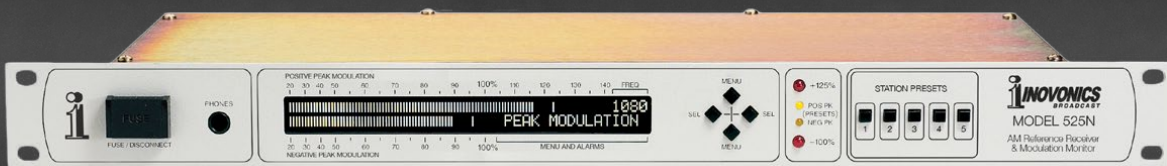


# 525N

AM Modulation Analyzer  
*with Network Interface*



The 525N is a third-generation AM Modulation Monitor from Inovonics. It can accept either a direct feed from the transmitter, or function as a precision Reference Receiver to give accurate off-air measurements reflecting ATU, phasor and antenna parameters.

A proprietary phase-locked synchronous detector provides precise demodulation, rejects interference, and recovers only the amplitude-modulated component of HD Radio™ 'hybrid digital' transmissions. The 525N is also compatible with power-saving MDCL operation.

Although the 525N maintains full wideband response for measurement, it features user-selectable audio-monitor cutoff characteristics to mitigate noise or to simulate the response of consumer radios.

IP connectivity with full SNMP support gives the user total access to the unit from any computer, tablet or mobile device. Setup, metering, alarms and audio monitoring are all available from the remote monitoring point.

The 525N is supplied with a large-aperture, weatherproof loop antenna.



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# 525N AM MODULATION MONITOR

## FEATURE HIGHLIGHTS

- Accurate, simultaneous display of positive and negative peak modulation with Peak Density histogram
- Absolute-limit and user-programmable Peak Flashers
- Calibrated RSSI signal strength display and asynchronous noise readout
- Alarms for Low Signal, Audio Loss and Overmodulation with panel indicators and 'tally' closures
- Text message and/or email alarm alerts may be selectively dispatched to multiple recipients
- Compatible with HD Radio transmissions and MDCL transmitter operation
- Full Web interface gives total remote control of all setup parameters, metering, alarms with logging, and streamed audio monitoring

## ADDITIONAL FEATURES

- Easy menu-driven setup and operation, or use the convenient Web interface
- 5 Station Presets
- 10kHz/9kHz channel spacing
- Balanced audio output
- Supplied with out-door loop antenna
- Headphone jack



Remote Web Interface



# TECHNICAL SPECIFICATIONS

## OFF-AIR RECEIVER

### Receiver Topology:

Single-conversion superheterodyne; 300kHz IF; phase-locked I/Q synchronous detector.

### RF Inputs:

The 75-ohm (F) antenna input connects to the supplied broadband loop antenna. Cable is not included, but up to 100 feet of general-purpose RG-6 CATV coax may be used. A short wire antenna may prove adequate in high-signal areas that suffer minimal interference. A 50-ohm (BNC) high-level input accepts a direct RF sample between 1V and 7V r.m.s. / 3V–20V p-p.

### Tuning Range:

Tunable via the front-panel menu or the Web interface:

- 520kHz to 1720kHz in 10kHz steps
- 522kHz to 1719kHz in 9kHz steps

Five station-memory pushbutton/Web presets are provided.

### Signal-to-Noise Performance:

(See Figure 1)

## MEASUREMENT PARAMETERS

### Measurement Bandwidth:

Carrier amplitude demodulation extends to 10kHz,  $\pm 0.2$ dB.

Measurement is not affected by the user-selectable audio cutoff.

### Audio Response:

User-selectable “FLAT” response, or restricted in programmable 1kHz steps between 10kHz and 2kHz.

(See Figure 2)

### De-Emphasis:

A menu command switches-in the NRSC ‘truncated’ 75 $\mu$ s de-emphasis characteristic to the program audio outputs with any restricted audio bandwidth selection. (See Figure 3)

### Audio Distortion:

Typically 0.15% THD at 50% carrier modulation; <0.5% at 99% modulation.

## DISPLAYS

### Modulation Display:

The peak-responding front-panel bargraph readout shows positive and negative modulation peaks simultaneously, with extended persistence of the most recent highest peak value. Measurement resolution is 1% between 50% and 100% (negative) and 50% and 140% (positive) modulation, and 2% between 20% and 50% modulation.

### RSSI and Noise Display:

The Modulation Display may be switched to show the dBuV level of the incoming carrier (RSSI) and a relative measurement of asynchronous noise.

### Peak Flashers:

- Absolute-limit flashers are factory-calibrated at  $-100\%$  and  $+125\%$  carrier modulation.
- A second set of flashers may be programmed by the user to values between  $-70\%$  and  $-100\%$ , and  $+70\%$  and  $+140\%$ .

## CONNECTIONS

### Program Audio Outputs:

- The active-balanced, rear-panel program audio output (XLR) delivers +4dBu from a 200-ohm resistive source.
- Front-panel headphone jack (1/4-inch, TRS).

### Alarms:

Open-collector NPN transistor outputs (screw-terminal block) for low signal, program audio loss and overmodulation.

Closure polarity is programmable.

## WEB INTERFACE

### Connection:

RJ45 jack for remote setup and operation via TCP/IP; DHCP or Static IP with local or remote selection

### Remote Monitoring

Remote Web-based monitoring of off-air audio

### Network

Comprehensive network configuration utility including dynamic DNS and full SNMP support with downloadable MIB file.

### Alerts

Supports email and text message services with or without SSL

## MISCELLANEOUS

### Power Requirements:

105–130VAC (0.250A Fuse) 210–255VAC (0.125A Fuse), 50/60Hz; 10W.

### Size and Weight:

1 $\frac{3}{4}$ "H x 19"W x 7"D (1U); 9 lbs. (shipping).

### Environmental:

0°C – 50°C operating temperature range; 95% non-condensing relative humidity; up to 3000 meters AMSL.

# RECEPTION AND AUDIO RESPONSE GRAPHS

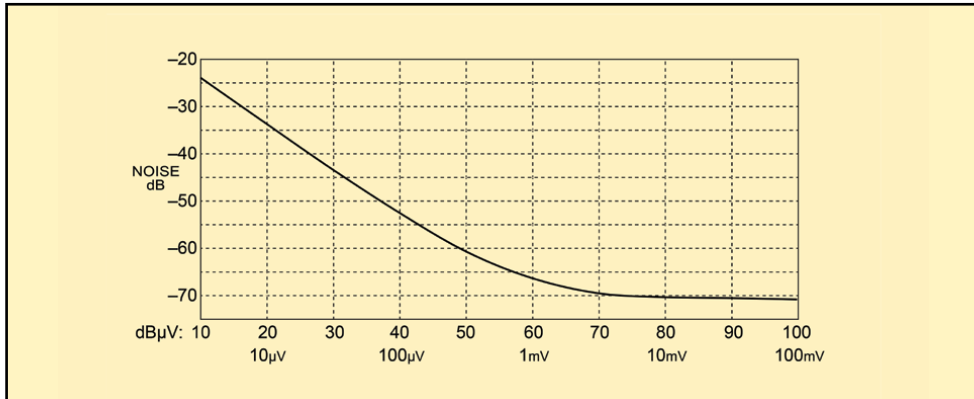


Figure 1 - Model 525N SNR Performance

Figure 1 plots the program audio output noise floor against the RF level at the antenna connector. Signal-to-noise performance of the 525N is a direct function of the incoming RF level. The figures shown reference 100% modulation with 10kHz audio bandwidth and NRSC de-emphasis.

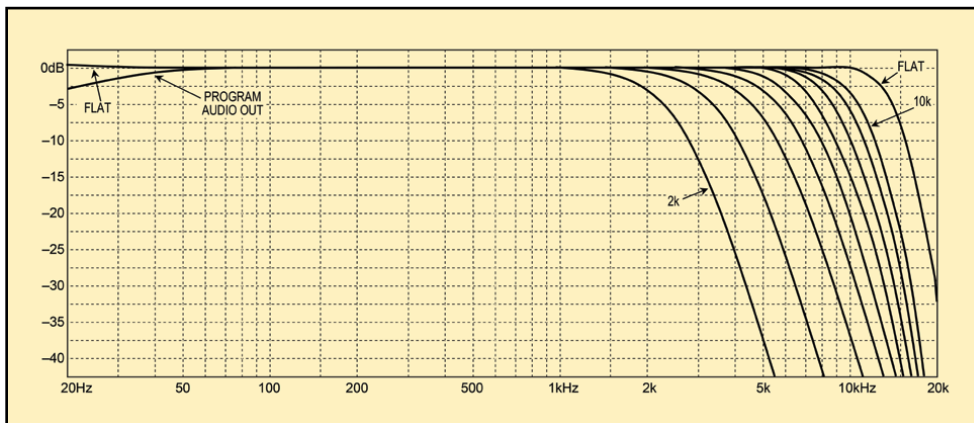


Figure 2 - Model 525N Off-Air Measurement Response (FLAT) and Program-Audio Cutoff Options

Figure 2 illustrates the effect of the menu-programmable audio-cut filter in the program audio and headphone outputs of the Model 525N. This filter does not affect modulation measurements, which always follow the FLAT response noted, regardless of the audio cutoff selected.

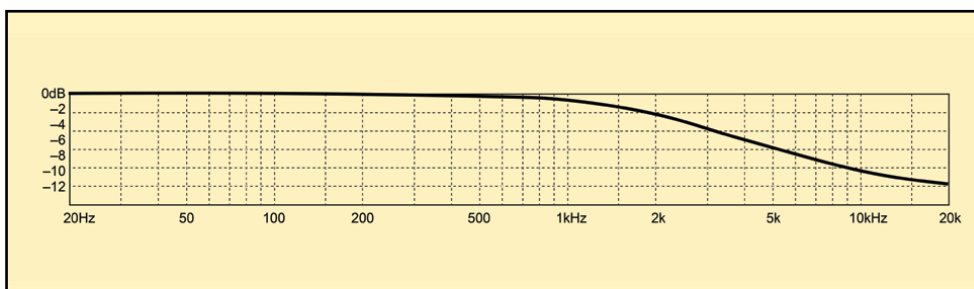


Figure 3 - NRSC De-Emphasis Curve for AM Broadcasting

Figure 2, above, does not reflect the 'truncated' 75µs NRSC de-emphasis characteristic graphed here in Figure 3. De-emphasis is a menu option that is normally engaged to compensate for complementary transmission pre-emphasis mandated by the 1985 NRSC Specification.



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