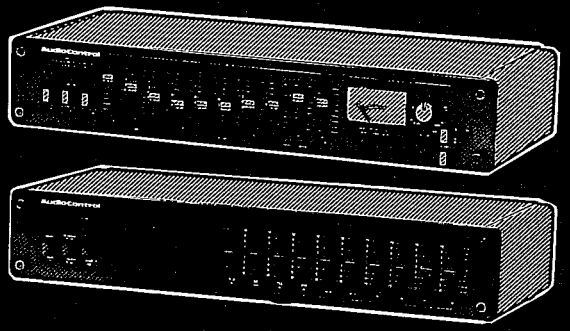
THE D-10 & D-11 EQUALIZER SECTION CONSCIOUSNESS COURSE.



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Congratulations on your taste in picking our equalizer over everyone else's.

Now it's our responsibility to show you how to use it. And that's a challenging job.

Because there are those of you who are virtual Electrical Engineers, and there are also those of you who have bought this as part of your first real system and who don't know a phono jack from a Fig Newton.

So bear with us as we try to mix the basics with a little theory. Because a little theory helps when dealing with tone and equalization. If our theory lectures seem a bit elementary, then write us and we'll lock equations with you EE types at twenty paces.

Even though you're dying to grab onto the thing and weave it into your system in a tangle of RCA records, please take twenty minutes or so to read our sage advice on operating your new audio product. Afterall, it DOES have thirteen controls.

FIRST, THE PAPERWORK.

Before you control audio with your Audio Control, you should first control your eagerness and.....

FILL OUT THE WARRANTEE.

After you've played with it a while, give us a comment or two and send it in.

NEXT, PUT THE SALES SLIP OR STEREO STORE RECEIPT AWAY IN A SAFE PLACE .

It's *very important* in the unlikely event you'd ever need service. You'll get some pretty blank looks from the store people if you don't have the receipt to prove when and where your D-10 or D-11 was purchased. Besides it's good for insurance purposes. Which brings us to the third important admonition:

RECORD THE SERIAL NUMBER OF YOUR UNIT.

Sure, theft is now the farthest thing from your mind, but, well....things DO happen and insurance adjusters don't

have very big imaginations when you lack any proof you ever owned something.

Last (and this ends the nagging section), is to be sure and SAVE THE BOX.

It would O.D. your garbage can anyway, and it will insure the safety of your analyzer should you move or need to return it for repair.

Okay. Onward to the good parts!

WHERE IT'S AT: PLACEMENT.

Give, also, some thought to where you wish to place your equalizer. This should be based not only on how you plan to use the equalizer, but on how you listen to your music.

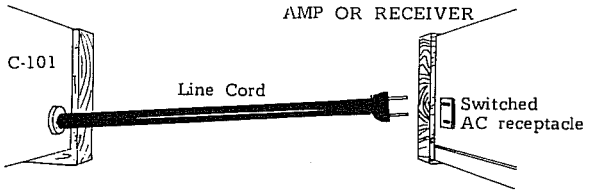
If you intend to use the unit to equalize room acoustics, which entails relatively permanent settings, or if it is being used in conjunction with a tape recorder only, consider a slightly more "out of the way" place for it, where children and guests of all ages will be less inclined to adjust its settings.

If, on the other hand, you intend to experiment constantly with the equalizer, using it as an integral tone control, set it up as close as possible to your existing amp or receiver tone controls. (We have seen truly devoted fans place the unit as close as possible to their favorite arm chair, as far as 10 feet from the rest of their electronics.)

And of course, if you're rack mounting the unit, its position is pre-ordained.

HOOKING UP THE D-10/11.

Unless the D-10/11 is far-removed from the rest of your hi-fi, the best place to plug it in is the switched plug on the back of your amp or receiver. What? There's already a turntable plugged into that socket?



No sweat. Get a multiple socket or "splitter" from your local hardware store and plug both the D-10/11 and your turntable in at once. Yes this looks like it violates what Sparky the Firedog taught you about electrical safety in grade school. But not really. Combined, the turntable and D-10/11 don't begin to exceed the wattage rating for a switched socket on a modern receiver.

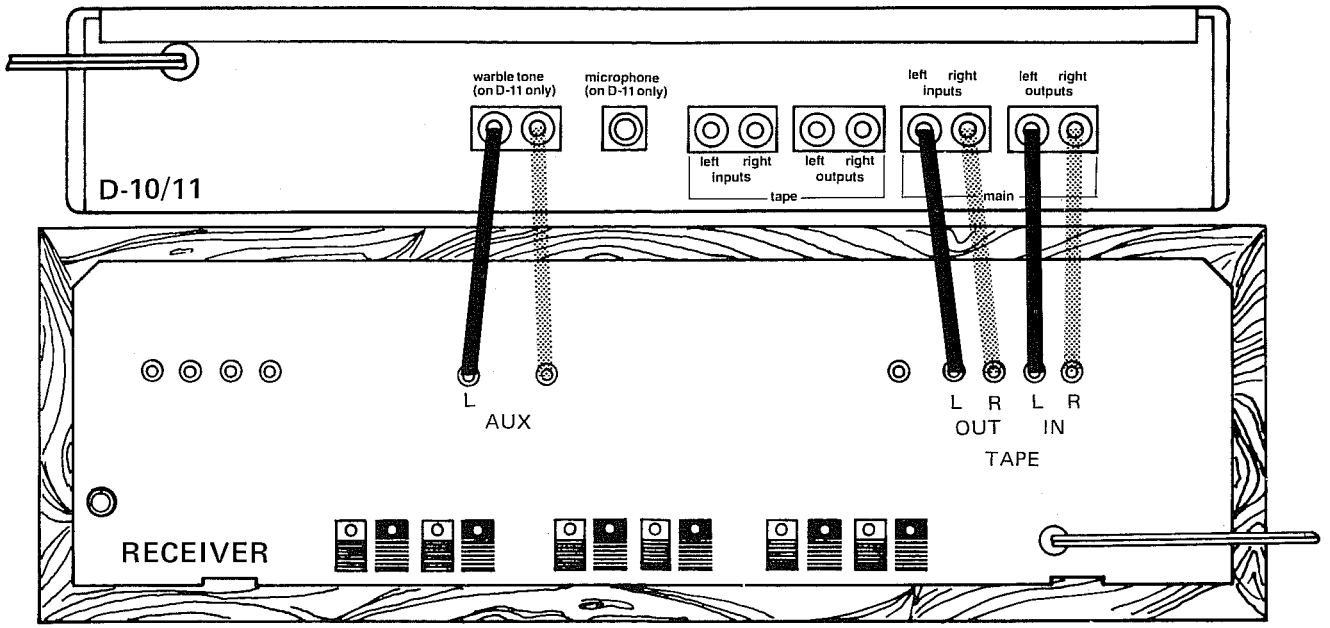
Or, you can always just plug it into a wall socket.

HOOKING IN OTHER OUTBOARD DEVICES.

First, by all means, turn off ALL equipment before hooking in the unit. A surprising number of audiophiles find their woofers on the floor after a 60-cycle buzz during hook-up.

The recommended way to hook in your unit is to put it in the tape monitor loop of your amp or receiver. That way you can activate it by pushing in the TAPE MON button. Look on the back of your amp or receiver for two or more sets of RCA sockets marked TAPE. Two will be marked OUT or REC; two will say IN or MON.

	TAPE 1		*REC*		*TAPE DECK ONE*	
L	○	○	○	○	○	○
R	○	○	○	○	○	○
	rec	*play*	*out*	*in*	*rec out*	*playback*
	EXAMPLE ONE		**EXAMPLE TWO**		**EXAMPLE THREE**	


warble tone
(on D-11 only)
microphone
(on D-11 only)
left right
inputs
left right
outputs
tape
left right
inputs
left right
outputs
main
D-10/11
L
AUX
L R L R
OUT IN
TAPE
RECEIVER

There may be two of these outlet socket groups. If so they will be marked "1" and "2".

In any case, at least two will be marked "REC", "OUT", "REC OUT", or "TAPE OUT", and two will be marked "PLAY", "IN", "MON", or "PLAYBACK".

To connect the D-10/11 into this circuit plug the end of a set of connecting cords into the "REC"/"OUT" sockets on the back of the D-10/11 labeled "INPUTS".

Make sure left and right at the amp are left and right at the D-10/11 (red is generally used to denote right; white, black or grey represents left).

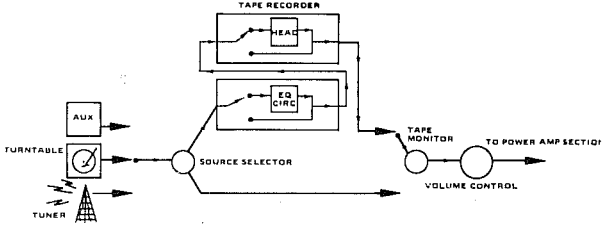
Now connect another set of connecting cords to the plugs on your amp marked "PLAY", "IN", "PLAYBACK", ect. Hook the other end of these cords to the D-10/11 sockets marked "MAIN" and "OUTPUTS".

Now check the handy line drawing.

POWER: THE MOST IMPORTANT HOOK-UP OF ALL.

As connected, the D-10/11 is now activated any time you press the "TAPE MONITOR" button on the control panel of your amp or receiver.

To prove it, 1) put on a record or FM. 2) Slide the D-10/11 slider marked 1000 all the way up.
3) Press the TAPE MON button on your receiver. 4) Press the EQUALIZER IN button on the D-10/11. You should hear a marked change in the sound. If you don't, check your connections.



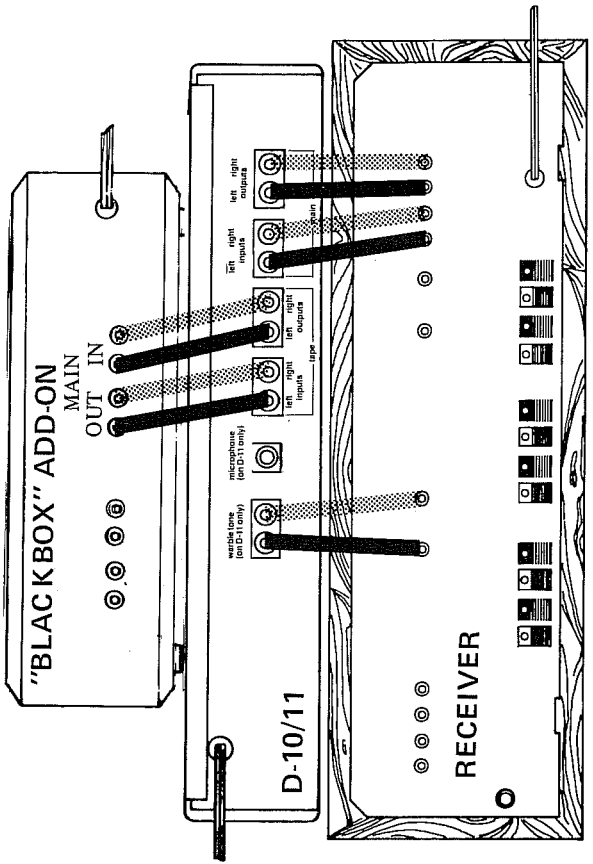
Okay, that's fine for those of us who just have a regular system. But how about the gadget-o-phile. How do you hook up a D-10/11 with lots of goodies.

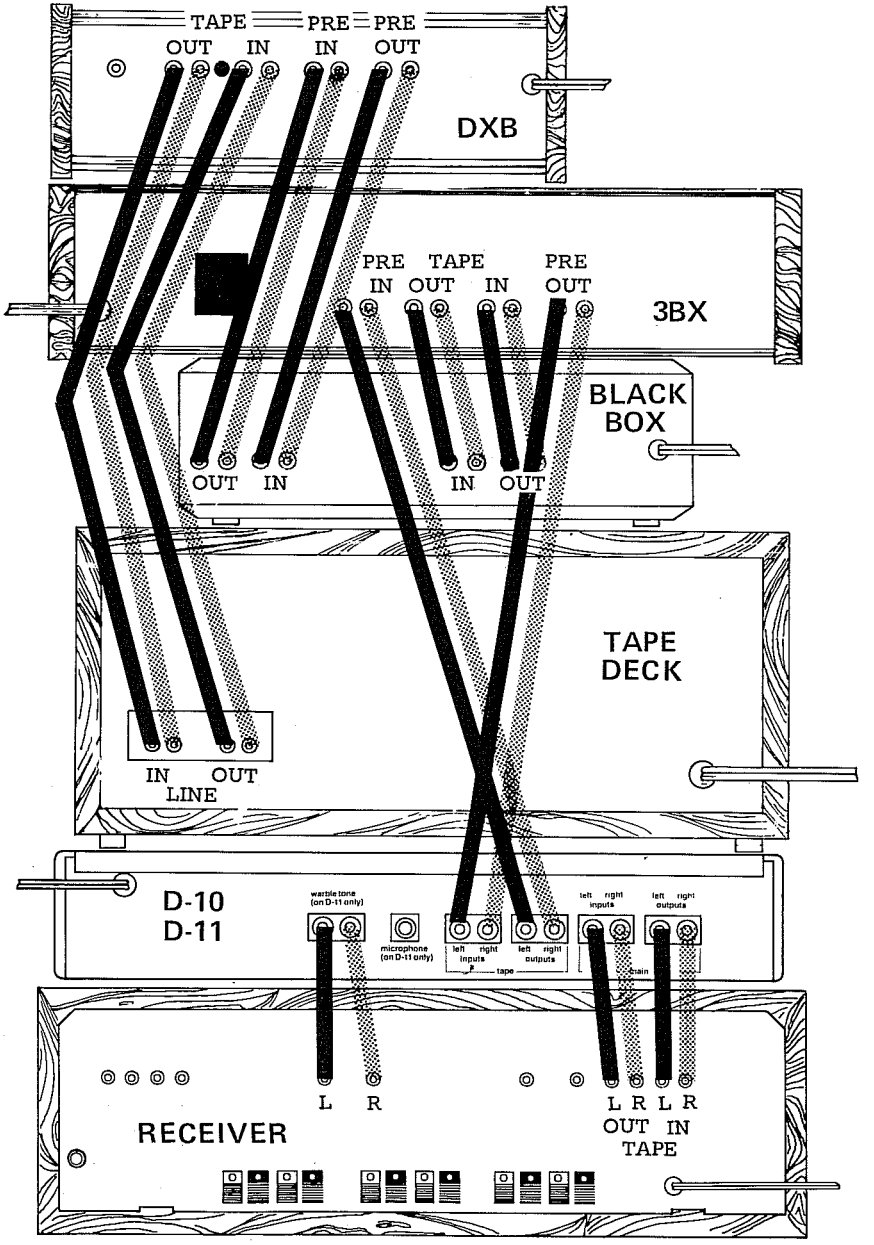
We recommend placing other equalizers, dynamic expanders, click and pop filters, and special systhesizers JUST BEFORE the D-10/11.

1. Simply route the hook-up cord from TAPE OUT on your receiver, to the INPUT of the device to the MAIN IN sockets on the Audio Control.

There's ONE EXCEPTION to this recommendation. Noise reduction devices such as Dolby*B, Dolby Hi-Q*, or dbx 122, 128, or 158 should be placed after the D-10/11 and preferably in the tape circuit described above. Both brands of units artificially compress and equalize signals for encoding on tape.

And now for something totally different. Proceed and consider yourself lucky we didn't try to get complicated or translate our manual out of broken Japanese.




TAPE
PRE
PRE
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IN
IN
OUT
DXB
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3BX
BLACK
BOX
OUT
IN
IN
OUT
TAPE
DECK
IN
OUT
LINE
D-10
D-11
warble tone
(on D-11 only)
microphone
(on D-11 only)
left
right
inputs
left
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right
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outputs
main
L
R
RECEIVER
L R L R
OUT IN
TAPE

THE SOUND OF A ROOM.

Sound doesn't just come out of your speakers and disappear into the woodwork. It bounces around. Some frequencies bounce better than others.

Mid and high frequencies, for example, are absorbed by carpets, drapes, bedding, Persian cats, nude bodies, philodendron plants and upholstered furniture. Inversely, in a bare room with hardwood floor, lightly curtained windows, and plaster walls, the highs bounce around and seem magnified to your ears. An acoustic engineer would call it *hot.*

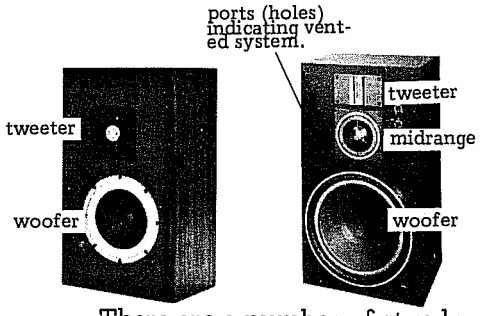
Low frequencies also tend to resonate (or bounce around rhythmically). This is why large auditoriums and even larger living rooms are so "boomy". A certain frequency range is getting accentuated by continuing to bounce around. Not only does this make your ear think there is more of a certain frequency coming out of a speaker or off a record, it tends to muffle sounds because they're still bouncing around when other sounds are being made. You get a sort of fatiguing BONK!!!

Here's how to make it all better.

START AT THE SPEAKERS.

Where your speakers are and how they are set, can affect their sound long before you begin to adjust them with your new D-10/11. Boosting highs or lows by correcting the positioning of your speakers is a lot easier on your electronics than forcing them to pump out more or less of a frequency.

If you're getting too much bass, get your speakers out of the corners of the room and up off the floor. Raising a speaker even 12" or moving it three feet out of a corner lowers bass.



There are a number of stands you can buy as accessories which do this fairly well. Some are unobtrusive frameworks; some are glitzy plex and chrome numbers. All of them help eliminate a doubling of bass by preventing the bass wave from "bouncing" off the floor and arriving a little bit late at your ear. Also many new speakers are tilted slightly or place their woofers fairly high in the enclosure to get around this.

If your speakers sound "bonky", like a juke box, try getting them off the ground this way. Just a trial wherein you prop your speakers up on some beer bottles will give you an idea of the effect.

Keep in mind, though, that not all speakers propagate "bonky" high bass when placed close to the floor or in corners. Each model is different and some....especially larger speakers with 12" woofers actually benefit from floor and corner mounting. Let your ears be the judge. Because more likely, you're not getting enough bass. Even though you bought your D-10 or D-11 to rectify that situation, first start trying corner and floor snuggling. This is the best way to boost bass because it does not require more amplifier power. You can always add even more chest-stomp'n bass later.

ADJUSTING YOUR SPEAKERS' CONTROLS.

Now that you have your speakers in a position where they sound best, it's time to fiddle with the controls on the speaker to make sure *they're* set for the best sound. Start by removing the grille cloth and counting the speakers you see

underneath (hereafter called DRIVERS). There will be two or three drivers. The littlest one is the TWEETER. The big one is the WOOFER' Any middle-size drivers, usually 3-6" in diameter are the MIDRANGE Also look to see if there is a hole, or "port" which vents the speakers. That's for later reference.

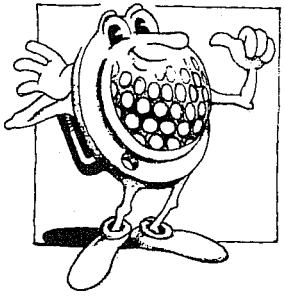
Inside each speaker is a circuit called a CROSSOVER which "assigns" the right frequencies to each driver. Unless you have really cheapoid speakers, there will be a control on the back of the speakers, either rotary or one or more switches. These control the amount of highs and midrange that come out.

What you want to do is adjust the control until the sound "blends". To do that you need some other sound source than an old Rolling Stones album.

1) Switch your receiver or tuner to FM. 2) Tune between stations. 3) Turn up the volume control. What you hear is "white noise", equal amounts of all frequencies. Now put your ear between the tweeter and midrange (or tweeter and woofer if you only have a 2-way system). Adjust the control on the back of the speaker until the sounds seem to blend between the two drivers. It should be fairly hard to discern which driver the sound is coming from. 5) If you have a 3-way system, repeat this process between the midrange and woofer, adjusting the other switch or knob on the back of the speaker. 6) Repeat the whole hissy sequence for the other speaker.

WHY SPEAKERS HAVE SPEECH IMPEDIMENTS.

The improvement of your speaker's performance is one of the best uses for the D-10 and D-11. That's not a slur on those

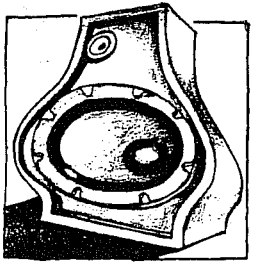


Zonkophone 8000 pride-and-joy speakers you bought last year, just an observation that no-one's invented the perfect loudspeaker yet. Even the $5,000-plus babies can stand a few tweaks here and there.

First, many speaker elements... the woofers, tweeters, and midranges... aren't as good as they could be to start with. They may have peaks within their frequencies at the same sound level, or they may not be able to reproduce their whole assigned total tonal range as well as they could.

They might just be really crummy in all respects, too.

Then there's how your speaker elements are hooked together. The crossover, which divides up the frequency spectrum and assigns it to the various drivers might be; 1) poorly designed, 2) made with cheap components which induce distortion or don't properly divide the frequencies, or 3) be simply nonexistent with a simple blocking capacitor protecting the tweeter but letting all frequencies into the woofer, which causes even more distortion.



The enclosure, too, can be less than optimal. Its composition, volume, inside damping materials and actual proportions all add to or subtract from a speaker's performance.

The engineers who design for the consumer market have all sorts of economic realities to deal with. Sure, if money was no object they'd get the best drivers, put them in a solid oak box with a complex crossover and pat themselves on the back. But your speakers may have cost $75 each. Or $100 each. Or even $300 each. Prices which necessarily lead to compromise.

And even if you have well-designed speakers with good drivers, there is only so much that can be done with speaker physics.

What we're saying is that most speakers can stand a little improvement. Even the best of them. And that inexpensive speakers can stand a LOT of equalization.

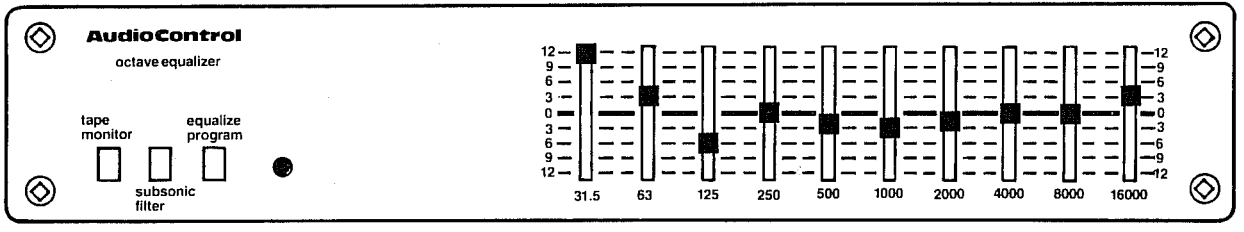
In the signal chain from phono cartridge to speakers, the speaker is the weakest link. Distortion that averages less than 1% in the cartridge, amp and pre-amp can be increased to as much as 30% in a bad speaker system. It's just a lot easier to design distortion-free, wide frequency range electronics than it is electro-mechanical speakers with magnets and cardboard cones and wire and surfaces that have to flex back and forth.

For example, some speaker systems have a nasal character, which can be reduced by removing a few dB of 1 Khz. sound. All small bookshelf systems, particularly 2-way systems have trouble at this frequency, too, since that's where their crossover frequency often lies.

MAKING YOUR SPEAKERS SPEAK MORE CLEARLY.

The following is a good starting point for adjusting the D-10/11. Try it. Push EQUALIZER PROGRAM button in and out to hear the difference. You'll probably be surprised. Listen to it this way for one whole song and you may wonder how you ever stood your speakers previously.

Now this may be a bit over-stated for some speakers and not overstated enough for others.



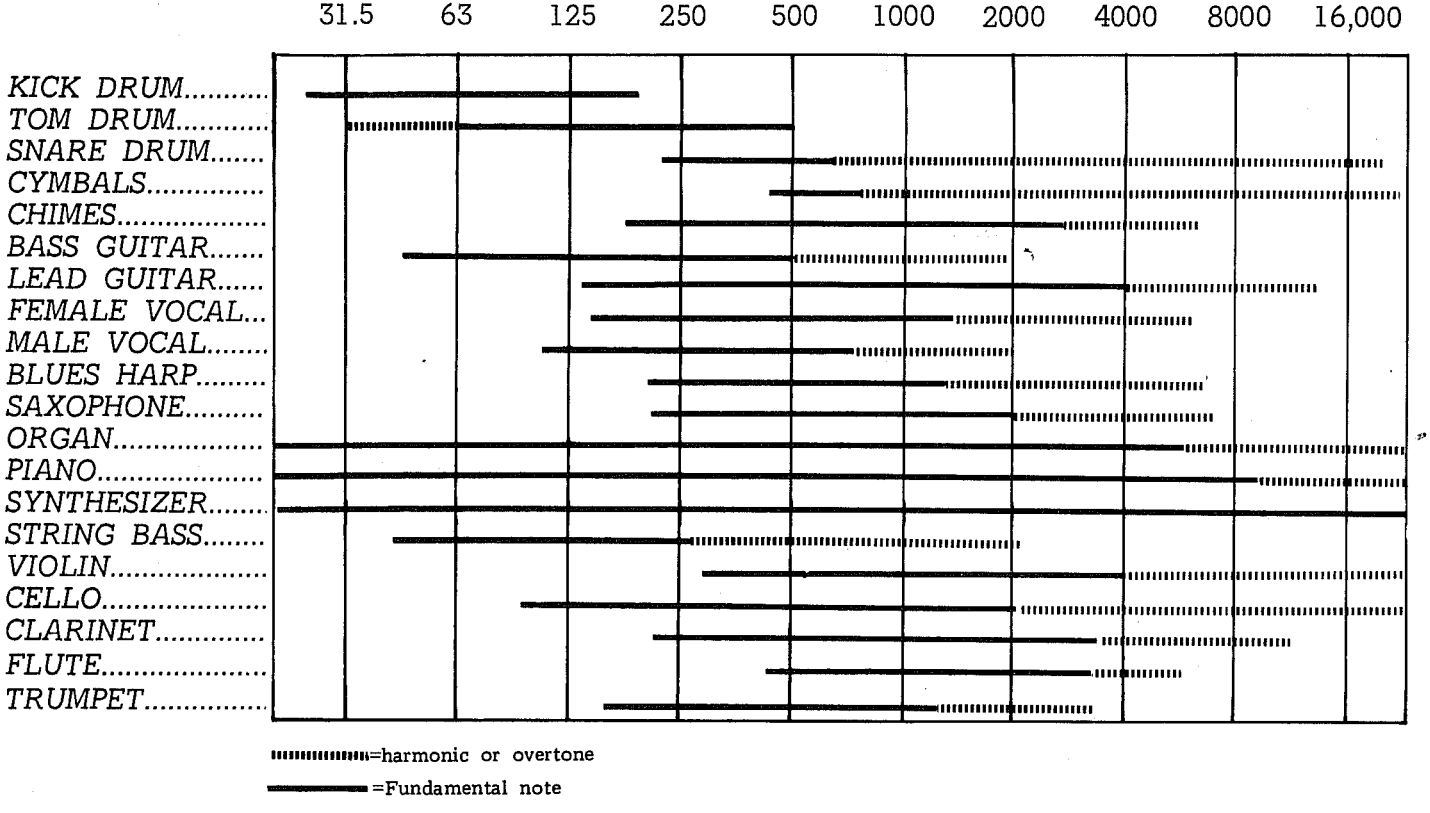
TYPE	31.5	63	125	1K	8K	16K
2-way book-shelf						
w/8" woofer	+12	+6	-3	-3	+1	+3
w/10"woofer	+12	+4	-2	-3	+1	+3
w/12" woofer	+12	+3	-1	-3	+1	+3
3-way book-shelf						
w/8"woofer	+12	+6	-3	-3	+1	+3
w/10"woofer	+12	+4	-3	-3	+1	+3
w/12"woofer	+12	+3	-3	-3	+1	+3
					+1	
3-way floor-standing						
w/10"woofer	+12	+2	-4	-3	+1	+3
w/12"woofer	+12	+2	-4	-3	+1	+3
3-way floor standing w/horn mid-range	+12	+3-6	-4	-4	+3 +3	+3
2-way floor-standing w/horn and 15" woofer	+12	+3	-3	-4	+3	+6
"Direct reflecting" type speaker	+12	+6	-6	-4	+3	+6
All-horn corner system	+3	0	-6	-3	+2	+3
Mini-monitors	+12	+6	-3	-4	+1	+3

In this chart we have tried to group general types of speakers together rather than singling out anybody's and getting a rash of lawsuits (speaker makers are content to kid themselves about how perfect their product is, and we wouldn't want to shake them up.)

There are some special considerations here. If your system has any of the new breed of improved tweeters, back off on the 15.5. These include the Heil/ESS system, ribbon tweeters, horn tweeters, and supertweeters.

The other consideration is that while smaller systems can be DRAMATICALLY improved by equalization, there's no way you're gonna turn a mini-monitor into a thundering Klipschorn with a few tweaks of your equalizer. You need cone area to make bass. If you really do have small speakers and don't want to buy new ones, consider a subwoofer to add to the very lowest frequencies.

WHERE MUSICAL INSTRUMENTS LIE ON THE SOUND SPECTRUM.



Forget the Audio Control for a minute. Just think sounds.

All natural and recorded sounds are measured in a term called hertz. Not a rent-a-car, but a measure of the frequency or number of vibrations per second. (We'll be batting this term around quite a bit.)

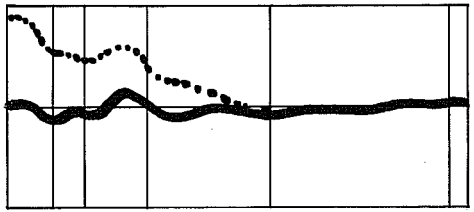
A cymbal's crisp treble sounds occur at the high end of the frequency spectrum. 10,000 to 18,000 Hertz. Most adult's hearing falls off rapidly at around 15,000 so we consider this the top end of the spectrum.

A bass drum's low thud sounds between 30 to 200 Hertz on the very low end of the audio spectrum. We consider 30 hertz about the lowest reproducible sound possible, and the low end of the hearing range.

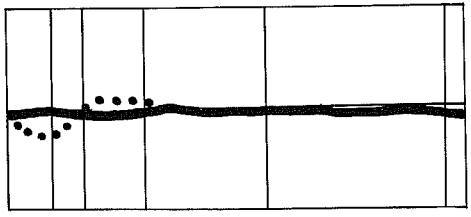
In between falls every musical instrument and vocal sound you hear. We've assembled the preceding chart after consulting with a number of recording engineers and acoustic specialists. It's more than just an informative chart of sound. It's a chart of what you can control now that you have an equalizer.

First check back to our big chart of music sound frequencies. Note which sliders correspond to which instruments. So if you like bass guitar, you can't single out one slider and expect bass drum or tubas to stay the same level.

Rather, you should remember how you used your bass and treble tone controls. If you wanted more bass you turned up the whole bottom end. Graphed out, that would look somewhat like this:



The Audio Control is capable of far more specific curves which represent boosts and cuts in specific areas. Like this:



But they are not just pushed around independently of each other. Instead, smooth "curves" have been formed much like those on the electronic graph. That, incidently, is why equalizers like this one are called "graphic equalizers": you can see the effect of the sliders by their positions.

31.5, 63, 125 and 250Hz. THE SLIDERS THAT SHOOK THE WORLD.

The four botton sliders on your D10/11 roughly correspond to the bass control on your amp or receiver--or rather we should say that your receiver's bass tone control is what's rough.

31.5Hz Truly a piece of the rock. This lowest of lows is what you've always wanted more of. It's the frequency that you *feel* as well as hear. The frequency that kicks you at live concerts.

Unfortunately, the whole signal chain conspires to remove it. Even $1000 microphones aren't flat that low; studio recorders roll off in this area. It's hard to master onto vinyl. Tough to pick up with most styli, and pretty near impossible for most speaker woofers to reproduce.

So, even if you run the 31.5Hz slider up to +15Hz, your speakers will probably be 5dB or more down at this gutrocking frequency.

Lay it on thick. If you have the woofers

and amp power to handle it.

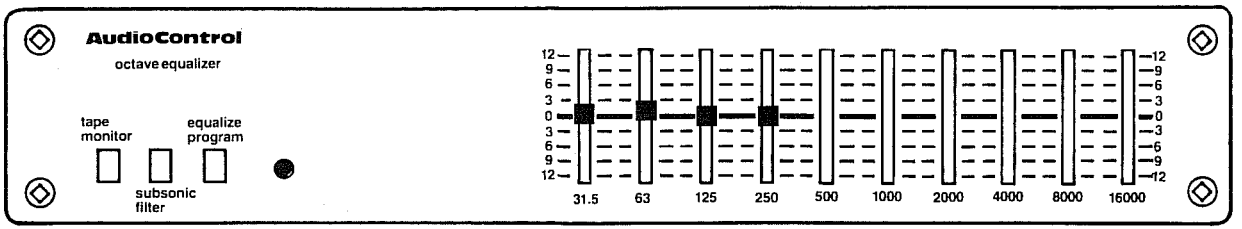
63Hz Here's the bass you were after when you used to turn on the loudness or bass tone control. It's the deep, tight, strong bass that makes rock solid and disco kick. It's also where most speaker systems start giving out.

Most studio producers and engineers actually *cut down* on this frequency to compensate for teeny, tiny AM radios and bubblegummers' cheap compact stereos, so adding some 63Hz is not "gonna be no sin", as B.B. King put it.

It's the slider that makes the bass drums and floor toms "bigger" and broadens bass guitar parts. And, even does surprising things to operatic basso voices. (Forget it on Neil Young's though.) 63Hz also falls under Appendix D further on.

125Hz This is the bass that juke boxes and cheap stereos specialize in. It has a boom quality that can get very tiresome after a while.

That's not to knock it. Push the 120Hz slider to MINUS 5dB and you'll find a lot of what you might have *thought* was bass will be gone.



So, run it up to PLUS 15. Sounds great for just a few minutes. Then your ears will begin to feel like they've been beaten with Hank Aaron's baseball bat.

You see, if 31.5 Hz and 63 Hz were the flour and eggs of a cake, the 125 Hz band is the vanilla extract and sugar--the flavoring of bass. Boosting it too high is like guzzling straight extract and sugar syrup. Use 120Hz sparingly, as a seasoning, the way producers do.

Maybe +3 to pump up a vocal or a bass guitar part. A bit more if you're a drum freak. Also good for acoustic bass, virtually all symphonic music and your Aunt Tillie's goiter.

250Hz This is on the upper fringes of bass . Fiddle with it and you'll see it has relatively little to do with bass guitar or kick drum. It does have a lot to do with voices and lead guitar solos, though. Without it they lack body. Add 250 Hz to "flesh out" thin vocals or older records with narrower dynamic ranges.

BRING'N 'EM FORWARD; MOVE'N 'EM BACK: 500, 1000, 2000 and 4000.

Long ago, back in the primitive days before cars, disco, high rises, Jamaica Almond Fudge ice cream, bongs, disco, and electric carving knives, man used his ears to hunt and to protect himself from things that hunted him. He also occasionally screamed, grunted and generally expressed himself verbally. Thus, the human ear became most sensitive to that part of the sound spectrum which contained speech, animal cries, and other nature noises.

We inherited this ear design. To this day, humans can distinguish between a distant shout and a close-up whisper of the same sound pressure level by the amount of mid-range in the sound.

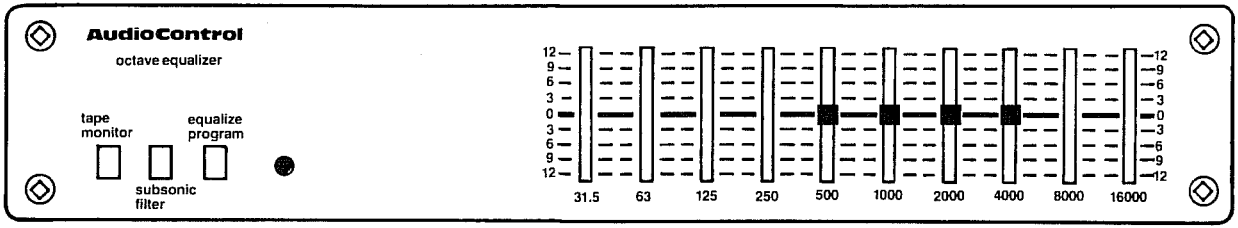
Midrange gives us information about the closeness of things. True to form, most of man's musical melodic musical instruments fall in this area, too.

That makes midrange very important. Too much and the ear gets fatigued. Not enough and things sound indistinct.

Thus, these sliders control the core of music. With care, you can substantially change the sound of most melody instruments as well as vocals. Each cut and album will be different, so experiment.

In our experience the 1000 slider does most for all-around human voice presence. 500 is great for male voices and jazz tenor saxes. Some solo piano benefits by a little boost here, too.

In practice, folks seem to roll off the 2000 and 4000 as much as they boost them. There seems to be plenty of these frequencies in most contemporary pop cuts. The question is, is there too much? Particularly as high sound pressure levels. Try it for yourself.



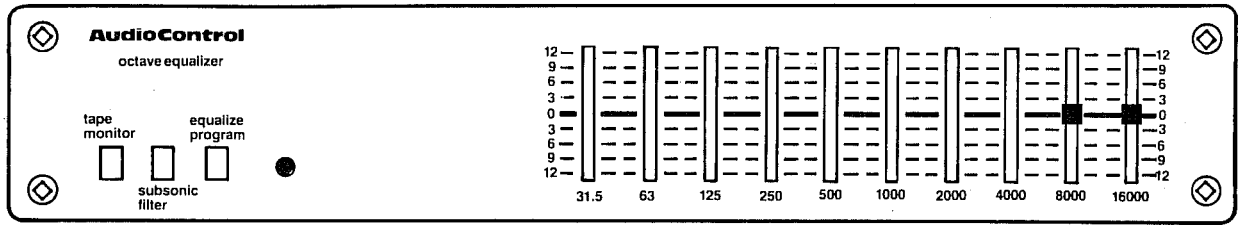
GETTING REAL HIGH: 8000 and 16000HZ.

Oddly enough, neither of these frequencies is as ear-percing as you might think. What you thouqht was tinny treble is really lower down at 2000 and 4000. Up at 8000 you'll be surprised how few instruments are actually affected. The tips of womens' vocals, snare drums, some synthesizer and higher brass and woodwinds. But you can use more of it than you might first suppose by its classification as "treble".

As for 16,000 KHz, well, it's the icing on that audio cake we were describing earlier. The crisp sizzling of cymbals, the high harmonic overtones that bring music to like....they're all here.

Unfortunately, this is also a frequency which involves (dare we bring it up) *your age*. From young adolescence on we start to lose the high end of our hearing. It's the ultimate finito frequency roll-off and there's little that can be done about it. Not that we're saying you are getting deaf when you reach thirty. But you can hear less 16,000 than you could ten years ago. That's all.

Boosting this band 3--5dB can "flatten" your hearing curve again and bring a lot out. Just don't get vain and leave it at 0dB.



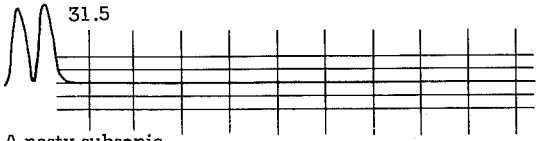
KILLING INVISIBLE MONSTERS
or
YOU NEVER HAVE TO CLEAN YOUR SUBSONIC FILTER.

Subsonics are just what their name implies: Sound below the range of human rearing.

You don't need them.

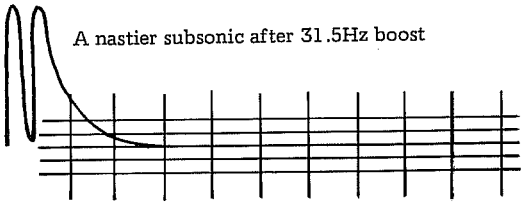
In fact, you shouldn't have them. Here's why. Your speakers insist on trying to waste energy and motion reproducing these inaudible, ultra-low frequency tones. Warped records, turntable rumble, the thump made when a tone arm is lifted off the record, the interference between stations when dialing FM or the feedback caused by placing a turntable close to the speakers can literally beat a woofer to death.

Amplifier power is wasted. And, since the speaker is trying to accommodate sound you don't hear, it messes up audible sounds (intermodulation distortion), especially in a two-way system where the woofer is also handling some of the mid-range chores.



A nasty subsonic

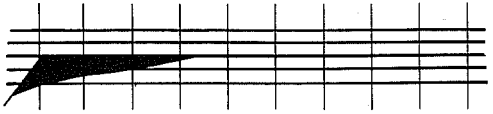
Reflex and vented speaker systems are particularly prone to this sort of potentially destructive woofer cone movement.



If you have such a system, ALWAYS leave the subsonic filter button on. To tell if your speaker system is vented, remove the grille cloth and look for a hole leading

into the enclosure. If there is one and you can feel a motion of air when you play the system, you have a vented or reflex system rather than an acoustic suspension (sealed box) system.

Audio Control octave equalizers use a sophisticated 3-pole, 18dB per octave subsonic filter to do away with subsonic interference for good, and without any audible side effects. The bass response of your system will sound more solid and in most cases you can safely use a more powerful amplifier. Just press the button... not a bad deal!



COMPARISON of the usual puny 6dB/octave subsonic filter found in many receivers and amps (lower line) with macho 18dB/octave subsonic filter in C-101. Shaded area is the gain in audible bass.

HOW TO BE A RECORDING ENGINEER WITH THE D-10 AND D11.

In the studio, almost all signals receive some equalization before they're put on tape. There are several good reasons for equalizing as you record something, even if it's just off a record and onto a cassette.

The best reason is so any high-end boost can be inserted without also boosting residual tape noise, too.

For example, if you want more cymbols and ultra-highs on a certain record when you're transcribing it to a cassette, doing it as you record it allows putting an already-boosted high and signal into the cassette. If you transcribe it flat, you're going to boost the tape hiss, too.

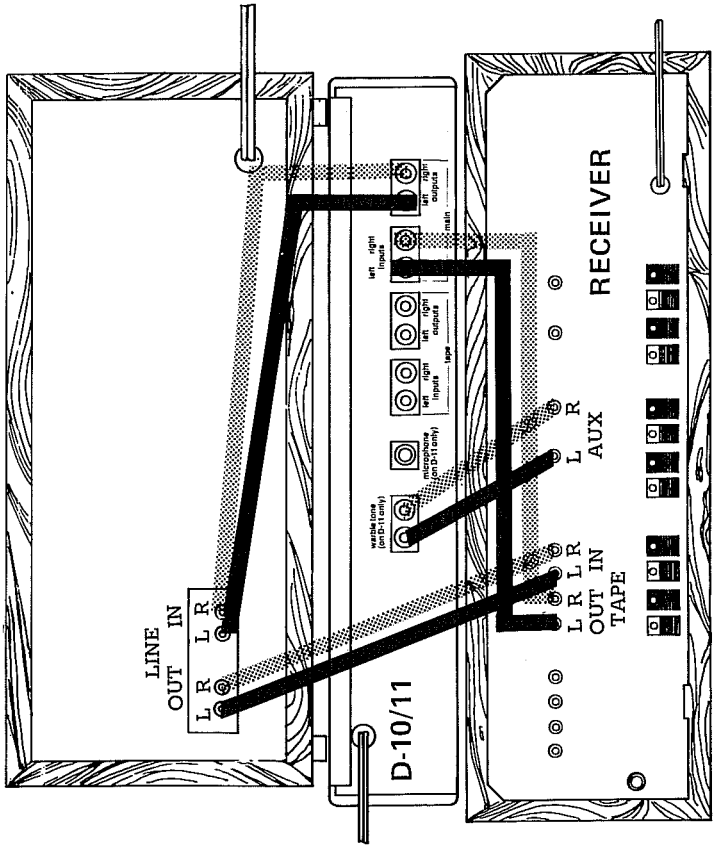
One word of warning, though. EQing onto tape means forever, so to speak. That's the way it will sound time after time, so you'd better like it. Another warning. If you boost the high frequencies too much it may cause tape saturation at those frequencies causing much distortion.

THE UNCOMMON TAPE MONITOR

To Listen Or Not To Listen

Nowadays some of the pre-amps and receivers have a separate switch for the tape recording source and the listening source. This feature seems to have some of you perplexed as to just how to hook in your equalizer into the system and use them. The connection is the easy part, just connect them the same as you would in a normal tape monitor. Now comes the different part. Instead of pushing the tape moniotr as you would on the average pre-amp, set the listen select switch to the TAPE position. Now with this done the record select switch has become the listening select control. Since it sets what is going into the equalizer it is also the record select. But fear not, the original reason that you got this fancy tape monitor can still be used, except the equalizer can only be used for EQing your tapes in this specific mode of operation.

This should clear up some of those little nightmares that have been plaguing some of you into staying up all night trying to figure out how to make it work.



If you really get into adjusting your Audio Control, you'll find that almost every album can be improved in some way and that your speakers can always be improved. Which can mean different settings for each album.

HOME TAPES

First, let us say that your Audio Control's PHYSICAL ENCLOSURE IS NOT DESIGNED FOR THE RIGORS OF SOUND RE-INFORCEMENT USE AND IS NOT WARRANTED FOR SUCH APPLICATIONS!! In other words, the electronics are professional grade but the case is not armored for months on the road or getting crammed into a lounge band's equipment case.

Its applications in a recording studio are obvious, though, and we think it does every bit as good a job as much more expensive 10-bands, so if you have a home recording set-up, the Audio Control is well suited. Even if you just have a single mike and plink a guitar or piano onto cassette once in a while, your equalizer can improve sound. Refer to the chart of musical sound frequencies for insight into which ones to vary to change which sounds.

AUTOEQUALIZATION

There is one area where equalization during taping is a must.

That's when you're making cassettes for your car system.

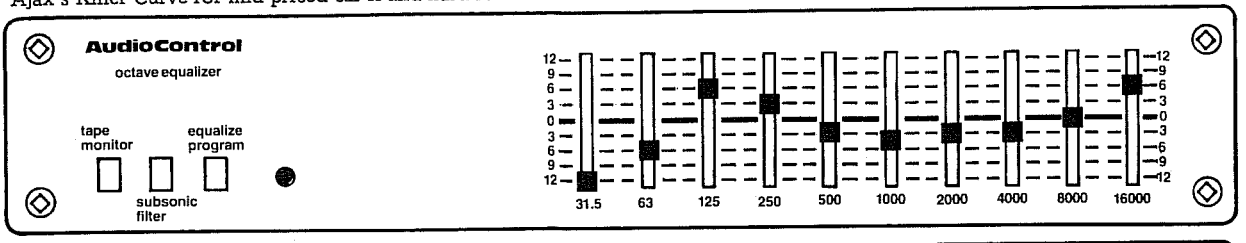
Here's an application where equalization adjustments on the same speakers kick. The acoustics inside cars and trucks are not exactly good for sound. It's about the worst acoustic environment around. By equalizing your car tapes you can make your auto system really sound good.

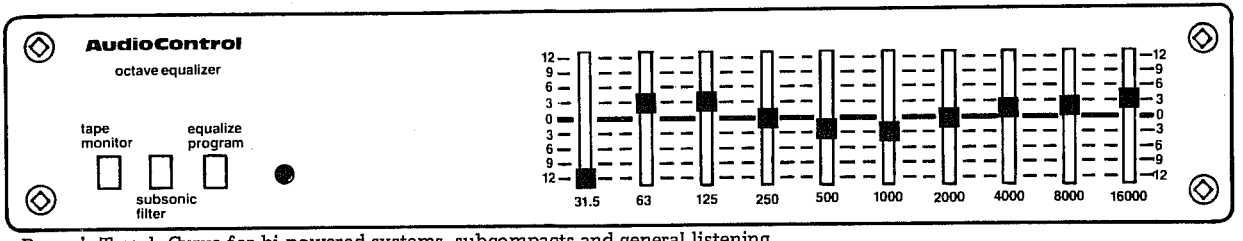
To really customize a cassette to your car, you should try and do the equalication adjustments on the same speakers

you're going to listen to the sound on. Bring them in the house, if possible, to get a rough idea on what EQ is needed, but better yet make several tapes and run back and forth between your home hi-fi and your car hi-fi.

Here are a couple of our favorite "recipes". Each acknowledges that unless you have a $5000 custom installation in your Aston Martin, you ain't getting zip 31.5Hz bass out of little 6" x 9" or 5¼" co-ax's Some 60 Hz, MAYBE, if you have a good power amp (remember our caution about how much power this band consumes).

Ajax's Killer Curve for mid-priced car-fi and hard rock.





Beano's Tweak Curve for hi-powered systems, subcompacts and general listening.

A fair amount of 120Hz. One of the few times you might like this frequency. Try it. Then a roll-off at 1K since that's what 6" speakers put out most of naturally. And a good healthy dose of high end to get above car and road noise.

125 and 250 Hz

Here's a case where these frequencies can be cut for good effect. The small drivers used in car systems usually resonate in this frequency range causing an overabundance of sound. Cutting this frequency range back a little has another advantage and that is that it will help reveal the lower bass that we are going to talk about in the next paragraph.

63Hz

Add some, since this is the really good bass area, but remember car speakers don't go this low too easily and will draw enormous amounts of power doing so.

31.5Hz

Many true, died-in-the-wool car stereo nuts totally roll this frequency off as much as 12dB, when equalizing a car tape.

The Rational: Car speakers can't handle this low sound and putting it on the tape invites saturation at a lower volume point anyway.

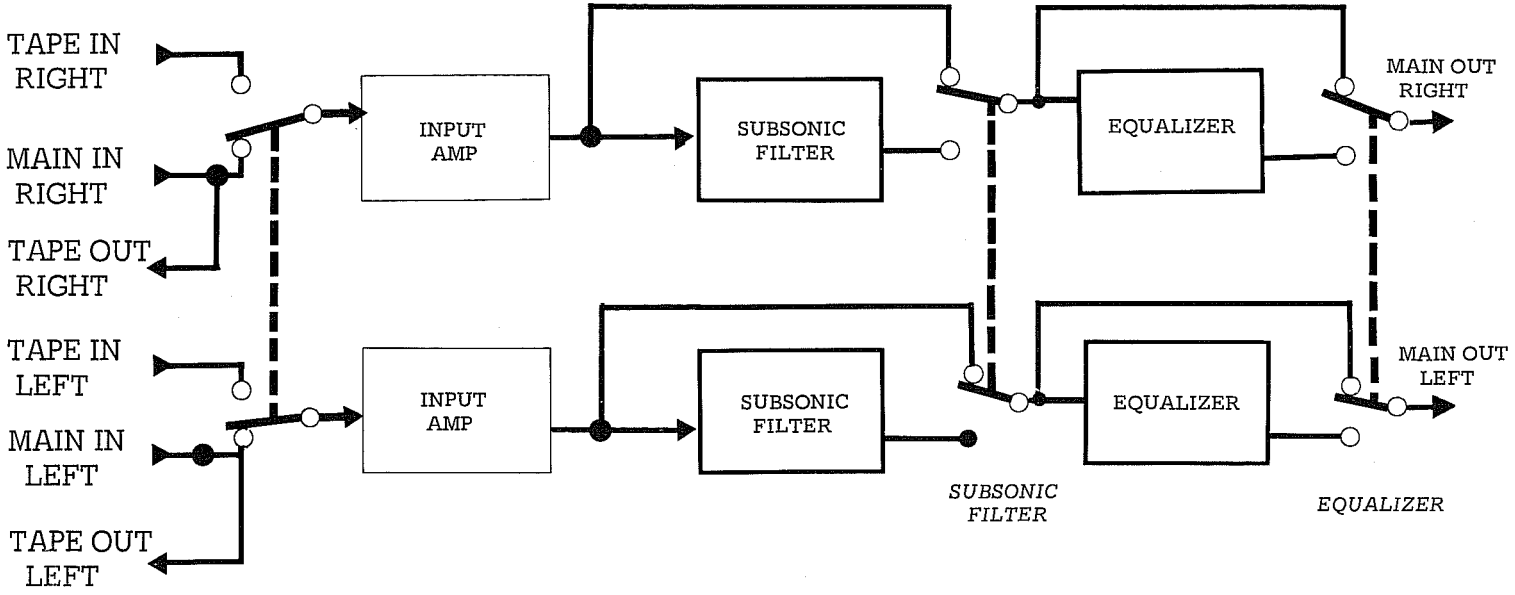
Midranges

Car systems are notoriously mid-rangy and you should be able to make a nice downward curve in this area to compensate for the over-abundance of mids in cars.

8K and 16K

While most car speakers put out sufficient 8K highs, almost none do justice to the crisp, tingling zingy highs at 16,000 Boosting these highs NOW, instead of with the "tone" control on the deck means you are only boosting musical highs, not tape hiss highs.

D-10/11 Equalizer Section Flow Chart.....



APPENDIX A—SPECS AND TECHNO-JARGON SECTION.

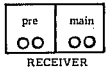
Distortion:.015% *THD*, Frequency response: *3Hz to 100kHz* $\pm$ *1dB*, Input impedance: *100,000 ohms*, Output impedance: *150 ohms*. Subsonic filter: *18dB/octave@20Hz*, Signal to noise:*-90dB*, Dimensions: *14½" (36cm), 5 7/8" (15cm)D, 2½" (62mm)H*, Weight: 5lbs. (2.3k)

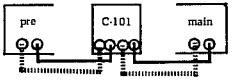
APPENDIX B—DIVIDE AND CONQUER. ANOTHER WAY OF HOOKING UP YOUR EQUALIZER.

What you really own is a power amp and a pre-amp hooked together with VERY short cords. The plugs on the amp or receiver back let you interpose any number of devices between the control section (pre-amp) and power amp, which just amplifies signals.

Just pull out the two short "U" plugs connecting PRE and MAIN on your amp or receiver. Connect amp PRE to the euqalizer's IN; connect the equalizer's OUT to your amp's MAIN' Now the Audio Control is actually part of your amp, just like the tone controls on its front.

Don't try it if you're EQing tapes, however,





since the pre- amp gain control would also control tape input gain.

DIVIDING AND CONQUERING THE ALREADY DIVIDED' The true audiophile has a separate pre-amplifier and one or more hugh, industrial strength power amps hulking on his shelf. For them, there's no need to dig around for the PRE and MAIN outlets. His amplification is already divided. Again, the Audio Control may be inserted as an intergral part of the system between the pre-amp out and the power amp in.

Well, that's it. If you have any questions, gripes, additions, or raves concerning this manual, write us: Attention Ajax at the same address given for factory service at the end of this manual.

A SIDE NOTE ON MUSICAL TRUTH AND ASSORTED JIVE.

You've been hearing about Musical Fidelity and Flatness and Accuracy and Closeness to Musical Truth for so long that you're probably under the impression that the Brain Police will batter down your door and arrest you if you dare fiddle around with tone and equalization.

Not true.

Musical Truth is a fine concept for cartridges, turntables, amps and speakers. And it is fine to use your equalizer to help your listening room get closer to this Mystical Musical Truth.

But, then when you've cleaned the "sound canvas" of mudges in your system's sound. THAT'S THE TIME TO PAINT SOME GLORIOUS SONIC PICTURES WITH YOUR D-10 OR D-11.

If you like tons of bass, order some up.
If you can't hear a vocal, boost it.
If you just want to fiddle around, fiddle around!
That's what the recording producer and engineer did. And now it's your turn as well.

APPENDIX C— HOW TO MAKE AN ACCURATE LOUDNESS CURVE.

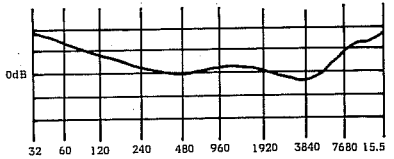
Even though you probably used the LOUDNESS button on your receiver as a way to make your speakers sound better, what it was REALLY for was to compensate for your ear's selective sensitivity to different frequencies when the volume is reduced.

Turn your hi-fi down low and you will hear predominantly mid-range. Bass and treble recede. That's partially explained by the natural sensitivity of our ears to certain frequency ranges. Originally, natural selection and evolution provided us with ears made to hear animal calls, the cries of other humans, rustling leaves, running water, and crackling fire, All are sounds falling mostly in the 500Hz to 3840Hz range.

Thus, our ears are much more sensitive to sounds in these ranges. Two scientists named Fletcher and Munson made a graph of this.

It represents the intensity of each frequency needed to sound the same. Note that we need much less of certain frequencies.

In terms of your stereo and the D-10/11 it means that as you crank up the SPL (sound pressure level) you can adjust for your ears' increased sensitivity to the mid-range. If you want sound real low for a party or relaxing--but still want to hear the nice, deep bass and crisp little sizzles-- you can compensate the other way. Note that as SPL changes, the curve changes.



APPENDIX D—THREE PIECES OF ADVICE FROM THE OLD STEREOPHILE ON THE MOUNT.

1. Consider: A 10 inch woofer must move upwards of a hundred square inches of cone, an inch or so, in-and-out against the pressure of the room air and sealed box. While a tweeter moves less than a thousandth of an inch.

So, guess which type of driver takes up to 80% of your poor stereo's power?

You guessed it. And that's before you arm yourself with a D-10/11 and boost the bass a lot more.

Say you have a 60 watt amp. Turn the volume knob to the twelve o'clock position and you're probably clipping your speakers somewhat. Crank it up to five o'clock and , chances are, you're gonna blow something up due to the amp's inability to put out enough power.

Now hook the D-10/11 in, equalize your system, and you discover you need +12dB at 32, +10 at 60Hz, and +3 at 120 to make the speakers flat in response.

Now your poor 60 watts-a-channel receiver is gasping at even lower overall sound pressure levels due to the increased bass power requirements of the 60 and 120 Hz boosts.

SO MAKE SURE YOUR AMP CAN TAKE THE EXTRA POWER DEMANDS PUT ON IT BY BOOSTING THE D-10/11 LAST FOUR OCTAVES'.

2. Don't totally stop using your receiver's tone controls. Remember when we had you use them to make "broad stroke" room EQ adjustments before fine tuning with the D-10/11? Heavy-handed and pretty general in effect, but sometimes their effect is the same as what you were trying to do with five or six sliders. Check your amp or receiver's owner's manual for the specs of the tone controls. Now that you've been working with the D-10/11 you'll understand better what your old tone controls can and can't do.

3. Stay loose. This is supposed to be a FUN hobby.

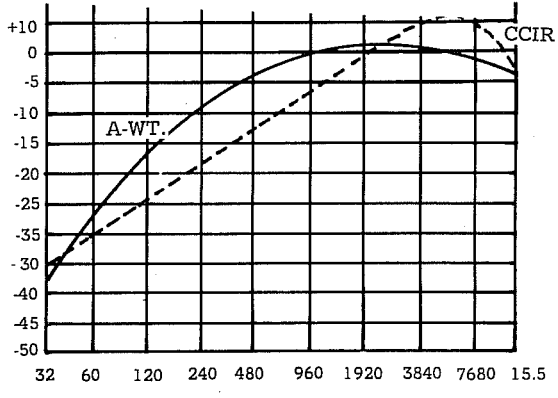
APPENDIX E—THE ANTI-HISS CURVES.

This hiss won't show up on the response display. but it will be noticeable to your ears.

You can't get rid of all of it because it's mixed with the music. But, some adjustment can knock out the most obvious parts.

Note these graphs. They represent two attempts to pinpoint which hiss frequencies are most audible. The solid line is an older curve called the "A-weighted" curve. The new one is called the CCIR/ARM curve, a 5dB dip at 7680 and 3dB at 3840 seem to get rid of the most hiss and least music.

Experiment, using the A-weight and the CCIR/ARM curves as guides and your ears as judge.



APPENDIX F — INTRODUCTION TO THE AUDIO CONTROL CONDITIONAL WARRANRY.

People are scared of warranties. Lots of fine print. Lots of non-cooperation. Months of waiting around.

Well, don't be scared of this warranty. It's designed to make you rave about us to your friends. It's a warranty that looks out for you and helps you resist the temptation to have your friend "who's good with electronics" try to repair your Audio Control product.

Also, warranties help us keep track of our customers so we can let you know of any modifications, dangers, or improvement. The old factory recall thing. Now, that doesn't mean you are going to to get put on a mailing list, and get weird Aztec porno or free deodorant samples. Your name and address on the warranty are strictly confidential to Audio Control.

So, go ahead and read through your warranty, then enjoy your equalizer for a few days before sending in the warranty and any comments.

THE AUDIO CONTROL CONDITIONAL WARRANTY. LEGALESE SECTION.

"Conditional" doesn't mean anything ominous.

The Federal Trade Commission makes all manufacturers use the term to indicate certain conditions you have to meet before they'll honor the warranty.

If you honor these conditions, we will warrant all materials and workmanship on your Audio Control product for one year from the date you bought it, and will fix it or replace it during that time.

Here are the conditions that make this warranty conditional:

1. You have to fill out the warranty card and send it to us within 15 days after you have bought your Audio Control product.
2. You must keep your sales slip or receipt so you have proof of when, and from whom, you bought your D-10 or D-11. We're not the only company to require this, so it's a good habit to get into with any hi-fi purchase.
3. Your Audio Control D-10 or D-11 has to have been originally purchased from an authorized Audio Control dealer. You don't have to be the original owner to take advantage of the one-year warranty, but the date of purchase is still important so be sure you get the sales slip from the original owner.

4. You can't let anybody but someone, at our factory, nurse your ailing unit back to life. If anyone other than us messes with it, that voids the warranty.

5. The warranty's also not in effect if the serial number has been altered or removed, or if the Audio Control unit is used improperly. Now that sounds like a big loophole, but here's all we mean. Unwarranted abuse is: a) physical damage, (our consumer products are not meant to prop up bookcases or get hauled around in a toolcase, etc. The D-10 and D-11 are home hi-fi- units, not bash-it-about utility equalizers, so if you bash one up, we can't be responsible.), b) improper connection, patch the phono jacks into a line socket or hook it to the speaker terminals on your power amp and we aren't responsible... high input signals could fry the innards, c) sadistic things you shouldn't do to any electronics, such as get them too hot, wet, dirty, ect.

Assuming you conform to nos. 1-4. and it's not all that hard, we get the option of deciding whether to fix your old unit or give you a new one. If we think it's fixable, we get to decide whether it can be fixed at a service center or sent back to the factory. This is the only warranty given by Audio Control. This warranty gives you specific legal rights which vary from state to state. Promises of how well your Audio Control product will work are not implied by this warranty. Other than what we've covered in this warranty, we have no obligation , express or implied. Also, we will not be obligated for direct or indirect consequential damage caused by defect or warranty claim, express or implied, or damage to your system caused by hooking up the Audio Control D-10 or D-11.

Failure to send in the properly completed warranty negates any service claims.

WHAT TO DO IF YOU NEED SERVICE.

Take it back to the store you bought it at. The Audio Control warranty for the D-10 & D-11 is an "Over-The-Counter" warranty. That means the dealer just gives you a new one. It's that simple. Then HE gets to hassle sending it back.

If you get any flack from the dealer after you've conformed to 1-4, call us and we'll have words with the dealer.

Unfortunately, you may have bought it mail order or moved to another city or the dealer disappeared one day into Chapter 11.

In that case, contact Audio Control. In writing at *6520 212th S.W., Lynnwood, Wa. 98036, (Attn: Service Department).* Or by phone at *(206) 775-8461.*

Make arrangements to have the unit sent back to the factory for service.

In either case, proof of purchase must be included with the unit. (That sales slip or receipt we've been harping about.) And a brief note telling us what's been wrong with the unit.
(You'd be surprised how many folks forget to do this.)

The normal service time at the factory is less than *three* days.

You're responsible for freight or postage when sending it to the factory or service center. (Actually, we recommend UPS emphatically over the Pony Express Postal Service. It's more reliable and faster, too.)

AudioControl

6520 212th S.W. In the Heart of the Northwest Rainforest, Lynnwood, WA 98036 (206) 775-8461