Anyone who has been around rock music at all knows that the phrase concludes, "...to the show that never ends."

In real life, shows end, and their aftermath prompts both recovery and reflection. Shows are exhausting. I'm old.

This kvetching was prompted by RMAF, now almost two weeks gone. It's hard to convey the amount of work involved in preparing to exhibit at a show, transporting and setting up gear, tweaking the set-up, then actually working the show, tearing it down, following up with media, dealers, customers....

It's even harder to explain the mania that envelopes a show-organizer long before the show, and
long after. Throw in that whole Due To Circumstances Beyond Our Control thing, and it's like running a restaurant: there are an almost-infinite number of ways for things to go wrong. I think back on my own gut-wrenching experiences at the New York show in 2012, which would have been shut down if I hadn't had my bedraggled old Teamsters card in my wallet....

But I digress. Props to Marjorie Baumert, who overcome a lot of issues to put on another great RMAF. I appreciate your efforts, and feel your pain.

Meanwhile, we work to keep our own show going, here at Copper. This issue features four columns about beguiling, charismatic, and occasionally-infuriating musical performers: Larry Schenbeck writes about Liszt; Dan Schwartz writes about Linda Perry and Grace Slick; WL Woodward writes about my old hero Frank Zappa (“The present-day composer refuses to die!”); and finally, Duncan Taylor writes about the amazing vocal trio, The Lone Bellow. On the tech side of things, Richard Murison writes about transforms; Jim Smith writes about subwoofer logistics; Haden Boardman looks at direct-drive turntables; and I explore plasma loudspeakers. There’s also a photo album from RMAF and a very impressive home system. Darren Myers and Paul McGowan will both be back soon.

Thanks as always for reading, and we'll see you again in two weeks!
Franz Liszt (1811–86) practically invented the showbiz end of classical music. He was the first touring pianist to give solo concerts in large halls. He was the first to play entirely from memory—absolute showbiz!—and then flip the trick, flawlessly sight-reading the music of fellow composers as a “favor” to them. (When he pulled that in Leipzig, using Robert Schumann’s *Carnaval*, its composer was both irked and embarrassed.) Liszt was the first to mix his own, contemporary music on programs with that of past greats like Bach and Beethoven, unsubtly suggesting that his works were of equal value. Sight-reading aside, all these practices caught on and are still used today.

The main tool in Liszt’s bag was his formidable technique. He could play more notes per second than anyone else on the planet. He wrote some of his music on three staves, implying that its ideal interpreter would need three hands, although for Liszt two was plenty: he had very long fingers, each hand spanning an interval of a tenth at the keyboard. As a young man he had been mesmerized by violinist Nicolò Paganini, who combined absolute command of his instrument with charismatic stage presence. (Like bluesman Robert Johnson, Paganini was reputed to have struck a deal with the devil. Pure showbiz.) Liszt developed similarly innovative piano skills. Those, and his striking good looks, generated hysteria among his fans.

But Liszt was also a creative genius. For years his formidable technique overshadowed his
contributions to the development of musical language itself. Critics couldn’t help dismissing him as a charlatan whose finger-wiggling brought him more attention than he deserved. The truth is, he also extended the boundaries of chromatic harmony, producing richer, more varied, surprising harmonic and tonal progressions. He pioneered thematic transformation, a way of unifying longer pieces around a single continuously morphing idea. Finally, he came to recognize that the apparent conflict between program music and absolute music was a superficial distraction. We can observe how this played out in two masterpieces, the symphonic poem Les Préludes and the Sonata in B Minor for piano.

Liszt invented the symphonic poem as a genre, composing thirteen such works with titles like Prometheus, Orpheus, Battle of the Huns, Hamlet. These one-movement orchestral showpieces attempt to evoke a picture, person, play, poem, etc.—i.e., an extramusical program. Their titles alone provide a sense of their composer’s gargantuan (and very Romantic!) ambitions. Liszt couldn’t escape criticism for that. Champions of so-called absolute music, like the critic Eduard Hanslick, believed that great music possessed “self-contained” beauty and was “in no need of content from outside.” In time Liszt sought to reconcile this view with his own preference for linking human experience across media.

Consider the purely musical way in which he unified Les Préludes. There is a program, of course. Liszt chose a poem by Alphonse de Lamartine and attached a summary preface to the score so that no one could be confused about the “message.” It’s basically a Seven-Ages-of-Man thing; I’m going to spare you its flowery, dated language, although you can read it [here](#).

Musically, Les Préludes consists of an introduction followed by five distinctive sections and a coda. They’re all based on a single three-note motive: one pitch, then another pitch a step below it, then a leap upward by four steps, e.g., C – B – E. You can hear it at the very beginning (low strings, echoed by flutes):

This repeats and “develops,” which leads to a brassy, martial statement (“man as mortal being”) by low brass and strings, giving way to an extended lyrical passage about a minute into this clip:

The best-known reworking of the motive occurs in the “happiness in love” section:

Don’t be too hard on yourself if you can’t hear anything like the original motive. Here’s how academic analysts pick it out:

![Motive](#)

The X’s above the G, F, and B show the motive; all those other notes provide the melodic gestalt. In disguising this transformation, is Liszt somehow “cheating”? Not at all—you are meant to sense these motives’ unity subliminally, so that the sublime will enter you in a subconscious manner.

This music may even be more enjoyable if you don’t know the program at all. Liszt admitted as much
in an 1855 essay he wrote with the help of his mistress, the Princess Carolyn von Sayn-Wittgenstein:

It is on the one hand childish, idle, sometimes even mistaken, to outline programs . . . and thus to dispel the magic, to profane the feeling, and to tear to pieces with words the soul's most delicate web, in an attempt to explain the feeling of an instrumental poem which took this shape precisely because its content could not be expressed in words, images, and ideas. . . . [On the other hand, unlike the specifically musical symphonist,] the painter-symphonist [sets] himself the task of reproducing with equal clarity a picture clearly present in his mind. . . . Why may he not, through a program, strive to make himself fully intelligible? (Adapted from Burkholder et al., History of Western Music, 8th ed.)

So: “programs” can get us into the emotional ballpark of a work, but we shouldn’t try to decipher programmatic details in the music as if it were a crossword puzzle. (Yes, I know the spot in Berlioz’s Symphonie fantastique where a severed head apparently plops into a basket. Crude fun, maybe, but not a great moment. See here; search “fatal blow.”)

The essential need for listeners to balance the programmatic with the absolute, the script with one’s individual fantasy, became clear to me years ago when I heard Alfred Brendel play the Sonata in B Minor at Emory University. In his recital notes—reprinted in his 1991 recording and in his book Music Sounded Out—Brendel made a compelling case for the Sonata as “a work of absolute music” that “exemplifies total control of large form.” Paradoxically, he also described its six (!) distinctive themes as “characters.” Familiar characters, in fact.

Here is the first theme. Note its resemblance to the first bars of Les Préludes:

And the second theme, in which “an actor makes his grand entrance on stage, his attitude a mixture of defiance, despair and contempt. May I call him Faust?”

The third theme, “instigating subversion, is Mephistophelean. Faust and Mephisto join . . . to produce what could be called a symphonic main idea.”

And with those themes, you know almost everything you need. Later on, will you hear the fifth theme “as a lyrical variant of the third,” i.e., “Mephisto turned into a vision of Gretchen”? Musically that’s valid. The metaphor is pretty good too.

This is just the tip of the iceberg. Much more will occur. As you listen, you’ll construct your own program. The sixth theme eventually takes things, as the kids say, to the next level. Brendel has given us his take on it, as have many others. Your turn!

(Recordings excerpted: Les Préludes, Berliner Philharmoniker, Karajan, DG; Sonata in B Minor, Kirill Gerstein, Myrios Classics MYR005.)
Sometime in 1995, Bill Bottrell called and wanted me to be on stand-by. He was supposed to meet someone whom he had been putting off, but just in case, he wanted me to be available to work. Likewise, on the other side of the meeting, he was also being put off.

But it was a happy meeting – Linda Perry proved to be everything that we feared she wasn’t. Love her or hate her, she was a genuine artist. Not that her record company, Interscope, really agreed. She’d had a big hit with “What's Up”, but according to her, that wasn’t like any of the rest of the album, and it also wasn’t typical of her writing. When her band, 4 Non Blondes, went to make their second album, the label wanted another atypical hit. Under pressure to produce, as the writer, Linda tried to leave the band, but Interscope wanted what they wanted. The band was dropped, but she was held to the deal.

And so they sent her to us, and to Bill. We had apparently gotten a reputation within record companies, based on the Tuesday Night Music Club album, and so they wanted us to manipulate Linda and gradually substitute our music for hers. But after two weeks of working with her, it was obvious to us that their agenda was to be thrown out, and we were going to make the album that Linda wanted.

And the album that Linda wanted was what we made, with early Pink Floyd as an inspiration: it was
called **In Flight**. It was a very happy time for me - my daughter was approaching a year old, and the album was coming out well. I have two main memories of making it, one of which will be obvious, and both involve **Grace Slick**, the singer from one of my very favorite bands as a young musician. Linda lived in San Francisco at the time, and had become friends with China Kantner. They hatched a plan to have China’s mother, Grace, on the album.

When she showed up, the one track that was more-or-less finished was “In My Dreams”, so that’s what we played for her.

[http://www.youtube.com/watch?v=fu2H3X4ITmE](http://www.youtube.com/watch?v=fu2H3X4ITmE)

When it was done, the first thing she said was, “Who’s playing bass?” Everyone looked at me. “What did you do to it? I know you did something on the board - I don’t mind that. But what did you do?”

“Nothing,” I said. “It’s just that bass –” I nodded at my fretless Steinberger L2 – “recorded direct.”. She said something like, “That’s amazing”. And all I could think was “This is Jack Casady’s singer saying this…”.

Linda had a song called “Knock Me Out” in mind for Grace to sing as a duet, and it became, in my opinion, the centerpiece of the album, with each singer singing their half of a very volatile relationship:

You knocked me out
You bit my lip
You held me down
And kept me sober

Through all this time
With no regret
I guess that’s just the way I liked it

[http://www.youtube.com/watch?v=AmOiS7H-d9M](http://www.youtube.com/watch?v=AmOiS7H-d9M)

It’s slow, it’s big, it’s stately, it’s got two great singers, and Kevin Gilbert plays truly gnarled licks on Bill’s National with flat-wounds. We play all sorts of rock and roll instruments on the record, but I especially want to mention Kevin’s organ playing (and particularly on the song “In Flight), which he also played live.

We played live a few times with Linda, and she was as great a person as she was a performer. Our first show was a benefit for APLA, the Aids Project Los Angeles. My large speaker cabinet was brought in by a crew, but I brought my own amplifier. I put it up on the stage, and jokingly said to her, “Hey Linda, my amp goes up on the cab!” She unquestioningly said, “OK!” and hauled it right up there: the perfect lead singer.

I recall that the first song we did was “Freeway”, which began with a verse solo --- and then two things happened: first, drummer Brian MacLeod and I had never been on stage together before this; we had just played in the studio, and we were both kind of shocked by the power of our playing together. It felt like a jet taking off. At the same moment Linda and Kevin played the opening chord of the 2nd verse so hard they that broke strings on both their guitars immediately. I remember a single thought: “This will either crash and burn or fly”. It flew. For the 2nd song, they borrowed guitars from the opening act (Stone Fox, who were on Linda’s label), while the girls in Stone Fox changed their strings.
After the show, a friend told me that it was “like seeing Janis Joplin with Big Brother”. I’ve got a few good memories, but this is among my highest.
I've already written plenty about this year's RMAF, and the challenges the show faced and overcame. Time now to just leave you with a few images from the show, and to note that it was a helluva good time.

Here's a video of that same group performing the Stones' "Wild Horses".
I promise to step away from the topic of audio shows after this. I can imagine that for non-attendees, reading about audio shows must be a little like reading a review of a concert, albeit with more photos of gear and fewer cries of “Play ‘Free Bird’!!”

To recap: the 13th edition of the Rocky Mountain Audio Fest faced some serious challenges, due to unfinished renovations at the host venue, the Denver Tech Center Marriott. The large auditorium which traditionally held the CanJam headphone area was not ready for use...at all. Likewise, the standard rooms on the Atrium end of the hotel---the rooms with the balconies overlooking the restaurant and bar---were unfinished. The auditorium where seminars have been presented? You guessed it. Not ready.

What to do, what to do? Nearly all the sleeping rooms booked for the show were farmed out to nearby hotels like the Hyatt. There was some grumbling from those whose hotels were waaaay farther out, but so it goes. Moving out the sleeping rooms allowed there to be exhibit rooms on every floor of the Tower. Seminars were held in trailer “pods” out front of the hotel, next to a big top which housed the majority of CanJam exhibitors. The remaining CanJammers were in Tower ballrooms that have traditionally held Kimber Kable’s demos; Ray Kimber graciously released those
rooms for the greater good.

How did it go? Surprisingly well. As you can imagine, the Tower elevators were challenged. In the past, traffic has been spread across the entire hotel, but this time the Tower was the primary destination for almost everyone. The standard operating procedure was to ride to the top, 11th floor, then walk down floor by floor.

Having spent most of the show in an exhibit room on 11 directly opposite the elevators, I can verify that 11th floor exhibitors won the lottery. Traffic was uniformly heavy, waxing and waning somewhat as the elevators loaded and unloaded.

I'm happy to report that the general standard of decorum was better than at most shows in the recent past. I'm also happy to report that there were a great many women in attendance, along with young adults, teens, kids, and even toddlers (few of whom were allowed to go free-range, thankfully).

Being an audio show, there were of course some examples of, umm, quirky behavior. Most notable for me was the gentleman who stood at the next urinal in the men’s room and began quizzing me about my company’s products. Yeah...no.

As if that weren’t creepy enough, the same guy showed up in our room on multiple occasions (STALKER!! skreet skreet skreet), then followed me to the elevator to complain in a petulant and highly-aggrieved manner about a product hiccup. When I said I didn't have the technical chops to handle his issue, and directed him to the designer and CEO—both of whom were in the room—he sneered, did a pivot-turn and vanished. Ooo-kay.

The focus of another attendee amused me: Imagine a room with massive, chrome speakers costing an eighth of a million bucks, accompanied by a massive stack of electronics. Most folks stepped off the elevator, spotted this and began laughing in delight and disbelief or uttering exclamations of “HOLY @#&*!”

Not Dude. Dude walks in to the room, gives the system a once-over, and stares at the speaker cables (which admittedly were flat and wide and obvious). Not the big, shiny speakers, not the mountain of gear... the speaker cables. He looked at me, then at the cables, then back at me.

“That’s the most ridiculous goddamned thing I’ve ever seen,” he said, pointing at the speaker cables. Not the megabuck lautsprechers. Not the gear.

The. Speaker. Cables.

I said, “I assure you, if they didn’t make a difference, we wouldn’t use them,” which is the utter truth. Guess what he did? Yep: sneer, pivot-turn, vanish. Oh, well. Gotta admire his (obsessive, relentless, picayune) attention to details.

Those of us who’ve been to RMAF year after year noticed the issues and the changes and may have tsk-tsked at some of them. Was anyone really disappointed or angry? Not that I heard. Would a first-timer have even known something was askew? I’m not sure. They might have found the tent thing kinda cool...and indeed, it was, though the dim lighting gave me pause.

Thanks to organizer/den mother Marjorie Baumert and her entire crew: in spite of the challenges and fears and obsessive speculation —so typical of our little community--- it was a great show. And next year, with a big new restaurant and more fresh new rooms, it’ll be even better.
What more could you ask for in these perilous times...than hope?
What is the biggest, most fundamental difference between Mathematics and Physics? I would say that it is the fact that Mathematics is absolute. Let me put it this way, our present understanding of Physics allows – in principle – for there to exist an infinite number of parallel universes, and for the laws of Physics in each of those universes to be different. However, in each of those universes, the exact same rules of Mathematics would still apply. Bizarre notions like these cause many people to look askance at hard science and prefer a simpler home-spun approach to life. It is perhaps more comforting to simply dismiss Einstein’s theory of relativity, and the many mind-bending paradoxes it entails, while at the same time being prepared to rely unquestioningly on your GPS system, which would not work at all if not for a strict implementation of relativistic principles. At least Mathematics tends to avoid the apparent paradoxes of advanced Physics.

The Fourier Transform is a nice example of a simple, yet powerful mathematical proof. It arose from the realization that many continuous functions (a description that applies perfectly to an audio waveform) can be perfectly decomposed into a sum of individual pure-tone sine waves. The Fourier Transform provides the exact mathematical relationship between the continuous function and its sine wave frequency components. It is a relatively simple equation, but its use requires analyzing the continuous function over all time, from the infinite past to the infinite future, which clearly introduces some practical limitations. For this reason, Fourier Transforms on real data can only ever be done in the digital domain.

The digital version of a Fourier Transform is called a Discrete Fourier Transform (DFT), and requires that the continuous function is sampled at regular intervals – which is good for digital audio. However, the underlying principle still applies – the continuous function (the waveform) must still be processed over all time, including the infinite past and infinite future. The way the DFT gets around this is that it takes a single finite snippet of the waveform and makes the assumption that this snippet is repeated ad infinitum into both the infinite past and future.

If this snippet does in fact repeat infinitely, then it must follow that any individual frequencies which comprise the waveform must also repeat infinitely. In fact, they must more than just repeat. Their phase relationships must also repeat. In other words, during the specific duration of the waveform snippet, each frequency must go through an exact integer number of oscillations, so that the frequency component is at exactly the same phase of its oscillation at the end of the snippet as it was at the beginning. That way, each repeating snippet, extending into the infinite past and future, must
be exactly the same.

The lowest frequency $F_1$ that fulfills this criterion is given by $F_1 = (F_s/N)$, where $F_s$ is the sampling frequency, and $N$ is the number of samples in the snippet. All of the other frequencies that fulfill the criterion are its harmonics: $F_n = nF_1$. Now, if we set $n = N/2$ then we get $F_n = F_s/2$ which is the Nyquist frequency. Finally, I must add $F_0 = 0$ to the list, because we need to account for a DC component. Therefore, in summary, a waveform comprising $N$ data points at a sampling frequency $F_s$, and repeating infinitely, can comprise $\text{ONLY} (N/2 + 1)$ frequencies given by:

$$F_n = (n/N)F_s, \text{ where } n = 0, 1, 2, 3, \ldots N/2.$$  

And this is exactly what a DFT delivers. It transforms the $N$ waveform values into $(N/2 + 1)$ equally spaced frequencies from DC to the Nyquist frequency. For each of these frequencies it tells you both the amplitude and the phase of the original waveform’s component at that frequency.

But can we relate what the DFT tells us about the waveform to the actuality of the waveform itself? Can we relate it to what a proper Fourier Transform would have told us? Are they the same thing? Well, not quite. Remember that the snippet of waveform we selected is assumed to repeat ad infinitum. The problem is that where the end of each of those repeating segments joins up to the start of the succeeding segment, there is no guarantee that the join will be smooth. In fact, it is almost assured that there will be an abrupt discontinuity at each of those boundaries. Those discontinuities are not part of the original waveform, but they will by definition be fully represented within the DFT analysis.

\[
\text{This frequency flows smoothly across the segment boundary} \\
\text{This frequency shows a discontinuity at the segment boundary}
\]

Standard practice is to artificially fade out the signal at the start and the end of the snippet so that there is \textit{de facto} no discontinuity at the join. What this achieves is to replace an uncontrolled discontinuity with a controlled one. This process is called ‘windowing’, and there are a large selection of useful windowing functions that can be gainfully employed. Each of those different windowing functions will affect the way in which the resultant DFT relates to the original waveform itself, but other than introducing the concept, it is beyond the scope of this article to elaborate further.

Bear in mind that what the DFT tells us about the data snippet is not merely an approximation – it is a full and complete representation. It tells you everything there is to know about the data that you feed it with. In particular, anything that is not in the DFT is not in the data. Similarly, anything that cannot be accommodated within the DFT representation cannot be encoded or captured within the data. Despite what you might think, the data contains only the frequencies which the DFT spits out,
and no others.

So, what happens if the original waveform from which we took our snippet contains a frequency which lies between two of the permitted frequencies spat out by the DFT (whose frequencies, you’ll recall, are determined by the number of samples in the DFT)? Well, such a frequency will not fit neatly into the repeating DFT snippet with an exact number of cycles. Therefore it will produce a discontinuity at the boundaries, and will therefore result in spurious data appearing within the DFT. Managing this issue is the reason why windowing functions are important. They control how that spurious data is distributed. Those characteristics of windowing functions have been thoroughly analyzed, and are well understood, although it is a deeply technical subject. Depending on what you are using the DFT to achieve, one windowing function may be a better choice than another.

I want to conclude by clarifying the relationship between a DFT and a FFT (Fast Fourier Transform). The DFT is a transform – a relationship between two sets of numbers governed by a set of equations. On the other hand, FFT is an algorithm, a methodology for implementing a DFT in practical terms by breaking the DFT down into progressively smaller pieces. There is nothing, for example, that limits the number of samples on which a DFT can be performed. But the most efficient FFT algorithms rely on the number of samples being an integer power of two, which is a limitation imposed only by the algorithm itself, and not by the underlying theorem.
Back in the day, I had many an asthma attack induced by musty old magazines purchased at yard sales and flea markets. I loved car magazines, hi-fi mags, and especially those thick catch-all mags like Popular Science, Popular Mechanics and Mechanix Illustrated, which managed to cover cars, electronics, and all types of technologies from lawnmowers to nuclear reactors with a sensationalist flair and fast-and-loose grasp of physics that seems quaintly charming in retrospect. Looking at them now, I often feel an involuntary wistful smile come on while reading Tom McCahill’s road tests, in which he measured a car’s trunk capacity by loading in his bird dogs; or stories about home-built hovercrafts or airplanes; or pronouncements from now-long-dead physicists of how lasers would eliminate the threat of Soviet missiles, and so on. If you love swoopy post-war dream-cars and the outer space paintings of Chesley Bonestell, you’ve probably read more than a few of these mags.

The holy grail of those magazines were the stories in which a nerdy guy in a plaid shirt built something in his garage which rendered Learned Scientists Baffled!! and which seemingly Violates the Laws of Physics!! In the automotive world that meant zillion-mile-per-gallon carburetors made out of cast iron pipe and a drinking straw, or engines like the Bourke two-stroke, a tiny two-cylinder engine which Beats Detroit’s Beefiest V-8s!! while going Miles on a Tea-cup of Gas!! (unfortunately, it did neither---I wasted a lot of time in college researching it).
Perpetual motion machines abounded in those magazines, and the audio equivalent of a perpetual motion machine was (and is) the massless loudspeaker, which promises flawless reproduction by moving air without the nasty physical jiu-jitsu of cones, domes, and panels. You might have just now discovered plasma tweeters and the like…but it ain’t a new idea. Not by a long shot.

English physicist William Duddell examined the “singing arc”, an annoying tone produced by carbon arc lighting. Duddell discovered in 1899 that by varying the voltage to the arc, he could produce a variety of tones, creating a Victorian-era steampunk synthesizer.

Other mostly-massless sound-reproducers include Oscar Messter’s Auxtephones from 1903, which used modulated compressed air to terrify listeners and sorta reproduce music. Along the same lines but even more terrifying was the flame loudspeaker built in the ’60’s by engineers at transformer company UTC, while trying to simulate the sound of rocket exhaust. Their system used a McIntosh amplifier to drive the flame from an oxy-acetylene welding torch to reproduce Beethoven’s Fifth. --- No, really---take a look here.

Getting back to those musty magazines, Hugo Gernsback was as responsible as any single individual for America’s enthusiasm for radio and electronics. His magazines may have featured prose that was a little caffeinated, but they were technically-solid and educational. The long-running Gernsback magazine Radio Electronics ran two articles in the November and December 1951 issues which had been translated from French, following their original appearance in Toute la Radio (“All Radio”).

The articles described the creation of French physicist Siegfried Klein, the “Ionophone”, a loudspeaker with no moving parts. The “Ionophone” was an ionization unit contained within a quartz horn-throat, coupled to a large, standard exponential horn. A platinum wire seated in the quartz horn acted as a cathode, and a 10-12,000 volt/400 kHz field is established between the wire and a cylindrical shield surrounding it. The field generates ions---charged particles--- and thus heat. An insulated vacuum enclosure which surrounded the quartz horn-throat prevented conductive heat-loss and loss of charge. By modulating the 400 kHz field at audio frequencies, sound was produced...along with UV and heat.

At this point, the prose becomes as purple as the plasma of the Ionophone. A frequency-response graph indicated relatively flat response of +/- 5db from 25-10,000 Hz; the text stated that the speaker could reach “much higher frequencies...however, its output diminishes in the supersonic range.” The articles concluded with the description of a future filled with massless loudspeakers directly coupled to radios, and stated, “the (unidentified) biggest French manufacturer of loudspeakers is tooling up for mass production of Ionophones.”

Sixty-five years later, it’s pretty clear that such never occurred. However, Klein did license his technology in the ’50’s and 60’s to the DuKane company in America (and through them, to ElectroVoice) and to Fane in England. DuKane made a tweeter unit known as the Ionovac; Fane’s version was called the IonoFane (and was utilized in an early Bowers & Wilkins speaker system). The Stereo/HiFi Directory in 1962 (and 1964, the only issues I have) listed the add-on Ionovac tweeter as $69.00 each, including power supply and crossover (about $550 today); other models ranged from $79.50 each (the tweeter housed in a small enclosure) to full-range systems including the Ionovac tweeter for as much as $246.00 each. Response was said to extend from 3.5-20 kHz, with no mention of the flatness of response.
Interestingly enough, that 1962 Stereo/HiFi Directory featured some pretty advanced speaker technology. Just before the Ionovac listings was the Kelly ribbon tweeter from the UK, marketed by Irving M. Fried under the brand IMF; after the Ionovac listings came Janszen electrostatic models, both add-ons and hybrid systems. Modern-day listings might look a trifle tame, in comparison.

Since the early ‘60’s, a number of companies have made, or attempted to make, massless/plasma loudspeakers. Klein himself developed a spherical ionic tweeter for the German company Magnat; that driver had a large and imposing flame structure, and despite the presence of a platinum screen that was supposed to act as a catalytic converter, was said to produce nasty amounts of ozone. Ozone is always a potential byproduct of a large plasma; the legendary Hill Plasmatronics dealt with ozone by piping in helium from a large tank! Given its Frankensteinian appearance and impracticality, it’s not surprising that only 50 pair were built, each pair supposedly sold at a loss, despite the hefty price ($7,000-$10,000 during the product’s lifetime, about $23-$25,000 today).

In the ‘80’s, the large and imposing French Tolteque plasma loudspeakers appeared at shows; I can’t even find a photograph, or state with certainty if they ever reached production. No less an eminence than Nelson Pass tried building a variant of the plasma speaker known as a corona wind speaker; Pass used electrode grids from copy machines. The device worked after a fashion, and was even
shown on the cover of Stereophile (Vol. 6, No. 1). Unfortunately, it also produced large amounts of ozone, which caused some respiratory issues for Pass, who shelved the project.

A German named Otto Braun produced a plasma tweeter called the Corona Acoustic; subsequently, the design was sold to Lansche in Germany, who produces systems using the tweeter. Acapella in Germany also has a tweeter based upon the Braun design (which may or may not be the same as the Lansche unit).

Going full circle: Jim Jordan, designer of Vaughn Loudspeakers, is now replicating the DuKane Ionovac tweeter. Jim told me that he’s had molds made for the horn, and is producing new quartz cells and porcelain couplers, and has designed a new power supply. The Vaughn Plasma Signature speakers were recently shown at RMAF with electronics from Wavelength, and Stereophile’s Herb Reichert--- a man known for enthusiasm, but not overstatement---wrote, “...it might be the best sound at any show, ever.”

Given the advancements in materials science that have appeared during the 65 years since Klein’s papers, I have no doubt that we will continue to see further improvements and developments in massless tweeters. I can’t wait.
Two of my kids have a cat with decidedly uncatlike characteristics. Having known a few cats in my time, the strangest thing about Jeter is the kids can take him to anyone’s house and he’s as cool as an iceman’s handshake. Very weird. Because the kids are at our place a lot our home is a second to the little guy. So we naturally keep a cat bowl and food, and a litter box downstairs in front of the furnace.

A few weeks ago Diane called to get the furnace cleaned. She takes the guy down to the furnace. Dwayne scopes the job and tells Di she has to keep the cat away for a while.

My wife. “We don’t have a cat.”

Pause, then Dwayne says “Ok...Then keep your husband away for a while.”

Confusion and cat pee drove Frank Zappa to some of the most barbequed nebulae and tire shredding blarps since Edgard Varese went to a Barbie reunion with Spike Jones.

If you started listening to Zappa when you were still living with your parents, you waited until they weren’t home, closed the door, and prayed yer Mom didn’t come up the stairs while you were
listening to Crew Slut. If she listened enough and got the drift they’d send you to West Point. If she heard this they’d put you in a home.

http://www.youtube.com/watch?v=Pw-0h318E4g

“What the hell was that?!”

“It’s a song from Burnt Weeny Sandwich.”

Pack yer bags, Johnny. We’re going for a ride.

Dad complained early that the music I was listening to, like Hendrix, Deep Purple, and Led Zeppelin, was nothing but worthless noise. When we started listening to Zappa, he was flummoxed, had no word for it. He’d gone to the superlative with “worthless noise” and had nowhere to go. That was worth the price of an album right there.

Zappa fell in love with Edgard Varese at an early age, early enough that for Frank’s 15th birthday his Mom let him call Varese’s home on the opposite coast as a present. Edgard wasn’t home. That’ll crap on your day. Point is that Frank at an age like 13/14 was not just listening to guys like Varese but was hungry for it. You can’t talk about Frank without Edgard Varese. Varese was an early 20th century composer who pioneered and composed music with a special focus that led in a host of directions. He took concepts of music in space, the floating of notes, the organized noise of music that fed spatial frames and waited for something to come back. That appeals to a very interesting group. Varese did have nominal success in his lifetime. One of his successes, albeit without knowing it, was a teenage Frank going into a Sam Goody music store in CA and purchasing The Complete Works of Edgard Varese, Volume 1.” This was the end of a yearlong search for Varese’s music. Frank had read an article in LOOK that described the percussion sequences on Varese’s Ionisation as “a weird jumble of drums and other unpleasant sounds”. He had to have it.

A young Frank found a mentor and new purpose to his music. That story that his Mom allowed him a long distance phone call for his 15th birthday to Varese places a book mark on his development and an insight into just how early Zappa was working with really avant garde ideas. When I was 15 I had just started dating my future wife and she was all I could think about. Frank was dating guys like Varese, Stravinsky and Schoenberg.

So consider this notion FZ had no formal training as you read on. He did take theory classes in high school and some short lived junior college classes, but for all intents was self-taught with training books and an amazing ear. He was composing in high school and had a few teachers who allowed him to conduct in band, but even at that early age found trouble finding kids who could play his music and teachers who could fathom what he was up to. By the time he graduated from high school he was composing and conducting avant garde pieces with the school orchestra. His primary instrument was drums, and with indulgence of his mom was playing in R&B bands in the San Diego area. Later, he switched to guitar.

In 1963 he incongruously got on Steve Allen’s late night show. I haven’t found a good explanation for this, Frank was 22 and unknown. Probably he’d gotten the attention of one of Allen’s minions and was put on the show as a foil for Allen, and in fact Allen treated Frank like a backwards relative. After all, Allen was a classically trained musician, and Frank came on the show to play a bicycle. Yep. Check it out. The sounds created here are incredibly prescient of later works.

http://youtu.be/Vip0H-I8pTg

By the early 60’s FZ was performing with bands around San Diego and LA. He was the guitar player
for a trio called the Muthers, and in 1965 they got the attention of Tom Wilson, a well known producer, who was able to get them a record contract with Verve. Verve insisted they change the name to the Mothers of Invention. Here we go. They released their debut album Freak Out! in 1966. This was only the second ‘rock’ double album after Dylan’s Blonde on Blonde, and being a debut album that was amazing enough, but on top of that the album was a collection of rock, doo-wop, and musical giraffes. The album had an 11 minute closing track called Return of the Son of Monster Magnet. Session musicians brought in for the album (a small studio orchestra was also used) were shocked to discover Frank had the stuff all on sheet music and were expected to be able to sight read. The release of the album established FZ as an important artist in the freak subculture. Good on ya Verve.

Zappa and the Mothers continued releasing albums in the late 60’s like Absolutely Free and We’re Only In It for the Money. FZ was experimenting heavily with taped sounds and strictly produced live recordings. His live performances were so heavily structured in key, time and signature that he was able to use the live recordings as samples in the studio. His live performances became such studies in composition and strict timing he had to employ the best musicians, even if the result sounded like dropping a drum kit down a well. My brother Jim saw Zappa in Hartford in the 70’s. At one point during the performance Frank was conducting a particularly complex composition with a 20 piece band, when a fight broke out in the orchestra pit. Frank stopped the band on a dime with his hand, and proceeded to tell these two clowns that they were disturbing people who had paid money to see them, and suggested they move their bullshit outside. Then he turned back to the band, and with a wave of his hand the band was perfectly back on the next note.

It was one of Frank’s drummers, Terry Bozzio or maybe Aynsley Dunbar, who talked about Zappa’s drum sheets looking like a black sheet of paper. In fact, FZ was concerned enough with the possibility of walking into a studio with a composition that was impossible to play that he decided to exorcise that demon by writing a percussive piece called Black Page. Originally played by Bozzio, it contained some of the most complex percussive passages ever written.

What we found so interesting was Zappa had a superficial reputation for writing potty songs, and did have some famous sexual and plastic banana lyrics that led to songs like Please Don’t Eat the Yellow Snow, Moving to Montana Soon, and Catholic Girls. These were really a lot of fun. Many people loved the raunch that got FM air play and were disappointed when they’d pick up an album like Burnt Weeny Sandwich and couldn’t figure out what was going on. Frank wasn’t above making money with the whack tunes but always used that money to fund his deepening journey into musical black holes. This was no Spike Jones. This was a genius, and as a genius he was certainly misunderstood and hounded by the censors his entire career.

But Frank was no saint. He was a tyrant in life, in studio and on stage, and believed absolutely in his version of the world and music with high disdain for anyone who couldn’t see it. He in fact treated fans like dolts, especially if they tried to discuss his music. In 1967 the Mothers were doing an extended stint in New York at the Garrett Theater. During an Easter show he somehow convinced some US Marines from the audience onto the stage. Frank had put a large baby doll on stage, then asked the soldiers to treat the doll like a ‘gook baby’. They dismembered the doll while Zappa played an antiwar composition. That was black, man. He thought of this as satire. With genius comes fear.

Frank was infamous for degrading drug use and had no patience for this in his musicians, who were some of the heaviest drug users in the industry. We were always amazed by this because listening to his music you’d think these guys, including Frank, were higher than Icarus. But there was an obvious example of a period in FZ’s life where he had to be using something. He despised most of the rock that was going on, considered bands like the Beatles insignificant pop. But he loved The
Monkees.

A quote from one of FZ’s bios states “Zappa had respect for what the Monkees were doing”. This really was odd because what all we thought they were doing was becoming the first boy band. Only one, Mike Nesmith, could play an instrument and they were always backed by studio musicians. Frank appeared in two episodes of the TV show and even did a cameo in their first movie, Zappa offered Micky Dolenz a job in the Mothers but RCA/Columbia/Colgems wouldn’t allow Dolenz out of his contract.

We knew Frank was weird but this was truly a departure from reality and smacks of running into Castaneda out in the desert. We call this his LSD Period.

Zappa released more than 60 albums over thirty years, with some of the most complex music ever written. What a nut. The discipline he needed and demanded required the best of the studio musicians of his day. The list is amazing. Ian Underwood, Vinnie Colaiuta, Dunbar and Bozzio, Flo and Eddie, Ruth Underwood, Stevie Vai, George Duke, Eddie Jobson, the Brecker Brothers, Patrick O’Hearn (bass!), Chester Thompson, Jean-Luc (I wanta hyphen in my name) Ponty and Don "Sugarcane" Harris. Zappa himself was featured in Rolling Stone’s 100 Best Guitarists list at #22. And I think he went too low.

Here’s a pic of Frank in concert in 1977. You can see the concentration on not only his instrument, but everything going on around him. OK, forget about the schnozz, I’m trying to make a point here. Geez, you guys are sick.

Frank Zappa did a lot for us, but especially this. OK so he did it for himself. He organized noise.

Here’s a cut from 1979’s Sleep Dirt called The Ocean is the Ultimate Solution. My favorite song title. With Patrick O’Hearn on bass.

https://youtu.be/zCNRqfkeWXs

That Zappa. He organized our noise.

[A few thoughts on FZ: I became a follower at any early age and through him was introduced to Varese, Arthur Honegger, Harry Partch, John Cage, and many other modern and modernist composers. I can't say it all stuck, but it broadened my horizons. It took a while for me to understand just how complex Zappa's music was, and the caliber of musicians with whom he surrounded himself; like FZ himself, they tended to look like escapees from a body shop or a motorcycle gang. These guys could play anything. Given the bizarre collection of musicians who came and went through the years—everyone from Turtles Mark Volman and Howard Kaylan (AKA 'The Phlorescent Leech and Eddie', later shortened to "Flo and Eddie") to Sonny Rollins...the level of musicianship is astoundingly high, though often veiled by adolescent, scatalogical humor. Suzy Creamcheese, what’s got into you?

A few Zappa anecdotes: FZ and the Mothers were playing at a theater in a casino in Montreux, Switzerland, when an audience member shot off a flare gun (!!!), which caught the rattan-covered ceiling on fire, and burned the complex to the ground. Yes, the Mothers prompted "Smoke on the
At a Fillmore gig, an audience member threw a bottle which hit FZ on the arm. He stopped playing, told audience members to point at where the bottle came from—which pinpointed one guy, who was escorted from the theater.

Several Mothers went on to have greater commercial success elsewhere: Guitarist Lowell George played his anthemic song, "Willin'", with its mention of "weed, whites, and wine", for the notoriously anti-drug FZ...who commented, "if you're gonna sing about drugs, maybe you should do it in your own band." Voila: Little Feat.

Did Top 40 radio have its revenge on FZ? Incredibly talented Mothers drummer Aynsley Dunbar went on to score big with '80's schlockmesters...Journey? Srsly?

Finally: as a DJ on the Armed Forces Network in Germany, PS Audio CEO Paul McGowan once interviewed FZ...who promptly told him he was an idiot, and walked off. Ever the diplomat, that Frank.

There's more, but Woody and I will likely come back to FZ again.—Ed.]
The Listening Position:

This series was implemented to assist music-loving audiophiles in gaining much more musical involvement with their systems that feature “full-range” loudspeakers. As such, it is not about adding subs to monitors to create a sub/sat system, although some of the upcoming info re sub positioning, levels, xover, & phase are applicable.

For this installment, we need to look at being sure that our main speakers are as smooth as possible through the boundary-dependent region (25-250 Hz). If not, we will never obtain the additional level of musical performance we could have enjoyed with subs – no matter how good they may be. That’s because the sub/main blend will never be as satisfactory as it could have been. Said another way, if you think you can simply add a couple of subs to your system as it is currently, and they will improve your system, I am afraid that I have bad news... :(
The Anchor - establishing your listening position first

Last issue, I said “the negative effects resulting from not addressing this critical issue simply cannot be overstated.” Basically, our mission is to find the best location/listening position for the smoothest bass in our acceptable listening area (‘acceptable’ due to restraints in décor).

Of course, if you are fortunate enough to have a dedicated room, and thus you have even more placement (listening & system position) flexibility, it’s even better. Either way, we want to work with our room, not against it (you will hear this statement again & again as I believe that this is critical if we are to enjoy any significant success in getting our music systems to reach a higher, more musically involving level).

Two proven techniques to achieve the smoothest bass response from our main full-range speakers:

1- Play a recording that has bass notes that are rising or falling in frequency - or various bass notes in a complex tune - that have approximately the same volume. Last issue, Paul suggested music from Brian Bromberg’s Wood. That’s a good one - I also like his Wood II.

While the cut is playing, your mission is to listen through a chosen musical section, then move forward and backwards in the room - each time listening to the same selection of music - in what could be an acceptable listening area. Whenever possible, using a lightweight seat that you can easily move so that you can listen at a seated position – which will give a bit more accurate results. Walking around can work, but it won’t be as accurate due to vertical standing wave issues. I would suggest not moving more than a foot forwards or backwards before listening to the selection again. The bass will change in its character. You are listening for the smoothest rendition – no notes booming away or almost missing. This is NOT about the deepest bass. We want the main speakers to have no obvious peaks and/or dips in the 25-250 Hz region. When you locate the position that has the smoothest overall reproduction, that is the place where you will locate your seat for serious listening and definitely for your speaker/room tuning.

As I said in Issue #17, moving your speakers about is important but it is of relatively small importance until you know where in the room you should listen because the bass is smoothest in that listening area. Then, once you have located that position, you can make other adjustments to speaker location without detrimental effects to the overall bass response smoothness... This is why I call the results of this step the Anchor Position. Once you have found it, then you can work on all else - presence, tone, etc...

2- These days, one can obtain a RTA (real time analyzer) or RTA app for very little expense and sometimes none at all. Why would you want to use one? Most certainly not for measuring your system’s overall response, and most certainly not for ultimate tuning of your system.

The RTA is great to have because it can save you a lot of time, compared to listening at a number of locations in the room. Although I have an expensive pro analyzer, the latest crop of apps (some free!) for phones and laptops make it easy to acquire and use one. You don’t need to have a technical background to use it at all.

The inexpensive-yet-more-than-accurate-enough app I use these days is AudioTools from Studio Six Digital. It is exclusively for iPhones & iPads. It cost me $19.95. All I ever use from this suite of tools is the RTA and the SPL (sound pressure level) loudness meter. Although it’s not necessary for our mission, you can purchase a calibrated microphone for your iPhone 5 or 6 or recent iPad from Studio Six Digital.
Six/Audio Control for around $200. Their iTest mic has software that automatically calibrates that mic to the iOS device intended for it. I checked it against my much more expensive RTA rig, and it was almost exactly the same!

There are loads of RTA/SPL apps for operating systems other than Apple. Taking the time to find one on the Internet that you can use will be time well spent.

Note – at this point, it’s useful to determine what the ambient noise level is in your room. You can measure that with the SPL app. Set it on flat weighting if available. Measure from the existing listening position.

Once you determine how loud the room’s ambient noise level is, you want to be sure to run the pink nose about 20 dB over that level, so as to be certain that the measurements you will take will not be polluted by ambient room noise levels.

Now, what you’ll do is simply play pink noise (equal loudness per octave - same as music). There are numerous resources for obtaining pink noise. The Audio Tools app supposedly has a pink noise source, but I have never tried it.

We only want to look at third octaves in the 25-250 Hz band. They are 25, 32, 40, 50, 63, 80, 125, 160, 200, & 250 Hz. Be sure to maintain the mic height at or near seated ear height when measuring. If it is higher, then you may encounter other anomalies in the bass related to the vertical room dimension. Starting at the current listening seat position, slowly move the RTA forwards & backwards and you will see various third octave frequencies rise & fall. You are looking at the room’s effects on your system. Obviously, we want to work with the room, rather than against it.

Hint – systems in rooms – from 25-250 Hz - almost never look good. The fact is – all of the rooms of the size that we might use in our homes will have problems. We simply want to locate the area where the problems are less objectionable.

Regardless of which technique you employ, you will have located the spot in the room where you will listen. If you then have to move the speakers a fair amount due to the resulting listening position, the bass smoothness is not likely to change very much. That’s because of the room dimensions, which do not change. Congrats! You are working with, rather than against, the room! However, at this point it is worth a listen to music to see if you want to adjust the seat slightly - a few inches forward or backward - to make the bass even better.

Next issue, we will address subwoofer location (including the critical-but-often-overlooked sub firing angle) as well as making appropriate settings for the most coherent musical reproduction.

Afterwards (the following issue), we will look at the pros & cons of electronic eq & room correction, as well as a well-documented story about that topic.

See you then!

You can read Jim’s work at his website. www.getbettersound.com
Back in my pre-teen youth, I had an undying love for the brand Technics. My uncle owned a Technics cassette deck, the local hi-fi store seemed to stock nothing else but, and I think I had virtually memorized the catalog by the time I turned teenage!

No surprise then that my first real turntable at age 16 was a Technics SL-1200/II. I had read enough to know that anything automatic and linear tracking in the arm department was a no-no, which ruled out most of the Technics range. I could find no word, good or bad, about the ‘1200 in the UK press, so I didn’t realize at the time that it had already been around some seven years. I eventually fitted the deck with an Ortofon MC10/II cartridge (a hefty £60 at the time!) and do you know what? It sounded rather good. Good enough to make the sound of a CD player a disappointment, when I finally managed to buy one of those wretched machines. I can remember listening to a Madonna album on CD versus the 7” single, and confused was I that the record sounded better. Especially since I had lusted after one of the bloody digital things for several years.

Before I was aged 21, I had worked at Alphason Designs, and left there for a job at what was then one of the UKs biggest Linn dealers, Cleartone Hifi. Mike Knowles at Alphason had explained in great detail all of his ideas on turntable design and theory. He didn’t understand direct drive, but doubted it was any good. At Cleartone I was sent up to Glasgow for ‘Linn training’. Pre-armed with Mike’s knowledge of the LP12, and knowing quite how superior the Alphason Sonata turntable was to the Sondek, I certainly wasn’t converted to the Linn cause. However, both Linn and Mike left me
with the notion that it was so hard to get the critical main bearing right, that it was totally impossible to get it right AND build a motor around it...which pretty much ruled out direct drive 'tables altogether.

Peer pressure. I caved in, The Tecchy became a bit embarrassing in my new hi-fi circles. A new, expensive suspended belt drive deck was ordered, the '1200 sold, and a temporary Thorens TD150/II was in place. The Thorens blurred the bass, was noisy, and not as defined, but it sounded ok. Livable. The expensive deck I did buy sounded worse than either the Technics or the Thorens. It was quickly swapped for something else, biggest disappointment ever, and again, the 1200 & 150, both now departed, sounded better. A new CD player was now sounding better than my vinyl. I was depressed, until the accidental purchase of a Garrard 401 came along!

Over the past 20 years, the Technics direct drive system has been realized to be something. In the UK especially, direct drive was considered something of a joke. Not quite as big a joke as idler drive, but a joke nonetheless. The fact that I feel both are vastly superior to rubber band belt drive is irrelevant.

The deck that started it all, back in 1969, was the Technics SP10, an arm-free motor unit. Built on a square chassis, of quite thin wall aluminium, the deck measures and sounds well. Technically, it offered noise and wow and flutter levels superior to any deck previously made. Speeds of 33 and 45 rpm, with electronic pitch control. As with the Garrard 301/401, the plinth is a critical component, and the original Technics plinth is just as bad as every other design from that era. The electronically-controlled motor, however, was a revolution in turntable design. On this early deck, an 18V DC supply feeds a central motor hub, which contains all the drive electronics. An oscillator and a three-channel power amplifier drive multiples of windings on the motor itself.
When mounted correctly, the deck is a firm rival for a standard 301 or 401. The biggest tweak is to remove the motor unit from the thin and rather ringy, resonant chassis and bolt it in to a solid lump of wood; this goes for the later SP10/II as well. The square shape of the SP10 makes fitting tone arms a bit of a chore.

The original SL1200 and the rest of the pre-1979 range all used some variant of this drive unit. Sadly the SL1200, SL1300, SL1400, SL1700 etc, all had rubbish plastic-y plinths, and pretty crappy arms. But again: rip the heart out of the deck, and you potentially have something excellent.

Direct Drive was Matsushita, Technics’ parent company, baby. The original SP10 I have seen
branded National, Panasonic, Technics by Panasonic, and just Technics! By 1980 most Japanese companies had developed their own direct drive systems. Pioneer made an excellent deck in the PLC 590, Sony did a really High-End deck. Less successful (in my perhaps solitary opinion!) are the Denon offerings or the JVC.

But it was the Europeans who really brassed off the Japanese: EMT launched the 950, which started instantly, stopped instantly, and bettered the SP10s specification. Technics counter-offered the rare SP10D, which only seems to have appeared in Canada, ex-broadcast. This has a much bigger power supply and motor drive circuit, and was also capable, with mods, of running at 78 rpm. But this was still no match for the EMT.

Matsushita upped the ante with the SP10 Mk II. The original deck was just ‘powered up and down’ from the mains. The Mk II featured a myriad of early logic ICs buried deep in the deck, which controlled a quartz reference voltage control, a gutsier motor, a very powerful servo system and a mechanical brake on the platter. Like the Mk I a strobe is provided, but on the domestic deck its ‘tits on a bull’ useful, as you can’t adjust the pitch. Biggest upgrade, and the only real sonic advantage, is that the power supply is no longer in-built, but is a separate little box with an 4 pin plug. On pressing the start button, the logic control gives the motor drive a jolt, and the deck spins up to speed ridiculously quickly. The servo is cast iron, you can apply as much pressure to the platter with a finger as you like--- you are just going to burn your finger! Stopping the deck engages the mechanical brake, and ‘stalls’ the motor in an instant. All of this jiggery pokery of the original design rivalled the much more expensive EMT; and record stations around the world dumped their Gates, Garrards, Thorens et al for them.

Along with the Mk II came a range of quite nice tone arms, ranging from modest to quite good, and some quite exceptional cartridges. The deck was a huge success professionally, being eventually replaced by the massive SP10 Mk III which used a different motor system that was a real monster of a thing. And yours truly has never had his sticky paws on one! (Technics also upgraded the plinth, to ‘obsidian’, volcanic glass combined with solid wood. Sounds as bad to be honest, makes your records as cold as digital.)

However, the SL1200/SL1210 Mk II used a new motor design similar to that of the SP10 Mk III. Not as big, but quartz and logic controlled, variable pitch, a rubber loaded plinth, the whole deck is as tough as old boots (except the arm!), incredibly reliable (although the power micro switch can stick in the off position on well-used examples), and sounds really quite good. I bought a very clean second-hand 1210 to play my car-boot finds on, and it is quite remarkable for the money just how good it sounds. Of course, this deck now has a reputation as a DJ deck due to its bomb-proof construction, fast start and stop, and ease of use. It has become an iconic design. It is and was designed as a Hi-fi deck. The arm is a little flimsy, but actually it isn’t that bad sounding. It’s easy to remove and put something better or worse in its place. Technics only stopped making them when the moulds broke a few years ago; not bad for a 1970s product.

For the money, it’s hard to fault these lovely Technics decks. SP10 or SL1200/II. The latter has of course been subject to a makeover and reissue. The iconic style remains, but only the lid from the original plays a part in the two new decks. It’s easy to go whoa! at the price of these two; but hold on, name me a single competitor that offers the features and sound for the money? I have only heard the new Limited Edition model briefly, I can’t tell you how it sounds in comparison. But as a collectable thing you can use and that sounds good, well it has no rival. Prices of SP10s have shot up of course, similar to the price of a nice clean Garrard. But there are plenty of SL1200/1210 out there--- just avoid the ones that have been in the DJ booth at your local club for the past 25 years!
That big shiny aluminum turntable is a Triangle Art Signature, with two Triangle Art 12" Osiris tonearims and ALL the extras!!! Cartridges are a Triangle Art Zeus with mods, and a Benz LPS-MR.

Tape decks? To the left of the turntable is an Otari MX-5050 B2 2 reel to reel tape deck with mods; the two hefty "portable" units precariously balanced on TV trays are the two parts of an Ampex 351-2 reel to reel tape deck. For cassettes, I have a Luxman K-05 cassette deck, and a Nakamichi 1000ZXL cassette deck.

I've also got a Luxman T-117 AM/FM tuner, Luxman MB-3045 mono tube amps designed by Tim de Paravacini with no holds barred/cost no object mods, PS Audio BHK Signature Preamp, PS Audio NPC phono stage, Thor Audio TA-3000 tube phono stage with mods, Isophon [now known as Gauder Akustik---Ed.] Casiano speakers, BSC SW-100 powered subs with mods, and LOTS of cables.
I am a human! That's all you need to know about me!!!

What makes me so proud of this kit, is that it is TOTAL KILLER!!! Every thing sounds REAL!!! What else could I want???

[Maybe you could use a few more tape decks, Ken! ---Ed.]

Want to submit your system to Copper? Send us an email with pictures and description and we'll likely publish it.
Tromping through the Rockies with a view camera strapped to my back, I spent many a lovely afternoon in search of fall colors. I had stumbled upon this dilapidated barn erected near the turn of the century. I loved the wood with its deep weathered grain.

No sooner had I set up the shot when a bright yellow leaf fluttered onto the wood.

Arca Swiss 4x5, Fujichrome, Schneider 90mm.