

the accurate  
alternative



professional systems engineering

# studio one



The Studio One brings the most accurate music reproduction possible into your listening room. We left off gimmicky features that would degrade the signal, and we included the flexibility to cope with a wide variety of listening environments. We used only the finest and most durable component parts, matching them carefully to their applications. And we designed a unique phono preamp that sets new standards for noise, distortion, and cartridge loading.

The Studio One uses all discrete, all class A circuitry. Discrete design is more expensive than designs employing integrated circuits, but it allows the designer total freedom to select the optimum component for each application. Hand selected, matched amplifier stages are used throughout the Studio One.

The Studio One is a professional quality component, built to stand up to the kind of constant use sound systems receive in recording studios and discotheques. Few components available for home use can match its reliability. Tantalum capacitors and metal film resistors are used in all critical circuits. All stages have RF rejection built in. All AC wiring is totally isolated from the amplifier section. The fully regulated power supplies are immune to line voltage fluctuations.

Every Studio One is burned in for 48 hours prior to its final inspection. A detailed individualized test report is included with each unit. The Studio One is warranted against any defects in materials or workmanship for three years.

The Studio One has inputs for magnetic phono, tuner, two tape decks, and three auxiliary sources. It has two line outputs and two tape outputs. A tape transfer function connects the tape one outputs to the tape two inputs and vice versa, allowing you to duplicate in either direction while listening to either tape deck, or any other source, over the system. The gain control is dB calibrated. A muting switch lowers the output 20dB. Mode switching lets you select stereo, left mono, right mono, or left plus right mono.

## Three stage phono preamp

A phono preamp must perform several tasks. Conventional phono preamps take on all the tasks at once. Since the different tasks are performed best by different components and different circuits, conventional phono preamps have to make compromises. Everything gets done, but nothing gets done well.

The Studio One's unique phono preamp takes on its tasks one at a time. Each channel employs eleven transistors in three amplification stages. Each transistor and each stage is optimized for the job it performs. Everything works efficiently and exactly. Noise and distortion are far below the levels obtainable by conventional designs.

The first stage isolates the cartridge from the RIAA circuits and ensures proper cartridge loading. The second stage incorporates a 3-pole sub-sonic filter and equalization for the low frequency portion of the RIAA curve. The high frequency portion of the curve is handled passively between the second and third stages. The final stage isolates the equalization circuitry from the line amp and the tape outputs.

## Shelving equalizer

Even if there were such a thing as a speaker with flat frequency response, the resonance, absorption and reflection in the listening room would bend the response curve out of shape. The only way any music system can achieve anything resembling accurate tonal balance is by employing some sort of equalization to correct the imbalances in the speaker and its environment.

Conventional tone controls don't offer much help. If your system's peaks and dips don't correspond to the preset turnover frequencies, you're out of luck. Ten band graphic equalizers offer the flexibility to correct any tonal imbalance, but they introduce audible noise and distortion into the system.

The unique shelving equalizer in the Studio One is flexible enough to correct any common imbalances, and it does its job without degrading the signal in any way. The Studio One's total harmonic distortion, is less than 0.01% whether the equalizer is switched in or switched out.

The Studio One allows you to decide where to place the bass and treble equalization. Both the low frequency control and the high frequency control have four octave spaced turnover positions. Together they cover the entire audio range, so you can always boost or cut at exactly the right place.

The Studio One's high and low filters are designed to eliminate annoyances on sub-standard program material without greatly affecting the quality of the music. The LF roll-off is at 40 Hz, the HF roll-off is at 10 kHz, and both have a 12 dB per octave slope.

# studio two



We noticed a long time ago that amplifiers with very similar specs often sound quite different. So when we set out to design what we hoped would be the most musically accurate amplifier in the world, we didn't rely, as too many designers do, merely on electronic tests of our prototypes. We listened.

We experimented with what seemed like an endless variety of circuit variations. By comparing the variations in critical listening tests we discovered new correlations between certain circuit details and certain sonic properties. In other words, we found out how to construct a more natural sounding amplifier.

A number of the characteristics we found to be crucial to any amplifier's ability to reproduce music accurately are seldom, if ever, mentioned in discussions on amplifiers, and are ignored by many designers. Needless to say, we did not ignore them.

Slew rate is a measurement of how fast an amplifier can change the voltage at its output. The Studio Two has a slew rate in excess of 100 volts per microsecond, making it one of the fastest amps available. This high rate eliminates the possibility of transient intermodulation distortion and assures that the Studio Two is loafing at audio frequencies. THD in the Studio Two is less than 0.1% at 100 kHz at full power.

The most irritating sound an amplifier can produce occurs when it is overdriven. The grating break up of sound you encounter when you turn the volume knob up too far is not the result of clipping, as you may assume. Rather it is the result of the amp recovering from clipping. The protection circuits in most power amplifiers cause slow overload recovery, resulting in the offending distortion. The Studio Two, while fully protected from overloads, recovers with astonishing speed. In fact, it is too fast to hear.

(This is due in part to the fact that there are no storage elements, no capacitors, in the signal path.) If you should drive it past normal linear operation, you probably won't be able to tell.

All amplifiers use negative feedback (NFB) to improve their performance. Basically, NFB is a process in which the amplifier compares its output to its input and corrects the differences. This correction process uses up a good portion of the amplifier's gain.

"Open loop" characteristics refer to the amplifier's performance before NFB correction is applied. If its open loop distortion is low and its open bandwidth is wide, the amp will have little correcting to do. If its internal impedance is low, the amp will need only a small portion of its gain to drive its load, leaving most of the gain available for NFB corrections. The Studio Two has extremely low open loop distortion, below 0.5%, extremely wide open loop response, flat to 50 kHz, and extremely low open loop impedance. Its NFB operation is unequalled in exactness and efficiency.

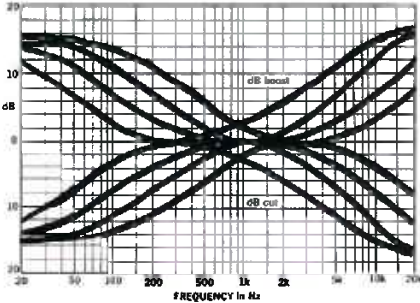
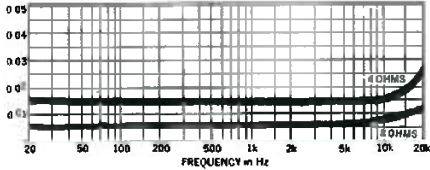
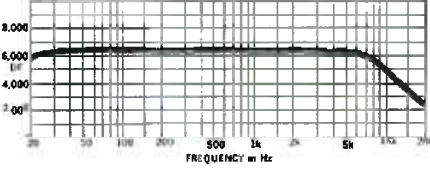
These technical characteristics, and quite a few more, result in a power amplifier that, to our ears, is clearly superior to any other available. But rather than ask you to accept our bias, we urge you to hear the Studio Two for yourself. Its sound is far more eloquent than any words we could use to describe it. Bias aside, we're sure you'll find the Studio Two uncolored through the entire audio range, with effortless high frequency response, and uniquely exceptional low frequency definition.

Like the Studio One, the Studio Two is designed and built to stand up to constant use professional applications. It has full short circuit and thermal protection. Every unit comes with a detailed individualized test report. The Studio Two is warranted against defects in materials and workmanship for three years.

guaranteed specifications

studio one

studio two

Design	All discrete class A	Design	Symmetric all discrete direct coupled
Distortion	Less than 0.01% THD from 20Hz to 20kHz with 2 volt reference	Power output	80 WATTS MINIMUM RMS PER CHANNEL WITH BOTH CHANNELS DRIVEN INTO 8 OHM LOADS WITH LESS THAN 0.02% THD FROM 20Hz TO 20kHz  140 WATTS MINIMUM RMS PER CHANNEL WITH BOTH CHANNELS DRIVEN INTO 4 OHM LOADS WITH LESS THAN 0.04% THD FROM 20Hz TO 20kHz
Noise	Phono preamp - greater than 88dB below 10mV at 1kHz (IHF A weighted) Line amp - greater than 98dB below 2 volts output (20kHz NBW)		
Slew rate	Greater than 50 volts per microsecond all stages	Clipping	Greater than 100 watts with both channels driven into 8 ohms Greater than 180 watts with both channels driven into 4 ohms
Clipping	Greater than 17 volts RMS	Sensitivity	1.2 volts for 100 watts into 8 ohms
RIAA response	Within 0.25dB from 30Hz to 15kHz 3-pole subsonic filtered	Slew rate	Greater than 100 volts per microsecond
Line response	Within 0.25dB from 20Hz to 20kHz	Damping factor	Greater than 2000 measured at amplifier output from 20Hz to 20kHz Greater than 200 at speaker terminals from 20Hz to 20kHz
Gain	Phono preamp - 45dB at 1kHz Line amp - 20dB	Power bandwidth	10Hz to 100kHz for 0.1% THD at 80 watts into 8 ohm loads
Equalization	Bass +3dB at 100Hz, 200Hz, 400Hz, 800Hz Treble +3dB at 1.5kHz, 3kHz, 6kHz, 12kHz Maximum boost or cut 15dB	Noise	Greater than 100dB below rated output (20kHz NBW)
Low filter	12dB per octave at 40Hz	Size	3.5"H x 18"W x 10.5"D rack mountable
High filter	12dB per octave at 10kHz	Weight	30 pounds
Size	3.5"H x 18"W x 10"D rack mountable	Power	105-125 volts 60Hz 35-450 watts (tested at 120 VAC)
Weight	16 pounds		
Power	105-125 volts RMS 60Hz 20 watts		
EQ curves		THD at rated power	
		Damping factor at final amplifier stage	

a word on the importance of specifications

Although we take great pride in the technical excellence of the Studio Series, we do not consider an evaluation of printed specifications to be an adequate evaluation of any high fidelity component. We have tested our products as thoroughly as possible. Yet many of the things that determine how a component actually

sounds can not be isolated, much less measured. We have come to believe that in the final analysis there is no test signal quite as relevant as music and no test instrument quite equal to the trained human ear. We urge you to assign critical listening tests a major role in your evaluation of any component.

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