

A HISTORY OF THE DEVELOPMENT OF DJ MIXER FEATURES;
AN S&TS PERSPECTIVE

A Thesis

Presented to the Faculty of the department of Science & Technology Studies

of Cornell University

in Partial Fulfillment of the Requirements for the Degree of

Bachelor of Arts with Honors

By

David Cross

December 2003

Traditional ideas concerning the role of the DJ have changed drastically over the past twenty-five years. At first thought of only as people who play music on the radio, the term “DJ” has come to encompass much more. DJs are radio personalities, people who may not even put on a single piece of music. DJs play dance parties in clubs. DJs do weddings and high school dances, and act as MCs, announcing the various events throughout the night. DJs are turntable musicians, people who spend years practicing hand movements to compete at “scratching” tournaments. DJs are icons of coolness; many teen-oriented commercials have a ubiquitous DJ somewhere in the shot, regardless of the product’s association with anything music-related. Most recently, DJs have become superstars;

celebrity DJs command crowds that can number in the hundreds of thousands. People can drive hours and pay exorbitant amounts to see a person (usually a male) simply stand behind some equipment and put on music.



The Celebrity DJ

A vibrant subculture has developed around these new DJs. Whether it’s techno or hip hop, old school or new school, underground or commercial, there are DJs out there

who play this music, and crowds that come to hear it. These crowds congregate on a weekly basis at the various raves, clubs, and lounges around the world.

To an outsider looking in, some features of this subculture may seem a little odd. A first-time club-goer may be surprised to see that the DJ is using records to play electronic dance music. Vinyl, a format viewed as archaic by most, is the main distribution media for dance music. These records are released by the hundreds of independent dance music labels in the world, each one specializing in a certain genre. At any week, at up to fifty of these labels are releasing a single. That's fifty new songs a week, two thousand six hundred songs a year, all on vinyl. Once in a blue moon, one of these independent songs will appear on the radar of mainstream radio and pop music, but most get unheard, except in the clubs and on DJ mix compilation CDs.

Another surprising feature of the subculture is the celebrity status of the DJs. Famous DJs can bring in tens of thousands of dollars for a single gig. They have become world travelers, working up to four nights a week (Thursday through Sunday), traveling from city to city in the daylight hours.

One more unique feature of the subculture is the loudness of the music. Many dance floors are so loud that holding a conversation is an impossibility.

To many, it may be a surprise that there is a vibrant music culture that still depends on vinyl records, or that a person they've never heard of went from Manchester to Boston to Charleston to Chicago in four consecutive days, spent 8 hours a night playing music, and was treated like a celebrity for doing it. Many of these aspects of DJ/club culture had to be constructed, and exist today because social groups have pushed for them.

These features of the subculture are relatively new phenomena. Originally, DJ culture focused only on specific kinds of music. Whether it was Northern Soul music in 1970's England, Disco-era New York, or House in 1980's Chicago, DJ-oriented music choices were severely limited until recently, when music production became more accessible to the masses. The idea that a DJ would actually do a tour is *very* recent. Only when club owners realized that they could make good money by bringing in famous guest DJs did people start making a living at it. Even volume levels in clubs are social constructions; the idea that one must "feel" the music as much as they listen to it is embedded into the marriage of heavy bass beats (programmed by the music makers) and high-powered speakers (installed by the sound engineers).

The richness of club DJ culture owes itself to the various social groups that have turned it into what it is today. The clubbers, the music producers, the club owners, the promoters, the sound engineers, and the DJs all had a hand in developing this subculture. A party cannot exist unless every one of these groups works together to make it happen.

The above is a relatively simple sociological argument, one that shows how socially constructed aspects of a subculture can be. In highlighting the various groups that had a hand in constructing it, a richer picture of the subculture can be painted. Instead of trying to talk about all of DJ culture, an analyst could choose a few social groups, focus on them, and show how that group operates with within the sphere of groups in the subculture.

Theories like the Social Construction of Technology (SCOT), in the field of Science & Technology Studies, have taken this a step further, through the realization that

one can analyze a technology in much the same way sociologists analyze subcultures. Social groups can shape technological artifacts as much as they shape a subculture. Thus, similar assumptions can be built into them, and their socially constructed aspects can become part of commonplace notions concerning the artifact.

This thesis focuses on aspects of one particular technology, the DJ mixer. The DJ mixer is the central artifact a DJ uses to bring music to the masses. The DJ mixer is the device that lies between the music playing sources (turntables and CD players) and the speakers. Many features on the DJ mixer are automatically assumed to exist, with little thought put into the struggles involved in putting even a simple knob on the artifact. This thesis will highlight the stories behind many of these features.

Though the ties are much harder to see, the same social groups involved in DJ subculture are linked to the DJ mixer as well. Many of the features on the DJ mixer were developed through a struggle by these social groups to define the artifact. This struggle came about in various ways, including the translation of needs between social groups, alternative interpretation of a device by a social group, and a desire to control the system the artifact lies in. The SCOT approach is of great assistance in sorting out these issues.

SCOT enriches the story of an artifact by paying close attention to three main factors:

1. the relevant social groups associated with the artifact
2. the interpretive flexibility of the artifact, ie: how different social groups can view the same artifact in a completely different light
3. rhetorical closure of the artifact; a period where the artifact stabilizes in the eyes of many social groups

Instead of relating a simple fact-based history, SCOT allows a rich story of the DJ mixer to be told. With SCOT, the history of the DJ mixer becomes less a story about the artifact itself, and more a story about the people who made it what it was.

Not only does it enrich a story, SCOT provides a theoretical framework for analysis of the ways in which social groups have affected an artifact. In this case, the various interpretations of social groups concerning the role of the DJ mixer in DJ culture were key in helping determine many of its features.

This thesis focuses on the interpretations of the DJ mixer by two major social groups, the manufacturers and the users, and how these interpretations helped determine key features on the device over the years.

The first part of the thesis covers the ways in which manufacturers approach the DJ mixer, and how those various approaches changed the artifact. The section focuses on the idea of a manufacturing philosophy that governs overall business practice, including research & development, marketing, and sales. Looking at DJ mixer development in this light allows agency to be attached not only to a specific social group, but also to the underlying manufacturing traditions that govern that group's actions.

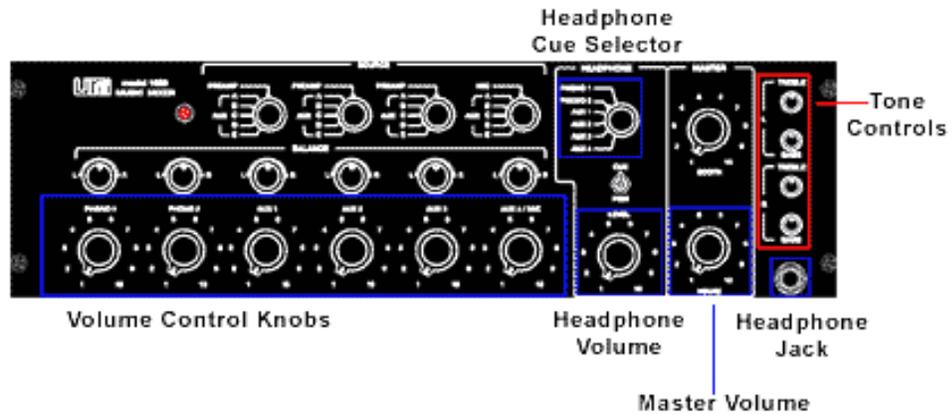
The second section covers user interpretation of the DJ mixer. Users, mostly DJs, come to the artifact from a very different perspective than the manufacturers. From this unique standpoint, DJs take the DJ mixer and do things to it unimagined by the manufacturers. This alternative interpretation, which brings with it completely new uses, will be covered in depth.

The main point of this thesis is to highlight the social constructedness of a technological artifact using theories from Science and Technology studies. Hopefully, by

the end of the thesis, readers will have in their heads a history of the DJ mixer, enriched with respect to the social groups that have turned it into what it is today.

Anatomy of a DJ Mixer

Urei 1620 Music Mixer



Rane MP44 Club Mixer



- Legend:**
- Core DJ Mixer Feature
 - Covered in Section 1
 - Covered in Section 2

Manufacturer Traditions

Aspiring and professional DJs have hundreds of mixer types to choose from, made by dozens of different manufacturers: Allen & Heath, Behringer, Carvin, Denon, Ecler, Fostex, Gemini, Numark, Peavey, Pioneer, Rane, Roland, Stanton, Vestax... the list goes on. The average consumer knows little about these companies. They may know that Rane just came out with a new mixer, or that Vestax sponsors hip-hop scratching events, but to them, they're just companies that make DJ mixers. Many of these consumers are oblivious to the fact that DJ mixer production is just a small part of what most of these companies do. The Pioneer of DJ mixers is the same Pioneer that makes car and home stereos. The Allen & Heath logo graces many more studio mixing consoles than DJ booths. Peavey and Carvin are brands synonymous with stage gear, not DJ gear.

The companies that *do* focus mainly on DJ mixer production are always selling name-brand turntables, phono cartridges, CD players and other products to accompany their mixers. DJ packages from companies like Gemini, Stanton, and Numark come complete with turntables, cartridges, mixers, headphones and speakers. Excluding custom jobs from small workshops, it is impossible to buy a DJ mixer from a manufacturer that doesn't also make something else.

The point of this is not to show the lack of a "pure" DJ mixer manufacturing tradition; it is merely to highlight the fact that the DJ mixer is not an autonomous artifact. The DJ mixer is always operating within some sort of technological system. Whether it is the system of physical connections to and from the mixer, the all in one DJ package a beginner purchases, or a DJ-oriented product line within a larger system of products at a

company, the DJ mixer is constantly being affected by non-DJ mixer products and decisions.

These influences have had a profound effect on the DJ mixer in its 30+ year history. The non-mixer manufacturing traditions of many of the above mentioned companies, the Pioneers and Peaveys, have helped determine key features of DJ mixers. Take, for example, Roland, a company famous for their electronic music-making machines. Using what they knew about their own instruments, they developed a DJ mixer that would fit neatly within their existing system. Their two mixers, the DJ1000 and DJ2000, have extra features that allow them to “talk” to electronic instruments.

Roland was also familiar with signal processors. Signal processors are devices that take an audio source and modify it in some way to enhance the sound. Their experience in making these devices gave them the ability to integrate one in the mixer, allowing DJs to creatively color their music without having to use external devices.¹



Roland DJ2000 DJ Mixer

This is just one example out of many, and Roland's influence on the overall DJ mixer industry is minor. Other manufacturers have had a much more significant effect on the industry, and DJ culture as a whole. These manufacturers all share a common trait; they abide by an all-encompassing philosophy that guides their business practice. Whether the philosophy is based on selling as many units as possible, making the best possible product regardless of price, or developing completely unique products, it governs even the smallest practices of the manufacturers. The following section will focus on how manufacturers have influenced the development of the DJ mixer, and how underlying traditions guided these actions.

Note: a manufacturer-exclusive look at DJ mixer history will not give a complete picture of the development of this artifact. Readers will see multiple references to other sections of the thesis. These are periods in the development of the DJ mixer where other social groups may have had more impact than the manufacturers.

Mixer: *At its simplest level, an audio device used to add (combine or sum) multiple inputs into one or two outputs, complete with level controls on all inputs.*²

The mixer in the kitchen combines multiple ingredients to turn them into one consistent mush, just as the mixer in the studio combines multiple audio sources into a singular output. Listening to a rock recording is listening to many things at once: drums, guitars, a singer, etc. The mixer combines all of those separate instruments together. It also makes sure the drums don't drown out the keyboards, it accentuates the low sounds of the bass, and it makes the singer's voice jump from left to right.

The First Mixers DJs Would Use

DJs were around long before the invention of the DJ mixer; and mixers have existed long before the DJ mixer. Decades before the DJ mixer came about, DJs were broadcasting songs to listeners, and at an even earlier time, producers in recording studios were mixing music together³. The artifact (mixer) and the craft (DJing) coexisted separately and happily for decades – it was only until the craft developed to a certain point that the two worlds collided (this collision will be covered in depth in section 2).

At a certain point in the history of radio, DJs started to use mixers to combine and broadcast different vocal and musical sources. Though semantically, this *is* a ‘DJ mixer’ (a “radio-DJ mixer”), it is not the same DJ mixer people talk about today. For purposes of this thesis, a DJ mixer is a device that has these three core features:

1. It allows someone to play at least two music sources at the same time
2. It gives the person the ability to listen to (cue) the non-playing source
3. It is made to output to a stereo PA (Personal Amplification, ie: speaker) system.

In a feature-by-feature comparison, the “radio DJ mixer” and the “DJ mixer” are quite similar. A radio DJ mixer does combine multiple music sources, and many of them allow the DJ to cue non-broadcast sources, but radio DJ mixers are not made with stereo systems in mind. They may be able to output to some sort of PA system (in the radio station), but are made specifically to broadcast to a transmitter for broadcasting.

Some DJ mixers can be broadcast mixers, but not many broadcast mixers can be DJ mixers. Most broadcast mixers are too bulky and delicate for DJ use, and many would have to go through a special device to hook up to a speaker system. The two devices share similar features, but have had different uses attached to them. These

prescribed uses have set development trajectories for the devices that have turned them into completely different artifacts today.

So, with respect to the current definition of the term, the first mixer a DJ used was *not* the first DJ mixer. This says something about the construction of the term. If “DJ mixer” isn’t a self-explanatory term, then some work had to have been put into giving it new meaning. Various social groups have struggled to turn the DJ mixer (the term, and the artifact itself) into what it is today. This section focuses specifically on the manufacturer’s role in this construction.

This isn’t to say that the term is completely agreed upon, though. The features listed above may exist in all DJ mixers, but “DJ mixer” is many things to many people. To some, the DJ mixer is a tool, a part of the profession. To others, it’s an instrument, a way to express artistry. The wedding DJ who plays “The Chicken Dance” for the groom’s mother is probably not going to say that his DJ mixer is an instrument, but the turntable musician who devotes all of his time perfecting his hand movements certainly would.

To a small number of people, the DJ mixer is almost a nuisance, a device that interferes with the pristine audio signal coming out of the record and into the speakers. This group played a key role in the development of the first DJ mixer.

Audiophile: *a person enthusiastic about high-fidelity sound reproduction*⁴

Anyone can listen to an audio recording and enjoy the music, but some people take their enjoyment a step further. Many listeners don’t pay attention to the audio quality of a recording. Some may notice that they’re listening to an mp3 instead of a CD,

but the loss in quality isn't a major deterrent. The success of peer-to-peer file sharing applications is a testament to this.

To one group of people though, audio quality is of utmost importance. These people, called audiophiles, love listening to music, but only if it is played to their own high standards of audio quality. For an audiophile, *every* stage of the audio signal is critical. This usually means separate (expensive) components for every link in the audio chain. Where most people would just get an audio receiver at an electronics store, an audiophile would need to buy multiple devices - all fine tuned and crafted for each specific use - to have the same functionality. Even cables are scrutinized; many audiophiles will spend hundreds of dollars on a custom made set of cables.

Most audiophiles are vinyl-heads in a CD world. Many of these people feel that CDs are a terrible audio format, that 44,000 digital samples per second is not enough to capture the essence of a recording, and that nothing has come along yet that sounds better than an analog recording.

Not surprisingly, many audiophiles are involved in audio engineering as well. Arguably, this level of appreciation of high-fidelity recordings only comes with a deep understanding of the components that make up an audio system.

Three audiophiles: Alex Rosner, Louis Bozak, and Richard Long, were influential in developing the first DJ mixers.

Early DJ Mixers

The first DJ mixer (see previous definition) was made by a man named Alex Rosner, a sound engineer who created and installed PA systems in New York disco clubs in the 1970s⁵. The mixer, named Rosie (after its red paint job), was incredibly simple,

but it laid the groundwork for the key features that DJ mixers were to have. On its face, Rosie had three volume sliders, and two toggle switches. The volume sliders were used to control different sources. Two of the sources were turntables. The third slider controlled another audio source, normally a tape player. One of the



Alex Rosner with Rosie

toggle switches was an on/off switch for the microphone input. The other could be assigned to one of three settings: Slider 1, Slider 2, and Slider 3. This was a headphone toggle. It sent the assigned audio signal to the headphones, *independent* of what was coming out of the speakers at the time. This allowed the DJ to manipulate the next song without anyone hearing. Rosner himself was not a DJ; he created the mixer for a club called Haven.

Though the creation of Rosie was significant, it was initially just another part of Rosner's job. As the sound system engineer at Haven, he created the unit for their new resident DJ as an accessory in the speaker system he built there ⁶. Rosner on audio:

“To this day, I like the concept of the discothèque, I like the concept of reproduced music as opposed to live music. And I thought that the technology was available to make things sound good and sound realistic.” ⁷

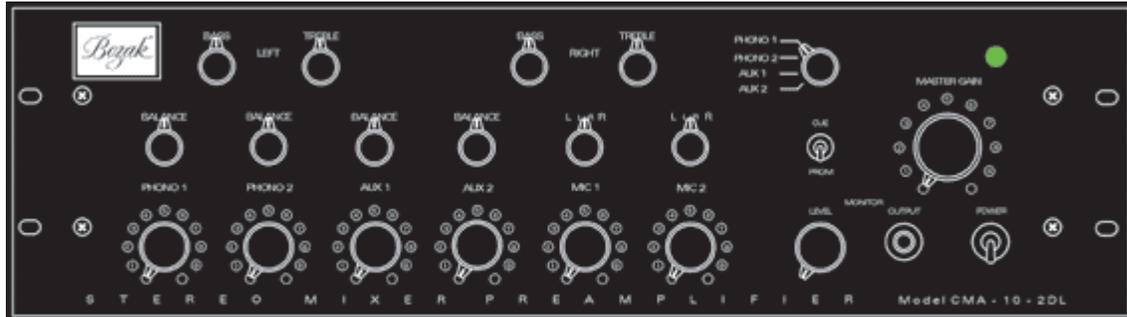
Rosner's main goal was to develop club speaker systems that could reproduce recordings in the highest quality possible.

Many of the other engineers Rosner worked with were also audiophiles. One of these engineers, Louis Bozak, owner of Bozak Inc., was simultaneously developing a DJ mixer for commercial sale. Rosie was a one-off job, a mixer that Rosner himself admitted to being “not that good,” but Bozak, with his own company, could mass-produce a high quality DJ mixer. Rosner, using his sound system knowledge, advised Bozak that he simply modify an existing mixer and make it work as a DJ mixer ⁸.

Bozak also received help from another famous name in the sound engineering world, Richard Long. Long, legendary for designing the sound systems in famous NYC clubs like the Paradise Garage and Studio 54, advised Bozak to add connectors (called effects send & return jacks) that would allow the mixer’s output to be modified by signal processors ⁹.

Thus, the Bozak CMA-10-2DL was born. Referred to as just the “Bozak” in the DJ world, this mixer looked very different from Rosie. Rosie was small enough to fit in one hand; at best it was six inches by eight inches and four inches deep. At 5.25 inches by nineteen inches and about eight inches deep, the Bozak was a 25-pound beast. The unit differed from Rosie in a few respects. Instead of sliders, many of the controls on the Bozak were operated with large knobs (knobs were characteristic of broadcast mixers of the time). The Bozak had two knobs for turntables, two knobs for tape players, and two knobs for microphones. The Bozak also had “Tone controls” (better known today as “EQs”), knobs that adjusted the amount of treble and bass being output to the speaker system. These were used to “fix” the sound; if the bass drums were overpowering, or if

the treble was getting ear-splittingly loud, the DJ could fix it.



Bozak CMA-10-2DL

The Bozak was an expensive mixer. These days, with some searching, one can find a Bozak CMA-10-2DL for about \$1000US. Coincidentally, the Bozak cost about the same amount in the 1970s (in 70's dollars, at that)¹⁰. Bozak was in the business of high-quality sound amplification, and he carried that same standard of audio quality over to his mixer. The Bozak became a club standard, and spawned the entire DJ mixer industry.

This first commercially available DJ mixer came from a tradition of high-quality sound engineering. The Bozak was obviously made for DJ use, but at the same time, it was made for another social group, the sound engineers who would be installing them into their speaker systems. Rosner, in suggesting a modification of Bozak's earlier mixer, cemented the idea that the DJ mixer was going to have very high audio quality. This standard of quality fit in with the speaker systems Rosner was installing throughout the city. When Richard Long suggested inserting the extra connectors, he was also inserting a part of his sound engineering tradition. Long, accustomed to using outboard signal processing devices, made sure that this new DJ mixer would fit in with his sound system design philosophy. Since these three men were largely responsible for creating

the mixer, it only makes sense for them to have incorporated features relevant to their interests.

All three of these men spent thousands of hours developing high-end speaker and sound systems, and they had their own notions of what good audio quality was. Now, an audio system is only as strong as its weakest link. If a record is pressed very poorly, if the cables are shot, or *if the mixer is low quality*, it will show up in the system, no matter how good the audio system is (a good DJ/sound engineer can help hide some of these defects, but they still are... defects). In order for these men to show off how good their speakers actually were, they had to maintain a high standard of quality in *every part* of the signal chain, from the turntable, through the mixer, through the amplifier, and out to the speakers. What better way is there to maintain high quality in the signal chain than to create the mixer yourself? This is a logical step, especially considering the fact that these men already knew quite a bit about the devices that the DJ mixer would interface with (speakers, amplifiers, signal processors, etc).

Rosner and Bozak were the “boundary shifters” of the DJ world; they took their extensive knowledge from one tradition (sound engineering) and applied it onto another (DJing)¹¹. This shift into the DJ world wasn’t a charity effort though, it was a method of control. Not to detract from these three men’s love for making new speaker systems, but it still was a business for them. The only way to make money selling speaker systems is to support the paying clubs that house them. A successful club needs a successful DJ, so if showing off the new speaker system requires making the DJs a special DJ mixer to play this “Disco” stuff, then so be it.

The Bozak had quite an effect on the DJs of the day. True to the qualities inherent in its design, many DJs who insist on using Bozak mixers today are as interested in audio quality as they are with their DJ technique. An entire community of users has built itself around the Bozak and its clones. Mostly older men, these DJs speak fondly of the old days, when clubs like the Paradise Garage had unrivaled, pristine sound.

The Bozak pushed a specific mixing style on DJs. Readers may notice that many DJ mixers today have studio up/down sliders, like on Rosie. These controls have taken center stage, but originally, Disco DJs mixed with rotary knobs. Knobs force the DJ to mix in a certain way. Knob mixing is done very gradually, in comparison to slider mixing. Moving a knob in small increments is much easier than moving a slider in small increments; on the other hand, moving a knob quickly is much harder than moving a slider quickly. The Bozak forced DJs to slowly layer music together.

One could imagine a world where Rosie took off instead of the Bozak. Rosie as an industry standard would've changed the DJ mixer world significantly. For one, knobs would've never had the chance to take off; arguments regarding the superiority of one mixing style (knobs) over another (sliders) would never take place, for there would be nothing to compare. Certain mixing styles may never have had the chance to take off; the technique of gradually mixing songs together (a core skill for many DJs today) may have been lost.

The Bozak was built for one specific purpose in mind, club installation. Taking it out of that realm is difficult due to price and portability constraints. On the other hand, Rosie's small size allows it go pretty much anywhere. If it were an industry standard, Rosie would take the DJ out of the club; it would change long standing ideas of what the

DJ is supposed to do, and where he's supposed to work. In fact, all of this happened, just not with Rosie.

Cheaper Alternatives

The Bozak established the vision for what a DJ mixer was in the early 70's, but this would soon change. When the industry standard DJ mixer costs \$1000, it only allows established (or very rich) DJs to use them. At the time, "DJ mixer" was an artifact reserved only for the professionals.

Other companies started to fill the gap between no mixer and a \$1000 mixer. As the seventies ended, and as hip-hop started to become a noticeable musical force, even more manufacturers entered the game. Note though, that Bozak wasn't interested in filling this gap. Bozak wasn't in the business of building cheap mixers. Cheaper equals cheaper components, which equals lower audio quality, and Bozak would never dare venture in that direction. Certain components on the CMA-10-2DL were *hand picked* to produce the highest audio quality¹². Sacrificing this wasn't an option for the audiophile manufacturers, because audio quality was the number one feature they were interested in. It is no exaggeration to say that these people *loved* audio quality, and held that standard above all others in a mixer.

Although the Bozak and its high quality clones still held at the disco (or in the 1980's: House) clubs, a new flood of alternative mixers started to challenge the idea of what a DJ mixer was. The DJ mixer was no longer going to be solely a club instrument.

Bedroom DJs

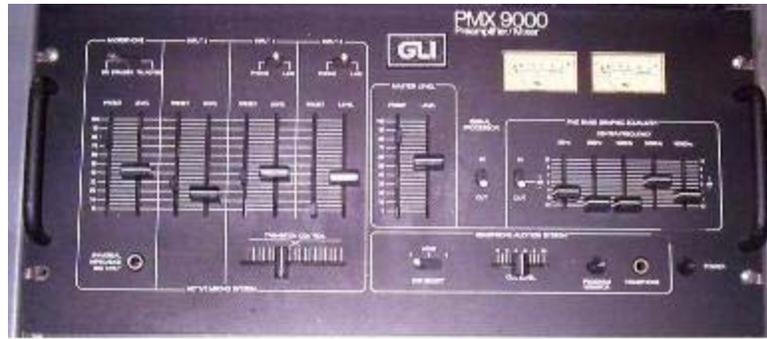
In the late seventies, a new, consumer accessible tradition of DJ mixers appeared. This group marketed their products towards a new breed of DJ, the bedroom DJ (named

for their favorite practice space). The bedroom DJ's existence is dependent on the professional DJ; the bedroom DJ aspires to become a professional DJ. One may think there's a chicken/egg issue here; how in the world can the professional DJ exist if he wasn't at one time a bedroom DJ? Well, Francis Grasso, the DJ for whom Rosie was created, the godfather of traditional DJ technique and the first professional DJ who had developed his craft to the point that a DJ mixer was required, developed his techniques while DJing in clubs¹³. Before Grasso, anyone could be a DJ. After Grasso, being a "professional DJ" became something else. Grasso developed a new DJing skill set that became a dividing line, an obligatory passage point towards professional DJ-dom (more on this skill set in section 2). After Grasso, the bedroom DJ needed two things to become a professional: professional-grade skills, and a place to play.

When the Bozak was the only game in town, acquiring "professional grade skills" was quite a challenge. Who could get practice time on a \$1000 mixer? The DJ's friends could; two of Francis Grasso's friends became professional DJs themselves¹⁴. The poor saps unfortunate enough not to know a professional DJ were left out to dry. Scrapping together a few hundred bucks for a set of turntables was often within reach, but not \$1000 for a mixer.

One of the first companies to rescue the bedroom DJ with a cheaper alternative was GLI. A New York-based company, GLI developed many different types of mixer product lines to meet a wide range of budgets. One of the product line, the PMX series, became quite popular; their PMX9000 was the "poor man's Bozak"¹⁵. The PMX9000 had a few features that distinguished it from the Bozak. Instead of knobs, the PMX series was riddled with sliders. The unit had four main volume control sliders: one for the

microphone, one for a tape player, and two for turntables. The PMX9000 also had a unique horizontal slider labeled “transition control.” Most



GLI PMX9000

sliders are vertical; this horizontal type was new. This minor transition from the Bozak’s knobs to the PMX9000’s sliders may seem only a slight shift, but it had a profound effect on the development of future DJ technique.

The Crossfader

The “transition control slider” was also called a crossfader. Crossfaders, first developed in the broadcast world, were a way to do the job of two hands with one ¹⁶. A DJ’s job has always been to continually move from one song to another, with as little dead air (complete silence) as possible. Extended silence is a DJ’s worst enemy; it’s the mark of an amateur, or an indication that something is wrong. In the radio station, dead air only exists in short snippets between songs and announcements. On the dance floor, where maintaining energy is key, dead air is cut even shorter.

Eliminating dead air between songs requires a few things: If the DJ has fast hands and one turntable, he can move from song to song with only a few seconds of dead air. With two turntables, the amount of dead air decreases significantly. Broadcast DJs developed a technique called “slip-cueing” (later adopted by disco DJs) to reduce this time even more. Using a piece of felt under a record, the broadcast DJ could hold on to the record while the turntable platter under it was spinning. The felt allowed the DJ to

stop the record without damaging it in any way. By “throwing” the record up to speed at the necessary time, broadcast DJs reduced the gap between records to nearly zero.

Having two turntables requires a mixer that can handle at least two sources at once. This means that there have to be two separate volume controls on the mixer for the two turntables (note: this was one of the prerequisites in the definition a DJ mixer). In order to switch from playing one turntable to the other, the DJ had to kill the volume on the first song, and raise the volume on the incoming song. When the DJ is working simply in one-song increments, it’s simple: just turn down the volume on Song A after it ends, turn up the volume on Song B, and start playing Song B. Now, if the DJ wanted to do an actual “transition,” moving from one song to another with nonstop music, it required much more skill. In the span of a few seconds, the DJ had to: start Song B, slowly lower the volume on Song A while increasing the volume on Song B while *making sure* to maintain the same amount of volume coming out of the mixer. The DJ had to make sure not to disturb the listener with a drastic shift in volume.

The crossfader basically allowed a person to automatically adjust the volume levels of the two turntables with one control. While Song A was playing, the DJ simply started Song B, moved a slider slowly from one side to the other, and voila, instant transition. The crossfader was a kind of deskilling technology: it did the painstaking work of adjusting two separate turntable volume levels while maintaining a consistent output level.

The GLI PMX series had crossfaders installed to switch between the two turntable volume controls. This allowed the DJ to simply move one slider instead of two sliders (or in the case of the Bozak, two knobs) to transition from song to song. The crossfader

became popular with the new wave of manufacturers entering the DJ equipment world. Excluding the Bozak and its clones, almost every single other DJ mixer designed had a crossfader as a main feature.

If the crossfader was so great, why didn't the original Bozak have one installed? Were Louis Bozak, Alex Rosner, and Richard Long unaware of crossfaders in the broadcast mixer world? With the amount they knew about the audio world, probably not. Did they not think to translate this feature from the broadcasting world to the DJ mixer world? Considering the user manual states that the CMA-10-2DL "lends itself to other such applications as broadcast stations..." and the uncanny resemblance of the Bozak to a broadcast mixing console, probably not. Did they think the crossfader was too de-skilling, a way to cheat? Cheating, an issue covered in depth in section two, is of major importance of many DJs. If DJs felt that the crossfader's "two hands in one" feature did too much work, and impinged on the basic DJing skill set, then there would be good reason not to put one in a DJ mixer. But Bozak, Rosner, and Long weren't DJs; they weren't thinking of cheating when deciding not to put a crossfader on the mixer.

The reason why there was no crossfader on the Bozak was because it could eventually degrade the audio quality. A crossfader is one more thing that the audio signal would have to go through, one more thing that could intervene. One lesson Bozak learned from the broadcast mixer manufacturers was that it's very hard to get dirt through a knob and into a mixer. A fader though, has an entire track for dust and debris to enter and mess up the internal circuitry. Knobs were much more reliable and lasted much longer than the faders of the day. Again, almost every feature on the Bozak maintained a high audio quality, regardless of the limitations it imposed on the DJ.

But companies like GLI didn't care as much as the audiophiles about audio quality. If faders did basically the same thing, and were cheaper than hand picked knobs, why not put them on a DJ mixer? If crossfaders made the job easier for the DJs, why not slap them on there, and see if people like them? GLI was operating under a very different manufacturing and marketing philosophy. Along with the regular professional DJs, they were out to sell mixers to kids who were saving up allowance money for them. They were trading audio quality for accessibility. Many of the features on the Bozak were only required when outputting to a high quality club system. Discrete circuitry and low signal to noise ratio don't quite matter when practicing DJ techniques on mom and pop's stereo.

And so, this consumer-oriented trend of DJ mixers took off. These companies started designing and selling DJ mixers at various prices to anyone that could afford them. They added features to their mixers that the audiophiles wouldn't dream of. To the audiophiles, these were sad times, when manufacturers cared more about quantity than quality, when good sound took second stage to cool looking mixers that could break after just a year of use. They started to realize that no one was interested in making something as good as the original, so they held onto them for dear life in the clubs.

This democratization was partially responsible for spawning a new genre of music, hip hop. Hip hop is the first musical genre that completely depended on the DJ and his mixer. One of the fathers of the genre, Kool Herc, owned a GLI 3800 mixer, a small, silver unit that had a set of volume knobs and a crossfader¹⁷. A party DJ in the Bronx, Herc used the crossfader to quickly play bits of soul and funk records for his audience¹⁸. This technique became the foundation of hip hop music (this will be covered in more detail in section 2).

Note though, that the crossfader was an enabling technology for Herc. Though his technique did not *require* the crossfader, one could argue that he may not have even tried if it weren't for the crossfader's ability to quickly go from song to song. Nowadays, a scratch DJ mixer (used for Hip-hop) is defined by its crossfader: if there isn't one on the mixer, it's not a scratch mixer.

Audio quality was not the highest priority in this new generation of DJ mixers. Saying this does not mean that the mixers sounded terrible; it merely means that these new manufacturers were guided by a different philosophy. They weren't in the high quality sound system business, and their DJ mixers reflected that. If a certain feature increased the functionality of the mixer at the cost of some audio quality/reliability, then so be it! It's the DJs buying many of the mixers anyways, not audiophiles. One man's cheap low quality mixer is another man's affordable chance to get into DJing.

These new manufacturers didn't just democratize the DJ mixer, they changed basic ideas of where DJing could be done. Before GLI, DJing was an activity reserved for the clubs. Now, one could DJ anywhere. DJs like Kool Herc did just that; they became mobile party DJs. DJing entered completely new arenas, including the rec center, the basketball court, and of course, the bedroom.

One can imagine the questions these manufacturers asked themselves when they approached new features on the DJ mixer (or to put it in SCOT terms, looking at the interpretive flexibility of the artifact). The first question the audiophiles are going to ask themselves is "what is this going to do to the audio quality?" The consumer-grade manufacturers are going to ask themselves, "will adding this feature make more people want to buy this mixer?" Both manufacturing traditions are approaching the artifact from

their own unique perspectives, and it's no surprise that the mixers that come out are completely different.

This makes it sound like Bozak wasn't interested in making any money, but actually, he was only interested in selling mixers to people who had the same love of audio as him. Beginning DJs numbered very few in this group.

Collision

A problem arises: kids grow up, and bedroom DJs become club DJs. These DJs suddenly get a gig at a club with a good sound system, and are presented with a mixer that looks nothing like what they're used to. The two traditions collide: the high-quality audio tradition and the consumer-friendly tradition. The two manufacturing traditions were dealing with their own conceptions of the DJ mixer, and the artifacts they created were vastly different. At their core, both artifacts fit the definition of the DJ mixer, but they went at it in different ways.

While new mixers were being introduced in the consumer market, the audiophile DJ mixer tradition remained quite stable. One company, Urei (pronounced "yuree"), made a very successful Bozak clone, the Urei 1620. Beyond some minor modifications, it shared basically the same feature set as the Bozak¹⁹. Improving upon the Bozak is a difficult task. Making a unit with better audio quality is nigh impossible, and adding extra features degrades the audio quality. Thus, this tradition stayed stagnant for many years, while the other traditions developed a multitude of new, DJ-friendly features.

Though both traditions were going after the same broad demographic, none of these companies "won" the battle to become the standard DJ mixer. There is no "standard" DJ mixer. Audio loving club owners and older DJs gravitated towards the

Bozak and Urei mixers, and mobile party DJs and scratch DJs gravitated towards mixers made by companies like GLI, but under no circumstances would a scratch DJ look at a Bozak and say, “that’s not a DJ mixer,” though he may say “I can’t use that thing.” Nor would an older DJ look at a newfangled scratch mixer and deny it’s validity as a DJ mixer, though he may say that it’s signal to noise ratio is terrible, or it makes his vinyl sound harsh. The new tradition of DJ mixers may have caught on with a larger proportion of the population, but it didn’t destroy the old tradition along the way. More than anything, the new manufacturers diversified the idea of what a DJ mixer was, what one could do with it, and where it belonged.

With these new ideas came changes in DJ culture. With their GLIs, bedroom DJs changed the perception of the DJ as club-only profession. Cheaper DJ mixers allowed people like Kool Herc to build mobile party audio systems, bringing the club to the crowd.

Other Traditions

Studio Influences

In 1980, a British company called Formula Sound decided to get into the DJ mixer game. Already experienced in developing and installing custom consoles in recording studios, Formula Sound took what they knew from the studio world, and added completely new features to the DJ mixer, features that have become almost commonplace nowadays. Formula Sound’s flagship DJ mixer, the PM80, was a “modular mixing system”²⁰. Parts of the mixer could be taken out and re-arranged according to the DJ or sound engineer’s preference. Though it was very innovative, the modular system had

little effect on future DJ mixers, but another feature on the PM80, the per-channel equalizer (better known as “per-channel EQs”), is now on almost every single DJ mixer.

The per-channel equalizer is a version of the “tone controls” on the original Bozak. Where the Bozak’s tone controls are used to manipulate the entire audio signal, the PM80’s EQs are used to manipulate specific sources. With per channel EQs, a DJ could make sure that there wasn’t too much high or low frequency sound coming through the speakers *from an individual song* during a transition. Drum sounds can clash together during a transition; with the per-channel EQ, the DJ can help eliminate or reduce those unwanted noises between audio sources.



These EQs are available on many DJ mixers nowadays, and DJ technique has reorganized around them. One of the qualities of a good transition is the DJ’s ability to make it sound clean, to use the EQs to fool the audience into not knowing when the DJ is going from one song to the next.

Per channel EQs have also become performance tools. Abruptly cutting frequencies on a song has become a way to increase energy levels. Traditional dance

music usually has a pausing period where the bass drums stop, and the energy builds until the drums start again. With per channel EQs, DJs can create this pause on their own.

For many, per channel EQs have become part of the standard feature set for a professional DJ mixer. They offer a level of control over the music that DJs take advantage of extensively. So why didn't Bozak put tone controls on each one of the six inputs on his mixer, when he already had a set of them on the master output? One reason has to do with the audiophile tradition Bozak was a part of. Tone controls are made specifically to modify the sound of whatever passes through them. Even in their "dead" position (ie: not boosting or cutting anything), they still have the ability to color the sound. For this reason, Bozak would want to use as few tone controls as possible. Thus, they existed only to modify the master output signal.

This is probable, but it's also likely that Bozak simply never thought of putting per-channel EQs on a DJ mixer. The sound system engineering tradition differs from the studio mixing tradition in one major respect. In the studio, producers have the luxury of being able to tweak the individual parts of a song before they get combined and recorded. Sound engineers, specifically men like Rosner and Long, can't do that; they only have a finished recording to work with. The best they can do is play with the finalized song to make it sound as good as possible.

Like electricity, audio runs along paths. The paths that runs through a mixer can be described in stages. The input stage is where audio comes into the mixer. External devices like turntables, CD players, and microphones get hooked up at the input stage. The output stage is where the mixer's final audio signal comes out. The sound at the output stage has already been processed by the mixer. In other words, audio at the output

stage has been mixed. The next step in the signal chain from output stage is connection to signal processors, speaker amplifiers, and tape recorders.

For Bozak, modifying an audio signal *before* it hit the output stage of a mixer was a relatively foreign idea. The tone controls on the Bozak were made only to adjust the signal at the output stage, where the per channel EQs on the Formula Sound PM80 all operated on the input stage (per channel EQs adjust the individual sources *before* they get mixed together). Sound system engineers think in terms of an already mixed signal, but studio producers think in terms of unmixed music. These basic ideas, each deeply embedded into these two traditions, become clear when looking at the types of features they develop with respect to their interpretations of the DJ mixer.

For sound system engineers, it's obvious to have tone controls operate on the master signal, because that's what they're used to dealing with. The same goes for the studio manufacturers; the obvious choice is per-channel EQs, because studio mixing consoles, the devices they use all the time, are riddled with them.

Compromise

The new breed of DJs still had trouble with the Spartan feature sets on the Bozak and its clones. A DJ accustomed to per channel EQs and crossfaders is going to mix very differently than a DJ with a Bozak or Urei. If the slider-based DJ is forced to use a Bozak, his mixing may suffer: the transitions may be too loud due to a dependence on the crossfader, and cymbals and bass drums may clash due a dependence on per channel EQs for transitioning.

Club sound engineers realized that their high quality mixers weren't so friendly towards the new DJs, but they had no alternative. They were torn: providing a more DJ-friendly mixer would require installing something far below their incredibly high standards of audio quality. What's better? A happy DJ that can play his music the way he wants to play it (at the expense of sound quality), or a DJ who can no longer mix well, but whose music flows beautifully out of the sound system? Many engineers stuck to the latter, and DJs were forced to configure their practice around these limitations.

In 1986, a new manufacturer entered the fray. Washington-based Rane Corporation, already established in the club world through their signal processors, produced a high quality slider based DJ mixer. This unit, the MP24, marketed itself towards clubs, and cost about \$1000. Like the Bozak, it still fetches about the same price today. The MP24 had an array of new features. It had 4 sliders, an assignable crossfader, and a level meter ²¹.



Rane MP24Z (newer model, very few changes from the MP24)

Assignable crossfaders give the DJ the ability to transition to and from any source. The GLI PMX9000 was permanently assigned to go from one turntable input to the other. With the MP24, DJs could have the crossfader transition from turntable, to tape player, to the newest innovation: DJ CD players.

A level meter is set of lights that allow the DJ to see a visual representation of the sound coming in and out of the mixer. Not all records and CDs are made the same: some are quieter than others. In a loud club environment, it's hard for the DJ to hear these minute differences, but if they see only half of the lights flashing on the meter, they can adjust accordingly.

Rane had a history of building high-quality units for a variety of different uses; they started out by designing devices specifically for small bands. Rane's products attracted enough attention for Richard Long to ask them to make special signal processors for him. The MP24's existence is actually due in part to Long. Impressed with Rane's products, Long suggested that Rane make a DJ mixer, something completely new to the company²².

Rane was in a unique position. Like the audiophiles who made the original rotary mixers, Rane focused on making high quality gear. They differed from the audiophiles in one respect, though. Audio quality, though high on their list of critical features, was *not* Rane's highest priority. Rane was willing to make concessions that the die-hard audiophiles weren't. Like GLI, Rane welcomed DJ-friendly features, but at the same time, they wanted to build gear that would hold up for many years in a club environment.

This combination of philosophies would help them tremendously in making new products for DJs. Attuned to the needs of the club sound engineer *and* the DJ, Rane developed a DJ mixer that would let visiting DJs flex their technique while maintaining the standard of audio quality the sound engineers needed.

The MP24 combined the sensibilities of both traditions: it met the needs of the new DJs (with its sliders and crossfader) while satisfying most of the audio engineers (with high quality components inside). Note though, that the rotary purist DJs and sound engineers still stuck to their Bozaks and Ureis, but the MP24 became established in almost every other club. The MP24 has been in continuous production longer than any other DJ mixer; its success in clubs is easy to see when one looks at how Rane made a conscious effort to please as many groups as possible through it²³.

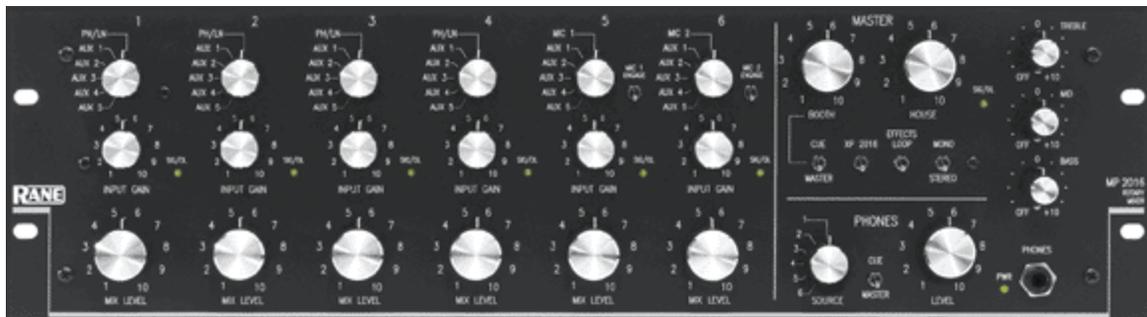
Return of the Rotary

While all of these slider-based mixers were developing new features, the rotary mixers stayed exactly the same. The clubs that kept rotary mixers in the DJ booths took very good care of them, but the Bozaks and Ureis were getting scarce. Both units were long out of production, and replacement parts were getting harder and harder to find (many engineers started to make some of their own parts). Enter Rane once again. In 1999, Rane released the MP2016, a new rotary clone. The MP2016 looks much like the traditional Bozak or Urei, and holds many of the same features, with one exception: A little switch on the MP2016 labeled “XP2016.” The XP2016 is explained in Rane’s product literature:

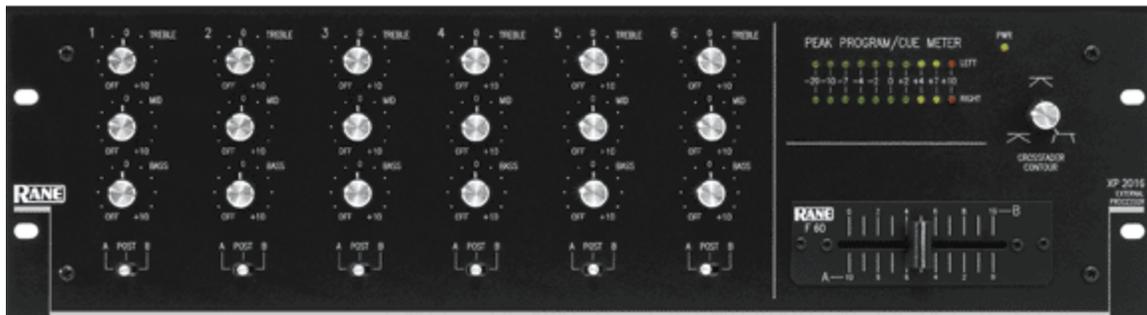
So you say, "Great, but to accommodate the diverse needs of all DJ mixing styles, I need dedicated high performance 3-band, full-cut, Accelerated-Slope tone controls for *each* of the six input buses, high-performance Active Crossfader with a full-range contour control, A-Post-B Crossfader Assign switches and a stereo, 10-segment, peak dBu Master/Cue Meter with peak hold; all without effecting the ergonomics of my classic rotary mixer."

We've got you covered! With the flip of a switch on the MP 2016 front panel, you can engage the **optional XP 2016 External Processor** and acquire all of these features²⁴.

The first paragraph, filled with complicated pro-audio-speak, is merely explaining the features the XP2016 has. “Dedicated high performance 3-band, full-cut, Accelerated-Slope tone controls” are per-channel EQs. “High-performance Active Crossfader with a full-range contour control, A-Post-B Crossfader Assign switches” is the assignable crossfader. The “stereo, 10-segment, peak dBu Master/Cue Meter with peak hold” is the level meter.



Rane MP2016



Rane XP2016

Note the statement, “to accommodate the diverse needs of all DJ mixing styles.” Rane acknowledges that the original rotary mixer limits the way in which the new breed of DJs mix, and tries to fix this with features from the newer manufacturer traditions. Where the MP24 was an attempt to inject audiophile sensibilities into the feature-friendly tradition of mixers, the XP2016 was an attempt to inject friendly features into an audiophile mixer.

The XP2016 is a perfect example of the development of features of the DJ mixer from the Bozak to today. The base unit, the MP2016, was created to mimic the original rotary mixers: simple controls with little interference in the audio signal chain. The XP2016, the external processor, holds the extra features. With the flick of a switch, a DJ can choose between the two separate mixing traditions. The two-part nature of the system exhibits a clear dividing line to see the original tradition in contrast with the features that have developed since then. Every feature on the XP2016 represents the collision and melding of multiple manufacturing traditions' take on "DJ Mixer."

Things seem to be coming around full circle: rotary mixers are once again getting popular. Other companies are following the rotary bandwagon; some do it as a gimmick, others do it to try and finally make a mixer that will trump the Bozak. Allen & Heath, a famous UK studio mixer manufacturer, recently released their Xone V6, a \$4700 behemoth that looks like a Bozak on steroids. Whether the Bozak faithful will like it or not is yet to be decided (the price makes it accessible only to the superclubs), but there's no denying that a new breed of rotary has entered the fray.



Allen & Heath Xone V6

The new rotaries have features not present on the Bozak and Urei, though. Some companies take a traditional slider-based mixer (complete with a crossfader and per-channel EQs), and simply replace the sliders with rotaries; one can even buy kits from manufacturers to switch between the input types on some mixers²⁵. Mimicking the XP2016, Allen & Heath recently released outboard per-channel EQs and a crossfader to go with their V6²⁶.

The DJ mixer and many of its features have developed in part through a constant translation of manufacturer-influenced interpretations of what a DJ mixer is, and what DJs should be doing with them. The originators of the DJ mixer felt it should belong only in high quality sound systems. New manufacturers come in, and develop products that destroy this idea. They provide mixers available to anyone with a few hundred dollars. In bringing these new mixers to the market, they change the role of the DJ.

This same social group introduces completely new features, and the users take to them. They become part of a base feature set for a new breed of DJ. This feature set expands, with manufacturers from even more diverse traditions coming in to vie for a share of the market. These new manufacturers, embedded in their own mixer traditions, have completely different ideas of what the DJ mixer should be doing. In translating those ideas into their own artifact, they introduce features nearly unimaginable to the existing DJ mixer manufacturers.

This new interpretation of “DJ mixer” incites a new manufacturer to come in and combine the needs of one group with the requirements of the other. In yet another twist,

the original tradition is revived, only with all of the features that have developed since its inception.

The richness of features in current DJ mixers has come about due to a constant collision and compromise between different manufacturer interpretations of the artifact. In the next section, the role of users' interpretations of "DJ mixer" will be highlighted, and readers will see that they have had just as important a role in its development.

Notes and Works Cited

- ¹ Roland Corporation. (no date listed) *DJ-2000 Professional DJ Mixer* [brochure]
- ² Rane Corporation Pro Audio reference. Available at: <http://www.rane.com/par-m.html>
- ³ Brewster, B., & Broughton, F. (1999). *Last Night a DJ Saved My Life*. New York: Grove Press.
Pg. 20-21
- ⁴ Merriam Webster Online Dictionary Definition. Available at: <http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=audiophile>
- ⁵⁻⁸ *Last Night a DJ Saved My Life* pg. 140. (see ³ for full citation)
- ⁹ Mick Music Page, Real Music and Dance Culture. Available at: http://www.mickmusicpage.net/bozak_dj_mixer.htm
- ¹⁰ Fitlin, S. (2003, September 17) Evolution of DJ Mixer Features. Message Posted to: <http://www.wavemusic.com/community/forumdisplay.php?s=&forumid=9>

- ¹¹ Pinch, T.& Trocco, F. (2002) Analog Days: the Invention and Impact of the Moog Synthesizer. Cambridge, MA: Harvard University Press
pg. 314
- ¹² Mick Music Page, Real Music and Dance Culture. Available at:
http://www.mickmusicpage.net/bozak_dj_mixer.htm
(same source as ⁹)
- ¹³ *Last Night a DJ Saved My Life* pg. 131. (see ³ for full citation)
- ¹⁴ *Last Night a DJ Saved My Life* pg. 137-138. (see ³ for full citation)
- ¹⁵ Fitlin, S. (2003, September 17) Evolution of DJ Mixer Features. Message Posted to:
<http://www.wavemusic.com/community/forumdisplay.php?s=&forumid=9>
(same source as ¹⁰)
- ¹⁶ RaneNote: Evolution of the DJ Crossfader. Available at:
<http://www.rane.com/note146.html>
- ¹⁷ *Last Night a DJ Saved My Life* pg. 215. (see ³ for full citation)
- ¹⁸ *Last Night a DJ Saved My Life* pg. 209. (see ³ for full citation)
- ¹⁹ Urei Inc. (1982) *model 1620 music mixer*. Northridge, CA. [User Manual]
- ²⁰ Formula Sound: Company Profile. Available at:
<http://www.formula-sound.com/Frames/history.html>
- ²¹ Rane Corp. (no date listed) *Rane MP24 Operators Manual*. Mukilteo, WA. [User Manual]
- ²² M. May (personal communication, July 6, 2003).
- ²³ Rane MP24: DJ Mixer evolution. Available at:
<http://www.rane.com/mp24evo.html>
- ²⁴ Rane MP2016: General Description. Available at:
<http://www.rane.com/mp2016.html>
- ²⁵ One clear example of this is available at:
<http://www.stantonmagnetics.com/alpha44/load.asp?page=rm100>
- ²⁶ XONE:V6 EQ ISOLATOR DEBUTS AT DANCE VALLEY. Available at:
<http://www.allen-heath.com/FullInfo.asp?view=107>

User Influence

The previous section focused mainly on the manufacturers' interpretations of DJ mixers and technique. This section focuses on the users of DJ mixers, mostly DJs. The manufacturers' influence on the DJ mixer seems overwhelmingly large. What part could the DJs possibly play when Rosie was an accessory in an existing sound system, when the PM80 was a heavily modified studio mixer, when the crossfader was already a broadcast DJ invention? Professional DJs were members of none of these manufacturing traditions.

Users did have a significant effect on the development of the DJ mixer, though. For one, they invented the need for a DJ mixer. The artifact was a translation of the DJ's needs. Manufacturers didn't just create "DJ mixer," and tell DJs they could use them; DJs developed certain skills that required something new, and manufacturers came up with the DJ mixer. The creation of the artifact was a cooperative effort by multiple social groups.

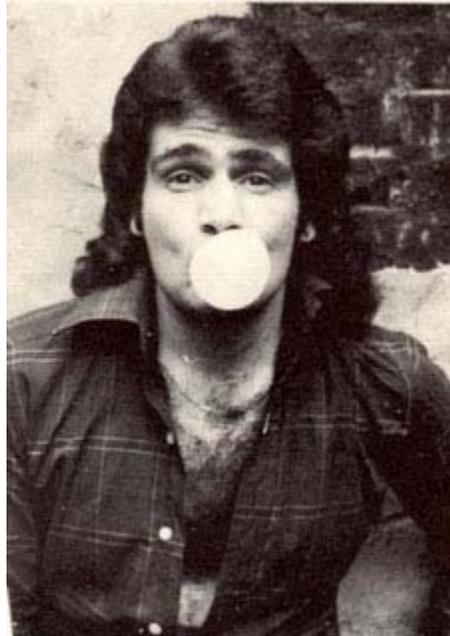
Also, if a user is unhappy with a DJ mixer, they're simply not going to buy it. If certain essential features aren't included, the mixer isn't going to sell. To audiophiles, "essential features" are high-quality circuits and knobs, but to many others, "essential features" include the newest innovations in audio technology applied to DJ mixers.

Essential features can be taken too far though; users can refuse to buy a product if it has certain features that don't mesh with the user's DJing philosophies. Cheating, using equipment that does too much work for the user, is a major issue for one group of DJs, and they can make or break a new mixer if they think a feature is doing too much.

In developing their craft, and in accepting and vilifying certain features, the DJs have determined key features on DJ mixers throughout its history. The following examples will highlight some of the most significant changes DJs have made to the DJ mixer.

Francis Grasso

Previously, mention was made of the artifact (mixer) colliding with the craft (DJing). This craft was developed by Francis Grasso, and without his contributions, the DJ mixer that we look at today would've never existed. Grasso changed the way DJs worked. He developed and perfected two techniques, beat mixing and slip cueing, that became the standard skills of the professional DJ, and turned the DJ from a human jukebox into a musician ¹.



Francis Grasso

Drawn into clubs on his doctor's advice (he was told to take up dancing as physical therapy), Francis Grasso got his first job DJing at a dance club when the resident DJ arrived late. Even in this first impromptu gig, Grasso was very attuned to the desires and needs of the dancers and partygoers (which caused the previous resident to get fired on the spot when he finally arrived). In his DJing, Grasso focused on maintaining energy in the music he played. If the dance floor was filled, he would make sure to keep it that way as long as possible.

He did this through his song selection; Grasso would make sure to have songs that progressed with increasing energy levels. He would never go from upbeat, danceable music to slow, lounge music; he would go from upbeat music to even more upbeat music.

Grasso was also very focused on maintaining the beat throughout the night, a part of maintaining the energy of the party. The DJ's need to maintain the beat is much like the need to maintain constant volume during transitions. A sudden shift in volume is going to disturb the listener, just as a sudden shift in beat is going to throw off the dancers.

Grasso maintained the beat with a technique called beat-mixing (better known today as beat matching). He would combine the percussive elements of two songs, making it seem like the drummer was still playing while the guitarist, bassist, and singer were replaced with a new band. Not all songs run at the same speed though, and not all drummers are perfectly on beat, so adjustments needed to be made while transitioning. For Grasso, this involved starting a record at exactly the precise moment for the two songs' drums to match together. He did this through slip-cueing, the broadcast technique that allows the DJ to start a record without waiting for the turntable to start spinning. Grasso would also manually adjust the platter on the turntable to keep the songs in time with each other. Nowadays, DJ turntables have speed controllers, eliminating the need to push and pull on the platter.

Grasso's techniques gave the partygoers absolutely no break in between songs. The energy level of one song was maintained and transferred to the new one. The DJ was no longer serving individual songs to a listening audience; he was performing for them, blending songs together in order to control the energy level of a party. The party was no

longer defined by one-song increments; it was defined by the DJ's performance in combining the songs together in a cohesive "set."

Grasso didn't invent club turntable mixing; party DJs before him were using switches and volume controls to transition from one turntable to another. What Grasso did was augment the existing mixing style, and invent techniques that put the DJ on center stage by ascribing a performance aspect to the craft. "DJ Francis played music, the other DJs before him had just put records on"². Anyone can put a record on, but it takes a skilled DJ to blend songs together, to create a unique performance experience for partygoers. Grasso made the DJ the centerpiece of the party with his unique skills. He changed the clubbers' ideas of what to expect in a party with a DJ.

Now, what does this have to do with DJ mixers? Essentially, Grasso's changes to DJ technique paved the way for a DJ-oriented mixer. Volume controls and switches were fine for most early DJs, but Grasso was creating new techniques that were limited by the simple controls. His popularity gave him power; as resident DJ of a club, Grasso could request items that made his job easier. Alex Rosner's Rosie at the Haven nightclub was made for Francis Grasso. The basic features on Rosie (multiple volume sliders, cueing switch, etc) were the exact features Grasso needed to effectively flex his new DJing technique.

Though Grasso was gifted in that he could do rudimentary beat-mixing without cueing, longer mixes and advanced techniques required it. In fact, most people were unable to beat-mix at all without cueing. In allowing the DJs to "pre-listen" to the next song, they could effectively maintain the energy between songs (and throughout the night). Cueing systems, one of the three core features that make up a DJ mixer, help

eliminate mistakes. They allow a DJ to hear if a song doesn't go along with another, to hear where the drums start on a song, and to hear how fast or slow a song is, all before the audience hears.

Alex Rosner didn't invent Rosie because he predicted the creation of this new type of professional DJ. He was merely outfitting a club sound system with a device that allowed new DJs to play in them. Rosie was revolutionary because it translated the needs of these new DJ techniques into an artifact, but these techniques were invented and polished by a user *before* the DJ mixer came along.

Crossfader Innovations

The “Dipped” Crossfader

The one DJ mixer feature that has changed the most since its inception has been the crossfader. The crossfader has been influenced heavily by user intervention and alternative interpretation, to the point that it has become a defining feature for many DJ mixers. The crossfader, stolen from the broadcasting world, has now become more synonymous with hip hop DJs than radio DJs. The original crossfader was made for simple transitions in the radio booth; the crossfader of today does that and much more.

As odd as it seems, the music a DJ chooses to mix has a significant effect on the crossfader's functions, because the music determines the mixing style. With Grasso's new techniques, beat-mixing became the new way to transition between songs. In the previous mixing tradition (ie: simple transitions with no consideration for matched beats), if a song's drums overlapped with another song, it was just by sheer chance. With beat-mixing, songs were *supposed* to overlap. A problem arises here: the original crossfaders were made to transition between non-overlapped songs, or random sources. With beat-

mixing, the sources were no longer random, they were synchronized. This made the crossfader nearly useless.

Imagine a person transitioning from an Elvis record to a Bach Sonata. The Classical piece is much slower than the Elvis record, and has no constant percussion, so there's no chance to overlap the two songs. When a DJ transitions from Elvis to the Classical record, he waits until the Elvis record is about to end, starts the Classical piece, and moves a crossfader from Elvis to Classical. The transition may not sound too good, but there won't be any dead air, and the volume level will be consistent. These two musical sources are completely different: the original crossfader is perfectly suited for this type of transition.

Now imagine a person transitioning from Donna Summer to the BeeGees. Both artists make Disco music, which has a constant percussive beat. While the Donna Summer song is playing, the DJ, using the cueing system, listens to the BeeGees song. He manipulates the speed of the BeeGees song to run at the same tempo as the Donna Summer song. When Donna is done singing (but while the beat is still running), the DJ starts the BeeGees song at a precise point, and slowly moves the crossfader from Donna to the BeeGees. Listeners hear a new set of drums coming in, and as the Donna Summer song ends, the meat of the BeeGees song begins. If the DJ is good, the beats of the two songs are going to be matched the entire time.

Now here's the problem: with non-synchronized sources, the crossfader works perfectly in combining the sources, but now the drum beats on the two Disco songs are matched together, and the combined signals make the volume louder. It's like the difference between a twenty-five person chorus with twenty-five people singing the same

song, and a twenty-five person chorus with twenty-five people all singing different songs. The first chorus is going to be much louder than the second because their voices are matched in unison. For this DJ, the drum beats are matched, so the transition phase is going to be much louder than the songs played on their own.

Beat-mixed music made the traditional crossfader obsolete. The crossfader was made to maintain consistent volume levels throughout the left/right travel of the fader; this was impossible with beat-mixing. Transitioning beat-mixed music using the crossfader without affecting the overall volume required two hands. If it was a two-handed effort, why not just use the individual volume controls?

Manufacturers came up with new modifications to accommodate these new techniques. One way to continue using the crossfader with beat-mixed music was to have the crossfader actually turn down the music while it was combining the sources. This way, the DJ could still have overlapped beats without overpowering the listeners during the transition phase. Manufacturers did just that. They developed new crossfaders that lowered the volume for them. These new faders still did the transitioning work, but they made sure that the combined volume was lowered as the DJ moved the crossfader from one extreme to the center. These were referred to as having a “dip” in the middle (in reference to a dipped, or lowered, volume level). The dip allowed seamless beat-mixing with no change in the DJ’s technique.

The creation of the dipped crossfader is an example of the manufacturers accommodating the DJ’s technique by incorporating new features on the mixer. Users, in developing their technique a certain way, changed the way the crossfader could be used. The manufacturers realized that DJs had developed new needs, and they translated those

needs through the dipped crossfader. The innovation on the manufacturer side came in problem-solving, translating the needs of a social group into a physical feature on an artifact.

The dipped crossfader brought with it a new age of DJ mixer features. Though the DJ mixer had constantly been changing, features like the dipped crossfader differed from previous features in one respect: manufacturers were starting to create features for DJ-only use.

One could imagine the pre-dipped crossfader DJ mixer as being somewhat of a patchwork of different manufacturing traditions. Every feature on that DJ mixer came, relatively intact, from a different tradition. Take volume controllers and per-channel EQs from the studio tradition, add a crossfader and cueing system from the broadcast tradition, mix in some PA system connectors from the signal processing tradition, and you have a DJ mixer.

With the dipped crossfader, this could no longer be done. Manufacturers could no longer take features from their respective traditions, and slap them on a DJ mixer to please the DJ. By taking DJ mixer features past their intended uses, DJs were forcing manufacturers to go beyond what they already knew, and start developing solutions specifically for the artifact.

In a sense, the DJ mixer was starting to develop *its own* manufacturing tradition. The dipped crossfader was the first completely unique feature on a DJ mixer. It was made specifically for the DJ mixer, and it didn't come from some other tradition. Broadcasters had no need for a dipped crossfader, nor would they have a need for the

bevy of other crossfader innovations manufacturers would come up with to accommodate the new hip hop DJ.

Hip Hop

The dipped crossfader is a small example of how genres of music and mixing styles can affect the DJ mixer. Hip hop, a music genre that depended completely upon the DJ, has had the greatest user-based effect on the DJ mixer since Francis Grasso invented the modern DJ. With hip hop and its derivative music genres, completely new interpretations of what DJs should be doing with the DJ mixer were established.

Francis Grasso wowed his audience by combining songs together to form one continuous, high-energy night. Hip hop DJs wowed their audiences by taking the most exciting part of one song, and playing it over and over again. This is called the break, or the breakbeat, the part where the melody stops in a song, and the drummer takes over. Afrika Bambaataa, one of the first hip hop DJs, describes the break in the documentary

Scratch:

The breakbeat is that part that you look for in a record that let's your God's self just get wowed. Then as soon as that breakbeat leaves you're saying like "awww, it's only a minute? it's only 30 seconds?" You know, you wanna hear some more. So that's where the hip hop DJs came in and started making that beat, that breakbeat, that stripped down funk, expand longer and longer for you could just get crazier and crazier and crazier on the dancefloor.

Kool Herc, a Bronx party DJ (mentioned in section 1), was the first DJ to do this. Herc realized that one main group of party-goers, the b-boys (breakdancers), only wanted to dance during the break³. By playing *only* the breaks on his Soul and Funk records, he allowed the b-boys to show off the entire night. Herc found himself spending most of the night playing small snippets of records instead of entire songs, and was quickly transitioning from one break to another.

Here is an instance where the dancers' effect on the DJ is quite visible. A DJ is nothing without his music, a DJ is nothing without his equipment, and a DJ is nothing without a crowd. Herc may have invented the idea of playing breaks exclusively, but he never would've thought of doing it if it weren't for a bunch of kids on the dancefloor that only danced to



Kool Herc

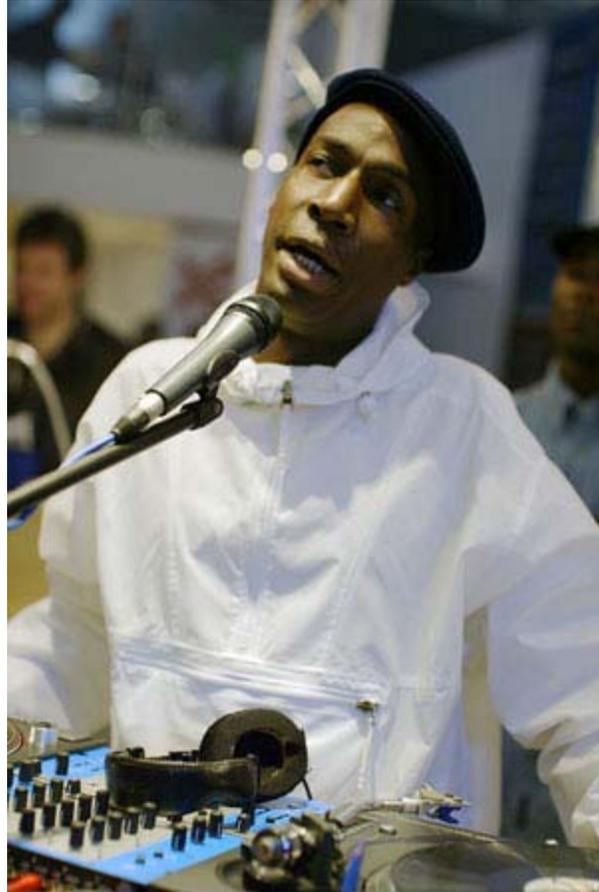
breaks. With hip hop, the dancers become a key social group in affecting change in DJ technique, and eventually, DJ mixer design.

Grandmaster Flash (aka: Joseph Saddler), another Bronx resident, took Herc's technique to another level. Herc invented the idea of using breaks exclusively, but his transitions were very simple affairs. Flash, inspired by the precise beat-mixing methods of disco DJs, wanted to find a way to go from break to break seamlessly, and to keep the beat going on between breaks⁴. If the beats were consistent, the b-boys could dance with absolutely no interruption. Herc gave the b-boys a lot of a good thing, but the dancers were constantly interrupted by transitions. Flash wanted to find a way to avoid this, allowing the b-boys to dance nonstop throughout the whole night. Flash couldn't afford a Bozak, and he didn't have a GLI either, so he took a cheap mixer made for combining microphone sources, added some devices to make the microphone inputs accept turntable signals, and voila, he had a DJ mixer.

Or did he? The mixer, the Sony MX8, did have multiple volume controls, and it did output to a traditional stereo system, but it did *not* have a cueing system. When Flash originally set out in his goal to find a way to seamlessly play breaks, he didn't know DJ

mixers had cueing systems. Only by begging a disco DJ to let him look at his mixer did Flash find out that beat mixers pre-listen to their songs ⁵.

Flash decided to invent his own solutions. Empowered with a high school background in electronics, Flash split the turntable signals to a special device that allowed him to pre-listen to the turntables while still allowing him to mix with the microphone mixer. He transformed the mic mixer into a DJ mixer ⁶.



Grandmaster Flash

After months of experimentation, Flash developed a series of new DJ techniques that became the foundation for hip hop. He became a human audio editing program before they even existed. With two turntables and a mixer, Flash could play snippets of one song over another, restructure songs at will, and constantly loop a part of a song over and over again. All of these techniques were based on quick shifts of the crossfader instead of smooth transitions.

Much of what Flash was doing was “cutting,” quickly moving from one audio source to another. Crossfaders are relatively effective cutting tools, because if a DJ wanted to change audio sources, he can merely flick his wrist from one side of the crossfader to the other. Flash was able to cut with DJ mixers, but they weren’t exactly

suited for it. The crossfaders on DJ mixers were transition control sliders; they were made for gradual movements, not quick cuts. They were also made with infrequent use in mind. The typical disco DJ's crossfader moved at most fifty times in one night (one time for each transition between songs); Flash developed techniques that could move the crossfader up to fifty times in one minute.

Flash added completely new ideas of what a DJ should be doing with the crossfader. Flash's techniques focused less on the crossfader's ability to transition, and more on its ability to switch between sources. He was taking an existing artifact and interpreting it in his own way. For Flash, the crossfader was defined by its extreme positions, because it allowed him to use it like an A/B switch between sources. For the Disco DJs, the crossfader was defined by the positions between its extremes, because it allowed them to blend sources together. The eventual goal of the Disco DJs *was* to get from A to B, but the transition, the points in between A and B, were just as important as A and B themselves.

Scratching

Grandmaster Flash's new interpretations of the crossfader had a significant effect on future DJ mixer development, but he wasn't the only person in hip hop to change existing perceptions of the DJ mixer. Scratching, the art of manipulating a record and fader in conjunction to create music, has transformed the crossfader into a completely different artifact. The idea of turning this odd sound into music came about completely by chance. In the book [Last Night a DJ Saved My Life](#), the authors interview the inventor of the scratch, Theodore Livingstone, aka: Grand Wizard Theodore:

“I used to come home from school and try to practice [DJing] and try to get new ideas,” he recalls. “This particular day I was playing music a little bit too loud. Any my moms came and like [*banging on door*] boom, boom, boom, boom, boom. ‘If you don’t cut that music down...’ So she had the door open and she was talking to me and I was still holding the record, and my earphones were still on. And while she was cursing me out in the doorway, I was still holding the record – ‘Jam On the Groove’ by Ralph McDonald – and my hand was still going like this [*back and forth*] with the record. And when she left I was like, ‘What is this?’ So I studied it and studied it for a couple of months until I actually figured out what I wanted to do with it. Then that’s when it became a scratch.”

So your mom invented scratching?

“Yeah, God bless my mama.” (pg. 224, 225)

With scratching, Flash’s original ideas of using the crossfader at its extremes were cemented into hip hop DJing.

DJ Qbert, a world famous scratcher, describes the function of the crossfader in the documentary Scratch:

This is a fader, um so you can just... what it is, is just on and off. [moves crossfader back and forth from the center to one end while scratching] You know, that’s all it is.

The fader is like, for that turntable [points at one turntable] and that turntable [points at the other] alright. And in the middle is both.

Scratchers imagine the crossfader existing mostly in three specific positions: far left, middle, and far right. At far left, only audio source A is playing, and at far right, only audio source B is playing. In the middle, both are playing. For quick cuts (a la: Flash), far left and far right are the only positions used. For scratching and layering, the middle position is added (scratching is often done over another musical source). Note though that the positions in between the three main ones are of little concern, because scratches and overlays are not usually blended into a song, they’re cut right in at full volume.

Instructional scratch tutorials refer to the fader only in one of two positions, “open” or “closed”⁷.

Scratchers and hip hop DJs focused on the crossfader configurations that were most relevant to their techniques, and worked their craft around them, while manufacturers made drastic changes to the crossfader to accommodate these new techniques. These manufacturer accommodations turned the crossfader into a completely new artifact.

How exactly did these new techniques affect the crossfader so much? For one, DJs started to manipulate the crossfader with much more frequency than the previous disco and broadcast DJs. These sliders were never made for the kind of abuse hip hop DJs and scratchers were putting them through, and it showed. Crossfaders would wear out; they would emit pops and crackles during movement, and sometimes the audio signal would cut in and out on its own. Replacements were tedious, and frequent. Note, it is impossible to do quick cuts and most scratches with a knob-based mixer (because moving a knob quickly from one extreme to the other takes much more time than with a slider), so switching to higher-quality knobs was out of the picture for scratchers. Hip hop DJing had built itself around the fader, and that’s what they were stuck with.

As a quick fix, manufacturers added field-replaceable crossfaders, making it possible for DJs to buy spares and install them on their own. In order to prevent users from completely opening the black box that was the mixer (and mucking with the internal components), some manufacturers designed DJ mixers in such a way that crossfaders could be replaced without opening up the mixer.

Along with the replaceable crossfader, manufacturers developed a variety of solutions to accommodate these new uses for the traditional slider. One of these new features was the curve control. The “curve” on a slider is the graphical relationship between its position and volume level. By changing its basic properties, the curve control completely subverted the idea of what sliders were supposed to do.

Curve Controls

Along the track for a slider is a set of silk-screened markers that tell the user where exactly the slider is lying. When a recording engineer moves a volume slider up to the second marker (with ten markers total), they assume that essentially, they’re playing that source at 20% volume. As the engineer

pushes the slider up, the volume increases with a direct relationship (ie: fifth marker is 50%, and ninth marker is 90%). A graph representing the marker/volume relationship would show a simple diagonal line moving upward from bottom left to top right, from 0% to 100% volume (the graph is actually somewhat curved, but still has essentially a linear relationship).

With curve controls, a scratch DJ could turn a knob, and change that relationship drastically. At one end of the knob, the curve control leaves the fader intact. At the other end, the volume gets to 100% volume *much* faster. A scratch DJ could adjust the curve control so the volume reaches 100% as soon as the slider hit the 1st or 2nd marker, with

Normal Fader Curve



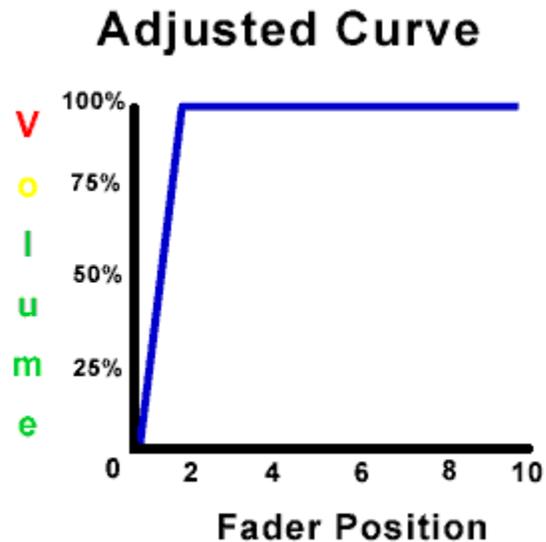
the ensuing markers staying at 100%. The linear volume relationship from 0% to 100% gets compressed significantly. A graph of this slider would be very different, with a steep diagonal line at the beginning, and then a horizontal line.

Why would a DJ want to do this?

Because a lot of scratch technique is all about speed. The faster you can manipulate the record and mixer together, the more scratches you can do in a second. The more scratches you can do in a second, the more impressive your technique is. If it takes a DJ 5

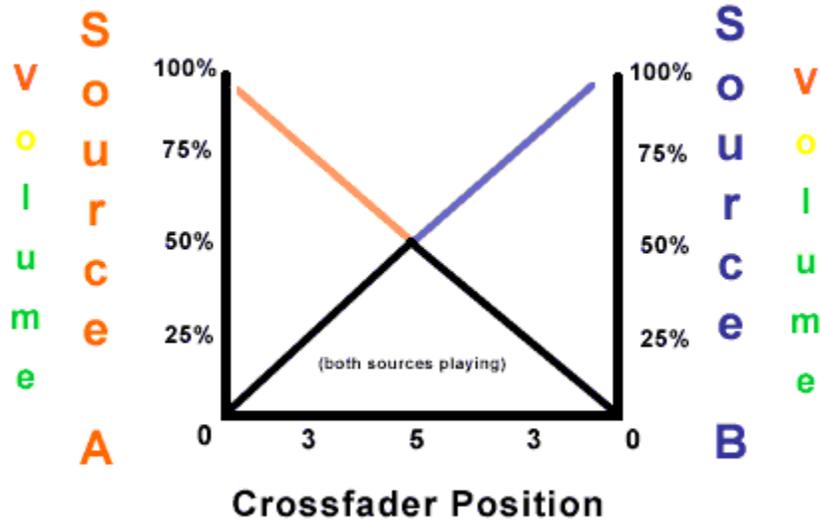
milliseconds to move a traditional slider from the 0 marker to the 10 marker (ie: to 100% volume), it should take them 1 millisecond to move it from 0 to 2. If adjusting the curve control causes the second marker to behave like the tenth marker, the scratcher can now do the same mixer technique in one-fifth the time. Remember, most scratch DJs don't care about the positions in between 0% volume and 100% volume, so the fact that you can no longer blend is of little concern.

Now, apply this same philosophy to the crossfader, the main slider a scratch DJ uses. A crossfader is essentially two normal volume sliders stacked on top of each other, with one reversed, giving full volume of only one source at either end, and even volume of both sources in the middle. With a traditional crossfader, in order to scratch over a piece of music, the DJ would have to move the slider from one side to the middle. Most scratching requires simultaneous record and slider movements, so the DJ is constantly

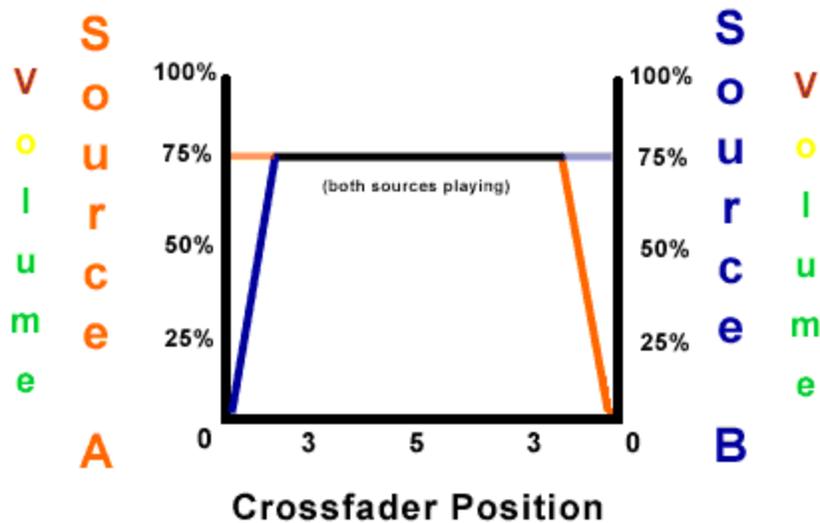


moving the crossfader back and forth from one end to the middle while manipulating the record.

Normal Curve (crossfader)



Adjusted Curve (crossfader)



Crossfader curve controls make the middle area much fatter. Instead of existing at just one point, the area that gives full volume of both sources is pushed out and

extended across almost the entire length of the crossfader. Instead of having to move the slider all the way to the middle, the DJ only has to move the crossfader a few millimeters from the end to have both sources play at full volume. This is called the “cut in distance,” the distance between full volume of one source, and full volume of both sources. Recent slider technologies and curve controls have made the cut in distance infinitesimally small, giving an almost instantaneous combination of sources with the slightest movement of the crossfader.

Why do this? Again, the answer is speed. With curve controls, DJs no longer had to move the crossfader all the way to the middle position. They could perform the same technique with smaller movements. Smaller movements mean more of them can be done in the same amount of time. Certain scratch techniques have based themselves around these smaller movements. Flaring and crabbing, both techniques that involve turning the sound off and on multiple times in under a second, is impossible with an old-style crossfader.

Another function of curve controls was ergonomics. Though some scratch DJs desire the infinitesimally small cut in time, some scratchers, especially the ones with large hands, want a little extra space for their movements. This is one main reason why curve controls are normally knobs instead of switches. A switch limits the scratcher’s ability to fine-tune the mixer to their technique.



Crossfader Curve Control

The curve control completely changes the traditional linear volume relationship on a slider. The scratcher's crossfader is no longer a transition control slider, it's more of a glorified three-way switch (left/middle/right). Note how curve controls are the manifestation of the extreme crossfader techniques Grandmaster Flash and Grand Wizard Theodore invented. By fattening up the middle area on the crossfader, the blending areas are pushed out of the way. All that is left are the three positions scratchers care most about: far left, far right, and middle. This isn't to say that all scratchers don't mix, and that all scratchers don't care at all about the blending positions, but a significant majority of scratching technique has focused itself on the three way switch approach to the crossfader instead of the transition control approach.

Here again is a case of users inventing techniques by taking existing features beyond their intended uses, and manufacturers accommodating these changes, creating new ways to translate these techniques into DJ mixer features. It would be easy to place agency on the manufacturers in this model, because they developed the curve control, but the true agency arguably lies with the users. The development of the curve control only came about when users developed techniques that would be made easier by it. Again, the DJs are inventing the uses, and the manufacturers are translating those uses into features.

Note, the fact that the new scratchers' crossfader is *nothing* like a transition control slider is of little consequence to the scratch community. For a scratcher, the crossfader is part of a musical instrument, and a modification that enhances it for better musical performance is a good thing, even if it diverges from the original conception of the slider.

Cheating

A feature can diverge *too* far from users' conceptions of the crossfader, though. Vestax corporation, a Tokyo-based DJ equipment company, recently crossed the cheating boundary in scratching.

Vestax is a highly respected name in the DJ world. They have made a serious effort to become part of scratching and hip hop culture. They provide mixers at tournaments, giving them a huge endorsement. Many DJs are into battling, scratching tournaments based around showing off DJ skills in a six-minute routine. The ultimate goal of many of these scratchers is to win one of these competitions. If the mixer they're going to have to use at the competition is a Vestax, then they may as well buy one for home practice as well.

Vestax has always been known for inventing unique products. They have experimented with a variety of different mixer body styles and configurations, and have even invented whole new instruments for scratchers. Their research and development department is always cooking up new designs. The Samurai series, based on a popular line of Vestax DJ mixers, was one of these new designs. The Samurai mixers were exactly the same as the existing line, except for the addition of a digital crossfader with special curve controls:

Samurai series mixers feature an amazingly precise and flexible digital crossfader. There are 4 basic crossfader curve settings available with a further 8 levels for each curve. Meaning that there are 32 digital crossfader curves available, each one as precise as the cut of a Samurai's sword.⁸

The Samurai series' crossfader was in fact very precise, and many scratchers enjoyed that feature. Some users started to take note of some of these new crossfader curve settings,

though. TurntableLab, a New York based DJ store, reported their findings after returning from NAMM, a professional audio trade show:

LAB PHOTO NOTEBOOK : CHAPTER 008: 02.10.00

The newest DJ technology unveiled at NAMM was Vestax's new curve switch which doubles and triples up your fader clicks. So a 1 click move is automatically transformed into 2 or 3 clicks. C'mon, what's next... a motorized fader?⁹



Curve Patterns 4 and 5 are the ones at issue here. A click refers to a movement where the crossfader goes from the center area to one of its ends (causing a clicking noise when it hits the end of the track). What's the big deal about a crossfader that clicks for you? To many scratchers, it's considered cheating. With one movement, this crossfader does two to three times as much work as is supposed to happen. Note TurntableLab's complaint: "C'mon, what's next... a motorized fader?" They're equating this curve control to something as extreme as a fader that literally moves for you.

What's interesting is that Vestax's digital curve control and the original curve control (mentioned earlier) are quite similar: they're both deskilling technologies that eliminate some work for the scratcher. The fact that one is considered cheating, and the other is not, is a construction of the users. For scratchers, there is a significant difference between a device that greatly reduces hand work, and a device that does hand work for you.

Certain scratches, specifically the crab and flare, are greatly enhanced by Vestax's digital curve controls. The flare is explained in a scratch tutorial:

A 3 click flare is done by pushing the record forward and brushing 3 consecutive fingers across the crossfader to create 3 quick silences, and 4 sounds in a sequence. Generally the fingers used are: pinky/ring/middle or ring/middle/pointer.¹⁰

These three clicks are performed *very* quickly; a good scratcher can do the clicks in under a half a second. Being able to pull off a successful flare or crab is quite a feat, due to the finger dexterity required. Scratchers consider the Samurai crossfader cheating because a key technique in scratching has developed around speedy clicks. By clicking for you, the Samurai bypasses the need to learn the true technique.

Scratching has evolved into a performance art form, with its own breed of DJ. Called "Turntablists," these DJs are interested in scratching for the sake of scratching; they're developing their skills to become better scratchers, not better party DJs. The combination of the performance and competitive aspects of scratching has put extra emphasis on the skills it requires. Any technology that subverts those skills is vilified.

Scratching technique is based upon presenting your skills to an audience. A scratcher that fools the audience in any way, either with a record that has scratch sounds built into it, or a mixer that does work for him, is committing a grievous mistake in the eyes of other scratchers. That scratcher is trying to get recognition for something he didn't do. He's undermining all the hard working other scratchers have put into developing the art. Using the Samurai fader is very similar to lip-synching at a concert: pretending you're doing something you're actually not, and attempting to take the credit for it.

If such a performance aspect were not attached to scratching, then the Samurai fader would encounter less resistance. DJs could argue that the digital fader simply gives the user a new way to scratch. The digital crossfader could be like the airbrush of traditional painting, a way to express artistry using new technology. The analogy stops there because painters don't fill auditoriums with people who want to watch them paint, where a scratch DJ readily gets paid to scratch in front of an audience.



**Vestax PMC-07 ProD
Samurai Series Scratch Mixer**

Painting focuses on the end result, the finished painting. Scratching does this too. Scratch artist CDs are available in music stores, but so are scratch videos that showcase the techniques involved in creating a CD. The fact that scratching is eye candy as much as it is ear candy is what prevents these deskilling technologies from taking off.

Watching a scratcher perform today is a dizzying experience, seeing hands and records fly all over the place. Viewers can rest assured that everything they're hearing has an equivalent hand motion, though. Scratching technique is based on this one-to-one relationship. Every scratch, every mixer click, and every trick has a sound associated with it. With enough patience, a novice DJ could study another DJ's scratch routine, and understand exactly what they were doing. And with the right records and a lot of time, that DJ could learn to perfectly imitate those sounds.

The Samurai series undermines this by introducing an unknown variable. With this mixer, listeners would never know if they're listening to a crabbing master, or a

novice kid on a Samurai. Even if an experienced DJ were to use the Samurai to enhance his already impressive technique, the one-to-one relationship would be destroyed. In order to learn what the DJ was doing, a viewer would have to find out what setting the mixer is at, then listen and watch closely for the automatic clicks.

It's ironic that so much controversy has stirred around the Samurai mixer, considering the techniques it undermines, the crab and the flare, already depend on a drastic change in the curve of a slider. It highlights the difference between these two types of curve controls, though. Users have accepted the original curve control as a viable scratch tool, while vilifying the Samurai Series' new curve control. The main reason why one was accepted and the other was rejected has to do with the ways in which they reduce the workload on the user. Both technologies do some work for the user, but one does it passively, while the other does it actively. Though the original crossfader curve control did a significant amount of work for the user, it still depended upon the DJ to move the crossfader. The Samurai series took on a much more active role in crossfader movement; by mimicking the clicks, it actually did the work of moving the crossfader for the user. The passive curve control stays true to the one-to-one relationship, though it does change it significantly. The active curve control makes it a two-to-one, or three-to-one relationship, and currently, that is unacceptable.

This isn't to say that the Samurai will always be considered cheating. Scratching has come to accept the standard curve control; it may come to accept this new digital curve control. As the art of scratching develops, the desire to push the envelope past the current physical limitations of clicking speed and record manipulation may eliminate the

singular hand-to-sound relationship. It will be the users who develop the craft in this direction though, not manufacturers.

Every manufacturer technology seen previously has been an attempt at translating the needs and desires of the user into a physical artifact. The need for a device that had a cueing system and that could control multiple music sources in a club was invented by Francis Grasso. The need for a crossfader that allowed constant-volume beat mixed transitions was created by Disco DJs. The need for a crossfader configuration more suited towards cutting and scratching was created by many people, including Grandmaster Flash, Grand Wizard Theodore, and the b-boys at their parties.

There never was a need for a crossfader that did multiple clicks for a DJ. The turntablist community had settled around certain practices, and this technology didn't fit in with their notions of good scratching. In this instance, the manufacturer took the initiative, and the resulting artifact was not a success. Does this mean that the manufacturers aren't allowed to invent new uses, that their job is simply to translate needs?

Steve Macatee, director of new product development at Rane, treats the development of DJ mixers in a strict problem/solution rubric. Rane operates under the assumption that, as long as they correctly identify the problems DJs are having, and solve them, they will have a successful product. Research and development at Rane focuses on innovative ways to solve problems, not on inventing new uses. In their problem/solution philosophy, Rane is embodying the idea that manufacturers merely translate the needs of the DJ.

Vestax has a somewhat different approach. They're still in the problem solving business, but they don't stop there. Vestax is very interested in giving the DJ new avenues for expressing their creativity. Part of this desire comes from Vestax's manufacturing philosophy. One of the three values Vestax abides by is:

A total commitment to MUSIC CULTURE. A total dedication to helping facilitate the growth of music culture is reflected in all areas of business at Vestax. This might be demonstrated by providing instruments that are highly innovative, or by expanding the features of a product to allow a new creative style to develop. The end result however, is that music culture benefits in a positive way, always.¹¹

Unlike Rane, Vestax isn't just responding to the scratch community, it's embedding itself into it (not only in mixer design, but in sponsorship and promotion). By taking it upon themselves to expand "the features of a product to allow a new creative style to develop," Vestax is blurring the line between the manufacturer and the user.

To say that one manufacturer is more or less successful than the other is impossible, because they have different goals in mind. Rane will always maintain the status quo, because their manufacturing philosophy is based on translating the current needs of the DJ. Rane wants to solve problems, nothing more; and they're very good at it.

Vestax has different goals in mind. They're interested in constantly pushing the boundaries of DJing. Vestax is thinking about the problems of tomorrow's DJs. If they make some mistakes along the way by developing something that doesn't quite fill a need, they don't mind, because it may be useful a few years down the line.

Vestax has become heavily invested in DJ culture, and works hard to push it along by providing unique new tools for scratchers.

Notes and Works Cited

¹⁻² Brewster, B., & Broughton, F. (1999). *Last Night a DJ Saved My Life*. New York: Grove Press.
Pg. 129

³ *Last Night a DJ Saved My Life* pg. 209. (see ¹⁻² for full citation)

⁴ *Last Night a DJ Saved My Life* pg. 214. (see ¹⁻² for full citation)

⁵⁻⁶ *Last Night a DJ Saved My Life* pg. 215. (see ¹⁻² for full citation)

⁷ The Ever: The Most Comprehensive Scratch Tutorial Ever. Available at:
<http://www.asisphonics.net/theever.html>

⁸ Vestax PMC-07 ProD Scratch Mixer information page. Available at:
<http://www.vestax.com/products/pmc07prod.htm>

⁹ TurntableLab Photo Notebook. Available at:
http://www.turntablelab.com/photo_notebook/08/0001.html

¹⁰ The Ever: The Most Comprehensive Scratch Tutorial Ever. Available at:
<http://www.asisphonics.net/theever.html>
(same as ⁷)

¹¹ Vestax Company History. Available at: <http://www.vestax.com/history/>

Scratch. Dir. Doug Pray. Perf. DJ Qbert, Rob Swift and the X-ecutioners, Steve Dee, Cut Chemist, Numark, DJ Craze, The Bullet Proof Space Travelers, and The Beat Junkies. 2001. DVD. Palm Pictures, 2002.

Collaboration

With Vestax, readers may notice how the strict user/manufacture division in this thesis starts to break down. Viewing development of DJ mixer features in terms of separate social groups does highlight some important aspects, but it hides some as well. The recursive “manufacturer creates → user responds → manufacturer creates...” approach was great for showing how various manufacturer traditions affect development, and was very helpful in showing how user interpretation once again incites manufacturer development. This approach ignores the close relationships manufacturers and users have built between each other, though.

Telling a story is a choosing what not to say as much as it’s choosing what to say. Highlighting one thing is putting another in the dark. Encapsulating parts of the DJ subculture into certain social groups was a choice, and arguably, a necessary one in order to make an analysis. That choice has obscured certain other relationships.

The truth is, users and manufacturers are not completely separate entities. Maybe in the early years, manufacturers and users kept away from each other, but today, they depend on each other. DJs have started work for manufacturers, people in companies have started to DJ, and DJs have invented new technologies on their own, selling them to manufacturers.

The “manufacturer creates → user responds...” approach does still hold in a broad sense, but the interaction is much deeper than that. Manufacturers don’t simply create an artifact and unleash it. They collaborate with DJs in making new products. There is a constant push and pull between DJs and manufacturers even before the artifact gets released. The priorities of one group don’t always mesh with the priorities of the

other. Grandmaster Flash recently developed a new mixer with Rane, and explains the development process in an interview:

I met with Rick [Rane engineer] and that was probably the closest thing to a fistfight that it could possibly get. With his genius, he'd say, "Flash, but it's not normally done this way." And I'd say, "But you must!" He'll say, "The mixer doesn't have enough room for that." And I'd say, "Well, you gotta squeeze it." He said, "What's going to be the output format?" And I told him XLR, quarter-inch, and RCA! He'd come back with, "Why don't we do two of the three," and I'd say no. You see, what if I walk into a concert hall or venue with a soundman with two jacks in his hands and he's not willing to change? It's like five minutes to 10, there's a line around the corner – something's gotta happen right now! After months went by, he began to understand. As I gave him my wish list, he'd have to keep going back to the schematic diagram and make it work. Rick was so helpful.¹

Translating the DJ's needs into an artifact isn't as easy as it looks; sometimes the DJ's problems are almost un-solvable by manufacturers.

Note that there are two translations going on here. Flash doesn't really care what plugs are on his DJ mixer, but the sound man at the venue sure does. In order to please this person, Flash takes on the needs of the sound man, and insists on having all three types of plugs on his DJ mixer.

On another level, the Rane engineers are translating Flash's needs, but doing so is much harder than he thinks. Having all three sets of plugs means extra circuitry, possibly pushing out other valuable features. A DJ who wants a simple change in his mixer usually doesn't think about the implications of that change, because he's only thinking in terms of his own interpretation of the artifact.

Looking only at Flash's wish list would give the impression that Rane was simply taking his needs, and putting them on a DJ mixer. But this view hides the constant push and pull between Flash and Rane – two giants in the DJ world – who have to work out their own interpretations of the artifact in order to create something new. This process

takes place constantly; almost every single manufacturer either has a DJ on staff, or regularly consults with DJs in product development.

The foundation of this thesis is the idea that multiple social groups worked in turning the DJ mixer into what it is today. The DJ mixer's inception and development was due to constant reinterpretation and translation of the artifact by these groups. Whether it was GLI reinterpreting the DJ mixer as a bedroom device, or Disco DJs forcing a change in the crossfader due to new mixing practices, social groups were constantly working for and against each other to apply their interpretations of the artifact onto the DJ mixer.

Viewing the history of the DJ mixer in light of these social groups gives a unique history, and it also makes room for analysis. Looking at manufacturers in terms of their underlying traditions allows one to speculate about various points in the history of the DJ mixer. One can try and figure out what a Bozak-less world would've been like, and the implications of that on the DJ mixer world. Looking at the signal processing, audiophile, and studio mixing philosophies, one can understand why Bozak didn't put certain features on his DJ mixer. One can also see the success of Rane's MP24 as directly proportional to the number of social groups it appeased.

Analysis of user interpretation of DJ mixers allows a deeper understanding of the relationship between the user and the manufacturer. Both groups needed each other to continue developing the artifact; the role of alternative user interpretation and manufacturer translation was key in furthering the DJing craft and the DJ mixer market.

Analysis of users also allows readers to see how a social group has taken DJ technique to the level of an art form, and how they work to protect it. Looking at issues of cheating shows how a manufacturer (with good intentions at heart) crossed an invisible boundary line between helpful and subversive features.

By this point, readers will hopefully have understood that artifacts like the DJ mixer have incredibly rich histories, and embody the desires of the various social groups it comes into contact with. Using themes from Science and Technology Studies gives people the freedom to look past the material artifact, and through the eyes of the true actors involved.

The story of the DJ mixer is not the story of Rosie, the Bozak, and the MP24, it's the story of sound engineers like Alex Rosner, Rudy Bozak, and Richard Long. It's the story of DJs like Francis Grasso, Kool Herc, and Grandmaster Flash. It's the story of all of the social groups involved with its invention and development.

Notes and Works Cited

¹ DJ Times Magazine. Feature interview with Grandmaster Flash. Available at: http://www.djtimes.com/issues/2003/03/_features_index_03_2003.htm