

# Simulation Server for Vectorized Audio

## GOLDSERIES

AuSIM GoldSeries™ systems are integrated packages for delivering AuSIM3D™ technology to almost any computing platform. The GoldSeries includes AuSIM's line of GoldServer application development configurations. At the core of any GoldServer system is the digital audio processing unit (DAPU), augmented by a console, headphones, orientation tracker, analog audio converter, cabling, and client software. GoldServers may also include many other options.

Besides the reCREate, other standard GoldServer configurations include the portable RollingNugget and the GoldMiner, an expandable and very flexible multi-purpose system ideal for R&D applications.

## reCREate

Crystal River Engineering's discontinued "Acoustetron2" 3D audio server was popular for virtual reality (VR) and simulation applications. AuSIM's reCREate™ is a drop-in replacement and performance upgrade that meets and exceeds every specification at a lower price.

This configuration is ideal for enriching VR environments with enough sounds for immersive realism. Sound and listener positioning control and programming is simple and easy to integrate

This is AuSIM's least expensive audio server. In an effort to minimize costs, the reCREate has fewer expansion options than any other model in the GoldSeries. However, like all AuSIM systems, it is software upgradeable and will support most of the features currently in development.

The system contains one DAPU rendering processor supporting eight signal sources, four hundred sec-

*Super-substitute for Acoustetron2  
from Crystal River Engineering*



### FEATURES

- Direct replacement
- Lowest-cost GoldServer
- Compact Package
- Silent
- Portable software
- Affordable alternative

### BENEFITS

- Hardware and software compatible with Acoustetron2 using the CRE\_TRON API
- Affordable for a wide range of applications
- Smallest GoldServer package can be easily relocated
- Can be used in environments where the sound of normal systems would be intrusive
- Applications developed on one system can easily migrate to a non-identical system
- Much less expensive than original Acoustetron2 or newer DSP systems of similar performance.

onds of audio buffering memory, two 24-bit audio input and output channels, one RS-232 client interface, high quality headphones and amplifier, and an inertial head-orientation tracker.

### OPTIONS

- Tracking** - Standard head-orientation tracker can be upgraded or deleted
- Headphones** - High quality headphones are standard, but can be upgraded with a wide variety of circumaural, studio, or wireless designs, with or without microphones, all selected for tracker compatibility.
- Expanded Audio Buffer Memory** - Up to over 20 minutes!
- Rack-Mount** - The small reCREare chassis and associated equipment can be modified to a rack-mount configuration.



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AuSIM  
Engineering Solutions

reCREate™

## TECHNOLOGY

The audio simulation technology, *AuSIM3D™*, from AuSIM, Inc. uses physical modeling and empirical data to synthesize a sound space in a completely natural and realistic way. When listening to a system incorporating such technology, a user not only feels immersed by real-world, three-dimensional sounds, but also can use natural filtering to discern and comprehend any of several layered concurrent sound streams.



For each audio source, the system produces a left and right output pair dependent on the direction of emission from the source, path of propagation, and direction of arrival to the listener. The output pairs corresponding to each source are mixed and played through conventional headphones or nearphones. The processing creates a signal providing the perception that the source is propagating from a specified location and orientation in three-dimensional space.



**Standard Sennheiser eH2200 headphones, with mounted InterSense InterTrax2 tracker.**

## reCREate SPECIFICATIONS

### ■ AuSIM Audio Simulation Engine

- single *AuSIM3D™* processor
- supports up to 8 sound-sources
- supports one listener
- supports custom minimum-phase HRTF filters up to 256-taps
- audio buffering memory: 400 seconds, expandable to 20 minutes
- small, fanless chassis (optionally can be made rack-mountable)

### ■ Analog/Digital I/O

- 2 analog input channels, 24-bit resolution, 48 KHz
- 2 analog output channels, 24-bit resolution, 48 KHz
- single-channel balanced headphone amplifier
- one RS-232 client interface

### ■ High-fidelity Sennheiser eH2200, closed-circumaural headphones

### ■ InterSense *InterTrax*<sup>2</sup> inertial-based head-orientation tracker

### ■ Pre-installed, royalty-free library of over 600 wavefile samples

### ■ Four sample listener filtersets (HRTF filters)

### ■ System, server, renderer, and Win32 client software licenses

### ■ Manuals, internal cables, and RS-232 null-modem cable to client computer

### ■ Server console: keyboard, mouse, and monitor

### ■ Performance

- localization: 8 concurrent sources @ 44.1 KHz/sample rate, 4 concurrent sources @ 48 KHz
- pitch: 20-500% shift control for all sources
- dynamic update rate: better than 30 Hz
- analog input: 128X oversampled, 24 bit A/D converters
- analog output: 8X oversampled, interpolating filters
- stereo crosstalk: 100dBV @ 100Hz, 80dBV @ 1kHz, 60dBV @ 10kHz

**reCREate** is a complete 3D sound-localization server subsystem to be a peripheral to a "host" computer running the user's application, which is a client to the GoldServer. A host can be any modern computer workstation, which will control the **reCREate** system via the ATRON RS-232 communication protocol. It is easily implemented in the user application through CRE\_TRON, a high-level 'C' application programming interface.

### Components

The system consists of an embedded processor hosting an audio filtering engine and digital audio stream controller, 2-channel analog input audio, 2-channel analog output audio, and a monitoring console. The filtering engine is optimized to filter 32 streams with 64 coefficients per left/right pair. All filtering is performed with 32-bit floating-point accuracy. All digital audio streams are maintained with 24-bits of resolution. The analog interface supports 24-bit encode and decode at 44.1 or 48.0 kHz.

Software on the server side includes the "GoldServ" server interface to the *AuSIM3D* rendering engine and the "ChannelManager" to manage input and output streams.

Bundled software also includes many example programs with source, demo applications, and diagnostic tools, along with hundreds of royalty-free sound samples to include in user simulations.

### Compatibility

The **reCREate** system is specifically designed for compatibility with legacy Crystal River Engineering systems. It uses an updated version of the CRE\_TRON API, and existing software written for an Acoustetron2 will run on the **reCREate** without modification, unless the user wants to utilize new *AuSIM* features.

Installing a **reCREate** in place of an Acoustetron2 entails simply moving wall power, RS-232, and headphone connections from the old unit to the new one. These connections are discussed in the User's Manual.

**AuSIM**  
Engineering Solutions

**reCREate™**

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