

....An Audio Processor Incorporating the latest in  
Sound Perception and Audio Analysis AI



**Perceptual SoundMax™**  
**Model Q24 - 6111**  
and the new  
**Model Q24 - 6111HD**

*24-band FM Audio Broadcast Processor with Internet Streaming  
now with  
SpatialMax Immersive Audio*



# Perceptual SoundMax™

## Lively, Crispy, Clear and Loud Sound:

Craft a breathtakingly detailed, consistent, and balanced sound for your FM and HD/Digital Broadcasts using Perceptual SoundMax™ 24 Band Audio Processor developed by ATC Labs. This product brings out novel innovations in audio processing & AI/ML based sound-quality enhancements. It is specifically designed for Professional Broadcasters by a team of some of the world's leading audio and speech scientists (former Bell Labs alumni) specializing in audio signal modeling & AI based analysis, psychoacoustics, and signal processing.

Perceptual SoundMax™ is actually a many-in-one audio processing platform featuring unmatched 24 - band dynamics processing along with independent processing of Digital/HD channels, noise reduction, and Internet Streaming. The product comes ready with highest quality HE-AAC V1/V2 encoding and HLS encapsulation for internet streaming and links seamlessly with many distribution servers.

## Audio Processing Tools Powered by Latest Research in Sound Perception:

- ❖ **Multi-band (24-band) high-resolution Dynamic Range Compression (DRC)** detailed time-frequency sound analysis.
- ❖ **Intelligent Loudness Control (ILC):** Intelligent Loudness Control algorithm with enhanced subjective loudness models.
- ❖ **Vocal Enhancement (VE):** Vocal, and dialog enhancement.
- ❖ **Bass Enhancement:** Tunable bass boost module with 2-independent stages.
- ❖ **High Frequency enhancement and Stereo Enhancement.**
- ❖ **High Quality Noise Reduction:** Adaptive Wide Band Noise Removal (AWNR) that does not distort the audio.
- ❖ **Final Look Ahead Limiting** A sophisticated final SmoothClip look-ahead limiting algorithm ensures distortion free look ahead limiting.

## Features Optimized for FM Broadcasts:

- ❖ Composite FM/MPX signal Generation with accurate 75 micro-sec or 50 micro-sec pre-emphasis and accurate peak limiting for maximizing *modulate index* of FM broadcasts
- ❖ Digital Composite MPX available at 192 kHz
- ❖ In box RDB/RBDS Encoder

## New Processing Paths for multi-channel HD/Digital broadcasts (Model Q24-6111HD):

- ❖ Digital Out 2 with accurate & independent delay and level control available for HD1
- ❖ Aux1/Aux2 Independent processing paths with Digital I/O for HD2/HD3 channels.

## Audio Encoding Powered by Latest Research in Sound Perception:

- ❖ Industry standard HE-AAC/AAC-LC encoder enhanced by advanced ATC Labs Psychoacoustic Models. Supports 32 kbps - 256 kbps encoding and HLS encapsulation for streaming.
- ❖ Inbuild distribution server supports HTTP Pull/Push/Post, UDP/TCP/Multicast/ Icecast

## Nielsen™ Watermarking Support In-Box

## Full Remote Control Through Networked PC Interface:

Allow for remote control of the processor using **SoundMax™ Manager** running on any PC present on the same Ethernet which automatically senses all available SoundMax hardware. Remote control features include:

- ❖ Tuning of profiles: basic/advanced tuning
- ❖ Profile exports/import
- ❖ Configuration of Internet streaming parameters



# TECHNICAL SPECIFICATIONS

## **Model : Perceptual SoundMax Q24-6111** **24 Band Audio Processing for Audio Quality Optimization**

### Analog Audio Input:

**Configuration:** Left and Right/Stereo  
**Maximum Input Level/Impedance:** +24dBu/ >10kΩ  
**Nominal Input Level:** Adjustable -10.0 to +12.0 dBu  
**A/D Converter Resolution:** 24-bit  
**EMI Suppressed:** Yes  
**Connectors:** Balanced XLR Female

### Analog Audio Output:

**Configuration:** Left and Right /Stereo  
**Output Level:** Adjustable -6.0 to +20 dBu  
**SNR:** ≥ 90 dB (20 Hz to 20 kHz)  
**Crosstalk:** ≤ -90 dB (20 Hz to 20 kHz)  
**Distortion:** THD ≤ 0.01% (20 Hz to 20 kHz)  
**D/A Converter Resolution:** 24-bit  
**EMI Suppressed:** Yes  
**Connectors:** Balanced XLR Male

### Digital Audio Input (AES/ EBU):

**Configuration:** Stereo  
**Sampling Rate:** 32, 44.1 or 48 kHz (Auto Sense)  
**Word Length:** 16 bit or 24 bit  
**Input Reference Level:** -25.0 to 0 dBFS  
**Connector:** AES- XLR Female

### Dual Digital Audio Output (AES/EBU):

**Configuration:** Two Stereo Outputs with Individual Software Level and Delay Control on the 2<sup>nd</sup> Output (Use first as MAIN/MPX and second as HD1 Output)  
**Output Level:** -20.0 to 0 dBFS  
**Delay (2nd Output):** 0-8 sec in steps of 100 msec  
**Sampling Rate Output 1 (MAIN/MPX):** 32, 44.1, 48 kHz (stereo) OR 192 kHz (Digital MPX)  
**Sampling Rate Output 2 (HD1):** 32, 44.1, 48 kHz (stereo)  
**Connectors:** AES - XLR Male

### Audio Over IP Input:

**Configuration:** Stereo, Livewire/ Ravenna/Wheatnet , Input , supports AES67 standard.  
**Connectors:** RJ-45, EMI-Suppressed

### AUX1/AUX2 Digital Audio Input/Output:

**Configuration:** 2 pairs of digital input/outputs for HD2/HD3 processing  
**AUX1/AUX2 Inputs:** XLR-Female connectors for AES digital input with auto sensed sample rate (44.1/48 kHz allowed)  
**AUX1/AUX2 Outputs:** XLR-Male connectors for AES digital outputs, sample-rate follows AUX1 and AUX2 inputs respectively.

### Composite Baseband Output:

**Configuration:** Two Outputs with Individual software level Control  
**Maximum Output Level (unbalanced):** +12dBu  
**D/A Conversion:** 24 Bits

**Signal to Noise Ratio:** ≥ 90 dB (20Hz-15kHz)

**THD :** ≤ 0.01% (20 Hz to 15 kHz)

**Stereo Separation:** ≥ 60 dB (20 Hz to 15 kHz)

**Cross Talk:** ≤ 90 dB, channel to channel

**38 kHz Suppression:** > 90 dB

**Pilot Protection:** 65 dB relative to 9% injection, +/- 500 Hz

**57 kHz (RDS) Protection:** >60 dB relative to 4% injection, +/- 2 kHz

**Connectors:** Coaxial BNC, EMI-Suppressed

### Streaming Audio Output:

**Configuration:** 1 Internet stream output  
**Encapsulation Format:** ADTS  
**Streams:** .aac, .mp3, .m3u8 (HLS with 2-rate chunks)  
**Streaming Media Formats:** HLS, Icecast  
**Distribution Servers:** HLS, In-built HTTP/HLS, Icecast  
**Distribution Modes:** *push* (TCP/UDP/FTP), *post/pull* (HTTP)  
**Player Compatibility:** iPhone/Android, VLC, WMP  
**Browser Compatibility:** Edge, Chrome, Safari, Mozilla

### USB Connection:

**Connector:** 1 USB 2.0 (EMI-Suppressed)

### Management Control:

**Powerful SoundMax Manager Software** on any networked PC for auto sense monitoring configuration and control.

### Ethernet & Remote PC Control:

**Configuration:** Auto Presence Broadcast on Ethernet

**Connectors:** RJ-45, EMI-Suppressed

### Dimensions:

Width: 19"

Height: 2U (3.5")

Depth: 16.9"

### Power

**Power Requirements:** 105-260 V AC Single Phase, 45-60 Hz

**Connector:** IEC, EMI Suppressed, Detachable 3-wire chord with earthing.

**Safety Standards:** UL, CE

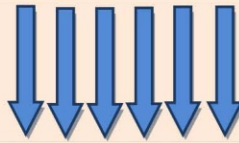
**Weight:** About 5.5 Kg

**Working Altitude:** 3000 meter AMSL

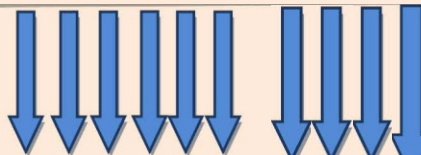
**Operating Temperature range:** 0° to 50° C

**Relative Humidity:** 95%

Stereo Analog, AES/EBU, Pilot/SCA/RBDS/Audio IP/USB



Processed Analog/Dual Digital/ Composite Output



HD1 Out  
 HD2 Out  
 HD3 Out

AAC+ Encoded Network Stream



Antenna



Transmitter



Internet



## Perceptual SoundMax™ Advantage:

- ❖ **Enhanced Consistent Loudness:** 24 Band Audio Processing allows packing in much higher audio density as compared to 5/6 band processing; thus significantly boosting the overall Sound consistency which results in much higher average modulation and enhanced coverage.
- ❖ **Crisp & Clear Sound:** State of art signal processing ensures that the processing output is free of any phase distortions and doesn't sound over-processed. Thus, it enhances clarity in addition to loudness and presence.
- ❖ **Lively Broadcasts:** Vocal Enhancement, Stereo Image Enhancement, Bass Enhancement, and available Sweetening tools make the sound livelier and pleasing to listen to.
- ❖ **Embedded Deep Audio AI Technology:** Incorporates novel optimized AI/ML based Audio classifiers and analysis. This Patent pending Real-Time Multi-Class Hierarchical Audio Classification Deep ML model accurately Classifies signal into Noise, Speech, Instrumental Music, Vocal Music, genres with high accuracy and high resolution. Useful in adaptively changing processing parameters for best quality.

## After Sales & Service support :

ATC Labs provides to its customer the unique benefits of 24x7 After Sales & Service support through its team of experts. As such you don't have to wait long for attending to any complaints/Faults/repairs. Also, the Software Upgrades are incorporated regularly by **ATC Labs** (being the OEM) as part of the after sales support.

For After Sales Support you can reach us at [<support@atc-labs.com>](mailto:support@atc-labs.com)

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