INOmini 647

AM SiteStreamer™ II

Installation & User Guide

April, 2025 – Initial Release

INOVONICS BROADCAST
www.inovonicsbroadcast.com

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Section I

INTRODUCTION

Product Description

The Inovonics family of SiteStreamers™ receive local broadcast stations off-air and stream program audio and signal metrics over the Internet to any location worldwide. This allows station personnel to monitor programing and transmission issues when away from the station or traveling.

The INOmini 647 is Inovonics' second-generation SiteStreamer™ for AM broadcasts. Its browser interface permits total remote operation and audio monitoring, and displays signal parameters and audio levels. Failure alarms are logged and can be dispatched instantly as an email notification.

Product Features

Features of the SiteStreamer™ include:

- Tunes both North American and European AM broadcast frequencies.
- Easy setup and operation with remote control of all operational features. It features full SNMP support and easy remote firmware updating.
- RF signal and program audio level alarms with logging, plus instant alarm text and email messaging to selectively alert designated personnel immediately.
- Built-in Scheduler for day/night power/pattern change or daytime-only operation.
- Selectable IF and demodulated audio filtering to optimize listening comfort.
- HE-AACv2 audio streaming via the dynamic Web interface for up to 10 simultaneous listeners; independent UDP streaming for 'skimmers' or audio loggers.
- The independent stereo AUX stream allows A/B comparison of source and air audio, or alternately can be used to transport a separate stereo audio feed.
- Accurate front-panel and remote Web-interface program audio level metering.
- Front-panel headphone jack.

Product Specifications

Tuning Range: 520kHz–1710kHz in 10kHz steps; 522kHz–1701kHz in 9kHz steps.

Antenna Input: 75-ohm (F), unbalanced.

Receiver Sensitivity: 40dBµV for 50dB SNR.

Audio Response: ±1dB, 50Hz–8kHz at maximum IF and audio-cutoff settings.

Audio De-Emphasis: NRSC 'truncated-75µs' curve, in/out selectable.

IF Filter: Defaults to "Auto" (SNR-controlled), or may be set manually between 15kHz and 5kHz in 1kHz steps.

Audio Filter: LPF turnover defaults to "Auto" (SNR-controlled), or may be set manually between 8kHz and 1kHz in 1kHz steps.

Audio Streaming: Utilizes HE-AACv2 codec. Stream may be switched to select off-air (radio output) or an independent AUX mono, dual-mono or stereo program source.

Program Line Input: Active-balanced (XLR) left/right analog AUX inputs accept program peak levels between –15dBu and +15dBu.

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

Headphone Jack: Front-panel 3.5mm (TRS) with menu-enabled volume control.

Alarms: Off-Air Audio Loss, AUX Input Audio Loss, Low Signal (with day/night settings) with adjustable level and timing parameters. Alarms are logged and can also send instant email notifications.

Power Requirement: 12VDC at 350mA (2.1mm x 5.5mm coaxial connector); 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; blanking panels and 'daisy chain' power cabling are included. The 647 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 in the event that return for Warranty repair is required. Shipping damage sustained as a result of improper packing for return may invalidate the Warranty!

Warranty Registration

Please complete the Warranty Registration process. Not only does 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/firmware updates. Register online at:

https://www.inovonicsbroadcast.com/support/productregistration

Mounting

The 647 SiteStreamer is packaged in a compact 'clamshell' chassis that defines the standardized module in the INOmini series of products. The 647 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 allow the 647 to be fastened to generic equipment rack shelves with two #4 screws.

An optional INOmini 1U rack-mount kit is available from Inovonics. The rack kit can hold up to three INOmini modules, and is supplied with blanking panels for unused spaces, along with two 'daisy-chain' power cables so that two or three INOmini modules can share a single power supply, current capacity permitting.

AC Mains Power

All Inovonics INOmini modules are supplied with an outboard, inline switching-type power supply compatible with any destination mains voltage. The actual power consumed by the 647 SiteStreamer is 350mA 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 SiteStreamer products will frequently be co-located with broadcast transmitters and other 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 647.

Headphone Jack

The front-panel headphone jack will accommodate stereo headphones with a 3.5mm stereo plug of virtually any impedance. When headphones are plugged in, the LCD menu will automatically bring up to the `Headphone Vol` screen. The front-panel knob adjusts the listening level, and when the volume has been set at a comfortable point, push the knob to return to the previous menu.

Rear Panel Connections

ANTENNA — The 647 antenna input is a US-standard 75-ohm F connector. Adapters to other RF connector formats are readily available, as are premade cables of various lengths.

ANALOG LINE INPUTS

These 'AUX' XLR female inputs accept stereo program audio at program peak levels between –15dBu and +15dBu. Levels may be adjusted from the front panel or remotely. Please see further details on this feature on the next page.

VERY IMPORTANT: AUX inputs have limited headroom and will clip approximately 3dB above the 0dB metering mark. For consistency in loudness when switching monitoring between the off-air signal and the AUX inputs, these analog inputs should be hard-limited, just as the off-air signal is hard-limited to 100% modulation. Adjust the front-panel AUX Input Ref: or Web interface AUX Ref (dBu): controls to avoid input clipping.

LAN PORT

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

+12VDC POWER I/O

Two paralleled 'coaxial' power connecters allow 'daisy-chaining' INOmini modules. Two short 'pigtail' power patch cables are provided with the Inovonics INOmini rack adapter.

The 647 draws 350mA. Check the label on the power supply to make sure that it is rated to accommodate all modules it must support.

These power connectors do not lock, and the mating plugs pull-out rather easily. A Ty-Wrap® will secure the cables to the plastic anchor above the power jacks if this proves a problem.

Antenna Considerations

The reception of AM broadcasts is subject to, and seemingly always fraught with, both man-made and natural sources of electromagnetic interference. In the case of the 647 Site-Streamer, this fact of life is mitigated to some extent by the

product's intended use, where it is frequently installed in a favorable reception area for the station(s) to be monitored.

Nonetheless, a good antenna system should always be provided. Not only will this improve the remote listening experience, but will also ensure that RF and audio metrics accurately represent what is being broadcast.

The rear-panel ANTENNA input of the 647 is able to accept a wide range of antenna impedances, from amplified whips or loops with 50-ohm outputs, to a relatively short passive whip antenna. A passive whip or random-wire antenna should be connected through a short, low-capacitance coaxial connecting cable. A broadband passive loop antenna should be of very low inductance so that the primary resonance of the antenna and its feedline lies well beyond the top of the AM broadcast band.

For single-frequency reception, a tuned loop with a low impedance tap or secondary winding may prove useful, although the high-Q, tuned-circuit properties, common in such antennas, may restrict reception bandwidth.

AUX Channel Notes

At first glance it may appear that two audio streams are simultaneously available: the Radio audio monitor feed, and the AUX stereo monitor channel. This is not the case, however. Level metering and alarm conditions are transported simultaneously for both sources, but streaming audio for listening is either one or the other, as selected by the front-panel Source: menu or by clicking the loudspeaker icon in the Webpage interface page headers.

The primary utility for the Radio/Aux switching arrangement is to allow an A/B comparison between the off-air signal and the program source, preferably the processed audio that is feeding the transmitter. But the ability to transport stereo audio to a remote location does suggest other possible uses of the 647. Do keep in mind, however, that there is only one stream. Levels and alarms are transported simultaneously, but you can't use both audio feeds at the same time.

Another thing to remember is that the level, alarm and other data arrives at the remote location very quickly. The streaming audio for listening can lag the metrics by many seconds, depending on the digital pathway.

Section III

SITESTREAMER™ II SETUP

Once network communication has been established, SiteStreamer setup is most conveniently performed using a computer. A few basic setup functions are made available from the front-panel, and you well may have to use this method to establish initial communication.

Front-panel LCD menu screens will be described in order, beginning with the 'home' screen at full counterclockwise rotation of the knob. Menus that can be edited will be identified as editable in the discussion subheads.

Flashing Alarms

The 647 has alarms that indicate and log transmission fault conditions. Alarms are displayed locally by the front panel LCD, which flashes red and spells-out the fault. Multiple alarms display sequentially. Pushing or turning the knob gives you a 10-second respite from the flashing so that you can navigate among menus for front-panel setup options.

Menu Navigation Basics

The menu tree is really quite intuitive. Quite simply: 1) *turn* the knob to navigate from one menu to the next, 2) *push* the knob to enter any menu that allows editing from the front panel, 3) *turn* the knob to choose an option or to set a value, and then 4) *push* again to accept the selection and return to menu navigation.

The callouts for menu items that can be edited will blink at a rapid rate when you push the knob. Don't confuse *blinking* callouts with a *flashing*-red-screen alarm mentioned above.

Each 647 SiteStreamer menu screen will be discussed separately and in order, except that the last menu is discussed first, as it could conceivably be a show-stopper!

Locked Menus (Menu Screen 14 - editable)

To guard against inadvertent menu editing or casual tampering, the

very last menu in the sequence allows the user to lock the knob out of the editing mode. If you find that when you push the knob you are unable to enter an editable menu, scroll all the way to this very last menu screen. Push the knob and the word Menus will begin blinking. Turn the knob to select Menus:Unlocked. Push the knob again to set this selection, and then navigate back to whatever screen you had been attempting to edit. You may go back and relock the menus when you're finished.

Tuning the Radio (Menu Screen 1 - editable)

When power is applied to the 647, a product-identifying 'splash screen' pops-up on the LCD. Within a few seconds this will revert to Menu Screen 1.

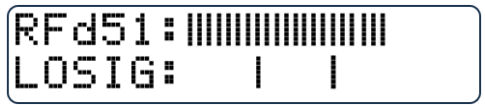
To tune the radio, push the knob and FREQ will begin to blink. Turn the knob to set the receive frequency, and then push the knob again to return to menu navigation.

The top line of Menu Screen 1 shows the frequency of the station in kilohertz. The second line displays RF 'bars' that give a coarse indication of incoming signal level.

Carrier Strength and Alarm (Menu Screens 2 and 3 - editable)

There are two editable screens relating to the RF signal strength trip levels and their alarms. Screen 2, RFd, pertains to the setup for daytime operation. Screen 3, RFn, is optionally available for a separate nighttime alarm setup for stations with sunrise/sunset power changes. Although day and night signal level setup may be made manually from the front panel, Webpage setup accesses alarm timing options, as well as being an easier setup method (see Page 21).

The RFd bargraph on the upper line of Screen 2 shows the incoming signal level. The numerical value, 51 in this case, represents 51dBµV at the antenna connector.



The editable LOSIG: scale has a pair of tic marks off to the right. These refer to the RF Low Signal alarm, which is best set up using the Web interface, as alarm on/off timing parameters are not addressable from the front panel.

To set trip levels (only), push the knob. LO and the left tic mark will begin blinking. Turn the knob to position the left tic mark anywhere beneath the RF bargraph, the corresponding dBµV numerical alarm trip value is also displayed. The RF: bargraph falling below this point during normal receiver operation initiates a carrier-loss alarm.

As a starting point, you might set the carrier-loss trigger point about two-thirds of 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. HI and the right tic mark will blink. Turn the knob to set the tic mark to a point that the carrier level must rise to and remain above to reset the alarm, perhaps several segments above the left tic mark. Push the knob again to set these points in memory and release the menu.

The setup procedure for Screen 3, RFn for nighttime operation, is identical. And again, LOWSIG alarm settings are best accessed through the Web interface, along with the setup of other fault alarms that can dispatch email and text messages. Webpage setup for alarms is detailed beginning on Page 21.

Signal-to-Noise (Menu Screen 4)

This screen displays SN, a first-order approximation of the signal-to-noise quality of the tuned RF signal. The numerical readout simply corresponds to the number of bargraph segments. This is a "more is better" indication that does not truly relate to program audio SNR in dB. RF and SN numbers can be useful as relative indications when positioning the receive antenna. In locating and aiming the antenna, do everything you can to maximize both RF and SN.

Radio/AUX Monitor Switching (Menu Screen 5 - editable)

The 647 not only monitors the off-air broadcast, but can alternatively monitor, and simultaneously meter, the level of a mono or stereo AUX analog program audio feed applied to rear-panel XLR connectors. This would, for example, enable A/B comparison between the air signal and the program audio feed to the transmitter.

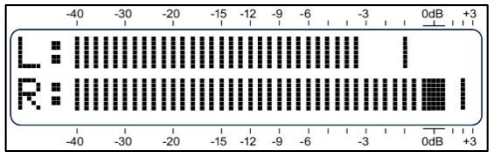
The primary and default Source: monitor mode is the Radio signal received off-air. Push the knob and turn it to switch to the AUX Input analog program source.

The rear-panel jacks accommodate left and right channel stereo program audio at *peak* (not 'nominal' or 'VU') line levels between –15dBu and +15dBu. Press the knob a second time and Ref will blink. Turn the knob to match the peak level of your program signal. In the illustration, the program audio applied to the rear-panel jacks has a peak level of +10dBu.

NOTES: The AUX Input channel clips just 3dB above the adjusted Ref: figure. Set up as shown, program peaks exceeding +13dBu would distort. It is assumed that audio fed to the rear-panel jacks will be peak-limited. Keep this headroom limitation in mind when making your Ref: setting.

Do please note the earlier discussion of the AUX program channel and possible limitations on Page 8.

Program Audio Metering (Menu Screen 6)



Menu Screen 6 is a bargraph readout of program audio levels. This is a peak-responding meter with a floating peak-hold function. L: and R: represent the left and right channels for the Source:AUX Input mode illustrated here. Both channels will display identically for the monaural Source: Radio.

When monitoring Source:Radio, the large block opposite the 0dB marking on the panel represents 100% symmetrical carrier modulation. The meter resolves +1, +2 and +3dB above 0dB. From 0dB down, it's 0.5dB steps to –6dB, then 1dB steps to –20dB, and finally 2dB steps to –40dB.

The Source:Radio measurement is based solely on recovered off-air audio, including selected IF and any subsequent audio noise filtering. A low frequency (250Hz) test-tone modulation at 100% should take meters to the 0dB point. By no means should the 647 ever be considered a modulation monitor. Aggressively-processed program audio will peak the bargraphs consistently at 0dB, and peak excursions

beyond that point can be attributed to asymmetrical modulation to the +125% limit (about +2dB).

Networking Mode and IP Address (Menu Screen 7 - editable)

The IP networking address may be set on this Menu Screen, though using the Webpage interface makes setup of all networking parameters a good deal easier.

Push the knob and Mode will blink. Select either Mode:DHCP or Mode:Static IP as dictated by your networking needs. With a Mode:DHCP selection, the IP address is automatically assigned by the router/server and cannot be changed manually.

Select Mode:Static IP and push the knob again to enter a fixed IP address manually. The first existing 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 release the menu.

HTTP Port (Menu Screen 8 - editable)

The default port assignment here is the commonly-used Port 80. The port number shows on the second line of Screen 8.

To change this port assignment, push the knob to enter the setup field as described for Mode: setup. Leading zeroes will display, just push the knob repeatedly to reach each digit you need to reset. When the last digit is set, press the knob one final time to commit the selection to memory and release the menu.

Gateway, Subnet Mask, Primary DNS (Menu Screens 9, 10, 11 - editable)

These three screens are available only when Mode:Static IP is selected under Menu Screen 7. The Gateway:, Subset Mask: and Primary DNS: are entered manually in exactly the same manner as described for Screen 7.

MAC Address (Menu Screen 12)

The MAC (Media Access Control) address for any piece of hardware with IP connectivity is a factory-set fixed value unique to that specific piece of equipment. Screen 12 displays the MAC Address: of your individual SiteStreamer and cannot be changed.

Headphone Monitoring (Menu Screen 13 - editable)

A front-panel PHONES jack offers convenient audio monitoring for SiteStreamer setup and casual listening. Plugging a pair of headphones into the front-panel jack automatically brings up LCD Menu Screen 13. Headphone 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 you'd been looking at.

Section IV

SITESTREAMER™ II WEB INTERFACE

Connecting Locally

Connect both the INOmini 647 and a computer to your local network. We'll assume DHCP operation for this exercise.

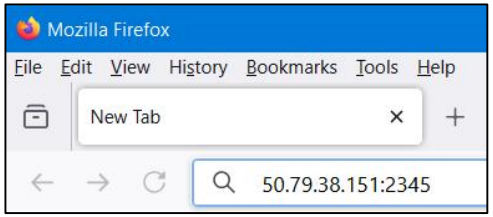
Go to Menu Screen 7 and jot-down the IP address that your router/server has assigned.

Typing the IP address into a browser will give you access to the 647. Alternatively, on your LAN you may also type the Hostname followed by / (a forward slash) into your browser address bar. The default Hostname for the 647 is MODEL647, so you can address it we have done so here. (See additional Hostname: notes on Page 27.)

Remote (Internet) Access

To access it from the Internet, the 647 must be assigned a static IP address. If your router makes DHCP assignments for other equipment on the network, just assign the 647 a static IP that is outside the router's DHCP range.

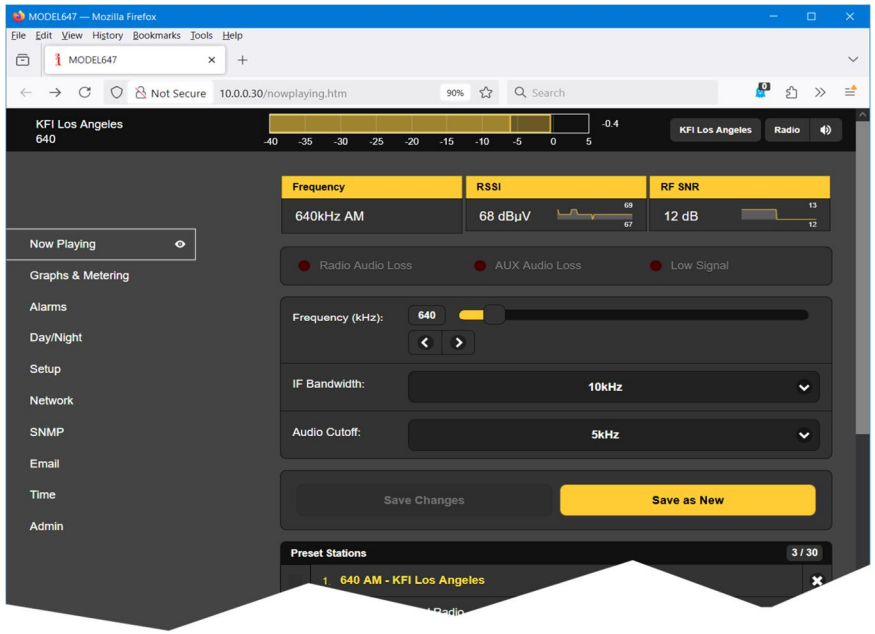
If your Internet Service Provider (ISP) assigns you a static IP address to your LAN, it's a relatively simple matter to address the 647 externally. Your router does first require to be set up for port forwarding. Then you simply type the IP address and port number into your browser as pictured here.



But if your ISP issues a *dynamic* IP, which is quite often the case, this mandates 'Dynamic DNS' operation using the services of an IP-forwarding provider. This is an operation you should entrust to your IT department, though explanations and instructions are available from multiple Web resources.

Now Playing

Open a browser window on your computer and type the IP address of the 647 into the browser's address bar. In short order the main Now Playing Web interface page will appear on your screen.

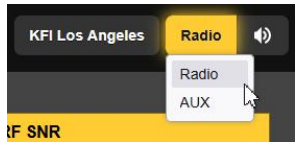


Webpage Header

A header at the top of the page and the Menu list on the left are common to each of the 647 Web interface pages. The header shows the tuned frequency and station call or description, audio level metering, station presets (when programmed), the monitoring source and the remote listening button. All 647 Webpages will be described here individually as listed in the Menu on the left side of the screen.

Remote Listening

Click the loudspeaker icon in the header to monitor audio through your computer or device browser. The default source is the off-air Radio signal, shown on the button to the left of the loudspeaker icon. Click that button to hear the AUX stream. Level metering in the header follows the monitoring selection.



The 647's listening utility is more to confirm the presence of audio than to allow a critical assessment of off-air audio quality. Encoding, decoding and latency of the listening audio will depend in large degree on the connection path and network quality. Audio latency may be several seconds, even locally on your LAN, but remote control and audio levelmetering should be quite quick. Keep in mind that listening and the associated level metering may be well out of sync.

Radio Metrics

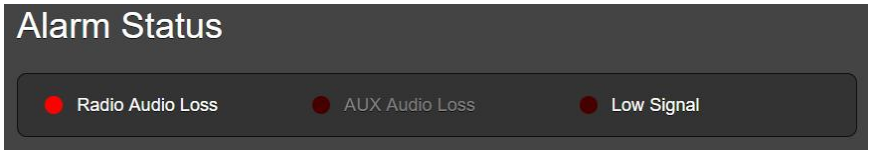
The next row of data shows the station Frequency and signal qualities of the incoming off-air signal, accompanied by small rolling graphs that display the measurements over the past 30 seconds. Graph numerical scaling adapts to represent the high and low values over the 30-second time period.

RSSI is the same measure of signal strength labeled RF on front-panel Menu Screens 2 and 3. The numerical value is signal level in dBµV at the antenna terminal.

RF SNR is described on Page 11, and labeled SN on front-panel Menu Screen 4. Although expressed in dB, this measurement is not a true indication of off-air audio SNR.

Fault Alarms

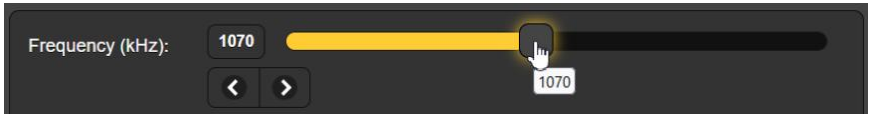
Simulated red LEDs alert the user to alarm conditions. Alarm explanations and setup procedures begin on Page 21.



Alarms that have been user-enabled will show a bright white callout here, and the simulated LED will glow when the alarm is tripped. The Low Signal LED responds to both day and night setups. Alarms that have not been enabled are grayed-out. (Front-panel alarm display was detailed on Page 9.)

Radio Setup

The SiteStreamer receiver may be tuned remotely in four ways.



1: Grab the 'slider' with your mouse and, holding down the mouse button, drag the slider back and forth as suggested in the illustration.

2: Highlight the slider (single click) and then use keyboard ▶ and ◀ cursor keys to step the frequency up and down.

3: Click the on-screen › and ‹ buttons to step tuning up and down.

4: Highlight and overtype the Frequency (kHz): number with a valid AM channel frequency and press Enter.

Saving stations as Preset Stations is discussed shortly.

IF Bandwidth: is selectable to help mitigate certain reception issues. The default setting here is Auto, which automatically factors-in reception metrics to maintain the widest clean passband. Click the bar to reveal a pull-down menu to select the bandwidth manually as may be required. Bandwidth settings are saved in memory, *specific to the station being received,* when that station is saved as a preset.

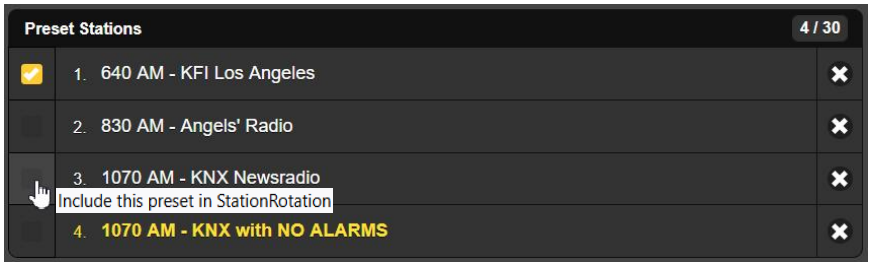
Audio Cutoff: is another variable that can be called into play, again to help reduce noise or other reception issues that a particular preset station may demand. The default Auto setting gives the widest audio response consistent with reception conditions. Again, a pull-down menu allows stricter response curtailment. Audio Cutoff: settings are saved in memory, *specific to the station being received,* when that station is saved as a preset.

Station Presets

Stations are saved as Presets by tuning-in the desired frequency, making reception-related selections and assigning various alarms for that station, and then clicking the Save as New button. You will be prompted to enter a 'friendly ID' for that station, an identifier that will also show in the header when that station is tuned.

When a Preset is tuned, and then any following changes are made to alarm or reception-related settings, the station ID on each Webpage header will revert to Not a Preset. You will be prompted to click the Save Changes (Preset ··) bar. If you do not save the changes, those changes will be lost and the memory will revert to whatever values had previously been saved.

Alternatively, you may Save as New after making changes if, for example, you wanted one preset for the station with alarms enabled, and another for that same station with alarms turned off. You can even make a short notation when saving (under Save Station) to remind you what's different. Remember, alarms and other setup parameters are *saved with that station* in Preset Stations memory.



StationRotation™

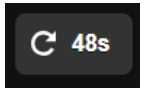
StationRotation describes a function of the 647 that allows sequencing through any or all of the saved Preset Stations entries in the order listed, and at a rate selected by the user. This might allow a station group engineer to receive alarms from multiple stations in a given market.

NOTE: Placing the 647 in StationRotation will inhibit manual tuning! Front-panel station selection will be inhibited and Now Playing and Alarms setup sections will be grayed-out and unavailable.

There is a checkbox ahead of each entry in the list of Preset Stations. Check the box of any and all stations you wish to place in sequenced reception (see example, above).

Begin StationRotation by setting Enable: to On. You also need to program the Rotation Time (Sec):. This takes some thought, as there are alarm setup considerations when using this feature. Alarms have Time On (Sec): and Time Off (Sec): settings that have to be factored into the Rotation Time (Sec): setting. See the Alarms discussion beginning on Page 21.

The Status: display gives a second-by-second countdown of remaining rotation time. This countdown also appears in the header of each Webpage when Station Rotation is enabled, as shown here.



Graphs and Metering

The Graphs & Metering Webpage gives high-resolution metering presentations of audio levels. The fast-acting level meters include a peak-hold function, and the held peaks are also displayed numerically in dB to the right of each bargraph.

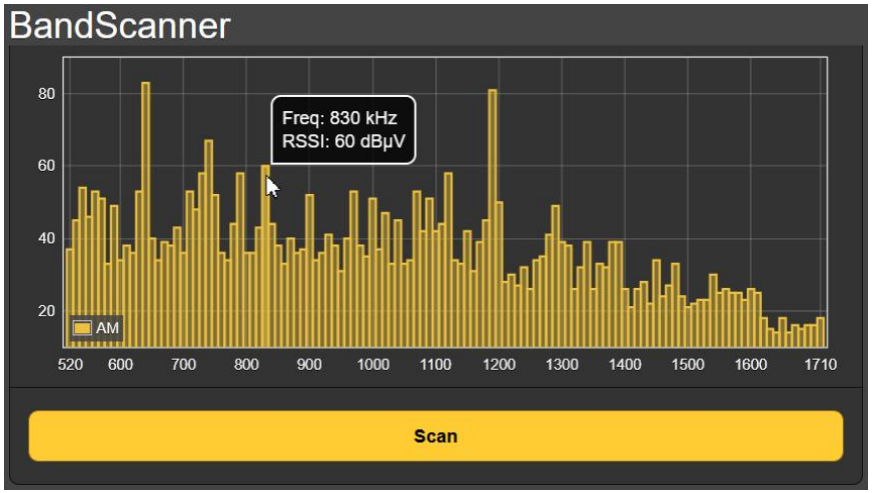
The Radio meter is a peak-responding readout of the off-air program audio. Keep in mind that the audio streamed from the 647 may encounter significant delay, so don't expect correlation between visual metering and the streamed audio.

The stereo AUX channel levels are shown simultaneously with the Radio channel. AUX channel headroom is limited, thus program peaks should never exceed 0 (zero) on the AUX level meters. Although AUX meter scaling extends to 5 (+5dB), they will top-out at 3, +3dB being the internal headroom limit.

The BandScanner™

The BandScanner is a useful utility of the 647, it displays the RF spectrum of the entire AM broadcast band. To initiate a scan simply click the Scan bar.

NOTE: The band scanning process will interrupt measurements and mute audio monitoring during the scanning cycle. Alarms are inhibited for the duration of the scan.



Above is a typical AM band scan plot. Figures at the left of the plot represent RSSI in dBµV at the antenna terminals. This level scaling is adaptive, changing automatically to accommodate the highest signal level in the monitored market.

In the example scan, stations show up as vertical yellow lines poking-up above the noise floor. As you hover over a line with your mouse, the station FREQ: and its RSSI: level pop-up per the illustration. Clicking on a bar will tune the radio to that frequency immediately.

Alarm Basics

The Alarms setup area is a very useful and important aspect of the 647 Web interface, but requires some forethought.

The time-stamp feature for email alarm notifications, and in the Alarm Log, depends on an internal RTC (Real Time Clock) synchronized with Internet time. A proper time zone offset and DST relationship are maintained by the RTC, and correct time setup should be confirmed before alarm setup is considered complete. RTC setup is detailed on Page 30.

647 alarms have similar threshold and timing setup requirements. Thresholds have two points to set. The first is the 'low' threshold point that the measured value must fall *below* to trigger an alarm, and then a second 'high' threshold point that the measured value must *return to* for the alarm to reset. This creates hysteresis in the alarm level settings, preventing 'chattering' as a metered value wobbles around the set points. This holds true even if the two thresholds set with only a small difference.

The other common alarm parameter is 'on' and 'off' timing; that is, how long the metered value must remain *below* the low threshold point before an alarm is triggered, and then how long it must remain *above* the high threshold for the alarm to reset. These settings will depend entirely on whether you want to be apprised of a short-term fault, or if the condition has to remain for a greater number of seconds before it is considered valid and the alarm triggers.

Alarms (Global) vs. Alarms (Per Preset)

Alarms (Global) is a classification specific to the AUX Audio Loss alarm. 'Global' signifies that the settings for this one alarm have no association with any off-air radio station.

Alarms (Per-Preset), on the other hand, means that each station that is a Preset Station has its own independent 'family' of alarms. In other words, each station that you assign to a preset memory slot must have its alarm parameters set up for the conditions of that station only. Those alarm setup

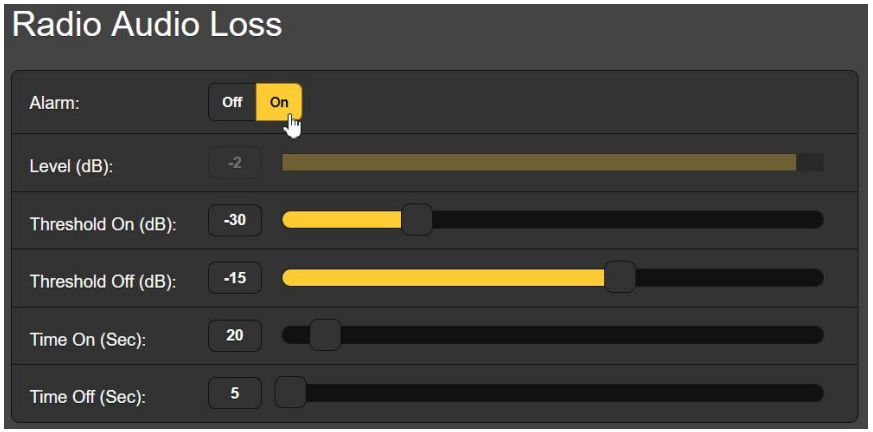
parameters remain resident in that station's memory slot and will pertain when that station is selected.

Alarm Parameters

Both *level* and *time* alarm criteria apply to the Radio Audio Loss, the AUX Audio Loss, and the Low Signal (Day) and Low Signal (Night) alarms. These four alarms display a grayed-out dynamic bargraph measurement of the current, real-time values to guide you in establishing threshold points.

A Radio Audio Loss alarm should be thought of as a "dead air" alarm; that is, an alarm for an unmodulated carrier… for reasons to be explained shortly.

An example setup of the Radio Audio Loss alarm panel is shown below. Refer back a few paragraphs if you missed the explanation of alarm level and time criteria, otherwise setup should be obvious.



1. The Alarm: has been enabled by clicking the On button.
2. The grayed-out, off-air audio program peak Level (dB): is indicated in real time as consistently hovering near 0dB, or 100% modulation.
3. Threshold On (dB): has been set to -30, meaning that the program peak level must fall *below* -30 to qualify as a level that is too low.
4. Moreover, the Time On (Sec):, set here at 20, means that the program peak level must not only fall, but *remain below* -30 for 20 seconds to actually trigger the alarm.

5. Threshold Off (dB): has been set to -15, meaning that the program peak level must rise *above* -15 to qualify as a valid normal-modulation level.

6 Moreover, The Time Off (Sec):, set to 5, means that the program peak level *must stay above* -15 (dB) for 5 seconds for the alarm to reset.

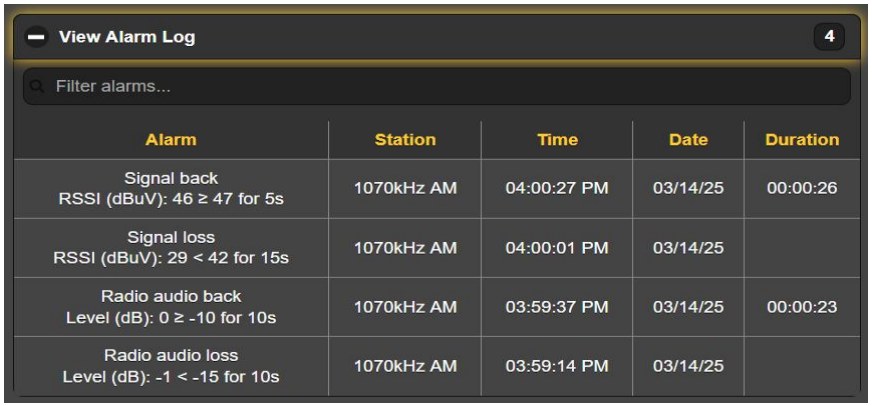
AUX Audio Loss alarm setup is exactly the same as for the Radio Audio Loss alarm just described.

Low signal alarm programming, for Low Signal (Day) or Low Signal (Night), has the same level and time setup criteria as the audio loss alarms, but it features an added Mute: function.

Mute: On mutes the off-air audio during a low signal alarm condition. This will automatically initiate an Audio Loss alarm for a low (or missing!) carrier. With Mute: turned Off, chances are that the radio's aggressive AGC would likely pump-up background noise of the vacated frequency and prevent a Radio Audio Loss alarm from triggering when the station goes completely off the air. Mute: should be programmed at your discretion, depending on your circumstances.

Alarm Logs

The 647 logs all alarms, each with the station identified, the nature of the alarm, and with date, time and duration stamps. The logging utility can send emails Daily, Weekly or Monthly as a small .csv file attachment. It can also send an alert when it has reached a certain memory capacity. The log is capable of holding an almost-infinite number of alarm events, but you may wish to go in and clear it every now and then.



Once the alarm log has accumulated some events, open the log by clicking the + next to View Alarm Log at the bottom of the screen. This brings the log contents onto your screen.

The most recent event appears at the top of the report, and each alarm is shown along with the criteria for its action.

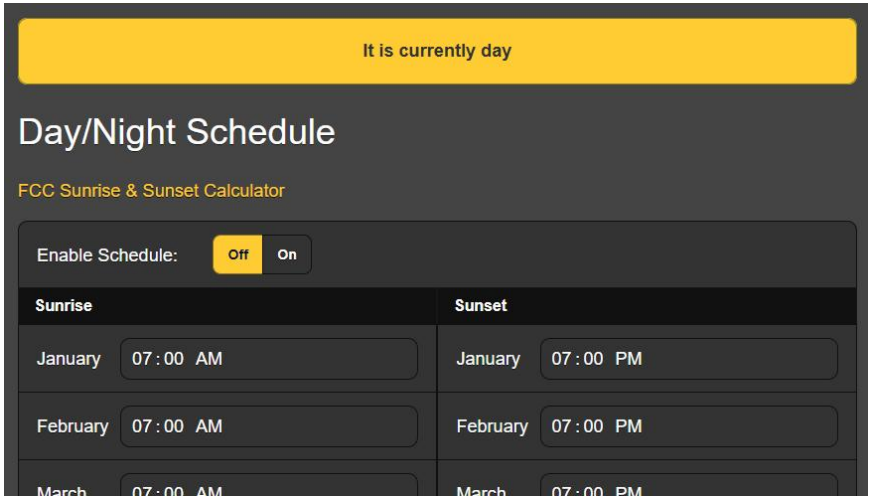
A particularly useful feature of the alarm utility is its ability to send instant email notifications, and to send those notifications selectively to appropriate station personnel. Setup of this feature is covered under the Email Notifications subheading on Page 29.

The Day/Night Scheduler

The 647 SiteStreamer has an internal scheduling utility to switch low-signal alarm parameters to accommodate day and night transmitter power or pattern settings. Aside from SNMP selection, the Scheduler is the only means of switching the unit between day and night operation, as no manual control or tally line is provided for this function.

NOTE: In using the Scheduler, it is important that the 647's internal real time clock is in sync with Internet time, as described on Page 30.

Opening the Day/Night Webpage will give access to the Scheduler matrix, partially shown here.



You'll see that Sunrise and Sunset times may be entered into this matrix for each month of the year. Correct times for your location may be obtained by clicking: FCC Sunrise &

Sunset Calculator just above the matrix. This will take you to the FCC Database, where you will need to enter the latitude and longitude of your transmitter site to obtain correct figures to plug into the matrix, replacing the factory-default 07:00 AM and 07:00 PM entries.

When all fields are filled, set Enable Schedule: On at the top of the matrix, and unless you are a daytime-only station, then just click Save at the bottom of the page to transfer your entries into SiteStreamer memory.

Daytime-Only Considerations and Night Actions

For daytimers, Night Actions at the bottom of the matrix give the option of 'muting' (inhibiting) all alarms and muting the audio once your station signs-off for the night. You still must enter Sunrise and Sunset times in the matrix per the FCC Database. At the appointed Sunset time, when your station goes off-air, *the 647 SiteStreamer will essentially go to sleep* until Sunrise the next day. Audio and alarms will be muted, but metrics will remain active and visible.

NOTE: Scheduler Night Actions Mute: On/Off setup is a 'global' parameter. Once enabled (On) to silence alarms and audio for daytime-only operation, Night Actions muting will apply to the monitoring of *any* off-air source. *Alarms and audio will be muted after Sunset for any and all stations.*

Once you have filled-in the matrix and set Mute: to On, click the Save bar to commit your settings to memory.

Miscellaneous Setup

The Setup Webpage lists a number of miscellaneous setup items that fall into housekeeping categories.

Under Radio, choose the AM channel spacing for your location: 10kHz tuning steps for North America and some other areas, and 9kHz steps for Europe and environs.

AUX Settings is the level-scaling adjustment for the stereo AUX streaming utility, AUX Ref (dBu):. A separate and independent program feed applied to the LEFT and RIGHT channel ANALOG LINE INPUTS on the 647 rear panel must be scaled in level to remain below the streaming codec clipping point. Set the AUX Ref (dBu): adjustment slider so that its associated numerical readout matches the input program peak level. For example, if your input audio peaks at +10dBu, you would set the AUX Ref (dBu): slider to 10. Once properly

set, the grayed-out AUX Level (dB): meter should rarely, if ever, exceed 0 (zero). This is important, as the codec clips just 3dB above the indicated zero level (+3 on the meter scale). Peak levels, in this case, refer to true program peaks, not just the maximum point that a VU meter attains.

Stream settings first address the streaming codec, which currently complies with HE-AACv2 protocols. Sample Rate: may be set either to 44.1kHz or to 48kHz, per system requirements, and Bitrate (kbps): to any figure between 18 and 64 kilobits per second as dictated by network quality and conditions.

The HTTP/Icecast Stream has two setup options. Audio Latency: allows the user to introduce additional delay in the program audio streaming path. While this may seem counterintuitive, additional delay may help overcome deficiencies of an uncertain network connection. Rather than allowing network latency to degrade packet transmission, purposely introducing an intentional delay of a few seconds gives the system time to reassemble the data with fewer errors, sacrificing just those few seconds of listening delay.

Although the 647 is able to accommodate as many as 10 simultaneous HTTP/Icecast Stream Web listeners, the number of listeners may be truncated in the interest of better streaming service to fewer authorized listeners. The Max Listeners: slider can be set between 0 and 10.

The 647 can also accommodate casual listening without Web interface privileges. To permit others to just listen to the stream, without any ability to make settings changes, simply type the full IP address of the 647 (including a specific port number) into a browser address bar, followed by /stream. For example: http://50.250.276.100:1567/stream. Nonetheless, competent hackers may well see through this ruse and gain access to the Webpages and their setup options.

An independent UDP Stream is available concurrently with the HTTP/Icecast Stream for sending audio to remote equipment, such as loggers and 'skimmers.' The Transport: format can be either ADTS or ADTS in MPEG-TS. Data are sent to the IP Address: and Port: indicated when Enable: is set On.

Once modified, Stream settings must be saved by clicking the Save bar. This resets the utility, disconnecting any current Web listeners who must then log back on.

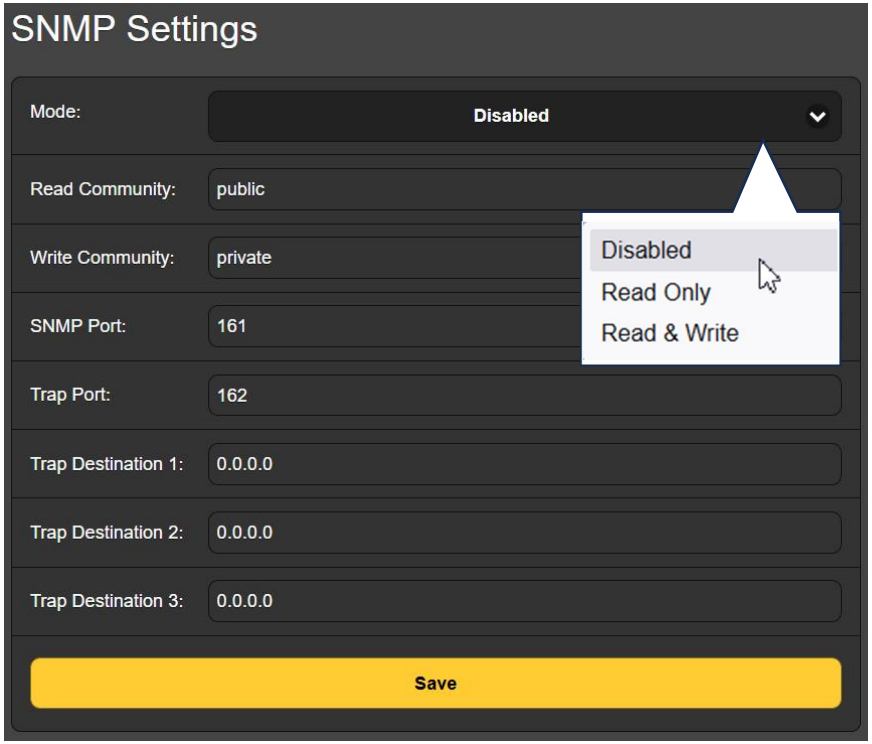
Network Setup

The Network Webpage displays the current networking setup. Some entries are 'grayed-out' when the 647 Mode: is under automatic DHCP assignment. When using a Static IP, however, this Web interface is a far user-friendlier means of entering networking parameters than from the SiteStreamer's front panel.

Hostname: is the 'friendly' name of the 647 that shows up on the Webpages interface browser tab and in remote browser address bars. This can be changed as required; for example, to differentiate one 647 from another on the same network, usually in conjunction with an alternate HTTP Port: assignment.

SNMP Operation

SNMP (Simple Network Management Protocol) allows other TCP/UDP/IP equipment to communicate directly with the 647, and for the 647 to be able to initiate an alarm on the network. The SNMP setup field is shown here.



The default mode for SNMP is Disabled. This inhibits communication between the 647 and SNMP gear. A pull-down menu shows operating choices.

Mode: Read Only allows the 647 SiteStreamer to be interrogated by the SNMP Manager so that 647 settings, metering, and alarms can be read and integrated with other equipment on the network.

Mode: Read & Write further allows the SNMP Manager to send commands to the 647, permitting other equipment to change the station and adjust setup options.

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.

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

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 that need to be apprised of 647 fault alarms.

NOTE: Once all SNMP Settings are complete, or following changes to any individual one, click: Save.

The MIB File

The 647 interfaces with a network controller, or SNMP 'Manager.' The 647 has a resident, embedded ASCII text file called a 'MIB' (Management Information Base).

The MIB File is a small text (.txt) file that is read by the SNMP Manager. To download and read this file yourself, click: Download MIB at the bottom of the page. The MIB file is plain text and may be read using Windows Notepad. Copy, save and use the file in the usual Windows manner.

This has been an abbreviated discussion of SNMP operation. SNMP is a complex utility managed exclusively by whatever SNMP Manager (monitoring equipment) is employed. Refer to all instructions supplied with, and for, the SNMP Manager hardware and/or software in setting-up the 647.

Email Notifications

The 647 SiteStreamer can send email notifications of reception faults to one or more recipients. Which alarms go to whom is explained in this subsection.

NOTE: The time-stamp feature for email notifications and the Alarm Log depends on a network connection to sync with Internet time, along with setting the proper time zone and other options (see Page 30).

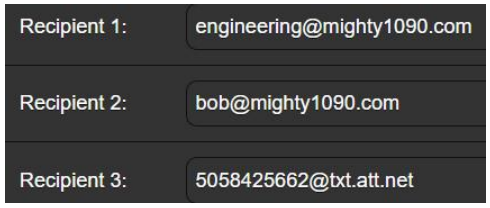
You need to set up an actual 'personal' email account for the 647, a procedure just like setting up any conventional email account. The email account may use you own domain, if security settings permit this, or can be a Gmail or other free, 'utility' account. Information to be entered here depends on the provider you choose. When you apply for the account, much of this information will be assigned to you. Consult your IT professional for setting up email accounts.

On the Email Webpage, under SMTP Server:, enter the provided outgoing mail server info (e.g.: smtp.gmail.com), the required Port: number and whether TLS: is On or Off.

From: is the 'friendly' name that identifies your SiteStreamer to the email or text recipient. You could use station call letters, or something like Streamer Alarm. User: is the full email address of the unit. You'll want to assign a Password: to the account.

Email Recipients

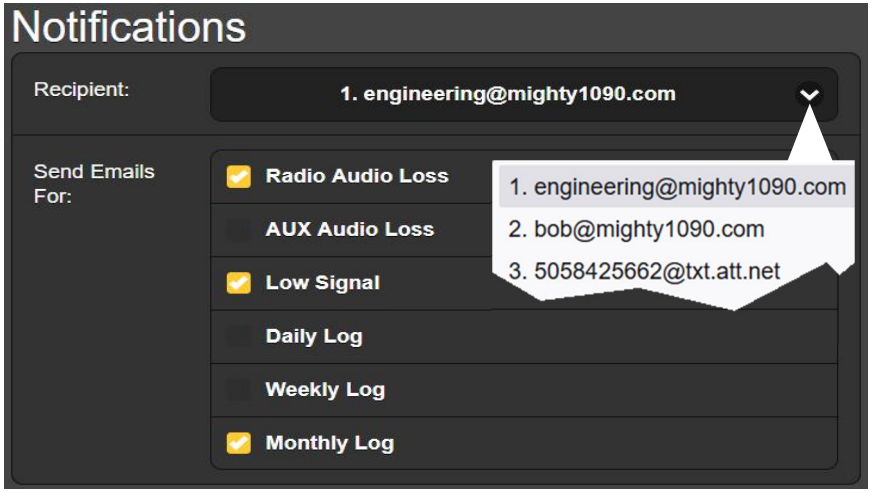
You can enter up to ten potential email recipients, typing-in their full email addresses. These recipients will be numbered, and each may be assigned individualized alerts.



Email addresses will take the form of Recipient 1: shown here. It may also be possible to send a text message to a recipient's mobile phone, using an email-to-text utility provided by the mobile carrier or by a third party. In that case the entry may look something like the Recipient 3: example. Further information on sending email notifications to a mobile phone can be found on the Web, or you can check with the wireless carrier to ascertain availability and the proper addressing protocols for direct, Web-texting delivery.

When all recipients have been entered, click Save. You may also click Send Test Email, which will memo-message all recipients to confirm proper communications setup.

Notifications setup is easy. Once recipients are listed under SMTP Settings, select the email and/or text message recipient from the pull-down list and check the alarms for that person to receive. When finished, click Save at the bottom



In this example, station Engineering will receive email notifications of Radio Audio Loss and Low Signal, plus an emailed Monthly Log of all alarms for that period. Other personnel can be programmed to receive notifications for these same or any other combination of alarm conditions

Timekeeping

Open the Time Webpage to set up the internal timekeeping functions. Correct timekeeping is essential for day/night scheduling, for time-stamping alarm notifications and for meaningful Alarm Log listings.

Select your offset from UTC (Universal Coordinated Time) with 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 as well. Choose Off to disregard DST altogether, On for fulltime DST, or Auto to accept seasonal changes automatically from the Time Server.

The Time Server defaults to a Web-based time authority pool, but you may enter an alternative Server: if desired. Status:

indicates the Last sync: (internet time update), which also shows that Internet communications is working properly,

Be sure to click: Save to commit timekeeping choices to memory.

The Admin Screen and Passwords

The Security heading under Admin allows you to set up a password tier for the 647 SiteStreamer Webpage interface. A Web Admin Password (Read/Write): is required to do 647 setup or to make any subsequent changes or adjustments. A Web User Password (Read Only): allows that user to look at, but not change, any variables within the Webpages.

Type the Web Admin (Read/Write): password into that field and click: Save. You'll get a pop-up window asking for login credentials; leave the Username field blank and type your Password into its field, and then click Sign In. At that point you may create a Web User Password (Read Only): entry in the same manner. Click Save when finished.

A password can be changed or purged, simply by overtyping or clearing the entry and doing a Save.

If you lose or forget your password, you'll have to perform a 'hard reset' from the front panel of the unit as instructed below. *This will purge all setup and other information from memory.* To obviate the inconvenience of having to set the unit up from scratch, we recommend periodically downloading and saving a Hardware Profile, which retains all the setup data that can later be uploaded back into the unit.

NOTE: You may find yourself with this situation in the Hardware Profile setup-recovery process. The old, lost password is part of the Hardware Profile that you have previously saved. If that profile were immediately loaded into the 647, you'd be back where you started, still locked-out and needing to do another Hard Reset. The final paragraphs under The Hardware Profile tells how to purge passwords from the saved profile.

Hard Reset

A hard reset can be performed only from the front panel of the 647 and *will purge all setup information from memory.* Please see The Hardware Profile discussion that follows to save your settings and allow you to restore them to the purged 647.

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

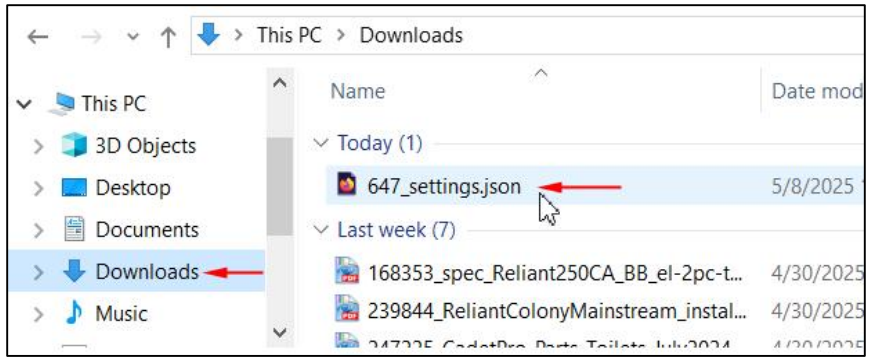
The Hardware Profile

The entire 647 SiteStreamer setup, which includes radio presets and setup choices, alarm parameters, alarm notification preferences, SNMP options and passwords… all this 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.

Under Configuration on the Admin Webpage, 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 647_settings.json.

To upload a saved Hardware Profile to your SiteStreamer, first click: Select Hardware Profile… to browse and locate the saved profile on your computer. Then, with the .json file highlighted, click: Upload Hardware Profile. This will replace all setup parameters that are currently loaded and running in your unit.

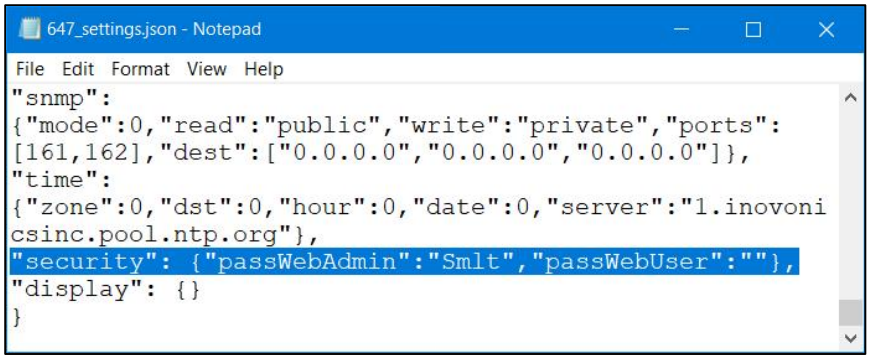
Now, here are the steps required to eliminate the old password from the Hardware Profile.



1. Locate the .json Hardware Profile file that you want to upload back into your 647. This may either still be in your Windows Downloads folder, or a folder set-aside for incidental data files.

2. Right-click the .json file and then click Open with > Notepad.

3. Scroll to the very bottom of the file and locate and highlight the line of text beginning with **"security":**, just as that line is highlighted below:



4. Delete the highlighted line of text.

5. At the top of the Notepad window, Click File > Save, and then close Notepad.

Now you may upload the Hardware Profile without fear of being locked out.

Section V

UPDATING THE SITESTREAMER™ II

The Firmware Updater

The 647 SiteStreamer hosts operating files that may easily be updated by the user in the field. These files are the primary firmware that controls the functions, memories and Webpage interface of the unit.

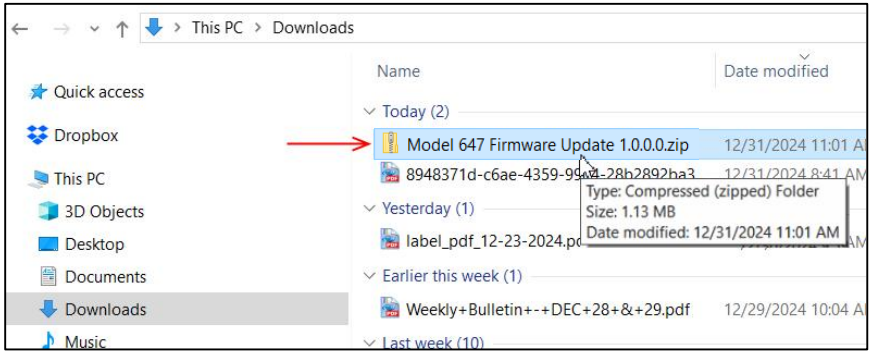
A built-in 'bootloader' utility allows firmware to be updated whenever Inovonics issues changes to add features, to improve performance, or otherwise to expand the usefulness of the product. In truly altruistic fashion, Inovonics supplies firmware updates free of any additional charges.

Warning

A firmware update *may* restore the 647 to factory defaults, in which case *all settings and presets would be overwritten!* The changelog, included with the firmware update, will indicate whether this is a danger or not. Always save a Hardware Profile (Page 32) before proceeding with an update. This will retain all user setup parameters for later restoration.

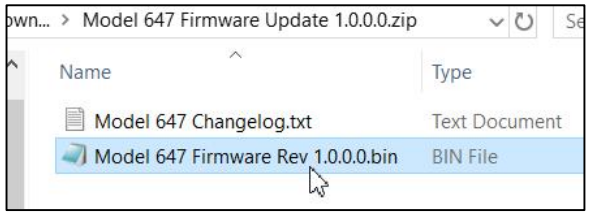
Update Files

A firmware update will be supplied as a small .bin file, part of a ZIP-file update folder. When downloaded from the Inovonics website, the ZIP file should reside in your Windows system Downloads folder as shown below.



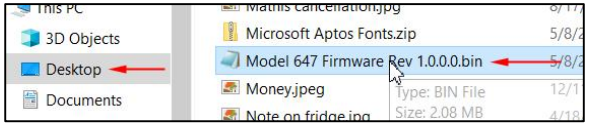
Either 'Save as' or drag the update ZIP folder to your Windows Desktop, and then double-click the ZIP folder. This will unzip

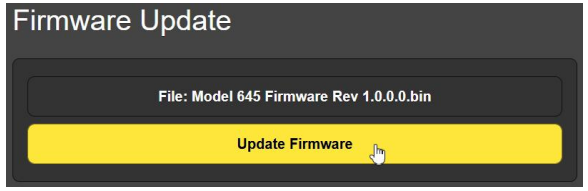
the folder, revealing the .bin update file, plus a changelog text file and perhaps other information pertinent to this update. Drag the .bin update file out of the ZIP folder and place it at another spot on your Desktop.



Now bring up the 647 Admin page and scroll down to the Firmware Update section. Click Select Firmware File… , which will open a Windows Explorer window.

In this window, navigate to the Desktop and locate the .bin file you have just placed there. Double-click this .bin update file. It should then show up in the Firmware Update pane as illustrated here. Finally, click Update Firmware and the entire process should be completed in about one minute.





From the Admin Webpage you may bring a copy of this manual up on your screen. You can also check the Serial Number: and Firmware Rev.: of your 647, and even view the Uptime:, or how long your unit has been running since the last boot-up.

Section VI

TECHNICAL MATTERS

Firmware Version

With 647 powered-up, hold the knob down for a few seconds. The menu screen you have been viewing will be replaced by the `647 Firmware` screen. This shows the firmware version installed in your unit, information that may prove important when communicating with the factory.

LCD Tint Options

With the `647 Firmware` screen showing, turn the knob once more and you'll find a utility to change the background color of your front-panel LCD display. Push and turn to change the red, green and blue values. The factory defaults are `R:255`, `G:40`, and `B:10`.

Turn back to the `647 Firmware` screen and push the knob again to return to the normal menu sequence.

'Under the Hood'

The 647 SiteStreamer is compact and sophisticated, with a predominance of surface-mounted (SMD) components. Many of these are application-specific, and all of them 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.

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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