push the knob to save the setting to memory and to return the screen to the last menu on display.

Section IV

SITESTREAMER™ WEB INTERFACE

Connecting

Connect both the INOmini 638 SiteStreamer™ and a computer to your local network. We'll assume DHCP operation for this exercise. Next, go to Menu Screen 6 and note-down the IP address that your router has assigned. In this case it's 10.0.0.16



Open a browser window on your computer and type the IP address into the browser's address bar. In short order the main Now Playing Web interface page will appear on your screen. The next page shows the entire 'raw' Now Playing screen as it might appear when loaded for the first time.

A header at the top of the page and the Menu list on the left are common to all SiteStreamer™ Web interface pages. The header displays the tuned frequency, the remote listening utility, audio levels and alarm status indicators. All SiteStreamer™ screens will be described individually as they are listed in the Menu on the left-hand side of the screen.

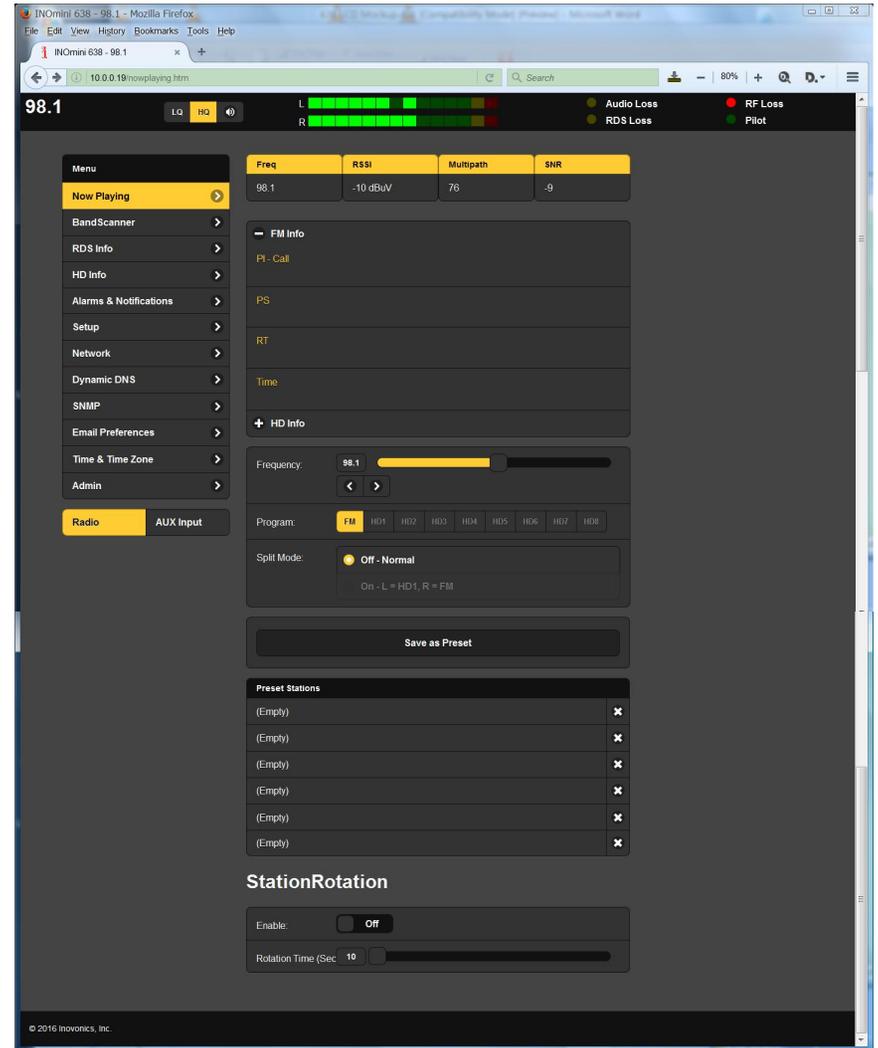
Remote Listening

Click the loudspeaker icon in the header to listen to the station from a remote location.



Two audio quality options are available. LQ has an MP3 data rate of 64kbps, HQ is 128kbps. With marginal network connections LQ may prove the better choice.

The encodings/decoding and buffering time (latency) of the audio will depend to some degree on the connection path and network quality. Latency may be several seconds, even on a Local Area Network. This listening utility has been included more to confirm the presence of audio than to perform a critical assessment of off-air audio quality. Keep in mind that the audio will lag metering.



Now Playing

The Now Playing Web screen is access to select the reception mode, tune-in stations, and save them as presets. This screen also gives signal quality information and displays basic RDS RadioData information for FM broadcasts, and PAD (Program-Associated Data) for HD Radio programming.

The top of the screen gives signal reception parameters.

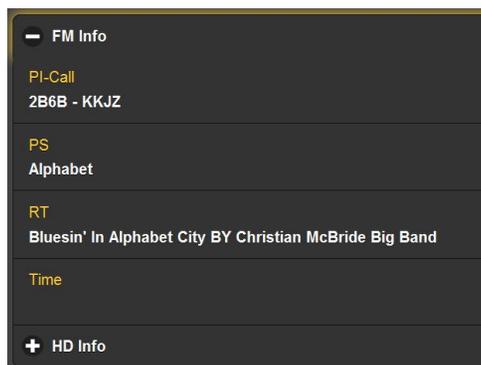
Freq	RSSI	Multipath	SNR
88.1	50 dBuV	4	17

Freq, of course, is the frequency that the radio is currently tuned to.

RSSI is the same measure of signal strength shown on front-panel Menu Screen 2.

Multipath and SNR are the same measurements displayed on front-panel Menu Screen 3 and are detailed on Page 11.

Below that are the two windows that display data associated with the FM or HD Radio programming. Both windows download and accumulate data concurrently, but must be viewed independently.

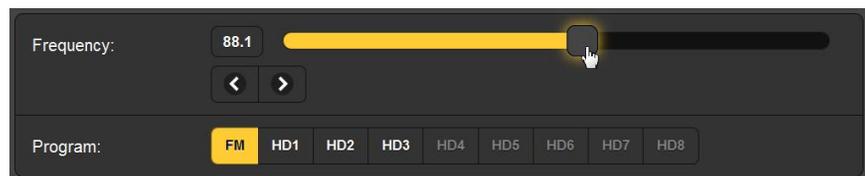


FM Info shows the PI code and decoded Call (letters) of the station.

PS is the 8-character display that appears on the faceplate of all RDS-equipped radios. RT (RadioText) is a 64-character field that can show title and artist, station contact info, or even advertising. Time shows the current clock time at the studio location if this group is transmitted. Many broadcasters elect not to.



HD Info is the Program-Associated Data (PAD) that accompanies HD Radio channels. It includes Name, the station's call letters; Slogan, the station's 'street' name'; and currently-playing Artist and Title.



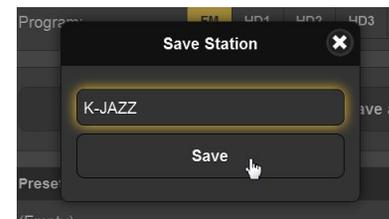
Select the reception mode by choosing a 'button' in the Program: field. FM is the first choice, and HD Radio broadcasts are available on buttons that are shown as active. HD buttons are grayed-out if that particular HD Radio channel is

not present. In the example above, the station is transmitting HD1, HD2 and HD3.

The receiver may be tuned with the Web interface by four different means. 1) grab the 'slider' with your mouse and drag it back and forth, 2) highlight the slider and then use computer > and < cursor keys to change frequency, 3) click the on-screen > and < buttons to increment tuning up or down, or 4) clear and re-type a frequency directly into the display window and then press keyboard Enter.

Preset Stations is the area to program frequencies into memory, for instant call-up by clicking on an entry or for the self-sequencing StationRotation feature, explained below.

With a station tuned-in, click the Save as Preset bar. This brings up a Save Station box for typing-in an identifier, either the call letters or a short 'street name,' up to 8 characters. This will replace the top (Empty) slot under Preset Stations.



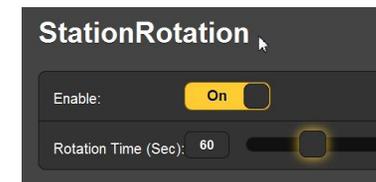
Note that the reception mode is saved as well, permitting a station's FM and HD1 channels to be logged as individual presets. HD2 and up are treated likewise; whatever is playing will become a separate preset.



Presets are erased by clicking the big X at the right-hand end of the individual entry.

StationRotation

The 638 SiteStreamer™ can monitor all station presets by 'round robin' sequencing. When the StationRotation function is enabled, the unit will tune to the next station on the list, 'listen' to that station for the interval programmed into the Rotation Time (Sec): box, and then cycle to the next preset.

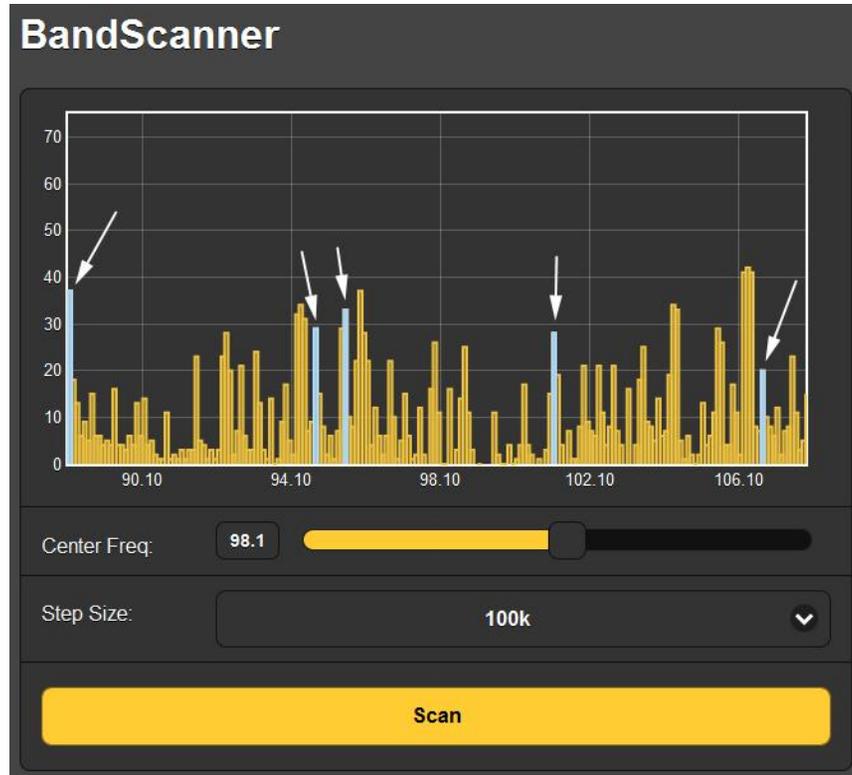


Station memories also retain the programmed parameters for the Audio Loss and Low Signal alarms. As alarm set-

tings are specific to the station being monitored at the time, it is important to factor-in the Rotation Time (Sec): figure when setting alarm variables so that the SiteStreamer™ will not sequence to the next station before an alarm is triggered.

BandScanner™

The 638 SiteStreamer™ incorporates a useful utility that displays the RF spectrum of the FM broadcast band. An example plot is shown here.

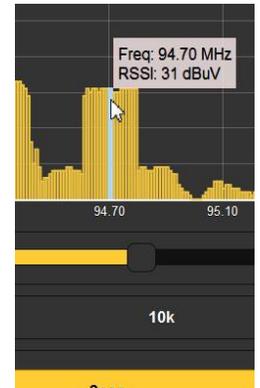


In this example, Center Freq: was set to 98.1MHz and the scanning Step Size: to 100kHz. This gives a plot of the entire FM band.

The BandScanner™ actually scans the band twice; once in analog FM and once in HD Radio FM. Progress is indicated during the scan, and once it has completed an image like the one above will be displayed. Stations shown above in blue (also marked by the arrows) are stations with HD Radio programming.

Any individual carrier can be zoomed-in-on. Center Freq: can be entered directly or with the slider, and the checkmark to the right of Step Size: opens a pull-down menu to select measurement bandwidth.

In this example, Step Size: was set at 10kHz and the scan centered at 94.7MHz. This station is transmitting HD Radio programming, and the HD Radio carrier pair can be seen 20dB below the FM carrier level, extending the occupied bandwidth by about 100kHz on both sides of the assigned frequency.



'Hovering' the screen cursor over any carrier will display the frequency and the incoming signal level in an information box.

A band scan necessarily interrupts program audio during the process, but alarms are inhibited during the scan.

RDS Info

The SiteStreamer™ gives a complete accounting of all the RDS data groups on this Web interface page.

The upper part of the RDS Info screen decodes and displays RDS information.

PS	PI Code	Callsign	
Hamilton	2B6B	KKJZ	
Radio Text			
Squatty Roo BY The Clayton Hamilton Jazz Orchestra KJazz 88.1			
Time	PTY	PTYN	
	Jazz		
M/S	DI	TP	TA
Music	Stereo	On	Off
RT+1		RT+2	
04 Artist - The Clayton Hamilton Jazz Orches...		01 Title - Squatty Roo	

Here, the PS, PI Code, Callsign, Radio Text and Time are repeated (these were shown and discussed on the Now Playing page). PTY and PTYN are format identifiers.

M/S, DI, TP and TA are RDS ‘flags,’ part of RDS housekeeping. RT+1 and RT+2 are special delineators, used by the station in this example for ‘song tagging.’ *Wikipedia* gives a comprehensive overview of all RDS features, or you may refer to the appropriate RDS or RBDS Standard.

Statistical information on all RDS data groups being utilized is tabulated at the bottom of the RDS Info Web interface screen.

The SiteStreamer™ calculates the percentage of RDS resources devoted to each data group. Our example station is using RDS to good advantage, yet only a few of the data groups are actually needed.

0A	85.27%	0B	0%	8A	0%	8B	0%
1A	0%	1B	0%	9A	0%	9B	0%
2A	9.49%	2B	0%	10A	0%	10B	0%
3A	0.89%	3B	0%	11A	0%	11B	0%
4A	0%	4B	0%	12A	0%	12B	0%
5A	0%	5B	0%	13A	4.35%	13B	0%
6A	0%	6B	0%	14A	0%	14B	0%
7A	0%	7B	0%	15A	0%	15B	0%
Alternative Frequencies List 0							
Open Data Applications 1							
13A 4BD7							

In this example the station has no rebroadcast ‘translators,’ so the Alternative Frequencies List is empty. The Open Data Applications usage is part of the ‘song tagging’ utility of the subject station.

HD Info

This screen is similar to the RDS Info one just discussed, but is specific to the ‘PAD’ (Program-Associated Data) that ac-

companies HD Radio transmissions. An example HD Info screen is shown here.

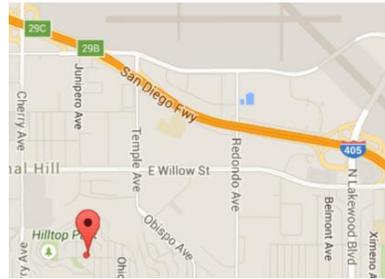
Name	PTY	FCC ID
KTWV-FM	00 None	US 25437
Slogan		
94.7 The WAVE		
Artist		
Hall & Oates		
Title		
I Can't Go For That (No Can Do)		
Album		
Rock 'N' Soul Part 1		
Genre		
Smooth Jazz & Rhythmic Hits		
Station Location		
GPS Locked - 34° 13' 29.0331" N 118° 3' 49.8339" W 1744M		
TX Gain		TX Blend Control
+0dB		Normal

The top line lists the station Name (call letters) PTY, or Program Type, which identifies the programming format, if used, and FCC ID, a numerical code specific to this station.

Slogan is the ‘street name’ or other informal station ID. Next is Artist and Title, reflecting the currently-playing music track.

The Album that the track came from is given also, along with the Genre, or variety of the music being played.

The HD Radio exciter is generally GPS Locked, and its latitude and longitude are displayed on the corresponding line on this screen. That location is actually a hyperlink, and clicking on it will bring up *Google Maps* and pinpoint the exact transmitter site location.



TX Gain is a dB-offset figure that accompanies the HD Radio signal. The broadcaster can effectively fiddle with the audio gain in the HD Radio receiver, perhaps to equalize perceived loudness between FM and HD1 programs that are processed differently. TX Blend Control is a command that inhibits a consumer receiver from blending automatically between FM and HD1. This is used in the HD Radio 'Ballgame Mode,' when diversity delay is removed from the analog FM audio path.

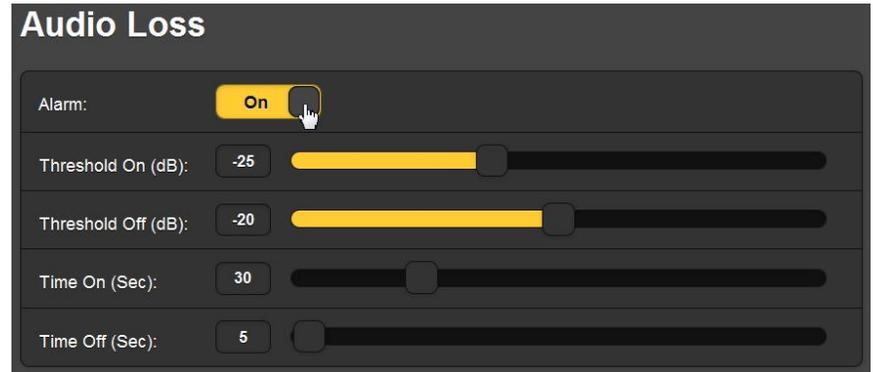
Alarms and Notifications

This is an important aspect of the SiteStreamer™ Web interface and requires thoughtful setup.

The time-stamp feature for email notifications and the Alarm Log depends on Internet time, plus the proper time offset and relationship to DST. Correct time setup should be confirmed before considering setup of this page complete. Internet time setup is explained on Page 31.

SiteStreamer™ alarms tend to have similar threshold and timing setup parameters. Thresholds have two points to set, the first is the threshold below which an alarm will initiate, and then a second point that the measured value must re-attain to reset the alarm. This implies *hysteresis* in the alarm level settings, and prevents 'chattering' as a metered value varies about one set point or the other. Usually the two points will be set with only a small difference.

The other common alarm parameter is on and off timing. In other words, how long the metered value must remain below the lower threshold point before an alarm occurs, and then how long it must remain above the higher, 'reset' threshold before the alarm is reset. These settings will depend entirely on whether you want to be apprised of a short-term loss, or if the condition has to remain for a greater number of seconds before the alarm is triggered.



Both alarm criteria apply to the Audio Loss and Low Signal alarms.

The Low Signal alarm duplicates front-panel setup on Menu Screen 2, but the Web interface adds a Mute: function that silences the monitored audio during a low signal alarm condition when Mute: is turned On. This is important when monitoring an FM transmission, as the typical loud hissing from an FM receiver in the absence of a carrier keeps the Audio Loss alarm from responding. Unless Mute: is turned On, an FM-mode Audio Loss alarm will be triggered only by 'dead air': an unmodulated carrier.

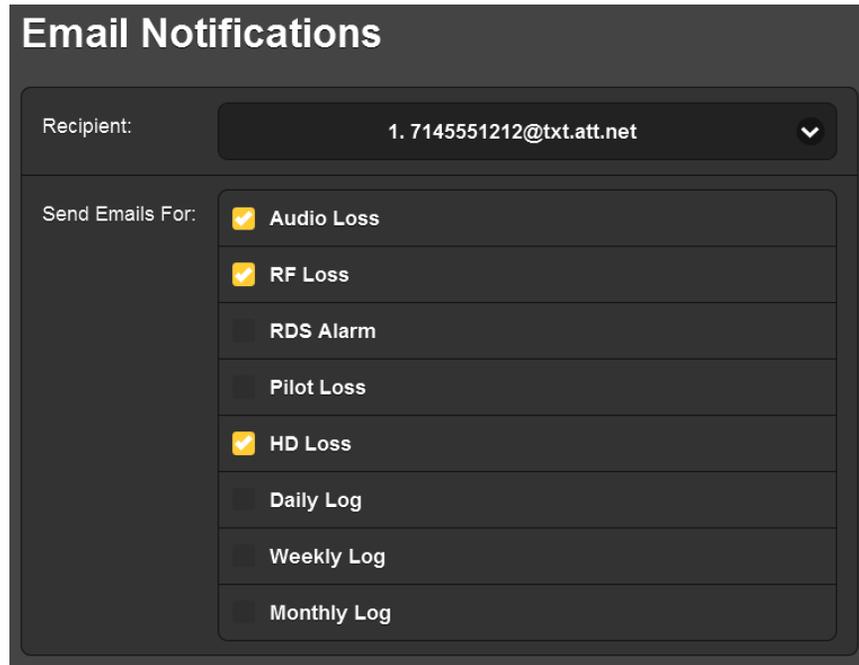
The RDS Alarm is triggered by either a missing RDS subcarrier (RDS Loss: On), or an incorrect PI code (PI Error: On). A PI error occurs when the station is 'hijacked,' or a translator receiver otherwise takes the notion to pull-in the wrong incoming frequency. Enter the proper hexadecimal value in the PI Code: box and click: Save PI Code. The SiteStreamer™ will then initiate an alarm when the entered value differs from the received PI code.

The Pilot Loss alarm simply responds to the 19kHz FM stereo pilot. Should the stereo-gen drop the pilot for some reason, this alarm will trigger. There are no level threshold set points, but Time On (Sec): and Time Off (Sec): do apply.

Similarly, HD Loss has no threshold values; the HD carrier pair is either there or it isn't. Timing is programmable.

Email Notifications lets you specify which staff member gets which alarm message, and whether the notification is an email or an SMS/text message. Before this can be set up, you must first enter the recipients on the Email Preferences Web interface page. This is covered on Page 30.

Email Notifications setup is pretty-much self-explanatory. Once recipients are listed under Email Preferences, and the outgoing SMTP mail server has been set up (see Page 30), all you need do is select the email and/or text message recipient from the pull-down list, and then check the alarms for that person to receive.

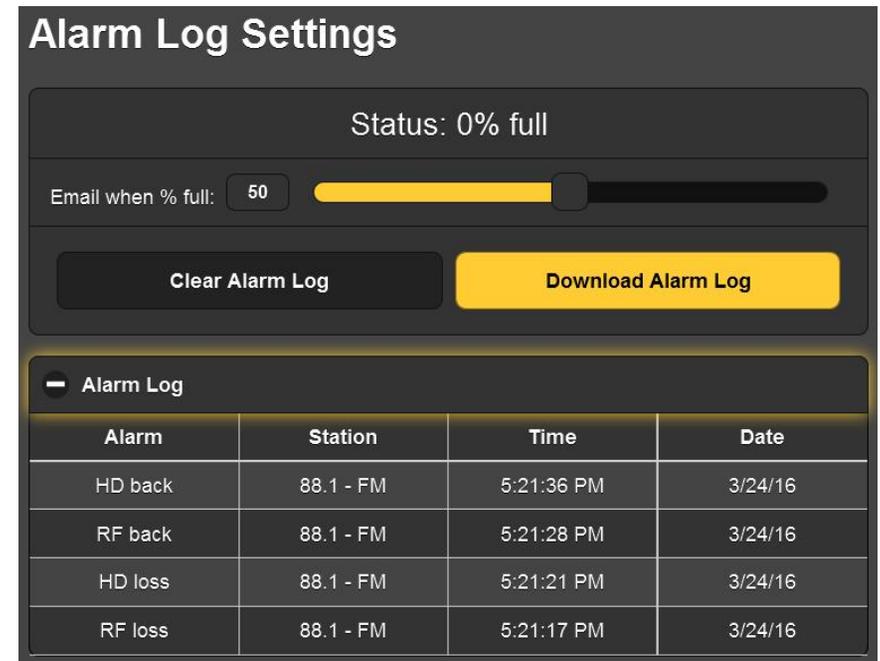


In this example, the station Chief Engineer has both an SMS/text and an email address on the list, and in this case will receive text message notifications of Audio Loss, RF Loss and HD Loss conditions. Other personnel or a contract engineer can be apprised of the same or of different fault conditions.

The Alarm Log

Open the log by clicking the + next to Alarm Log at the bottom of the screen. This will open the log to view the contents on the Web interface screen. The SiteStreamer™ logs all alarms and includes a date and time stamp. In addition to sending emails with a daily, weekly or monthly log as a small .csv file attachment, the logging utility can also send an alert when it has reached a certain memory capacity. The log is capable of holding several hundred entries, so

you'll probably want to go in and clear it every now and then.



The current contents of the log may be downloaded by clicking: Download Alarm Log, which will prompt you to pick a location to save the .csv file. Click: Clear Alarm Log to purge all entries, but keep in mind that this will affect any daily, weekly or monthly logs being accumulated for automatic scheduled email dispatch.

Setup

The Setup Web interface page presents options that are not available from the SiteStreamer™ front panel. These include De-Emphasis: selection; Stereo/Mono: with a selection of (normal) Stereo, a Blend option that blends stereo to mono as reception conditions deteriorate, and 'forced' Mono operation.

Other selections include RDS (European) or RBDS (North American) RadioData standards specification, and Source: switching between FM Radio and the rear-panel digital AUX Input for monitoring. In addition, AUX Gain: adjusts the scaling of this input so that the panel and Web audio level me-

ter will indicate 0dB/OVU with a digital AUX input of 0dBFS or more conservative, lower levels as noted.

Network

This screen displays the current networking setup. Some entries are 'grayed-out' when the SiteStreamer™ is under automatic DHCP assignment. When using a Static IP, this Web interface page is a user-friendlier means of entering the various network parameters.

Hostname: is a 'friendly' name you can assign to your SiteStreamer™. Type this name into a browser address bar to access the unit on the same local network. This is particularly handy if you have more than one SiteStreamer™ on a given network; easier than remembering IP addresses that can change with DHCP assignments.

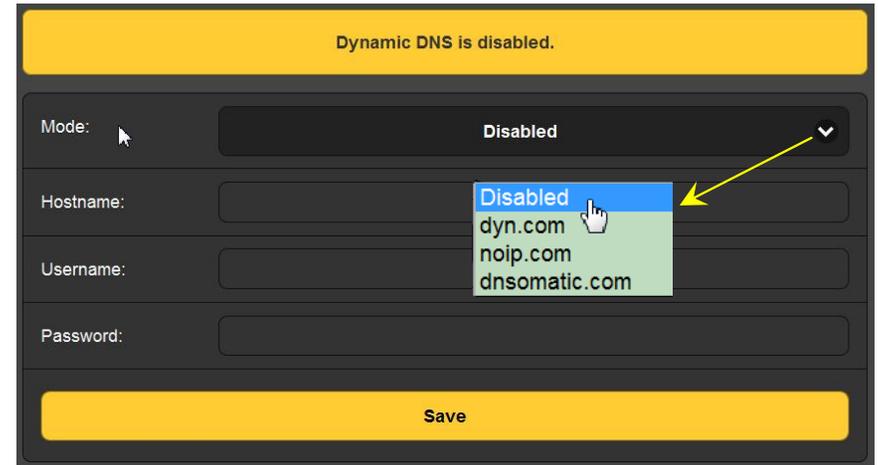
Dynamic DNS

It would not be possible to address equipment behind a dynamic IP address if it were not for IP-forwarding providers available on the Internet. Their services, which are either free or at very modest cost, will allow your SiteStreamer™ to apprise the forwarding provider of its reassigned IP address each time that address is updated by the ISP. The IP-forwarding provider intercepts data attempting access the SiteStreamer™ with an old address, and replaces that IP address with the updated one.

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

In the example on the next page, the dynamic DNS function is shown Disabled. But if you click on the arrow to the right you'll see the drop-down list of the three popular providers. Jot down these provider names and enter each in your Web browser to learn more about their services, and to register with whichever provider seems best to meet your needs.

When you register, the provider will issue you a Hostname, (not to be confused with the Hostname of your SiteStreamer™), Username and Password.



Click on the provider you have chosen, and then type the information into the appropriate boxes on the Dynamic DNS Web interface screen. Follow with a Save. This will allow you to access your SiteStreamer™ when it is behind a dynamic IP address.

SNMP Operation

SNMP, or Simple Network Management Protocol, allows other TCP/UDP/IP equipment on the same Local Area Network (LAN) to communicate directly with the SiteStreamer™, and for the SiteStreamer™, itself, to initiate an alarm on the network.

The SiteStreamer™ will interface directly with a network controller, technically known as the SNMP 'Manager.' The SiteStreamer™ incorporates an embedded ASCII text file called a Management Information Base, or MIB. In setting up for SNMP operation, the MIB file is downloaded from the SiteStreamer™ and uploaded to the SNMP Manager.

Click: SNMP to bring up the window shown on the following page.

The default mode for SNMP is Disabled, which inhibits communication between the SiteStreamer™ and the SNMP Manager. Click the arrow to the right of Disabled to view operating choices in the drop-down menu.

SNMP Settings

Mode: Disabled ▼

Read Community: public

Write Community: private

General Port: 161

Traps Port: 162

Trap Destination 1: 0.0.0.0

Trap Destination 2: 0.0.0.0

Trap Destination 3: 0.0.0.0

Save

Changing Mode: to Read Only allows the SiteStreamer™ to be interrogated by the SNMP Manager, so that SiteStreamer™ settings, metering, RDS/PAD data and alarms can be read and integrated with other equipment on the network.

Disabled

Disabled

Read Only

Read & Write

With Mode: set to Read & Write, the SNMP Manager can send commands to the SiteStreamer™. Other equipment can then change the station and adjust other setup parameters.

SNMP ‘Communities’ serve as passwords for this function. Go into the Read Community: and Write Community: boxes to enter text that is specified for the read/write strings on the SNMP Manager monitoring device. As with similar text-entry screens, execute a Save after entering.

When the SiteStreamer™ initiates an alarm, rather than being queried or polled for one, the alarm is known as a ‘trap.’ You may enter three local network IP addresses as Trap Destinations, each corresponding to other devices on the LAN to be apprised of alarms.

The default SNMP Ports, General Port 161 and Trap Port 162, are customary assignments for the majority of SNMP operations. These may be changed as required by typing-in new values.

The MIB File

The MIB file is a small text (.txt) file that is read by the network controller (the SNMP Manager). To download and read this file yourself, click: [Download MIB](#). The MIB file is in plain text and may be saved in the usual Windows manner, and read with Windows Notepad.

Email Preferences

Enter the email server settings and email addresses for the various recipients of email or SMS text messages here on the Email Preferences menu page. These entries determine ‘who gets it and how.’ However, the alarm preferences for email notifications, or ‘who gets which alarm message’ are set on the Alarms and Notifications menu page. This is described with the alarms discussion on Page 23.

This example shows typical setup for an SMTP mail server.

SMTP Server: smtp.office356.com

Port: 465

SSL: On

From: INOmini638

User: SiteStreamer@kyup.com

Password: ●●●●●●

Recipient 1: 7145551212@txt.att.net

Recipient 2: sam@kyup.com

Recipient 3:

Mail server settings vary, but essentially you create a separate email account for your SiteStreamer™. The User: name can be anything you like, and will actually be the formal name of the sender. But with most email clients, emails from the SiteStreamer™ are received with the sender identified by the ‘friendly’ name: INOmini 638 – 95.9 (or whatever frequency the unit is tuned to when the message is sent).

Recipient 1: and Recipient 2: in this example are the SMS/text message and email addresses, respectively, for the station’s Chief Engineer.

When this utility has been set up, click: Save at the bottom of the page to commit this information to memory. You may also click: Send test Email to dispatch a confirming test message immediately to all recipients.

Timekeeping

Open the Time & Time Zone Web interface screen to set up the internal timekeeping functions. Correct timekeeping is essential for time-stamping alarm notifications and for meaningful Alarm Log listings.

Select your offset from Universal Coordinated Time (or Galactic Interstellar Time in other solar systems) using the Time Zone (Hours): slider. When this is set correctly, local time will show at the top of the window. You may make allowance for Daylight Saving Time here too. Choose either the automatic function, fulltime DST, or disregard DST altogether by leaving both boxes unchecked.

The Time Server defaults to the US Government Web-based time authority, but you may enter an alternative Server: if you know a better one. Be sure to click: Save at the bottom of the window to commit you choices to memory.

SiteStreamer™ Password

The Admin Web screen allows you to set up a SiteStreamer™ password. Simply type the password into the Password: field, click: Save, and the click: Enable. You’ll immediately be prompted with a pop-up window asking for a User Name: and Password:. The User Name: is optional and may be left blank as it is not used with any other SiteStreamer™ function at this time. Just enter your new password in the Password: field. This pop-up will greet you each time you launch the SiteStreamer™ Web interface pages. Again the User Name: is optional.

If you lose or forget your password, you must perform a ‘hard reset’ (see below). This will purge all setup and other information from memory. To obviate this inconvenience, we recommend periodically downloading and saving a Hardware Profile, which retains all the setup data and can be uploaded back to the unit. This procedure is described on the next page.

Now, the old, lost password is part of the Hardware Profile, so you must edit this file before restoring it to the purged SiteStreamer™, otherwise you’ll be back to where you started. The snapshot at the right shows the very bottom of the Hardware Profile where the administrative data is held. Note the numeral ‘1’ marked with the arrow. This shows that the password is enabled. Use MS Notepad or another text editor to change the one to a zero. This turns password protection off. Re-save the edited file. You can now do a hard reset of the SiteStreamer™ and then upload the edited Hardware Profile. This will restore your previous settings, and you will even be able to see the old password, which you may use or replace.



Hard Reset

A hard reset will purge all setup information from memory. Please see the Hardware Profile discussion that follows to save settings and restore them to the SiteStreamer™.

To perform a hard reset, hold down the MENU knob while power-cycling the unit. Remember: this restores the SiteStreamer™ to ‘factory-fresh’ condition; you will lose all setup information.

The Hardware Profile

The entire SiteStreamer™ setup, which includes receiver setup choices, alarm parameters, alarm notification preferences and SNMP options, may be saved to your computer as a small text file.

The Hardware Profile is useful for restoring a previous setup or for ‘cloning’ a second unit for backup service. Click: Download Hardware Profile to save the profile to your system. Depending on your browser and version, the file will normally be saved to a Downloads folder unless you are asked

for a specific 'save to' location. The file has a default name of 638settings.ini.txt.

To upload a saved Hardware Profile to your SiteStreamer™, first click: Browse... to locate the saved profile on your computer, and then click: Upload Hardware Profile. This will replace all setup parameters that are currently loaded and running in your unit.

Section V

UPDATING THE SITESTREAMER™

The Firmware Updater

The SiteStreamer™ is host to two operating files that may be updated easily by the user in the field. These files are the primary firmware, which controls the functions, memories and Web interface of the unit, and the individual Web pages that comprise the Web interface screens.

The SiteStreamer™ includes a 'bootloader' utility that allows firmware to be updated whenever Inovonics issues changes to add features, to improve performance, or otherwise to expand the usefulness of the product. Inovonics supplies firmware updates free of any additional charges.

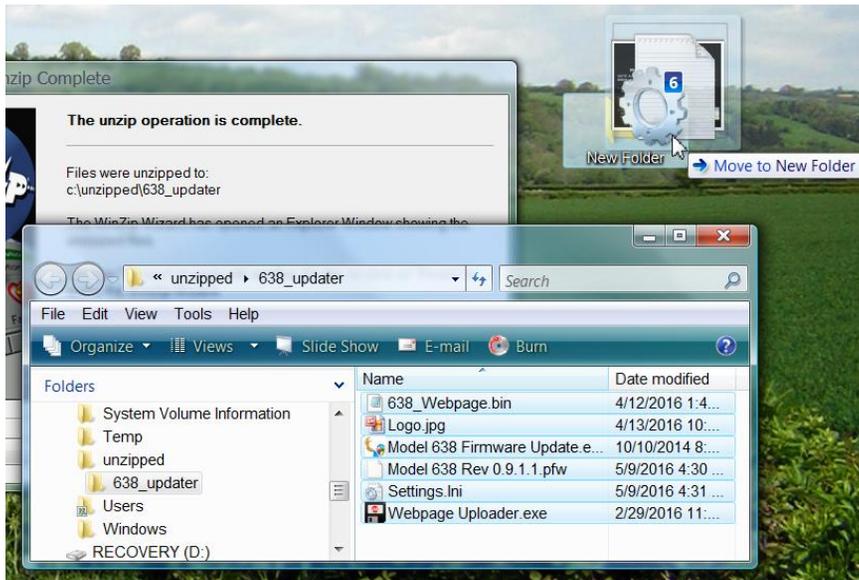
A bootloader is a simple software routine that runs on any PC connected to the same network as the SiteStreamer™. Refer to Page 15 for securing a connection between the SiteStreamer™ and your computer. This *must* be a wired, LAN connection for both the PC and for the SiteStreamer™. Attempting to use a Wi-Fi link will almost always fail.

Warning

A firmware update will restore the SiteStreamer™ to factory defaults. *All settings and presets will be overwritten!* Always save a Hardware Profile (Page 32) before proceeding with an update. This will retain all user setup parameters that can be restored afterward.

Update Files

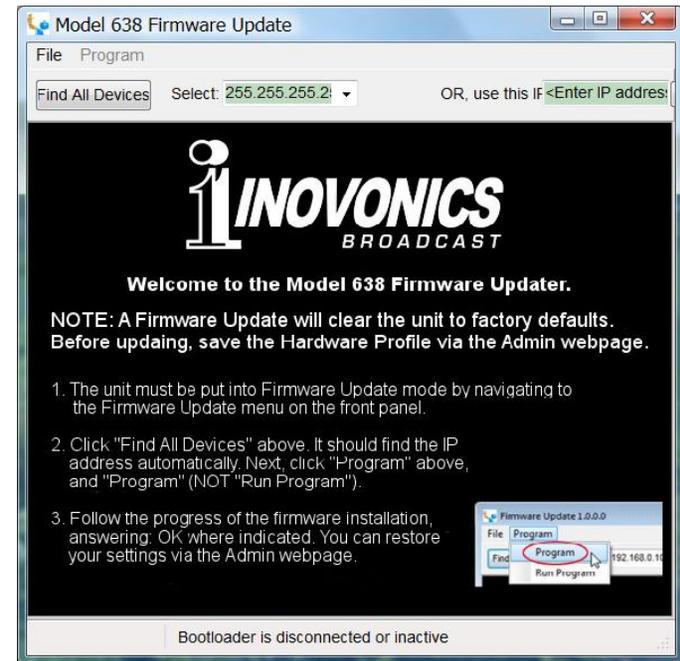
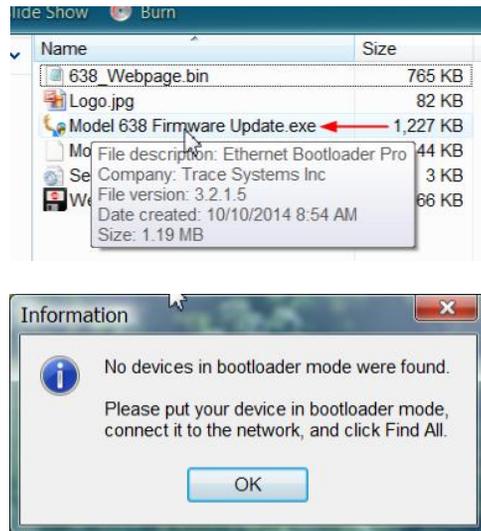
A firmware update will be supplied as a 'zipped' folder containing a number of files. Make a temporary New Folder on your PC Desktop and unzip these files to it as shown at the top of the next page.



One of the supplied files is the third-party bootloader utility, an 'executable' (.exe) file. Because executables are notorious for propagating viruses, many antivirus programs will not allow .exe files to be downloaded and will urge you not to install them. But we insist that you trust us, glibly throwing caution to the wind.

Firmware Update

Navigate to your temporary Desktop folder (New Folder) and double-click the Firmware Update.exe file. This is the file marked with the arrow in the upper snapshot. This will bring up the Information message in the second snapshot, advising that the Firmware Updater does not yet find your SiteStreamer™. Click: OK to start the updating utility anyway and to display its main screen, shown at the top of the next page.

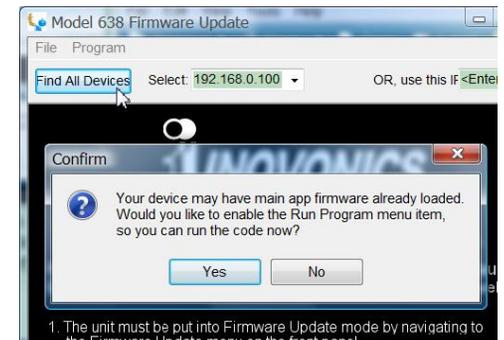


The bootloader window outlines the firmware update process in three easy steps. The first step advises that the SitesStreamer™ must, itself, be in the 'bootloader' (Firmware Update) mode.

Hold down the front-panel Menu knob until 638 Firmware pops-up on the front-panel LCD. Next, turn the Menu knob to the next screen: Update Firmware. Push the knob and select YES, and then push the knob again. This will bring up Loadine Bootloader on the LCD.

Click: Find All Devices at the top of the Firmware Update window. Look for the SiteStreamer™ IP address to populate the Select: area, and for a Confirm box to pop-up on the screen as well.

The Confirm box is a 'watchdog' feature included in the third-party bootloader utility, but it is not pertinent to the SiteStreamer™ update procedure.

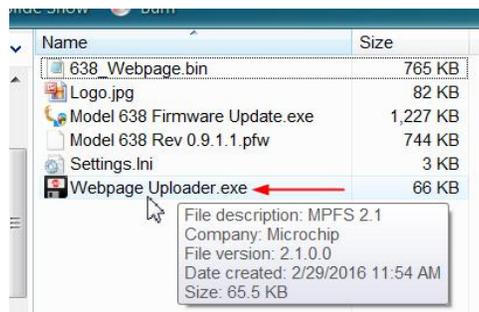


Click: No in the Confirm box to close it, and then click: Program at the top of the window, and finally click: Program, the first item in the drop-down list. The update utility will run and then return the SiteStreamer™ to normal operation with factory-default values. You may then upload a Hardware Profile to reclaim all user setup parameters (Page 32).



Updating Web Interface Pages

If a new version of firmware calls for a Web interface page update, there will be an extra Webpage Uploader.exe file in the Firmware Update folder (New Folder). The arrow in the snapshot at the right points to this file.



Immediately after the firmware update is bootloaded, while the SiteStreamer™ is in communication with your computer, return to the New Folder and double-click the Webpage Uploader.exe file. Click: Update on the screen that appears and the existing Web interface pages will summarily be replaced with the new ones.

Section VI TECHNICAL MATTERS

Firmware Version

With the SiteStreamer™ powered-up, hold the knob down for 5 seconds or so. The menu screen you have been viewing will be replaced by the 638 Firmware screen. This shows the firmware version installed in your unit, information that may prove important when communicating with the factory. Push the knob again to return to the normal menu sequence.

'Under the Hood'

The SiteStreamer™ is compact and sophisticated, utilizing mostly surface-mounted (SMD) components. Many of these 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.

Having said that, our policy has always been one of 'full disclosure.' We feel that, unless we are doing something nefarious (or acting in the interest of national security!), 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 SiteStreamer™ for factory servicing, firmware upgrades, etc. is an option that we encourage. Inovonics has never considered factory repair charges a significant source of revenue, and we are confident that you will be astonished at how reasonable our rates actually are!

(NOTES)

(MORE NOTES)

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. The Warranty Registration Card supplied with the product *must* be completed and returned to Inovonics, or the Warranty registered 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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— www.inovonicsbroadcast.com —

Serving the broadcast industry since 1972