PRODUCT INFORMATION

HSS® DIRECTED AUDIO SOUND SYSTEM

MODEL SERIES: 220

American Technology Corporation™
Shaping the future of sound™

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TECHNOLOGY INTRODUCTION

HyperSonic Sound® (HSS®) is a completely new approach to sound generating technology. It is a paradigm shift in sound production based on solid principles of physics. There are no enclosures, crossovers, woofers, midrange or tweeter elements. The sound we hear is actually generated in the air indirectly, as a conversion byproduct of the interaction of ultrasonic sound waves and the air itself.

First, consider the fundamental operating principals of conventional loudspeakers. About a half-dozen commonly used conventional speaker types are in use today. Whether they be dynamic, electrostatic, ribbon, or some other transducer-based design, all traditional loudspeakers today have one thing in common: *they are direct radiating*—they are fundamentally a piston-like device designed to directly pump air molecules into motion to create the audible sound waves we hear. As an example, a typical cone loudspeaker moves the paper cone back and forth in the air, which directly creates the sound we hear.

In contrast to conventional loudspeakers, HSS technology produces sound in the air indirectly as a byproduct of a completely different process. HyperSonic Sound Technology starts by projecting a directional beam (column) of modulated ultrasonic audio frequencies into the air. However, we cannot hear these ultrasonic frequencies. The interaction of the air and the modulated ultrasonic frequencies creates the audible sound we hear within the column of ultrasonic frequencies. The sound is actually created as a byproduct of the interaction of the air molecules and the modulated ultrasonic frequencies. The audible acoustical sound wave is caused by the air down-converting the ultrasonic frequencies to the lower frequency spectrum we can hear. Since the audible sound is produced inside the column of ultrasonic frequencies (which is highly directional), an important byproduct of this process is that the audible sound can be tightly focused in any direction within the listening environment. Unlike a conventional loudspeaker, no sound is projected to the sides or rear of the HSS unit. This provides outstanding flexibility and allows an unprecedented manipulation of the sound's direction.

How is HSS different from traditional loudspeakers?

1. HSS projects sound in a tightly focused column without spreading sound in all directions.

2. HSS does not follow the traditional loudspeaker Inverse Square Law (6dB decrease in level for every doubling of the distance from the source). This means that HSS sound can travel much greater distances than the sound from conventional loudspeakers while maintaining complete intelligibility.

REFER TO ATC DOCUMENT #98-10006-3000, "HSS TECHNOLOGY INTRODUCTION"; #98-10050-AFAQ, "HSS FREQUENTLY ASKED QUESTIONS AND ANSWERS"; AND #99-10054-2500, "HSS PRODUCT OWNER'S MANUAL" FOR ADDITIONAL DETAILED INFORMATION.

PRODUCT DESCRIPTION

This brochure refers to unit model number S220A. This model is a fully self-contained unit with audio input processing, power amplification, and output emitter device(s). It only require a source of audio and AC power to be fully functional.

The HSS Directed Audio Sound System contain an audio input section which will play any incoming line level analog audio signal in real time.

APPLICATIONS

The Series 220 HSS Directed Audio Sound System was specifically developed for museum displays, retail environments, trade shows, point-of-purchase, kiosk sound, or any other applications where highly directional sound is advantageous.

REFER TO ATC DOCUMENT #98-10006-3000, "HSS TECHNOLOGY INTRODUCTION" FOR ADDITIONAL APPLICATION INFORMATION. As new types of HSS applications are studied and measured in the field, ATC will publish application notes with more specific details regarding each installation type, best practices, suggestions, cautions, and answers to many of your questions. They will be available on our website: www.atcsd.com

USING THE HSS SYSTEM

The most important thing to remember is that HSS produces a tight beam (column) of audible sound.

If the HSS unit is pointed directly toward the listener, he or she will hear the sound since they are standing directly in the column of sound produced by HSS. Other listeners standing off to the side or to the rear of the HSS unit, will not hear the sound coming from the HSS unit. This is very similar to shining a flashlight toward someone. If the listener stands in the light beam and looks at the flashlight they easily see the light coming directly from the end of the flashlight. HSS performs in a similar fashion. If you focus the audible sound column directly toward the listener, the listener will hear the sound coming from the direction of the HSS unit and we refer to this as using HSS in the *Direct Mode*.

However, if the listener is not in the sound beam (standing off to the side or behind HSS) and the sound column strikes a hard surface, the sound will, in fact, be reflected back into the environment. What the listener will hear is the reflected sound from the surface. The listener will perceive the sound as originating on the reflective surface, not the HSS unit, because that is the actual direction the sound is coming from when he or she hears it. The reflective surface becomes what is called a Virtual Sound Source, meaning that the listener perceives that there is an actual speaker on the reflecting surface. Using HSS in this mode is known as *Virtual Mode.*

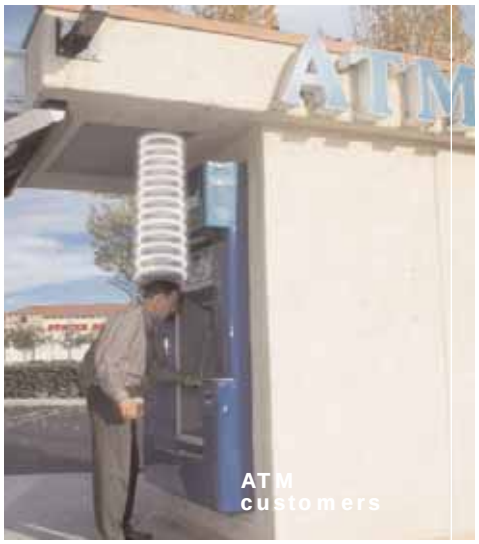
REFER TO THE HSS OWNER'S MANUAL, #99-10054-2500

MOUNTING HARDWARE

A variety of available mounting brackets and hardware are detailed in the HSS Mounting Options data sheet available from ATC or download the Mounting Bracket Accessory document from:
www.atcsd.com/pdf/OmniMountDataSheet.pdf

Note: The bracket mounting bolts on the rear of the HSS unit require USA 10-32 Nuts (metric M5 (5mm - 8)).

HyperSonicSound®

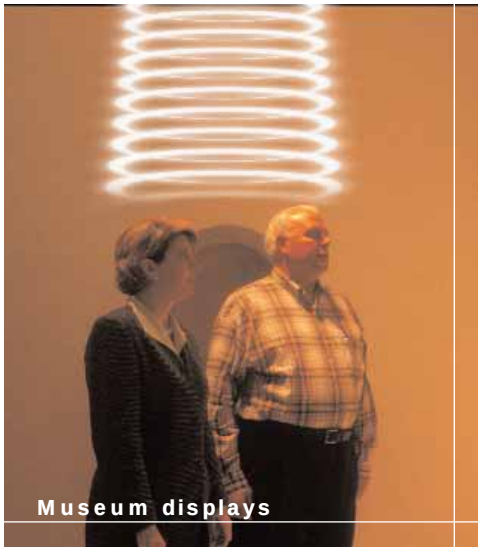


ATM customers

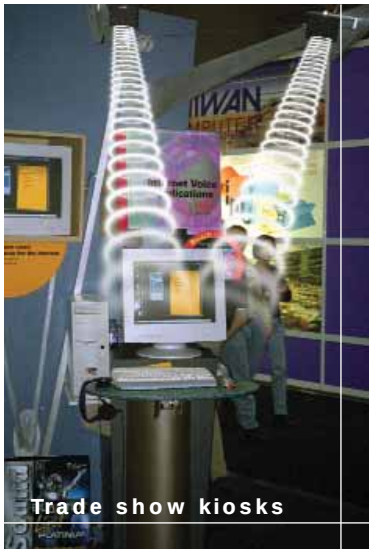
FEATURES

All Series S220A HSS Directed Audio systems contain the following features:

- **Fully self contained digital signal processing, amplification, and emitter device(s)**
- **Digital Volume Up and Down Controls**
- **Active / Standby mode control to place the unit into normal active mode or standby mode which mutes all audio signals**
- **6 Pin, RJ-11 Telephone style jack for external remote control connections**
- **Analog audio input for real time audio playback from an external, line level, audio source**


Museum displays


Retail displays


Trade show kiosks

TERMINOLOGY

HSS®: Acronym for HyperSonic® Sound, American Technology Corporation's proprietary trademark for its directional audio sound system technology.

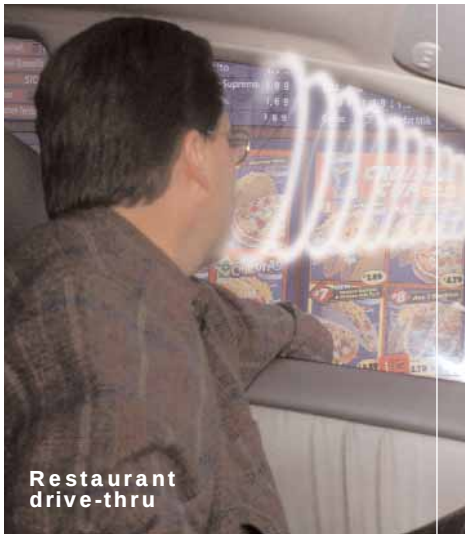
EMITTER: The silver, dimpled surface behind the front protective screen is the face surface of the HSS emitter. This component is what emits the ultrasonic sound waves into the air.

SPL: Sound Pressure Level, a term indicating the volume (loudness) of the audio program material in the air.

BEAM WIDTH: The effective width (size) of the audio sound beam as it is projected into the air.

DIRECT MODE: When the listener is in the direct audio beam of sound.

VIRTUAL MODE: When the listener is intended to hear the sound reflected from a surface.


Restaurant drive-thru

GENERAL SPECIFICATIONS / SYSTEM MODEL No. S220A

ULTRASONIC & DSP PROCESSING

Carrier Frequency:	approx. 48 kHz
Modulation Method:	Proprietary Dynamic Carrier

ULTRASONIC EMITTER

Type:	ATC proprietary PVDF Piezo Film device

AUDIO

ANALOG INPUT SECTION:

Input impedance: (real time unit)	10 Ω∂
A/D converter:	16 bit
Input connector:	3.5mm female STEREO (tip, ring, sleeve) mini jack
Input channels:	Two # 1(Tip + Sleeve) # 2 (Ring + Sleeve)
System configuration:	Monaural (Two input channels summed together at input stage)
Nominal Input level:	1.0 V p-p, each channel.
Max Input level before clipping:	2.0 V p-p, each channel

SYSTEM:

Bandpass Filtering:	400 Hz – 16 kHz
Max Audio SPL output:	See Measurement Section
Compression Ratio:	2:1

POWER AMPLIFICATION (ALL UNITS)

Amplifier Type:	Proprietary Class D – ATC ModAmp™
Amplifier Power Output Potential:	200 watts
Amplifier Efficiency:	>90%

ELECTRICAL

AC power cord length:	1.83 m (6 ft.)

POWER REQUIREMENTS

NOTE: Units are prewired for correct input voltage. Check rear panel for specific unit operating voltage

Wattage:	120 watts

MECHANICAL

Physical Dimensions: Depth (Front to Back) Height (Top-Bottom) Width (Left-Right)

88 mm (3.5 ") 280 mm (11.0 ") 280 mm (11.0 ")

SHIPPING WEIGHT

USA 6.52 kg (9.62 lb), Europe 13.68 kg (14.37 lb)

UNIT WEIGHT:

USA 3.54 kg (7.82 lb), Europe 5.7 kg (12.57 lb)

ENVIRONMENTAL

Operating Temperature:	**-10° C to 40° C (14°F to 104°F)**
Storage Temperature:	**-40° C to 50° C (-40°F to 122°F)**
Operating Elevation:	**Sea level to 6000 ft. (0 m to 1900 m)**
Operating Humidity Range:	0 to 95% (non-condensing)
Storage Humidity Range:	0 to 95% (non-condensing)

OPTIONAL ACCESSORIES

Mounting Brackets	Contact ATC

SAFETY REGULATIONS

THIS HSS DEVICE WILL MEET OR EXCEED THE FOLLOWING SAFETY REQUIREMENTS AND REGULATIONS:

UL UL Standard 6500

CE

OSHA (USA) OSHA Technical Manual, Section III, Chapter 5, Section V, Table III:5-4 *"TLV's For Ultrasound"*

FDA (USA) American Technology Corporation (ATC) has submitted the applicable reports to the FDA pursuant to Title 21, CFR, sub-chapter J as it pertains to ultrasonic devices for other than medical device applications. The abbreviated report is pursuant to Section 1002.12 of the regulations. According to this report, the FDA has assigned the following Accession Numbers to HSS products: 0181485 and 0191486.

FCC (USA) This device complies with Part 15 of the FCC Rules. This Class A digital apparatus complies with Canadian ICES-003.

Structures and methods utilized in this system are patented under one or more US patents. Additional US and International patents pending.

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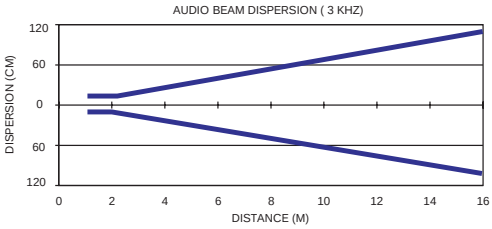
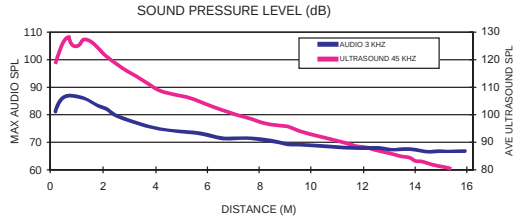
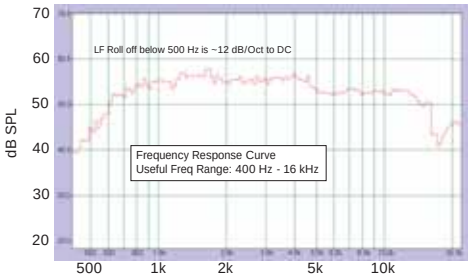
PART No. 89-10061-0002 / REV. C

220 SERIES MEASUREMENTS







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