MODEL 677

AM/FM/NOAA Triple Tuner

Installation & User Guide

November, 2023 - Rev. 1 Firmware

EAS
Emergency Alert System

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

INOVONICS
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www.inovonicsbroadcast.com

TABLE OF CONTENTS

Section I

INTRODUCTION

Product Description

Inovonics' 677 Triple Tuner incorporates three independent radio tuners, each capable of AM, FM and WB (Weather Band) reception. With primary utility as an off-air monitor receiver for EAS and NOAA emergency broadcasts, the 677 responds to the emergency alert tones as defined by the US Emergency Alert System and the US National Weather Service.

NOTE: The 677 **does not** respond to or decode the characteristic SAME "chirps-and-screeches"; that is, the digitally-encoded data associated with the specific alert. It does, however function as a stable and dependable radio receiver and audio source for connected equipment that does decode and interpret these digital data.

Product Features

Features of the Inovonics 677 include:

- Three sensitive DSP-based (SDR) tuners that stay on-frequency through signal and power interruptions.
- Easy initial, local setup using the OLED menu and jog-wheel. In addition, Internet access via the internal Webserver provides expanded remote setup and operation control, SNMP implementation and remote audio monitoring.
- Front-panel alarms with assignable rear-panel GPO tallies for Alert Tones, Low Signal, Audio Loss and RDS PI mismatch. All alarms are logged and can dispatch individually-directed emails or SMS texts to appropriate station personnel.
- Precise metering of RF signal and audio levels, including graphic history plots of RF and audio levels for all three tuners for later diagnostic analysis.
- Independent balanced analog monaural outputs from each tuner with adjustable audio levels.
- Front-panel headphone jack with volume control can monitor any of the three program sources.
- When issued, free firmware updates are quickly and easily installed in the field.

Product Specifications

Reception Modes: AM and FM per worldwide broadcast practices. WB (Weather Band) conforms to the US National Weather Service Instruction 10-1712 (April 20, 2022)

Antenna Input: Separate 'F' antenna connectors for each tuner; input characteristics per reception mode as follows:

   FM: 50Ω; usable for both 50Ω and 75Ω antenna feeds.

   AM: High impedance; suitable for local short wire antenna or a 50Ω 'house' feed with an external terminator (if required).

   WB: 50Ω; suitable for a local whip antenna or 50Ω and 75Ω antenna feeds.

Tuning Ranges:

   FM: 64.0MHz-108.0MHz in 100kHz steps.

   AM: 520kHz-1710kHz in 10kHz steps or 522kHz-1692kHz in 9kHz steps.

   WB: 162.40MHz-162.55MHz in 25kHz steps.

Receiver Sensitivity and Noise (with IF and audio bandwidth mitigation set to Auto)**:**

   FM: 3dBµV for 50dB monaural SNR

   AM: 40dBµV for 50dB SNR.

   WB: −3dBµV for 40dB SNR (Re: ±5kHz carrier deviation).

Audio Squelch: Selectable Auto-Mute function can silence the audio output during a Low Signal Alarm condition.

Audio Bandwidth (with IF and audio bandwidth settings at maximum values)**:**

   FM: 20Hz-15kHz, ±1dB; normalized for either 50µs or 75µs de-emphasis.

   AM: 50Hz-6.5kHz; normalized for NRSC de-emphasis and measured per NRSC-1-C Standard, ¶6.3.

   WB: 100Hz-3kHz, ±1dB (normalized for de-emphasis per NWSI 10-1712).

Audio De-Emphasis:

   FM: 75µs or 50µs (selectable).

   AM: NRSC 'truncated' 75µs per NRSC-1-C (fixed).

   WB: Per NWSI 10-1712 (fixed).

Reception Optimization: Each tuner performs RF signal-quality assessments and can offer bandwidth-constraint settings for each reception mode. The factory-default is 'Auto,' although user-selectable settings for IF and audio passbands are available.

Program Audio Outputs:

   Balanced Analog: (XLR) balanced, monaural for each of three tuners; level adjustable between –15dBu and +15dBu in 0.1dB steps relative to 100% carrier modulation.

   Front-Panel Headphone Jack: (3.5mm TRS) with adjustable listening volume.

   Audio Streaming: Any one of the three tuners may be selected to stream an HTTP Icecast and an independent UDP stream. The Icecast stream may be monitored by up to ten listeners concurrently, including using the internal Webserver for audio monitoring through any Web browser on any device.

Alarms:

   Audio Loss: Alarm trigger/reset thresholds and on/off delay intervals are independently programmable. Levels are set with reference program audio quasi-peak values.

   Low Signal: Alarm trigger/reset thresholds and on/off delay intervals are independently programmable. Levels are set with reference to the incoming RF level (RSSI).

   PI Error: An RDS PI alarm is triggered either by loss of the PI identifier or by a mismatch between the expected PI code and the code received off-air.

   Alert Tone: This alarm responds to the 853Hz/960Hz tone pair (AM/FM) or the 1050Hz Warning Alarm Tone (WB).

General Purpose Outputs (GPOs): Six individual open-collector NPN transistor closures to ground have programmable logic polarity and serve as alarm 'tallies.' Each may be individually assigned to any single alarm function of any tuner. GPOs can sink 200mA at a maximum of +24VDC.

**LAN Port:** (RJ45) The 677 interfaces with the Internet via a Local Area Network.

Power Requirement: +12VDC at 750mA. A universal 100-240VAC inline switching power supply is supplied.

Mounting Options: An optional rack adapter accepts one or two half-rack modules in a 1U, 19-inch rack space.

Size and Weight: 1.6"H x 8"W x 6.5"D; 4 lbs. shipping weight.

Operating Environment: 32°F/0°C-122°F/50°C; 0%-95% non-condensing relative humidity; 10,000ft/3048m.

Conformances:

CE   EN50081-1, EN50082-1, 93/68/EEC

✔RoHS   2002/95/EC
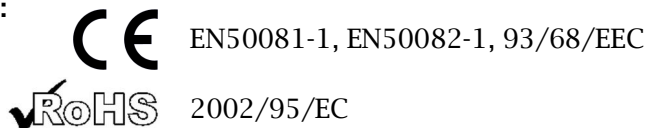
Section II

INSTALLATION AND CONNECTION

Unpacking and Inspection

Immediately upon receiving your 677, inspect for possible shipping damage. If damage is found or suspected, first notify the carrier and then contact Inovonics.

We recommend that you set aside the original shipping materials 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 do complete the Warranty Registration process. Not only does registration assure coverage of the equipment under terms of the Warranty (printed inside the back cover of this manual), but the user automatically receives any specific operating or service instructions and firmware updates. You may register online at:

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

Mounting

The 677 AM/FM/NOAA Triple Tuner is packaged in a compact half-rack chassis. An optional rack-mount kit is available that can house one or two half-rack units (or up to three of the INOmini product series). The kit comes with blanking panels for unused space, and with 'daisy-chain' power pigtails that allow multiple units to share a single power supply.

AC Mains Power

Inovonics one-half-rack and one-third-rack (INOmini) modules are powered from the external 12VDC adapter, a universal 100-240VAC inline switching-type power supply supplied with the 677. The actual power consumed by the 677 is 750mA. A second, paralleled DC connector allows the user to 'daisy-chain' modules. This means that two or more units may be fed from the same AC adapter, but with the caution that the total input power specification of a given rack-mount pair (or trio) must not exceed the DC current rating noted on the power supply label.

Alternative Power Options

The 677 may optionally be powered by a 12VDC battery backup system. The nominal input voltage should never exceed 15V, and protection should be afforded against voltage surges from charging circuits.

Radio Frequency Interference (RFI)

Although we have anticipated that the 677 will be used in the proximity of other radio gear, please practice reasonable care in locating the unit away from *abnormally* high RF fields.

Antenna Considerations

For EAS monitoring, the 677 is best served with outdoor antennas specific to assigned frequency band. For FM reception, the antenna connector assumes a characteristic that will give a good match to either a 50Ω or a 75Ω antenna and feedline.

AM broadcasts may often be received with just a short length of wire, or with a small loop of the type sometimes provided with better consumer receivers. The tuners have a high-impedance input characteristic in the AM mode, so if the receiver is to be fed from a 50Ω distribution amplifier, best practice would be to place an inline terminator between the feedline and the 677s antenna connector.

In the Weather Band (WB) reception mode, the antenna connector assumes a characteristic that will give a good match to either a 50Ω or a 75Ω antenna and feedline.

Weather Band reception can be problematic. The NOAA Website gives hints for optimizing Weather Band reception:

www.weather.gov/cae/reception.html

The Front-Panel Display and Menu Knob

The front-panel MENU knob (jog wheel) scrolls the OLED display through various viewing and programming options. However, a good number of features may be accessed only by using the Webserver interface. Section III of this manual covers the easy setup and programming instructions.

Headphone Jack

The front-panel mini phone jack will accommodate stereo headphones with a 3.5mm stereo plug of virtually any impedance. When headphones are plugged in, the OLED menu will automatically switch to the Headphone Volume screen, allowing you to select the listening source and adjust volume. Once you have set volume to a comfortable level, push the knob to return to the previous menu.

Rear Panel Connections

ANTENNA / TUNER	The three individual tuner antenna inputs are common US-standard 75Ω ohm 'F' connectors. Inexpensive, ready-made cables of various lengths are common in this format, as are adapters for other RF connector types. Note **Antenna Considerations** on the previous page.
GPO	These are alarm "tally" outputs. Each GPO is software-assignable to any tuner for reception issues or emergency alerts. The plastic connector body may be unplugged from the chassis to make connection and quick disconnect easier.
	Alarm outputs are the collectors of NPN transistors that saturate to ground. Output polarity is programmable, giving either a ground or an open circuit for an alarm condition. These outputs can sink up to 200mA to operate relays or LED indicators using an external voltage source up to 24VDC, which must be returned to the G (Ground) terminal. The current-limited +5V terminal may be used to light LEDs or opto-couplers.
ANALOG OUTPUTS	Each of the three tuners has its own active-balanced, monaural analog line output. These outputs have a 200-ohm source impedance and provide a program level that may be adjusted be-

tween –15dBu and +15dBu, corresponding to 100% modulation for the selected reception mode.

ANALOG OUTPUTS are studio-standard, 3-pin XLR connectors. Pin 1 is chassis ground, Pin 2 is program 'hot,' and Pin 3 is program return. Unbalanced connections should utilize Pin 2 as 'hot,' Pin 1 as the ground return and Pin 3 should be left floating. The unbalanced output level will be 6dB below the level stated next to the adjustment sliders.

LAN PORT

This RJ45 jack is the interconnect to the user's Local Area Network and the Internet. The 677 offers full IP remote control over all setup and operating functions, including remote listening to the selected tuner using any Web browser. SNMP is fully supported as well.

+12VDC POWER I/O

Two paralleled coaxial power connectors allow 'daisy-chaining' two 677s mounted in the same optional rack chassis. One DC supply can power multiple one-half or one-third (INOmini) modules, provided that the rating of the supply is not exceeded. Two short 'pigtail' cables are provided with each rack adapter.

The 677 Triple Tuner draws 750mA. Check the rating on the label of the power supply to make sure it has sufficient capacity for all modules it must support.

These power connectors are not a locking type, and the mating plugs pull out rather easily. A Ty-Wrap® can secure the cables to the plastic anchor adjacent to the jacks.

SETTING UP THE 677 Triple Tuner

Front-Panel Navigation Basics

Turn the jog-wheel knob to cycle among and to highlight menu items, and then *push* the knob to select, edit or adjust the highlighted option. To further clarify:

1) If the submenu has a checkbox or toggle option, highlight the option and *push* to select or toggle it.

2) To make a selection, change a value or enter text, highlight the option, *push* and the option will begin to flash. *Turn* to select and *push* again to accept.

   On a text-entry screen, *turn* and *push* the knob to select alphanumerics, punctuation, backspace, etc. After text entry, select Save and then *push* the knob to accept to the entry.

3) Use the BACK button to escape from the current menu and step backward, ultimately to the Home screen.

Once you have linked your PC or mobile device with the 677 through the Webserver interface, you'll discover the wealth of additional features the more sophisticated control method affords, and the ease with which settings may be made. For this reason, our setup and operating discussion will concentrate on the Web utility. But do keep in mind that many of the basic functions can be accessed from the front panel.

Connecting to the 677

Plug the 677 and your laptop into the same LAN. Using the front-panel knob, navigate to: Setup / Network / IP Settings. If your router makes DHCP IP assignments, you can accept factory-default ■ DHCP on this menu screen and type the IP: shown on the OLED into your browser address bar. This will bring the 677 Now Playing menu onto your browser screen.

To assign the 677 a fixed IP address, clear the □ DHCP box and then navigate through the various fields on this screen, entering the called-for information manually in each. Be sure to execute a Save after entering the IP data in the appropriate fields.

Setting the Clock

We recommend setting the internal real time clock early-on, as 677 logging and reporting functions depend on proper local time and zone settings. This may be done either from the front panel (Setup / Network / Time), or using the Time Webpage utility. Setup is simple and self-explanatory. The default time server is thoroughly dependable, but feel free to choose another timekeeping URL if you prefer.

Now Playing

The screenshot below shows the upper portion of the Now Playing Webpage. This is the primary readout area for the three individual 677 multi-mode tuners.
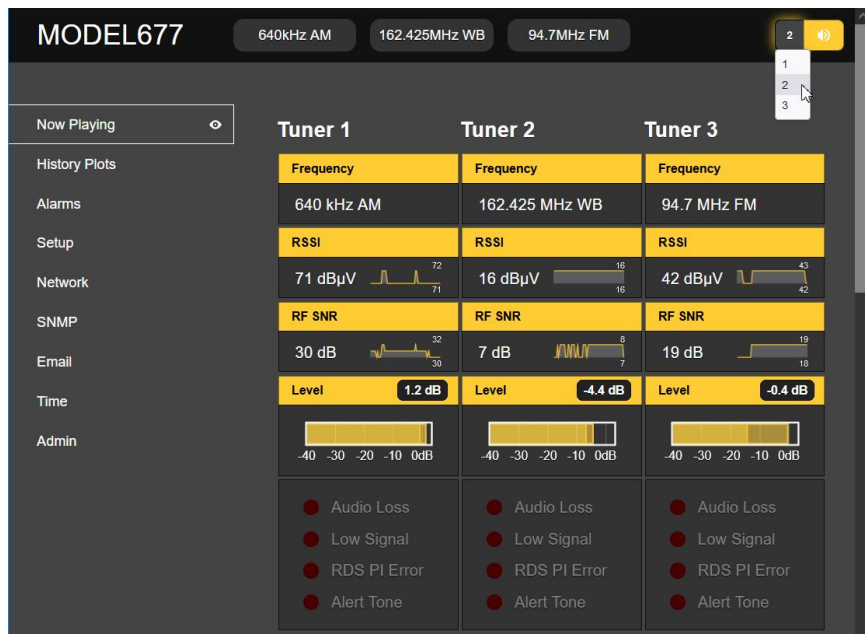
In this illustration, tuners 1, 2 and 3 have been set up to receive AM, Weather Band (WB) and FM stations, respectively. The tuned **Frequency** is shown at the top of each tuner's display area and also appears for all three tuners in the Webpage header on all menus.

RSSI is the incoming signal level at the tuner's antenna input. It is shown numerically in dBμV, along with a rolling 30-second-history graph of the level. The graph automatically

scales to the high and low values during the subject time period, the numerical value being the most recent high reading

RF SNR indicates the ratio of signal to channel noise, which is generally proportional to, but should not be confused with, the demodulated audio signal-to-noise ratio. This readout also has a history graph and numerical notation. **RSSI** and **RF SNR** readings can be useful when installing and orienting antennas.

Level displays monaural demodulated program audio. This is not a 'VU' meter, but instead has quasi-peak-responding ballistics that give a good visual indication of program levels and dynamics. The most recent high value is shown numerically and held for a brief period before updating to a more current high value.

The four simulated red LEDs identify alarm conditions. Alarm setup is addressed in the Alarms Webpage discussion. The alarm LEDs and their callouts are grayed-out until they have been programmed and enabled.

Setting Up the Tuners

Each of the three tuners has its own setup area for the various options. This screenshot from the Webserver Tuners page shows Mode: and Frequency (kHz): settings for Tuner 1.
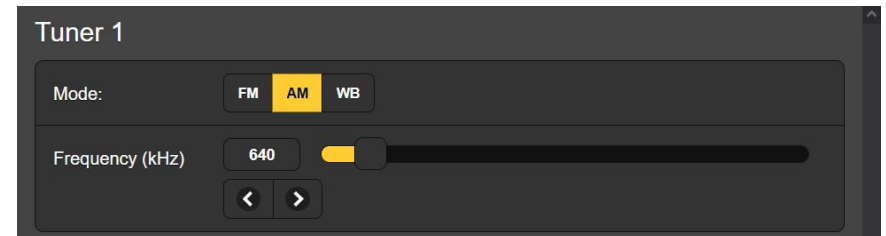

Click the desired **FM**, **AM** or **WB** (Weather Band) reception mode. To tune, click on the number to the right of Frequency (kHz): to highlight the number, which you may then overtype, pressing your Enter key afterward to accept the new frequency. You may also grab the slider knob with your mouse and move it back and forth, or click on the **< >** (down/up) arrows to single-step the frequency. From the front panel, navigate to the Tuners menu to make these settings.

Reception Bandwidth Settings

The three 677 tuners are able to assess the incoming signal and automatically restrict RF and audio bandwidths under poor reception conditions. The factory default 'automatic' setting for all modes may be overridden if you prefer to choose your own fixed settings.

Bandwidth settings are available only through the Web-server interface. Click **✚ Tuner 1 Settings** to open the utility, shown in the screenshot below.

Each reception mode has its own dedicated set of filters. **Auto** is the factory default and recommended, and will generally revert to the widest bandwidth with any reasonably good incoming signal.
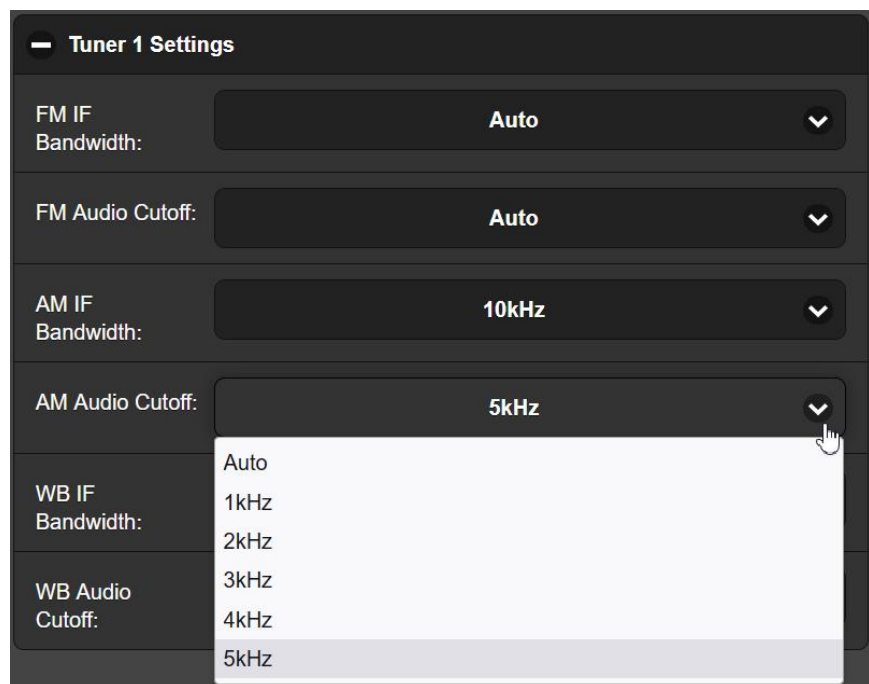
Tuner 1 is set-up for AM in our illustration and appears to offer only rather restricting IF and AF bandwidth choices. But don't discount the AM audio quality of the tuners, these filters are far from 'brick walls.' Here we've manually programmed the AM filters to their widest settings.

Audio Program Monitoring

The three tuners have dedicated, independent, rear-panel balanced AUDIO OUTPUTS. These are monaural line-level sources with levels adjustable over a wide range on the Setup Webpage under ANALOG OUTPUTS, or from the front panel under Setup / Audio Outputs.

The front-panel headphone jack may be switched to monitor any one of the three tuners. Inserting the headphone plug will bring up the appropriate screen, or choose Headphone Volume from the front panel. Select the Source: (which tuner), and adjust Volume: to suit. Push BACK or the knob to exit.

From any Webpage menu, you may select and monitor any of the three tuners using the little loudspeaker icon at the top of any menu screen. Just click the icon to listen to the audio through your browser. The number to the left of the icon identifies the tuner you are listening to. Click on the number and a pull-down menu allows you to pick the source.

Streaming Program Audio

The utility just described for Webpage audio monitoring uses Icecast Media-Server protocols. Audio streaming is also available independently of the Webpage interface using the same stream for general 'tune-in' listening, and as an independent, simultaneous UDP stream, allowing the 677 to send raw compressed audio to a specific IP address and port.

NOTE: Only one tuner at a time may be streamed. The streaming audio program will always be the one selected for Webpage listening at the top of Web-server interface pages.

Streaming setup is done only on the Setup Webpage under STREAM. The streaming Codec: is fixed to HE-AACv2 standards. The streaming Sample Rate: default is 48kHz, but may be changed to 44.1kHz. The streaming Bitrate (kbps): defaults to 64, but may be manually reset all the way down to 18 for a really poor network connection.

You may elect to add-in a fixed Audio Latency (Sec): delay to normal transport delay. This provides more data "ready to go" upon connection, helping the client buffer to fill and playback to start faster.

There can be a total of ten simultaneous Icecast listeners (Tune-in plus Webserver listeners), but you can cut this number back with the Max Listeners: slider if need be. Remember, Icecast listeners include not only the 'tune-ins,' but station personnel using Webserver interface listening as well.

'Tune-in' listening on a common local area network is as easy as directing a browser or media player to the IP address of the 677, followed by '/stream.' A typical address might be 192.168.0.123/stream. Access from outside the LAN may require more complex addressing, including DNS forwarding. Seek help from your networking-savvy IT professional.

The 677 can stream over UDP to any IP Address: with a designated Port:. Enable: must be set **On** and a proper Transport: mode selected. Check with the receiving end to confirm either **ADTS** or **ADTS in MPEG-TS**.

Once streaming parameters have been set-up or modified, settings must be saved by clicking the **Save** bar at the bottom of the section. Note the **Remember:** caveats below **Save**.

Alarms

Each of the 677's three tuners offers alarm functions that respond to reception errors and to the EAS or NOAA Alert tones used to notify the public of pending weather and other emergency situations.

PLEASE NOTE: The 677 responds only to the alert tones. It does not respond to the characteristic SAME chirps-and-screeches, the digitally-encoded data relevant to the alert.

A triggered alarm condition is displayed on the Alarms and Now Playing Webpages, and on the front panel of the 677 as a red LED with an accompanying flashing-text description on the OLED readout. Remote alarm interfaces and automatic email or text messaging is covered in later discussions.

Alarms are set up on the Alarms Webserver page. Using **Tuner 1** as an example, click **✚ Audio Loss** to open the setup area for this alarm as shown at the top of the next page.

You must click Alarm: **On** to activate the audio loss alarm function. This alarm has both level- and timing-sensitive settings.
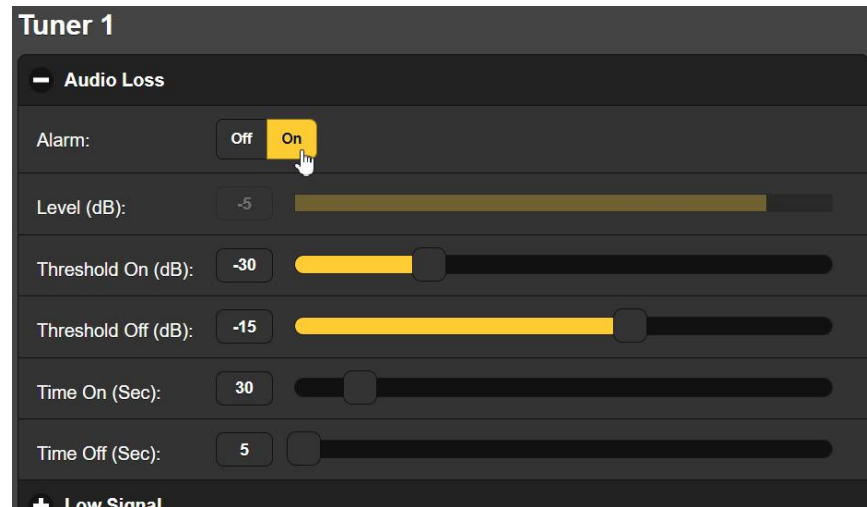
Level (dB): is a real-time readout of the program audio level as received. This is not adjustable, it's an indicator to guide your setting of the level threshold values.

Threshold On (dB): is the 'dead air' level the audio must fall below to initiate an alarm condition. Moreover, Time On (Sec): is the number of seconds the audio must remain below the Threshold On (dB): trigger point before the alarm is actually registered.

Similarly, Threshold Off (dB): is the level the program must return to, and stay above the Time Off (Sec): duration, for the alarm to reset.

In this illustration, the current program audio is hovering about 5dB below 100% modulation. Our audio loss alarm is set such that the level must drop to –30dB or below for a duration of 30 seconds to activate the alarm. And then when program audio returns, it must stay consistently above –15dB for 5 full seconds to reset the alarm.

Next, open the **✚ Low Signal** setup window. It is quite similar to the audio loss alarm. First you must click the Alarm: **On** to activate it, but this setup has an extra feature.

Mute: is a squelch function that silences the audio in a low signal condition. This kills the background RF noise of the channel when no carrier is present. In doing so it enables the Audio Loss alarm, which otherwise might not trigger because of channel noise; think of the loud hiss when an FM station goes off the air.

Like the Audio Loss alarm, RSSI (dBμV): is the incoming signal level for your setting-up convenience. Threshold On (dBμV): is the alarm trigger point, and the carrier must fall to this level and stay below it for the Time On (Sec): interval to initiate an alarm. Conversely, to reset the alarm the carrier must reach and stay above the Threshold Off (dBμV): value for the Time Off (Sec): period.

The ✚ **RDS PI Error** setup window is only relevant to the tuner if it is in the FM reception mode and tuned to a station using RDS. Current PI: should show the Program Identification code for the monitored station. If you are confident that this is the case, type that same PI into the PI Code: field and click **Save**. With Alarm: **On**, whenever the Current PI: and PI Code: differ, including the Current PI not present, the alarm will be activated following the programmed Time On (Sec): interval. When the two codes once again match, the alarm will reset following the Time Off (Sec): interval.

Opening the ✚ **Alert Tone** window reveals only an Alarm: **Off** or **On** selection. Depending on the reception mode, the Alert Tone alarm will trigger for the duration of either the EAS Alert Tone or the NOAA Weather Alert Tone (WAT). Threshold and timing parameters are fixed.

General Purpose Outputs (GPOs)

The rear-panel GPO terminals enable quick interface with external low-level logic or remote alarm indicators. GPO 1 through 6 are NPN transistors that saturate to ground for an alarm. Polarity is programmable so these terminals can alternatively assume a grounded condition and go open-circuit on an alarm.

GPOs are programmed on the Setup Webserver page under GENERAL PURPOSE OUTPUTS, or from the front panel under Setup / General Purpose Outputs. The procedures are virtually identical; Webserver setup will be detailed here.

Open ✚ **Output 1** to open that terminal's GPO assignment section, and then click ⌄ for the pull-down Type: assignment menu.

Any rear-panel GPO terminal can convey alarm logic from any tuner alarm function. This gives the greatest versatility for assigning alarms to the limited number of GPOs that the crowded rear panel can easily accommodate.
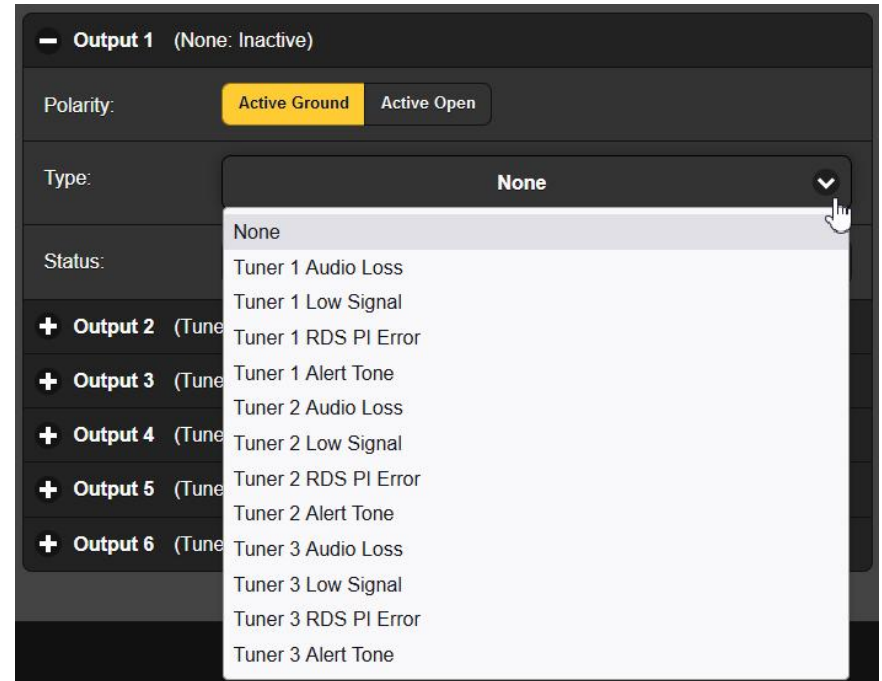
Once you have decided and assigned an alarm to GPO 1, you can choose the Polarity:, whether an alarm gives a ground or an open at the terminal. Status: simply states whether the subject alarm has been triggered (Active) or in an untriggered or reset state (Inactive). Even with the assignment window closed the assignment and status will be visible as shown here.
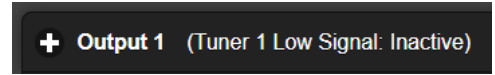
Alarm Emails and Text Messages

The 677 is able to send email and SMS-text alarm notifications, selectively, to various station personnel; that is, you can choose which alarm goes to which recipient. Setup for this feature is on the Email Webserver page.

There are three steps in setting up alarm messaging. The first is to actually set up an email account for the 677, using either your station's mail server or virtually any free email account (e.g., Gmail).
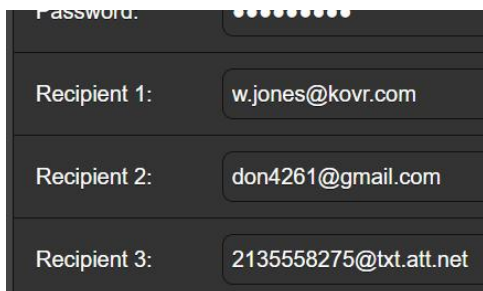
At the top of the Email Webpage, you'll see the SMTP Settings that any email account requires for outgoing mail. Sample entries are shown there to suggest proper formatting, and

most email providers furnish instructions on their Website for any necessary Port: number or TLS: 'secure connection' requirements.

Your 677 will never be receiving incoming mail, so there is no need to specify incoming POP settings when establishing the account.

Next, add recipient email addresses for alarm email messages. The 677 can send SMS texts to cell phones as well. Consult with the wireless carrier for proper address formatting that converts the email to a legitimate text message. Here are examples for Verizon, AT&T and T-Mobile, respectively: 7145553497@vtext.com 8315550884@txt.att.net

+14085552130@tmomail.net.

Begin with Recipient 1:, adding the email/text addresses for your station's crew similar to the example here. Which alarm notification each recipient will receive is determined in the next and final step.

After entering, changing or deleting Recipient: email addresses, click **Save** at the bottom of the list to commit these to nonvolatile memory. You can also **Send Test Email**, which will send a quick test message to all recipients on the list.

The last step is to set up Notifications, just a bit farther down the Email Webpage screen. Here you'll decide 'who gets what.'

The next page shows an example Notifications setup for Recipient 2 at a fictitious station.

Don is the CE at this station, and as a Recipient: in this instance, uses his personal email (Gmail) address.
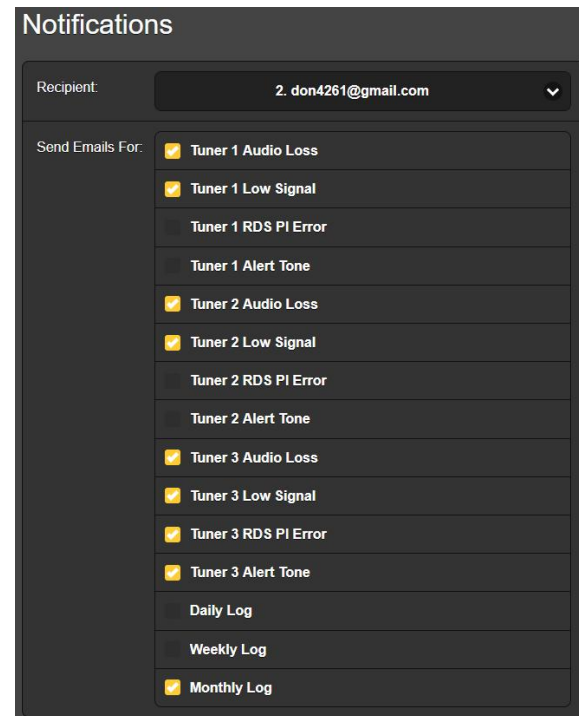
As a consciencious Chief Engineer, Don is most interested in the proper functioning of his equipment. He has set up Tuner 1 to monitor his Primary Entry Point (PEP), a large market AM station, Tuner 2 to monitor the Weather Band, and he has Tuner 3 tuned to his own FM station.

Judging from his setup of the 677, he evidently doesn't have much interest in Alert Tones unless his own station initiates one.

Don has ready access to the 677 and can check the log when he needs to, so he's opted to receive only the emailed Monthly Log. Other station personnel may well have different priorities and can have alarms specific to their needs assigned to them.

The Alarm Log

Navigate back to the Alarms Webpage and, you'll find the logging section at the bottom.

The 677 logs all alarms, which may be helpful as proof of receipt or to permit further analysis at some later time. Unless the log is purged by clicking **Clear Alarm Logs**, the primary, **Complete**, log remains indefinitely.

Daily, **Weekly**, **Monthly** and **Complete** (all accumulated) logs may be downloaded and saved to your computer's Windows / Downloads folder as small .csv files. Just click on the bar for the period(s) you want to save.

As noted in the Email / Notifications discussion, you may also opt to receive log files as periodic emails or text messages with those alarm statistics.

At the bottom of the page, clicking ✚ **View Alarm Log** will open the Complete (accumulating) log like the sample shown at the top of the next page.

Each alarm is identified by its type, which tuner it pertains to, the station ID, and time, date and duration notation for each event, both when the alarm was triggered and when it was cleared.

In addition, you may type into the Filter alarms… field, using terms or wording common to the alarms notations to focus on a particular type of alarm, station ID, date, time, etc.

EXTENDED FEATURES & HOUSEKEEPING

RSSI and Audio History Plots

The 677 offers plots of signal strength (RSSI) and audio modulation levels that may be viewed over selectable time periods, from the past minute to a 6-hour time study. This utility is found on the History Plots Webpage.

Statistics for all three tuners are shown together, each tuner in a separate color. This is the RSSI History (dBμV) plot, showing relatively stable incoming RF for all three tuners.

The strongest signal shown here, the upper yellow trace, is the Primary Entry Point (PEP) AM station being monitored for EAS alarms. The central red trace is the user's own FM station, monitored primarily as a confidence indicator. The pitiful blue trace toward the bottom is the strongest NOAA weather station that can be received in this market.

The most recent 1 Minute of history is shown in the illustration, although 10 Minutes, 1 Hour and 6 Hours of Time Span: are available to view as well.

This next screenshot is the Audio History (dB) for the same three stations, this time using a Time Span: of 10 Minutes. The audio level represented here is the peak level of the program audio, 0dB equal to 100% carrier modulation in each case. The yellow AM peak value frequently exceeds 100% as AM broadcasting in the US is permitted up to +125% positive-modulation on program peaks.
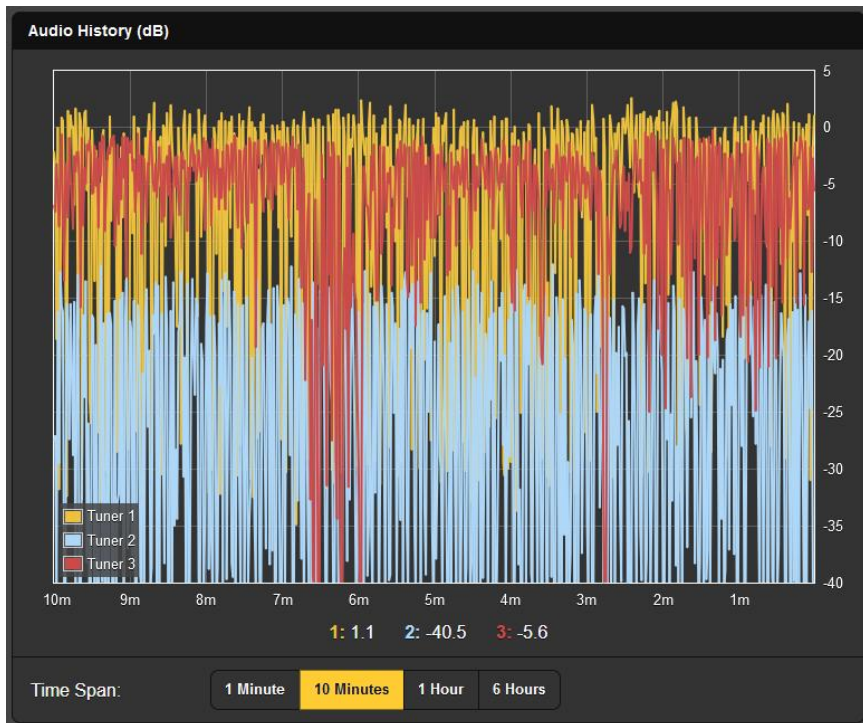
The numerical values directly below the graph reflect the audio peak level at the current (zero minute) time.

SNMP Operation

SNMP allows other equipment on the same LAN to initiate communications with your 677, and for your Triple Tuner to send alarms and supplementary information to other equipment on the network.

The 677 interfaces directly with a network controller called the SNMP Manager. In setting up for SNMP operation, the MIB file resident in the 677 will have to be downloaded from your 677 through the Webserver interface and uploaded to the SNMP Manager.

Open the SNMP Webserver page and scroll down. At the bottom, under MIB File, you can click **Download MIB** to download this file directly to your Windows Downloads folder. You can then upload it to your SNMP Manager as directed by the instructions for that utility.

Scrolling back to the top of the Webpage, here's a review of the SNMP Settings.

Mode: is Disabled by default. **Read Only** allows the 677 to be interrogated by the SNMP Manager so that other equipment on the network can read 677 setup parameters, alarms, etc.

Setting Mode: to **Read & Write** allows the SNMP Manager to send commands to your 677 for remote control of all functions.

SNMP 'Communities' serve as passwords. In the Read Community and Write Community fields, overtype the factory-default public and private entries with text that is specific to the read/write strings on your SNMP Manager monitoring device. Do a **Save** after entering this text.

The default SNMP Ports, SNMP Port: 161 and Trap Port: 162 are customary for a majority of SNMP operations. Overtype these defaults to change them if need be and **Save**.

When the 677 initiates an alarm, the alarm is known as a 'trap.' Three local network IP addresses may be entered into the Trap Destination 1, 2 and 3 fields, each corresponding to other devices on the LAN that require alarm notifications. Overtype the 0.0.0.0 defaults with valid IP addresses and **Save**.

Password Protection

Access to your 677 Triple Tuner may be protected by passwords. Use the same or different passwords to lock out front-panel and/or Webserver interface access.

Passwords may be set either from the front panel, under Admin / Security, or on the Admin Webserver page.

NOTE: Passwords *will appear in clear text* on the front panel Admin OLED screen once the unit has been accessed with a

password. Passwords are *hidden* on the Admin Webserver page when the user is logged-in as a 'Web User.' A 'Web Admin' will be able to see all passwords.

Open the Admin Webpage and go to the Security section at the top. The three password fields are fairly self-explanatory, type a password, which is case-sensitive, into each applicable field, clicking **Save** after each entry for upload into 677 firmware.

Entering passwords from the front panel of the 677 is quite similar to what was just described. When 'typing' with the knob, Left and Right will move you through typed text. Use Del to backspace from the blinking cursor, either to correct a mistake or to delete the password entirely. You must Save after each entry.

Once password-protected, the 677 will lock each time the screen times-out (goes dim or dark). Lock it immediately by holding-down the BACK button for a few seconds.

At the installation site, you will be prompted to enter a password before any OLED screen can be accessed, other than Now Playing. A Webserver-interface password must be entered on any connecting device. When the sign-in box appears, ignore the User Name field and type into the Password field.

If you lose a password, the only way to recover access to the 677 is with a hard reset, which must be done from the front panel. A hard reset is accomplished by holding-down the BACK button while power-cycling the unit.

NOTE: A hard reset will return the 677 to factory defaults; you will lose all settings. For this reason, it's imperative to maintain a Hardware Profile, which will save all setup options and passwords.

Saving a Hardware Profile

A Hardware Profile contains all your setup choices and passwords. It saves to your computer as a small text file.

On the Admin Webpage, scroll down to Configuration and click Download Hardware Profile. This will place a small 677_settings.json text file in your Windows Download folder. From there you can move it to an appropriate location or copy it to a flash drive.

To upload (restore) a Hardware Profile, or to clone a second 677 Triple Tuner, click Select Hardware Profile…, on the target

unit, and on the screen that appears, navigate to the folder where the profile has been saved. When prompted, Open the file, and then click Upload Hardware Profile.

Uploading a Hardware Profile automatically reboots the 677. Other circumstances might warrant a manual reboot, just click Reboot in the Configuration area. This won't change any settings, it's the same as doing a power cycle.

Updating Firmware

Firmware updates, issued at no charge, are small .bin files that may be downloaded to your Windows Downloads folder and then stored in any convenient folder on your computer.

We do recommend saving a fresh Hardware Profile, as there's a chance that firmware update could affect user settings, and the update will include notes to that effect.

Once you are ready to update, scroll to Firmware Update at the bottom of the Admin Webpage and click Select Firmware File… Navigate to the Windows Downloads folder or other location containing the .bin update file and double-click it. This transfers the file to the updater as shown below. Then click Update Firmware to start the update process, which should take no more than about a minute.

- 23 -

— 24 —
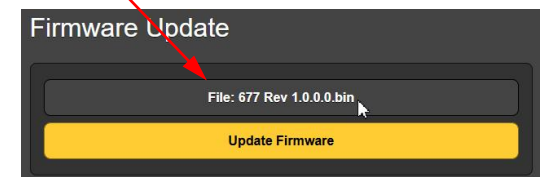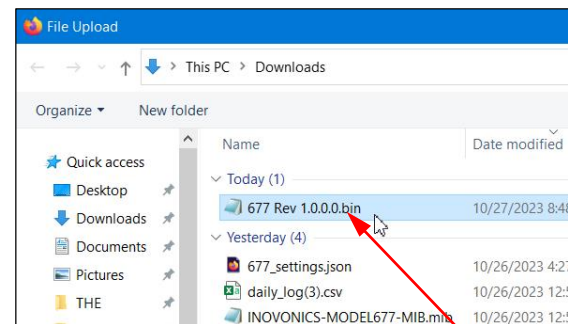
Miscellaneous Information

A PDF copy of the 677 Manual is resident in the unit's firmware; click View Model 677 Manual to bring this to your browser screen.

The bottom of the Admin screen shows the Serial Number: of your 677 Triple Tuner, the current Firmware Rev: and displays the Uptime:, or how long your 677 has been running since power was last applied.

You may also click Check for Updates and Open Source Licenses for that information, or click the Inovonics logo to be taken directly to the company's Website.

'Under the Hood'

The Inovonics 677 Triple Tuner is very compact, 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.

Because of its modest size and weight, returning the 677 for factory servicing 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!

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INOVONICS WARRANTY

I **TERMS OF SALE:** Inovonics products are sold with an understanding of "full satisfaction"; that is, full credit or refund will be issued for products sold as new if returned to the point of purchase within 30 days following their receipt, provided that they are returned complete, and in "as received" condition.

II **CONDITIONS OF WARRANTY:** The following terms apply unless amended *in writing* by Inovonics, Inc.

A. Register the Warranty online at www.inovonicsbroadcast.com within 10 days of delivery.

B. The Warranty applies only to products sold "as new." It is extended only to the original end-user and may not be transferred or assigned without prior written approval by Inovonics.

C. The Warranty does not apply to damage caused by misuse, abuse, accident or neglect. This Warranty is voided by unauthorized attempts at repair or modification, or if the serial identification tag has been removed or altered.

III **TERMS OF WARRANTY:** Inovonics, Inc. products are warranted to be free from defects in materials and workmanship.

A. Any discrepancies noted within THREE YEARS of the date of delivery will be repaired free of charge, or the equipment will be replaced with a new or remanufactured product at Inovonics' option.

B. Parts and labor for factory repair required after the three-year Warranty period will be billed at prevailing prices and rates.

IV **RETURN OF GOODS FOR FACTORY REPAIR:**

A. Equipment will not be accepted for Warranty or other repair without a Return Authorization (RMA) number issued by Inovonics prior to its return. Fill-in our online RMA form using this link: www.inovonicsbroadcast.com/support/processRMA. We will then email or text you an RMA number. Be sure to mark this RMA number 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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