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THE MUSIC COMPANY

CITATION

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BY THE

EXPERTS

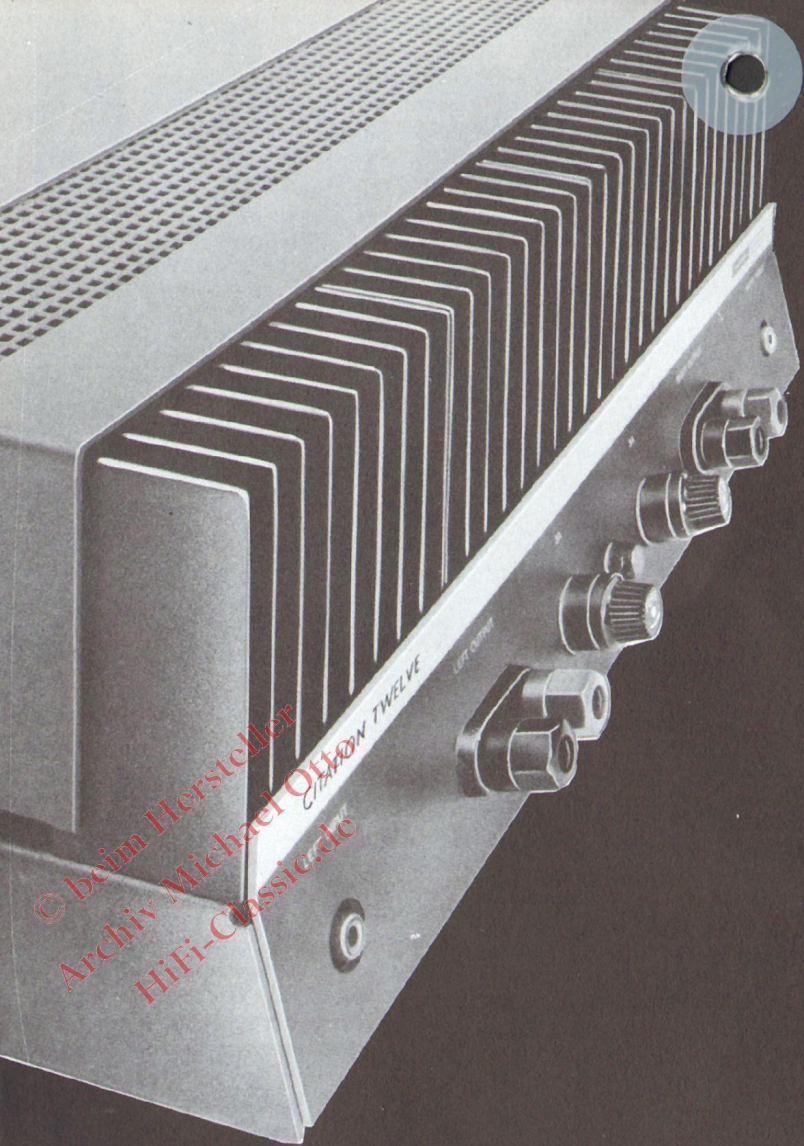
The Audiophile Magazines report on The Citation Twelve Amplifier and The Citation Eleven Preamplifier

As perhaps never before in the history of high fidelity sound reproduction, has critical reaction been so widespread and so unanimous. Harman-Kardon, with pride, presents the words of the experts as they appeared in the leading high fidelity magazines.

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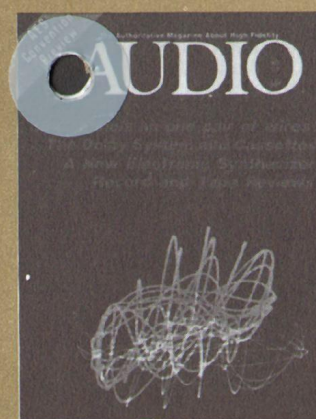
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Citation Twelve Amplifier

Audio



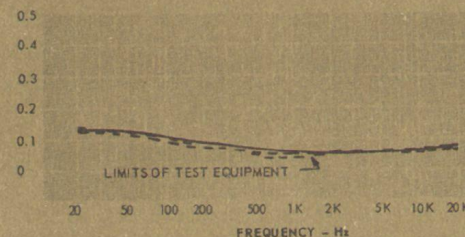
Harman-Kardon has done it again.

Listed as *an* amplifier the Citation Twelve is actually two separate amplifiers on the same chassis, which they share. There are two power transformers, two separate silicon bridge rectifiers, and separate filter systems.

The four output transistors—two per channel—are mounted on four heavy-duty heat sinks which serve as the front of the unit with the dress panel with input and output connections, the power-line fuse posts, and the pilot light.

This observer had the opportunity to construct a Citation Twelve from a kit of parts, and had no difficulty at all.

Chassis assembly and wiring should not take more than eight hours, assuming some familiarity with construction, so for ten hours of work you can save \$70.00 if you are so inclined. Best of all, however, is that you will have an excellent product of which you can be proud, and you will have joined the elite of kit builders—those who have built Citations.



In practically every category, the Citation Twelve surpassed its specifications. We measured distortion at 60 watts at .06 per cent, and at 70 watts we found THD was only 0.15 per cent, while it reached 2.3 per cent at 80 watts for a short while—then the output circuit breaker cut out, as would be expected. Coming down the power scale,

we found THD to be .06 per cent all the way down to a 1-watt output. We measured more distortion at 20 Hz, but there was more residual at this frequency. At 5000, 10,000, and 20,000 Hz, we also found distortion to remain at .06 per cent. We have heard of lower measurements on the Twelve, but those involve much more elaborate test equipment to get the residual down below the .04 per cent, which we find in our equipment. Intermodulation distortion measured 0.1 per cent at 60 watts and 0.2 at 1 watt. IM is normally higher at low levels than at rated output with solid-state amplifiers.

Frequency response was within ± 1 dB from 1 Hz to 100 kHz, which is as good as anyone could want for audio applications. Hum and noise was better than 100 dB below rated output when the input jack was shorted, and 86 dB below rated output with the input jack open. Power Bandwidth measured 4 to 35,000 Hz, slightly better than specifications, and is shown in Fig. 6.

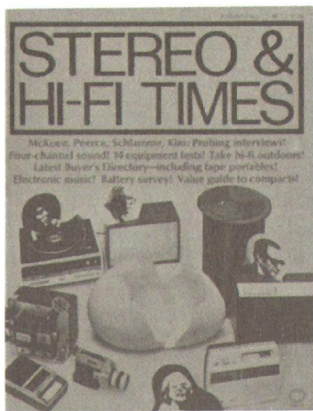
From 20 to 10,000 Hz, there is little difference in the square-wave response, as shown in Fig. 5. The pattern at 20,000 Hz shows a rise time of approximately 2 μ sec, which is exceptionally good.

Listening to the Citation Twelve is an enjoyable experience. Reproduction is clean and crisp with good, solid lows. You are just not conscious of the amplifier at all. As we said about the first Citation amplifiers, you listen *through* the amplifiers to the original source. And we say it even more so with the Citation Twelve.



Fig. 5—Square-wave response. Reading from top, 20Hz, 100Hz, 1000Hz, 10,000Hz and 20,000Hz.

Stereo & Hi-Fi Times



I have fond memories of the Citation name. At one time or another I have built all of the earlier Citation kits, and I was impressed that they represented positions either at or close to the highest state of the art of their period. But for reasons of its own, Harman-Kardon put the Citation line in limbo for some years; I'm glad to see it back.

The Citation Twelve is the first of the new series. It is a basic power amplifier that is designed to challenge the best in current amplifier design. Harman-Kardon's engineers have accepted this challenge and what results must surely be a present pinnacle of design. It is to sell for \$225 as a kit, \$295 wired.

Transistors make it easy for 60-watt amplifiers to be designed. But mere power is only a small part of an amplifier's performance. The Twelve delivers 75 watts into 8 ohms and it will deliver that power within a quarter of a dB over a 20-20,000 Hz range. At 4 ohms it's just as good, except that the maximum power is down to 70 watts; at 16 ohms it is 50 watts. So much for power. (Any amplifier that will deliver 71 watts into 8 ohms at 15 Hz has sufficient power to drive any speaker—and this Citation will!)

I haven't made a graph for frequency responses, as my graph masters only go down to 10 Hz. You can draw a straight line with a ruler on any graph for 1 watt response that extends from 1 Hz to 100 kHz. Response starts to drop above 100 kHz and reaches 2 dB down at 140 kHz. This should be wide band enough for anybody.

I only measured harmonic distortion at 8 ohms. At any power level from 20-20,000 Hz up to rated output, distortion

was below the residual level of my test instruments. Intermodulation was also residual at 1 watt. It stayed that way until the power toe was reached; to wit: at 70 watts it was 0.25 percent and at 75 watts it was 0.5 percent. It should be made perfectly clear that this is a 60-watt amplifier.

The square waves I put through the amplifier look the same going in and coming out at mid-band frequencies. At the bass end, I have never seen less phase shift; at the top end there was no ringing, only smooth rolloff (even with capacitive loads); and rise time was measured to be a super-fast 2 micro-sec.

Finally, the signal-to-noise ratio is over 100 dB and the input sensitivity to achieve full output is 1.6 volts.

The amplifier uses independent power supplies to feed each channel. Thus, all readings apply to both channels driven.

How would you expect such an amplifier to sound? The specifications quoted are extraordinary, after all. Will the sound be the same? I hooked it up to several excellent speakers at different times. As I expected, the amplifier passes everything that it is fed. But Harman-Kardon has produced an amplifier that is so close to theoretical perfection that it may be said that the Citation Twelve simply drops out of the reproduction chain. *It simply produces no discernible sound of its own*

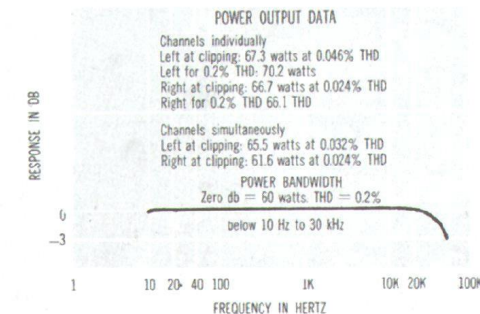
High Fidelity



Harman-Kardon's Citation line, of which the first tubed models appeared about ten years ago, denoted excellence of performance and represented H-K's bid for a perfectionist-oriented market with separate components that were offered either in kit or factory-built form. The reintroduction of the Citation has a similar aim, but in solid-state rather than tubed equipment. The first of the Citation series is a power or basic amplifier; it will be followed with a preamp-control unit, a tuner, and speaker systems all under active development as we go to press.

The Citation 12 we tested was built from the kit, following the instructions furnished. No snags were encountered, and the unit performed as shown in the accompanying CBS Lab data—which is to say, as good as or better than H-K claims.

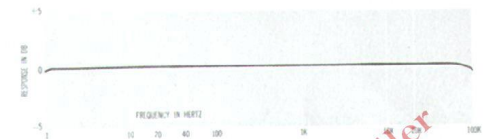
It thus stands as the best kit amplifier we've yet tested (including the old Citation 2), and certainly among the best of any type. With both channels driven simultaneously, it furnished better than 60 very clean watts per channel.



Distortion—both THD and IM—was so low that to show any amounts (which, by the way, would be just about nonmeasurable on any but the most sophisticated of test gear) we had to expand the

vertical gradations on our graphs. From a practical standpoint, the Model 12 can be regarded as a virtually distortionless device that calls to mind the "straight wire with gain" phrase that was originally applied to the old Citation amplifiers.

Power bandwidth, for a very low 0.2% THD, extends below and above the normal audio band; frequency response is literally a ruler-straight line from 10 Hz to 40 kHz, and is down by only 0.75 dB at 100 kHz. The 1.28 millivolt input sensitivity matches the signal output typically supplied by today's preamps, and the better-than-100 dB signal-to-noise ratio indicates that the Citation 12 is a very quiet amplifier introducing no noise of its own into the reproduction. Square-wave response,



at both low and high frequencies, is exemplary; near-perfect and signifying very wide-band, stable response with full bass and excellent transient characteristics. The amplifier, with its built-in "fail-safe" circuit with automatic reset, can drive any type of efficiency of speaker system. It actually employs two separate power supplies to ensure full-rated power for each stereo amplification channel.

The high undistorted power reserves enable the Citation 12 to drive speakers to louder acceptable levels than you may have been accustomed to. But they also lend the amplifier an ability to handle normal listening levels in a "coasting" state of operation, imparting to the music a sense of utter ease, clarity, transparency and openness—which in sum makes you feel as if you are listening *through* the amplifier back to the program source. Subtle nuances of definition, of attack, of inner musical fabric are more clearly presented—and suddenly you want to stay up all night rediscovering all the old records that you thought you had heard enough of.

It is true, of course, that the major portion of today's stereo market belongs to integrated units, especially receivers. We have a feeling that as word of the Citation 12 gets around, and as more and more dedicated listeners have a chance to hear it, we may see somewhat of a shift in the audio state of affairs.

Radio Electronics



In operation, the Citation Twelve lives up to the high promise of its published specifications. H-K claims a frequency response that is essentially flat from 1 Hz to over 100,000 Hz, with extremely low phase shift (less than five degrees at 20 Hz.) This kind of extended range performance pays off in particular at the low end, where bass response is noticeably cleaner and "tighter" than with our old, high quality, tube-type amplifier of similar power capability (60 watts RMS per channel).

Adding a power amplifier such as the Citation Twelve to a slightly aging component system results in both satisfaction and frustration — the satisfaction of having advanced one key element of the system to a quality level that need not ever be surpassed; the frustration of realizing the deficiencies in the remainder of the components. And so the pursuit of the always elusive "perfect sound" continues its never-ending search.

The important issue is, as the ads say, "Citation is Back"—and we're glad!

Legends and great names notwithstanding, **Radio-Electronics** decided to take a critical look at the new Citation Twelve amplifier, Harman-Kardon's first kit product in eight years.

Unpacking our Citation Twelve kit and examining the components and literature, it was apparent that H-K hadn't lost its touch for producing great kits. The 45-page manual is clearly written, profusely and accurately illustrated, and it's obvious that the person who wrote the manual actually assembled the amplifier, with comments such as "watch your fingers when installing these connectors" sounding like the voice of experience itself. It's all kind of reassuring.

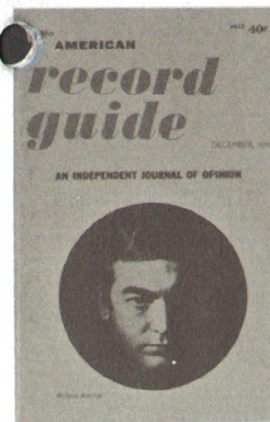
Accompanying the assembly manual are ten life-size pictorial diagrams that accurately depict every detail, even showing which direction to wrap wires around terminals. The manual and pictorials are well integrated and virtually foolproof.

We completed the assembly of our Citation Twelve in less than nine hours, and were delighted when the unit performed flawlessly on the first try. The only adjustments required are setting the output transistor bias for each channel. H-K even provides a specially marked test meter to facilitate this operation. (The meter is not installed, just used for initial adjustment.)

The completed amplifier looks as good as it works, with the heat sink fins providing a rugged, handsome appearance as well as doing an excellent job of keeping the amplifier running cool, even under heavy signal loads. Input jacks (standard pin plug type) and the large color coded speaker binding posts are mounted, along with primary fuses and the pilot lamp, on the decorative panel beneath the heat sinks. The power cord enters through the rear of the chassis.



American Record Guide



The revival of Harman-Kardon's Citation kits gives me particular joy. I liked to build Citation components way back in the tube era. I continued to enjoy building them in the early transistor period. And now, after too long, the line has been reactivated with a whole new generation of models.

The assembly took only three evenings (I could have done the job in two), and I encountered no pitfalls whatever. The power-supply elements—there are two separate power transformers and thus independent power supplies for each channel—are mounted on the chassis. The output transistors, on their massive heat sinks, come from the factory already mounted; you merely wire them to the chassis. On the latter, everything terminates at a series of pin connectors. These eventually mate up with a single printed-circuit board on which all of the remaining amplifier electronics must be mounted.

Thanks to Harman-Kardon's excellent manual, the job is quickly done. Two final adjustments for transistor bias (made easy by a meter, which is supplied), and you are ready to turn on the Citation Twelve.

What lovely sounds come through this amplifier! To put it more accurately, what a pleasure it is to hear music through an amplifier that produces no sounds other than those which it receives.

In a moment of modesty, Harman-Kardon rates this model as capable of delivering 60 watts (continuous power) per channel. In my opinion the manufacturer is *too* modest. With an 8-ohm load, the Citation Twelve will deliver 75 watts per channel at mid-band, at 20,000 Hz, and even at 30 Hz. (At 20 Hz, the maximum power was 71 watts—down less than 0.5 per cent!)

Like all transistor amplifiers, the Citation Twelve delivers different amounts of power to 4- and 16-ohm loads. With the former,

power at the 20-kHz extreme is limited to 60 watts per channel; at 16 ohms, power at this frequency is 50 watts. Predictably, the figures are better (though not by much) at mid-band frequencies. But in any case it is safe to say that the Citation Twelve has more than enough power for *any* speakers under any imaginable conditions.

What about distortion? Well, the simple truth is that I could not find any harmonic distortion to measure (it was below the residual of my instruments) at any power and at any frequency! I could indeed measure intermodulation distortion, but only when the power got up over 60 watts. At 70 watts, there was 0.25 per cent; at 75 watts, it was 0.5 per cent.

I might mention that all of the foregoing distortion measurements were made at 8 ohms. At 4 and 16 ohms I made only spot checks (but got equally impressive figures). I should add that every measurement applies equally well to one channel (driven) or two (driven); "separate power supplies" actually means two independent amplifiers sharing only the single wall-plug.

As to signal/noise, I gave up when I found that noise was at least 100 dB (!) below the maximum power output. My estimate is about 115 dB—and note that the theoretical maximum s/n is just a bit over 130 dB.

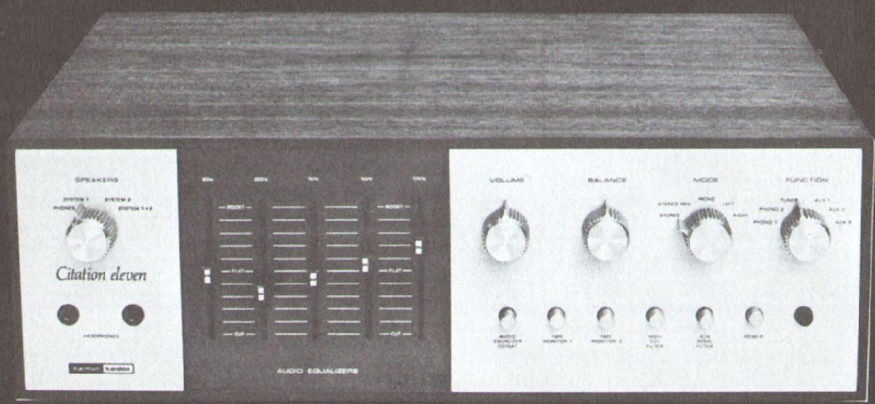
Of course I *could* measure frequency responses, and did, even so, I had to use my direct-coupled scope to verify the bass response because a meter would not go down as far as this amplifier does! (You, too, can draw a straight line on a graph. Start it at 1 Hz and run it right up to 100,000. It begins to droop downward above that, reaching -2 dB at around 140,000 Hz.)

In short, the Citation Twelve is rockstable under any load, and apparently indestructible in the presence of shorts or under no-load conditions. In my judgment it now becomes the amplifier against which others will be measured.

Factory-wired, the Citation Twelve costs \$295.00. The kit version sells for \$225.00.

Citation Eleven Preamplifier

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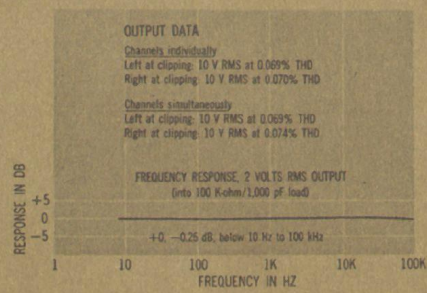
High Fidelity



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Comment: The Eleven is the second in the new Citation series of high-performing components offered by Harman-Kardon. A self-powered preamplifier-control unit, it may be used with any separate basic amplifier. Its performance is superb; indeed its ultrawideband response and extremely low distortion again call to mind (as they did for the Model Twelve) the phrase "straight wire with gain" that was applied to the first Citation amplifiers in pre-transistor days.

The speaker selector is an unexpected convenience. A separate preamp/power amp setup normally requires that speaker switching be accomplished at the output of the basic amplifier via some kind of external switch that you wire in yourself. In the Citation Eleven, that switch and the associated facility for correct speaker hookup is provided in the form of a special cable: one end has four tinned and color-coded leads that you connect to the speaker outputs of your basic amplifier; the other end terminates in a five-pin plug that you insert into a special socket on the rear of the Eleven. You then connect your speaker lines to a speaker terminal board on the Eleven, which accepts two separate stereo speaker systems. You may use the Eleven's front-panel selector to choose either, both, or none of the stereo speaker systems.



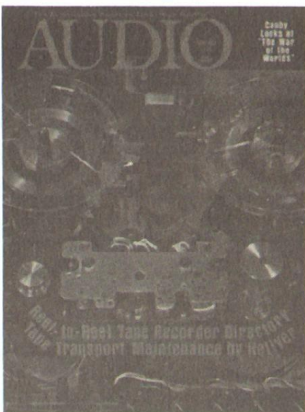
The audio equalizer controls, which

handle both channels simultaneously, divide the frequency spectrum into five main bands, with nominal centers at 60 Hz, 320 Hz, 1 kHz, 5kHz, and 12 kHz. Each provides up to better than 12 dB of boost or cut, and their overlap or cross-over points fall about midway above or below the total dB range so that a smooth, continuous shaping effect is possible even when all controls are moved to their extreme positions.

Another unusual feature of the Eleven is its two tape monitor facilities. By hooking in two tape recorders—using the various combinations of tape monitor, tape output, and auxiliary jacks at the rear of the Eleven—you can record on both and monitor either; you can dub from one to the other while adding your own volume tone, and filter adjustments via the Eleven's controls.

Testing the Citation Eleven was virtually a matter of simply confirming the manufacturer's specifications for the unit. Distortion ran so low, it was just about nonexistent; the tiny values that were measured could be displayed only on an expanded graph. Square-wave response was just about perfect; frequency response—except for its being a mere 0.25 dB down at 100 kHz—was a ruler-flat line clear across the graph. The test data, incidentally, was taken at CBS Labs using a load on the preamp of 100 Kohms/1,000 pF which corresponds to 50 feet of audio cable; this indicates that the Eleven has the ability to deliver its rated performance under very exacting load conditions and marks it as a truly professional instrument.

Using and listening to the Eleven is a music-lover's delight: the unit does nothing to the source material that you don't want it to do. It is one of those superior audio devices that functions without seeming to be in the circuit; it lets you listen through the system back to the program material. We have no doubt, in fact, that the performance capabilities of Citation equipment exceed the response capabilities of commercial program material. Just to nail home this point we played a stereo tape that had been dubbed from master tapes containing a variety of orchestral and vocal selections which we could now hear several generations earlier than we normally would in their commercial-release versions. Their superiority was clearly audible on Citation equipment, once again demonstrating that "Citation sound" is nothing more or less than accurate reproduction of musical sound.



The Citation Eleven satisfies its specifications excellently. The curves of the audio equalizer section are shown in a composite in Fig. 4. These curves show the effects of each of the five controls separately at both maximum boost and maximum cut positions. An intermediate setting of the control results in the dashed curve shown for the 1000-Hz position, and others are similar. To effect a certain curve, one may boost one of the five frequencies and cut the next, for example, and if every possible combination were plotted, it would take several pages for the curves alone. Suffice that practically any desired response curve can be obtained with the controls in the various positions. Simply add and subtract the curves and see the possibilities for yourself.

The curves track within ± 1 dB throughout their ranges, and provide a maximum boost or cut of 12 dB at each of the five frequencies. Similarly, the phono circuits follow the RIAA curve within ± 1 dB from 20 to 20,000 Hz, and curves for both phono positions are identical, naturally, as are those for both channels. The lo- and hi-cut curves are shown in Fig. 5. The maximum rated output for the preamp is 6 volts, but clipping does not occur until a 12-volt output is reached. Phono overload is a comfortable 112 mV, which should accommodate the loudest rock records, even when played with a high-output cartridge. At 6 volts output, IM distortion measured a miniscule .04%, and THD was under .05% at 6 volts, and below residual at 2 volts, which means that distortion is essentially not a factor in the output. The signal-to-noise ratio measured 62 dB on phono (referred to a 10-mV signal and a 6-volt output). With the volume control at maximum, S/N was 82 dB, and with the volume control at minimum, S/N was 93 dB.

These figures transcend the term "excellent" in any particular. Even the two sections of the volume control track within ± 0.5 dB, which is remarkable.

Having made all the measurements, we were champing at the bit to try it out. We have been using the Citation Twelve as a power amplifier for some months, and from the moment it was put into service, we noted a definite improvement in our sound quality. The Eleven does away with the need for any frequency shaping devices, since it has practically all that anyone could desire. One can change the quality of male voices, for example, and it is likely that you could have all announcers sound almost the same if you wanted to. With music, you can correct for recording misequalization, if it exists, or you can add your own. You can compensate for room acoustics to a remarkable degree, increasing the bass to make up for speaker deficiencies, and boosting or cutting the highs—extreme or middle—to make up for room furnishings. In short, there is very little that you cannot do with the Citation Eleven. It is a worthy addition to the already distinguished reputation that the name Citation has achieved over the many years since they first made their appearance.

Stereo & Hi-Fi Times



Let me say it right out. The Citation Eleven is a fitting companion to the power amp I wrote about last time. That is, the pair of units represent no-compromise audio.

When you listen to both units combined, you don't hear them at all—which is the best thing that can be said about any component.

The Citation Eleven is a sophisticated preamp. For that reason there are no present plans to release it in kit form. It does everything a separate preamp is expected to do, it does things with finesse, and it does things no other preamp does.

The tone controls are perhaps the most obvious innovation. Five slider controls make a sort of minigraphic equalizer, instead of the usual two controls. Each slider is centered on a particular frequency and acts primarily to boost or cut around this frequency. The five that H-K have chosen are 60 Hz, 320 Hz, 1 kHz, 5 kHz and 12 kHz. I cannot imagine a better choice of five frequencies. With these controls you have maximum control over the flavor of music as it is affected by poor records or transmissions, or by the sonic characteristics of your listening room. These controls do much more than tone controls, as you can gather. It's difficult to describe their versatility—rest assured that once you get used to them you will never be satisfied with mere bass and treble control again. If you insist on absolute flatness without tone action, a separate switch bypasses the tone circuits entirely.

PERFORMANCE TESTS

Testing a preamp such as this is really a test of my equipment. In most forms of distortion, at least, the meter indications were reflections of the residual distortion in the generator and not any addition by the preamp. Only with IM testing did I find a readable figure. At 1.5 volts out with 1 volt

in, IM measured 0.12 percent. This is close to the residual of my instruments so it may actually be lower and, in any case, is so low that it may as well be residual.

The Citation Eleven may be termed as a distortionless preamp. Phono sensitivity is very high. Only 0.6 mV was needed to drive the preamp to 1 V, and 2 mV produced an output of 3.2 V. (The preamp has a capability of up to 10 volts output.)

What pleased me most is the fact that overload distortion did not set in until 110 mV, more than an adequate safety factor. I also checked the phono equalization to the RIAA standard. The specification calls for 30-15,000 Hz. Over this range the equalization was accurate to within 0.25 dB.

Preamp noise is also extremely low. With 5 mV in and 1.5 V out, noise was 69 dB (unweighted) down. In the high level inputs noise was over 100 dB down—how much more than 100 I could not reliably measure.

Frequency response is also exceptional. Take a ruler and draw a straight line. Now dip the ends of the line downward slowly. The straight line is 0 dB, and the dip points cross the -2 dB point at 1 Hz and at 155 kHz. As can be calculated from this, the square wave rise time is 2 μ sec.

I'll only add that there is also a low cut filter that is -6 dB at 30 Hz, and a high cut filter that is -6 dB at 2 kHz. That high cut filter is a bit severe, I think, using the high cut filter is a bit more drastic than it might have to be.

I started off heaping praise on the Citation Eleven. That praise is unqualified. Granted, there are not too many separate preamplifiers left on the market. But of these, the Citation Eleven must be the best—and more important—it will not be bettered in the near future. At \$295, it represents the culmination of a purist's dream.

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American Record Guide



The state of the amplification art moves inexorably on. Just as I get to a point when I begin to believe that preamps hardly can be improved, some manufacturer proves me utterly wrong. Harman-Kardon has done it this time—and not for the first time, either.

Now for the things that no preamp has *except* this one. For a start, extra switching has been incorporated into the unit to allow your wiring back the speaker output of your amplifier to the control center. This permits a front-panel switch to select the speaker output to either pair of speakers (or both). In addition, the speakers can be muted so that low-impedance (standard) stereo headphones may be plugged into the front panel. (Of course, you would connect the speaker leads to the preamp rather than the power amp.) This is a marvelous convenience for those of us with two separate speaker systems.

Five slider switches are to be seen on the front of the unit. These form the heart of an unusual tone-control system. Instead of the bass and treble controls found on other preamps, H-K has chosen to give you five. They enable you to cut or boost music at points centered around five frequencies: 60 Hz, 320 Hz, 1 kHz, 5 kHz, and 12 kHz. Each lever will boost or cut approximately ± 12 dB. This gives you a measure of tone control that goes far beyond the two-knob approach, so that defects of program content really can be compensated for effectively. As a single example: hum content of a program can be eliminated via the 60-Hz control with a minimum of bass loss. (A conventional bass control would eliminate the hum, too; but also it would cut a great deal of the bass content.)

Test results: One of the problems presented by state-of-the-art devices (of which there are few, believe me) is that they

strain the capabilities of certain instruments to measure possible imperfections. As an example, this unit's harmonic distortion with a 1.5V output is below the residual distortion of my test instruments from 20 to 20,000 Hz!

I did get an indication of IM distortion, but it was a low 0.12 per cent and I suspect that some of this was my meter indicating background noise at the 1.5-V output.—In other words, the real distortion undoubtedly is even lower than this very low reading indicates.

Frequency response curves can be drawn with a ruler. At the extremes, where response is down 2 dB, I was at 1 Hz bass point—and at 155 kHz high point. This is indeed a *wide* wideband!

Phono equalization to the RIAA standard was within 0.25 dB over the specified 30-15,000 Hz range.

Noise was also extremely low. To wit: A 2-mV phono input (1.5V out) had noise 58 dB down. With a more typical 5-mV input the noise was -69 dB. In high-level inputs, noise was more than 100 dB below a 1V input.

The phono sensitivity for a 1 V output was 0.6 mV at 1 kHz. A 2-mV input gave an output of 3.2 volts—more than any amplifier is ever likely to need. High phono sensitivity is often bought at the expense of poor high-level cartridge input overload. Not this time! It took an input of 140 mV to start any noticeable overload. No present magnetic cartridge will ever reach this. Thus the Citation Eleven will fully amplify the output of low-output cartridges, but at the same time will not overload with the high-level ones.

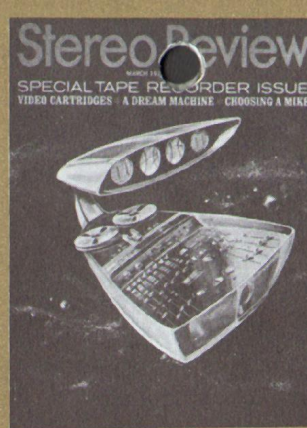
More important however, is the uniform excellence of square-wave appearance as it passes through this unit. Particularly at the bass end, square waves look almost the same incoming and outgoing. This is a testimony to the ultra-extended bass response of the unit—and in my opinion a large part of the reason for its superb sound.

More correctly, the "sound" of this system in my listening tests *could* be described as nonexistent. Music flowing into the preamp flows out with nothing taken away, and also nothing added that you did not deliberately introduce.

The Citation Eleven sells for \$295.00. It is not available as a kit.

I might add that the Citation Eleven is now the preamp that acts as the control of my own music system. And there it will stay for the foreseeable future. What more can I say?

Stereo Review



Harman-Kardon's Citation Eleven preamplifier, a companion to their Citation Twelve power amplifier, is a deluxe stereo control center with exceptional flexibility and impressive performance characteristics. Instead of the customary bass and treble tone controls, there are five vertical slider controls, each providing a ± 12 dB range of adjustment in a selected portion of the audio spectrum. The control areas are centered at 60 Hz, 320 Hz, 1 kHz, 5 kHz, and 12 kHz. The nearly infinite variety of response curves offered by this equalizer permits a user with good listening judgment to correct many, if not most, of the frequency-response aberrations found in speakers, rooms, and program material. In addition, it can provide ideal loudness compensation for low-level listening.

The usual tape-recorder outputs and monitoring inputs, unaffected by volume control or equalizer settings, are also provided—but in duplicate! This simplifies the connection of two tape recorders to the system for uninterrupted recording of long programs. Each set of tape-recorder outputs and inputs has its own front-panel pushbutton monitoring switch.

A special feature of the Citation Eleven is a speaker-selector switch—a control not usually found on separate preamplifiers. The speaker terminals of the power amplifier are connected to the Citation Eleven through a special cable, and two sets of speakers may then be connected to the Citation Eleven and controlled from its front panel.

Laboratory Measurements. The basic frequency response of the Citation Eleven was absolutely flat from 20 to 20,000 Hz: in fact, we could not detect any variation in output over this range. Over the span of 5 Hz to 125 kHz, the response was essentially within 1 dB: +0.3' dB at the

low end and -0.8 dB at the high end. Within the audio range, the frequency response measured as flat with the equalizer controls set to their center positions as when the bypass switch was activated. Square-wave response tests confirmed Harman-Kardon's claim of 1 microsecond rise time for the preamplifier.

The harmonic distortion at 6 volts output was about 0.03 per cent from 20 to 20,000 Hz. At -10 dB (1.9 volts) it was about 0.017 per cent over most of that range. At 1,000 Hz the distortion was below the noise level at low signal levels, but could be measured at 0.018 per cent at 3 volts output, 0.03 per cent at 6 volts, and 0.064 per cent at 10 volts—just below the clipping point. The IM distortion was 0.045 per cent at 0.1 volt output, 0.018 per cent at 1 volt, and 0.055 per cent at 3 volts. Considering that the strongest signal required by any power amplifier we know of is perhaps 2 volts, the Citation Eleven can be considered an essentially distortionless device.

The Citation Eleven was completely free of switching and turn-on noises. A time-delay circuit reduces the output level by about 20 dB when the preamp is first turned on. The gain increases smoothly to normal levels in about 15 to 20 seconds. This prevents turn-on transients from input sources from reaching the speakers. Crosstalk between channels was -63 dB at 1,000 Hz, and there was no detectable crosstalk between inputs. Phono overload occurred at 120 millivolts, which is 44.5 dB above the phono sensitivity. This is one of the best dynamic ranges we have ever measured for a phono-preamplifier section. As would be expected, noise was quite inaudible at all normal gain settings, and the phono section was virtually immune to overload.

Comments. The Citation Eleven is unquestionably one of the best preamplifiers we have measured. It would take better ears—and instruments—than ours to find any unintentional signal modification in the output of the Citation Eleven. As a rigorous test of the Citation Eleven's "wire with gain" properties, we connected it up so that a signal could be led either around it or through it on the way to the power amplifier. Any response aberration introduced by the Eleven would then be audible during A-B comparisons. Perhaps needless to say, the Eleven left the signals (including white noise) completely unaffected in any way detectable by our ears. It is an ideal companion for any really good basic power amplifier. In combination with the Citation Twelve, it would be hard to beat.

The Citation Twelve Amplifier

PROFESSIONAL FEATURES

- Hermetically sealed silicon output devices capable of handling sustained high power without breakup or overload are used in output stage.
- Exceedingly broad frequency response at full power with low harmonic and intermodulation distortion results in clean and totally transparent sound.
- Phenomenal square wave response throughout entire audio spectrum. Phase shift at 20 Hertz is less than 5 degrees. Rise time at 20K Hertz is better than 2 microseconds.
- Two individual power supplies deliver superb regulation for absolute stability and extended low frequency response. Handling of transients is effortless at any power level.
- Fail-safe operation with all types of speakers including electrostatics. Amplifier can handle high power transients, short circuits, inductive and capacitive loads or unloaded condition without damage to the output stage.
- Computer grade components guarantee long, trouble-free life.
- Instrument type speaker binding posts assure positive connections reducing possibility of short circuits.
- Heavy duty heat sinks keep amplifier cool even under stress operating conditions.
- Two thermal cutouts, one per channel, remove power from the output stage when heat build-up exceeds 80 degrees C. Two series-type limiting relays protect amplifier from short circuits. Reset automatically once short is removed.
- High degree of feedback reduces distortion without sacrificing stability.
- 120 volt 50-60 Hertz or 220 volt operation.
- Two year service warranty on parts and labor for factory wired amplifier.

TECHNICAL SPECIFICATIONS

Continuous Power Output:	60 watts per channel, RMS, @ less than 0.2% THD, at any frequency between 20-20,000 Hertz, both channels driven simultaneously into 8 ohms.
Peak Power Output:	120 watts per channel.
Power Bandwidth:	5-35,000 Hertz @ 0.2% THD.
Total Harmonic Distortion:	Unmeasurable at normal listening level. Less than 0.2% at rated output, 20-20,000 Hertz.
Intermodulation Distortion:	Less than 0.15% at all power levels, 60 and 6,000 Hertz.
Hum and Noise:	Better than 100 db below 60 watts.
Damping Factor:	40:1
Input Impedance:	30K ohms
Input Sensitivity:	1.5 volts for 60 watts.
Frequency Response:	1-70KHZ, ± 0.5 db @ normal power level. Less than $1/2$ Hertz - 100KHZ, ± 1 db @ normal power level.
Phase Shift:	Less than 5 degrees at 20 Hertz.
Rise Time:	Better than 2 microseconds @ 20K Hertz.
Inputs:	One RCA type input terminal per channel.
Outputs:	Instrument type binding posts. Accepts speakers from 4 to 16 ohms.
Front Panel:	Two 3 amp, A.C. fuses, two color-coded speaker output terminals, two inputs, neon on/off indicator light.
Construction:	Close point to point wiring with bussbar ground. Printed circuit board. Highest grade components held to tight tolerances.
Power Consumption:	200 watts, both channels driven simultaneously. 30 watts at zero signal.
Dimensions:	5 $1/4$ " H x 12 $3/4$ " W x 12 $1/4$ " D (complete with metal cage).
Weight:	30 pounds.

All Features and Specifications Subject to Change Without Notice.

The Citation Eleven Preamplifier

PROFESSIONAL FEATURES

- Flexibility of professional audio equipment employed in recording studios.
- Controls arranged in logical groupings to facilitate operation.
- Professional audio equalizers replace standard tone controls. Hinge points located at five critical sections of the audio spectrum give user total control over room acoustics, program material and speaker sound. Settings are instantly repeatable.
- Special defeat switch removes audio equalizers from circuit for absolutely linear response. Provides instant comparison of equalized and flat response.
- Audio equalizers may be used while taping by connecting second audio output from preamplifier to input of tape recorder.
- Pushbutton on/off switch enables user to turn system on and off without upsetting careful setting of operating controls.
- Two sets of tape recorder outputs permit connection of two tape recorders to the preamplifier at the same time without necessitating use of "Y" connectors or similar external devices. Both pair of tape recorder outputs provide a signal unmodified by the volume control.
- Two tape monitor switches on front panel permit individual monitoring of two tape recorders.
- Front panel speaker selector permits use of two separate stereo speaker systems in different sections of the home. Listener may select speaker system one, system two or both speaker systems simultaneously.
- Two low impedance headphone receptacles.
- Specially designed high frequency filter provides sharp cut off of highs without introducing ringing.
- Subsonic noise filter (15 hertz) removes annoying rumble and other low frequency disturbances without drastically affecting the character of the sound.
- Specially designed power supply delivers individually decoupled voltages to each feedback pair for optimum stability and lowest noise.
- Shape and tolerance of the RIAA equalization playback curve is held tightly to plus or minus 0.5 db.
- Close tracking volume control provides exceptionally close balance between the two stereo channels. This precise balance is maintained down to the cut off point of the control.
- Phenomenal frequency response results in superb square waves at all frequencies from below 5 hertz to beyond 100,000 hertz. This is an indication of virtually non-existent phase and transient distortion.
- Plug-in printed circuit modules provide easy accessibility and professional appearance.
- Extremely high dynamic range prevents overload distortion of the preamplifier stage.
- Six position function selector switch with two low level positions permits use of two individual record players with low level magnetic pickups and four high level sources.
- Two sets of audio outputs enable user to connect preamplifier to two individual power amplifiers, or to connect the second set of audio outputs to a tape recorder to permit use of the audio equalizers while recording.
- Pushbutton switches for equalizer defeat, tape monitor 1, tape monitor 2, high cut, subsonic filter and on/off.
- Mode selector switch has provision for stereo, stereo reverse, mono, left channel and right channel.
- Four A.C. receptacles are located on rear panel. One A.C. receptacle is unswitched.
- Special connections on rear panel for connecting power amplifier and speakers to permit use of special speaker switching and headphone receptacles.
- 117 volt, 50/60 Hz or 220 volt operation. A.C. line fuse.
- Two year service warranty on parts and labor for factory wired preamplifier. Two year warranty on parts for kit.

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CITATION ELEVEN SPECIFICATIONS

Audio Output:	Up to 6 volts RMS into 10k ohms.
Frequency Response:	Below 5 hertz to beyond 125K hertz ± 0.5 db. Below 2 hertz to beyond 250k hertz ± 1.0 db.
Square Wave Rise Time:	Less than 1 microsecond at 20,000 hertz.
Square Wave Tilt:	Less than 5% at 20 hertz.
Total Harmonic Distortion:	Less than 0.05% at 6 volts RMS from 10-30,000 hertz. Below residual level of most test instrumentation at 2 volts RMS and below.
Intermodulation Distortion:	Less than 0.05% at the equivalent 6 volts RMS output.
Noise (Unweighted):	Low Level: 65 db below 6 volts at 10 milli-volts input reference. High Level: 80 db below 6 volts (volume control wide open). Residual: 90 db below 6 volts.
Sensitivity:	Low Level: 15 millivolts for 2 volts output. High Level: 150 millivolts for 2 volts output in all auxiliary positions except Aux. 3 which is 300 millivolts for 2 volts output.
High Cut Filter:	- 8 db @ 10,000 Hz; 6 db per octave slope.
Subsonic Filter:	- 12 db @ 15 hertz; 6 db per octave slope.
Input Impedance:	Phono: 47,000 ohms. Aux: 20,000 ohms.
Output Impedance:	Source Impedance: Less than 500 ohms. Recommended Load: 10,000 ohms or greater.
Phono Overload:	Greater than 115 millivolts.
Audio Equalizers:	Five sliding controls operating at the following hinge points: 60, 320, 1k, 5k and 12k hertz. Boost and cut ± 12 db, each position.
Phono Equalization:	RIAA curve, ± 0.5 db.
A.C. Convenience Receptacles:	Three switched. One unswitched.
On/Off Switch:	Pushbutton, heavy duty rating.
Function Selector:	Mag. Phono 1, Mag. Phono 2, four high level positions.
Mode Selector:	Stereo, Stereo Reverse, Mono, Left Channel only, Right Channel only.
Balance Control:	Zero to infinity type.
Volume Control:	Close tracking dual potentiometers, frequency insensitive within range of frequency response specifications.
Tape Monitor:	Two separate tape monitor switches permit monitoring of two recorders while recording. Instant comparison of program vs recorded material. Tape Monitor #2 takes precedence over Tape Monitor #1 to avoid mixing of both channels.
Audio Equalizer Defeat:	Bypasses audio equalizer circuit for absolutely flat, uncompensated response.
Speaker Selector:	Permits choice of speaker system 1, system 2 or both at once when preamplifier is connected in the manner described in the instruction manual.
Headphone Receptacles:	Two low impedance headphone receptacles controlled by front panel speaker selector switch. May be switched in or out at user's discretion.
Output Receptacles:	Four main preamplifier outputs. Four outputs for tape recording.
Inputs:	2 pair for low level phonograph. 4 pair for high level equipment. 2 pair for tape monitor. 2 grounding terminals.
Special Features:	Input receptacle on rear of preamplifier connects power amplifier and preamplifier through special cable. This permits speaker switching and use of low level headphones. Cabinet installation from front. Simple attachment to mounting board. Controlled turn on circuit to delay initial surge into power amplifier.
Dimensions:	18 $3/4$ " W x 4 $3/4$ " H x 12" Deep.
Weight:	20 pounds.

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