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## PRODUCTION OF AUTOMATION MUSIC PROGRAMMING TAPES AT DRAKE-CHENAULT 5/1/02

*By Hank Landsberg, Director of Engineering, Drake-Chenault Enterprises, Inc. 1974-1988.*

This part of the website will take you "behind the scenes", into the Drake-Chenault studios where all those automation music tapes were produced! About 1,000 reels per week were shipped from the Canoga Park facility.

***Photos by Kent Randles and Hank Landsberg***

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### THE EARLY DAYS



Canoga Park, CA facility

When I joined Drake-Chenault, the company occupied about 1/4 of the top floor at 8399 Topanga Canyon Blvd. in Canoga Park, CA. We had a staff of about 15 people. Bert Kleinman was GM; Lee Bailey was PD. There was a small sales staff, and clerical and accounting staff. "In the back", there was Record Librarian Val Falkenbridge, Studio Engineers Mark Ford, Mike Williams, and Kent Randles. I was hired as Director of Engineering in April of 1974.



Hallway 1973

General Manager Bert Kleinman always said that the success of any broadcast format was dependent upon "The Three C's: Control, Cohesion, and Consistency". Control and Cohesion were functions of Management and Programming. Consistency was the function of the Production Department. Any inconsistency in Drake-Chenault's programming tapes would be instantly audible to the radio audience and detrimental to the success of the station. A typical automated broadcast station could be airing tapes that

were anywhere from one week to one year old. There needed to be absolute consistency in programming, studio engineering, and tape duplication in order for the final product to sound seamless on the air. The production of music programming tapes for automated radio stations at Drake-Chenault evolved into a highly regimented process that produced a polished, consistent product week after week, month after month.



Studio A, 1974

In the Production Dept, there were 2 studios. Studio A was built c. 1973. It had a Cetec console, a couple of Ampex 440 tape machines, a Rusco turntable, and a Sony 4-track mastering recorder. Studio B was built a few years earlier; I suspect it was actually moved from D-Cs original location in Hollywood. It had a custom-built (very simple) 6-channel audio mixer, a few Ampex 440s, a Sony direct-drive turntable, and a Sony 4-track mastering recorder.



Studio B, 1974

It was pretty evident that these studios had been built with some haste, as they were less than ideal in design and equipment. The Ampex 440s had been "imported" from KYNO/KPHD in Fresno, the radio stations owned by Gene Chenault, which were often used as a "test beds" for format development. In fact, it was at this Fresno FM station in 1968 that the concept of an automated pop-music format was originally developed and refined.

Broadcast automation equipment of the 60s and 70s was usually limited to "easy listening" music formats, because the hardware of the era wasn't capable of executing a tight, fast-paced pop music format. With easy listening, it was OK if there was some silence between songs; not so with Top 40! Top-40 needed



Hank Landsberg, loads automation system



Shafer 903 in D-C lobby  
Map shows clients

tight segues, jingles, spots, time announce, weather, and other elements in rapid succession. The problem was: how to make an automation system sound tight and quick?

The answer was developed by D-C: put the end-cues ("EOM"s) on the program elements (music, jingles, etc) one second early, so the automation equipment had a "one second head start". This would compensate for the start-up delay of the reel-to-reel playback decks, and yield tight segues without any "wow-in". The next challenge was to figure out how to put those inaudible 25 Hz tones at the end of each song precisely one second early. The answer will explain why we used multitrack mastering decks in the D-C studios.

The original studios used Sony 4-track, 1/4 inch mastering decks. The master tapes were recorded at 7.5 ips. At the end of each song on the tape, a cue tone was recorded on a separate track. However, it wasn't the usual 25 Hz cue tone and it wasn't recorded one second early. It was a 1 kHz tone that was recorded in "real time", i.e., at the logical segue point for the song, not one second early. Because this tone was easily audible (through a small "cue" speaker) and it was on a separate track, it was easy for the studio engineer to place it at the proper segue point, tight against the end of the song. The cue tone could easily be re-recorded as many times as necessary until it's placement was appropriate to the song ending.

In 1974, we had 3 production engineers: Mark Ford in Studio B during the day, and Kent Randles and Mike Williams in the studios at night. At the time, there were 5 music formats available: XT-40 (Top 40) Hit Parade (A/C),



Mark Ford, 1978



Denise Cox in record library



Mike Williams, 1973

Solid Gold (A/C with oldies), Classic Gold, (oldies), and Great American Country (country). There were two "house announcers" who did all the voicing for these formats. Billy Moore did the voicing for XT-40, Hit Parade, Solid Gold, and Classic Gold formats; Bob Kingsley voiced the Great American Country format.

Once each week, Billy and Bob would come to the studio and record the voice tracks (VTs) for all the music reels that would be produced that week. The music librarian would pull the various LPs and 45s that were needed for each reel to be produced. The studio engineers would then mix the music from records with the VT tape to produce a finished master reel. The masters were recorded using 1-mil tape, so we could get up to 90 minutes of material on a reel.

### **QUALITY CONTROL**

Drake-Chenault's standards for technical quality were absolute, and our studio engineers were perfectionists! We carefully watched levels, double-checked cue tone placement, fixed fades, and manually edited out tics and pops! The studio staff would spend hours with a razor blade removing tics, pops, and other noises that were common on vinyl records. This was no easy task, as our masters were recorded at 7.5 ips. A typical record "tic" would occupy maybe 1/16 of an inch of tape! Songs that needed "major surgery" to correct technical faults were first dubbed to a "cut-down" reel. LP tracks were often used (after editing, to match the 45 "hit" version) because the quality of LP vinyl was usually superior to the poly-plastic used to press 45 rpm singles. The most frequent question asked by our clients was "How do you get record companies to send you those



master tape dubs?" We didn't. We used records like everyone else, but we went to extremes to make them sound like master tapes.



Master tape QC sheet

To ensure technical consistency, a full set of Level, EQ, and head alignment tones were recorded at the head and tail of each master tape. We went to great lengths to be sure that there was no phase error in the audio, which would cause a degraded signal when a stereo station was heard on a mono receiver. All audio was checked using a vectorscope to ascertain mono-compatibility. We would very often discover phase error in 45s and LPs; it was corrected before transferring the audio to a master tape. The turntables were equipped with Shure V15 cartridges and Marantz "audiophile" preamps. The audio path was clean and direct, without any "house EQ" or level compression. Voice tracks were recorded using Shure SM7 microphones.

Until 1976, Drake-Chenault used Superscope Inc. in Sun Valley, CA. to produce the tape copies that were shipped to client radio stations. Once a master tape was finished and QC-passed, it was ready to be converted to a conventional 2-track duplicating "sub-master" that would be used by Superscope's high-speed duplicating system.



Sub-master dupe system,  
1974

To create the sub-master, the music tracks of the 4-track studio master were simply dubbed to a 2-track recorder. This duplication process operated "tails-out", so the music was playing backwards during the duplication process. The master's cue track was fed to a circuit that sensed the 1 kHz cue tones. When a cue tone was detected, it triggered a 25 Hz tone, which was mixed into the left channel audio.

However, when the 1 kHz cue ended, the 25 Hz tone generator stayed on for one second, thus "stretching" the length of the 1 kHz cue that was on the master tape. Because the system was operating tails-out, the "one-second stretch" made the 25 Hz tone start one second before the 1 kHz cue tone on the master. This one-second advance was electronically controlled, hence it was exact and consistent. That's how we got the 25 Hz tones exactly one second before the logical EOM point at the end of each song!

Our attention to the most minor detail is what made the product what it was. Here's an example: most "quarter-inch" tape is actually slit to a width of between .245" and .248". We discovered that we could minimize the azimuth error in our duplicating masters (and duplicated copies) by using tape stock that was slit at the "wide" end of this range. I used a machinist's micrometer to measure the width of various batches of tape, and selected only those reels that were slit to .2475" to produce the submasters that were sent to Superscope. It worked.

The 2<sup>nd</sup> generation duplicating sub-masters were high-speed duplicated at Superscope. All of the Level, EQ, and head alignment tones were duplicated onto the copies, and were QC-checked before any tape was shipped. We got the best quality that Superscope could provide. Frequency response was within 3db to 10 kHz; phase was within 90 degrees to 10 kHz, a very tight spec, all things considered. The Superscope high-speed copies were 3<sup>rd</sup> generation dubs.

In 1974, we had about 100 client stations, and we shipped about 200 reels of tape each week. Over the next few years, D-C's client

list began to grow. We hastily added two more studios to accommodate the increase in clients and to handle new music formats that were being developed.



Ernie Sheesley loads 1st  
Dupe system, 1977

In 1976, it was determined that we could duplicate our tapes in-house, using a real-time duplicating system. The tape copies would sound better, be 2nd generation dubs, and cost less than the Superscope tapes. I built the first duplicating system using 9 Crown model SX-722 2-track recorders. The system actually operated at double-speed (15 ips), so we could produce 9 copies in about 50 minutes. Terry Tretta was hired as the first duplicating engineer. As our need to produce more copies grew, the system was expanded. Eventually, the 9 Crown decks were replaced with 24 Technics model RS-1500 recorders.



New Dupe system, master  
control, scope

The duplicating system produced copies that were flat to 15 kHz, and typically had less than 30 degrees of phase error at 10 kHz. To achieve this level of quality, each "slave" recorder was hand-aligned to each new "pancake" of tape before the duplication process was started. The duplicating engineer would start the system, and feed a 20 kHz tone into all the slave recorders. Each deck's playback output was monitored on a vectorscope. The duplicating engineer would align the record head of each recorder for zero phase error. Then the master tape would be started and the duplication process would begin. The 25 Hz automation EOM tones were injected during the duplication process, with the "one-second advance" electronically controlled.



QC deck, phase scope

After duplication, each tape copy's alignment tones were checked on a special "QC" deck. We again verified level, stereo balance, EQ,

and phase (head alignment) before the tape was shipped.



Dan Musselman loads new  
Dupe system, 1978

### **THINGS GET BUSY...**

By the late 70's, Drake-Chenault was on a winning streak! We had about 300 client stations, with all of them producing top ratings in their markets. D-C employed nearly 50 people, and we had taken over the entire top floor of our building. Our 4 studios were in use 2 and sometimes 3 shifts per day; the tape duplication system was running 'round the clock. We were shipping over 1,000 reels of tape each week! The original studios were really showing their age; even the newer studios, built quickly out of necessity, were less than reliable. It was time to get serious about our audio plant.

In 1978, I proposed to General Manager Jim Kefford that we completely build 5 new studios from the ground-up. We could no longer rely on Sony tape decks, Radio Shack amplifiers, and similar gear that was never intended for heavy-duty studio use. My proposal included 24 MCI tape recorders, 10 Technics turntables, lots of peripheral gear, and 5 custom audio consoles that would be designed and build by myself. My proposal was approved.

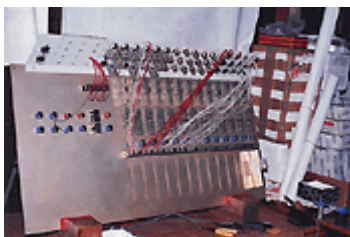


Machining console panels

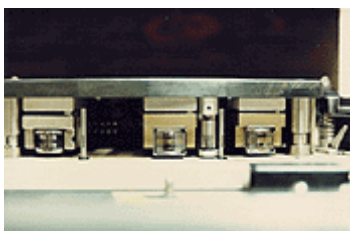
### **THE BIG PROJECT**

Drake-Chenault's studio operations were similar to those of a radio station, but we were also similar in operation to a recording studio. We were both, yet neither. When it came time to specify an audio mixing console for the new studios, neither a "radio board" nor a "recording board" was a good fit. So I designed a console that would be just what we needed: a console that incorporated some features of a "radio board" (Cue speaker,





Wiring the console



Custom 3-track heads



3-track master deck



Custom audio console



Turntable bay

Program and Audition stereo mix buses) and features usually found only on a "recording board" (Monitor Solo, Effects bus, Booth Cue bus). Designing and building the consoles was the first phase in our total studio rebuild. The project began in the fall of 1978.

One goal of the new studios was to convert from the old quarter-track masters to a new 2-track format that would be both (a) compatible with conventional professional 2-track equipment but also (b) provide a means for recording the 1 kHz cue tone on a separate track, as we had done in the past with the Sony 4-track decks. I consulted with Nortronics, and we custom designed special 3-track heads for the new MCI mastering recorders. These 3-track heads had the usual two audio tracks, plus a narrow (10-mil) "cue track" in the center "guard band" that separated the two audio tracks. Each studio would have two MCI mastering recorders equipped with these special 3-track heads.

Construction of the new studios began in early 1979. The audio consoles were completed early that year. The first new studio, Studio B, went on line in May of 1979. Four other studios were quickly built thereafter. By 1981, we had 5 new studios in operation.

Each studio had 4 (or 5) MCI recorders, and a pair of Technics SP10 turntables with Stax UA7CF carbon fiber tonearms fitted with Shure V15 cartridges. Each turntable electronic system consisted of a Kenwood L07C audiophile preamp, Burwen TNE7000A and DNF1201A "tic & pop" and dynamic noise filters, Urei 530 graphic EQ, and an LFX "low frequency crossover". The LFX was used to cancel out-of-phase low-frequency audio



New studio overview

(floor vibration) without reducing the bass content of the turntable audio signal.

One unique feature of the studios was the "Deadroll Automation" system. On all D-C tapes, there was to be exactly 3 seconds of blank tape between the end of a 25 Hz EOM cue tone and the beginning of the next song on the tape. Again, this 3-second accuracy was the key to tight and consistent on-air segues. We maintained consistent accuracy by automating the timing process. The studio engineer would cue the song on the turntable a fixed distance before audio. Then he'd start the master deck playing the last few seconds of the previous song. The Deadroll Automation system would sense the 1 kHz cue tone at the end of the song. At the end of the cue tone, the MCI recorder would automatically go in Record mode. A timing circuit would start the turntable, mute the audio until it reached stable playing speed, then un-mute exactly 3 seconds after the end of the cue tone for the previous song. A digital "Deadroll Timer" on the console would measure the deadroll "on the fly" in one-tenth second increments to verify 3.0 seconds of blank tape between songs on the reel. The Deadroll Automation system was another one of our secrets of consistency!



Dave Kephart, Studio E

In the 1980s, Drake-Chenault increased production of "Special Feature" programming, in addition to the usual automation programming tapes. It began with the 1979 production of The History Of Rock And Roll, a 50-hour blockbuster documentary expertly engineered by Mark Ford, Dave Kephart, and Bill Mouzis. All 5 studios were very busy, operating 2 or 3 shifts per day. It truly was a "radio programming factory". There were numerous music formats offered for


 HitParade


 CLASSIC  
GOLD


 SOLID GOLD


 GREAT  
AMERICAN  
COUNTRY


 SUPERSOUL

automation clients. Most music formats were available in 4 "flavors": stereo or mono with announce, and stereo or mono without announce. We received huge shipments of tape, reels, and boxes each week, nearly destroying the old hydraulic elevator with heavy pallets of these supplies. And each week, without fail, about 1,000 ten-inch reels of tape would be shipped from our facility. In my 15 years at Drake-Chenault, we never missed a shipment. The place ran like a finely tuned watch.

## AUTOMATION FORMATS

The first music format developed by Drake-Chenault for automated radio was HitParade, an MOR format that debuted on Gene Chenault's FM "test" station in the late 60's. Once proven, it was the first format to be syndicated for automation. HitParade was joined by Classic Gold, an oldies format, then Solid Gold, a format that combined the musical genres of HitParade and Classic Gold into "MOR with oldies". XT-40, a top-40 format was added. XT-40 and the other pop-music formats were originally voiced by Billy Moore. As country music's popularity grew in the early 70's the Great American Country format, voiced by Bob Kingsley, was developed. SuperSoul was created to satisfy the demand for an "urban" format; it was voiced by Walt "Baby" Love. The final format offered by Drake-Chenault was Beautiful Music Plus, an easy-listening format that was programmed by Frank Proctor.

In 1976, Art Astor became Drake-Chenault's General Manager. He re-named the HitParade and Solid Gold formats to "Contempo 200" and "Contempo 300". It was rumored that the inspiration for these new names came from "Contempo Waterbeds", a

cheesy retail store that was visible from Art's office window!

Most Drake-Chenault music formats were designed to run on an automation system that had 4 reel decks. There were usually 4 categories of music reels: Currents, Recurrents, and 2 types of "basic library" reels. Each reel category had its own sequence of reel numbers. Currents were "2"s, Recurrents were "3"s; the basic library reels were either "1"s or "4"s. Reels were available in stereo or mono.

Current reels included the current hits of the week, and were produced and shipped weekly. Currents were produced in 3 versions: Hard, Medium, and Soft. The Hard current had mostly Top-40 up-tempo tracks, the Medium current was slightly less intense (for A/C formats), and the Soft current was suited to "soft A/C" formats or for quieter dayparts. Current reels were available in either "announced" or "no-announce" versions. The station could either use the "stock" D-C voicing or use their own DJs, as was common with a live-assist operation. Current reels were numbered according to the week of the year, eg, 2/34M would be the Medium tempo Current reel for the 34th week of the year.

Recurrent reels included hits that had been on previous Current reels, and that had been proven to have long-term listener appeal. Recurrents were also available in 3 tempos, but were available only as no-announce reels, since the songs were very familiar (if a few months old) and didn't need announcing. Recurrents were numbered the same as Currents, but were produced and shipped every other week: reel 3/26M would



be the Medium tempo Recurrent for the 26th week of the year.



Terry Tretta, 1977



Mike Williams, 1978



Announce booth



The "basic library" reels were the "cream of the crop" tracks that were appropriate for each music format. There wasn't much difference between the 100-series and 400-series reels, although the 400's often contained more recent music than the 100s. Most basic library reels were announced. There would typically be 15 to 20 reels in each category, for a total of 30 to 40 basic library reels for each format. Since each reel held about 18 songs, a typical format would have about 600 songs in rotation, not including Currents and Recurrents. Basic library reels were produced and replaced about once per year as part of the format service.

In addition to automation format tapes and Special Feature programs, Drake Chenault also produced custom jingle packages, image music, time-announce carts, and the other elements needed to produce a polished, professional air sound using automated broadcast equipment.

Jingles were produced by an outside "jingle house"; various suppliers were used over the years. Generic jingles would be recorded (without call letter "sings") so that these a capella tracks could be added and mixed for each station's call letters and city.

Time announce carts allowed an automated station to announce the current time of day, accurate to within 30 seconds. Two cart playback decks were required: one for the even minutes and a second deck for the odd minutes. The "Even" cart had all 360 even minute announcements for a 12-hour day: ***It's 12:00, It's 12:02, It's 12:04...etc, up to It's***

## Moving day



Last load of gear leaves  
Canoga Park

**11:58.** The "Odd" cart had another 360 announcements for the odd minutes of a 12-hour day: ***It's 12:01, It's 12:03...***etc, up to ***It's 11:59.*** Drake-Chenault offered custom time announce carts, recorded with station call letters, eg, ***It's 12:04 at WRAL, Raleigh.*** Of course, this meant that all 720 time announcements had to be recorded for each station! Recording time announce carts was dreaded by all of D-C's house announcers, as well as the person who had to engineer the session. Usually, this was me!

The Programming Consultants at D-C required client stations to periodically submit an aircheck, which would be critiqued by the programming staff. The D-C Programming Consultants would offer suggestions on how to make the station competitive and sound it's best. It must have worked; nearly all DC-programmed stations were rewarded with high ratings.

The cost for Drake-Chenault to supply a radio station with music and programming service was dependent upon the rank of the station's market and the potential audience size. A small-market station might pay \$1,000 per month, while a larger market station could pay many times that amount.

## THE END OF AN ERA

In 1986, the company was sold to "Wagontrain Enterprises"; it re-located to Albuquerque, NM in the summer of 1987. The 5 studios and tape duplicating system were dismantled, moved, and re-assembled at their new home in Albuquerque. Some key studio personnel moved to NM, but many (including myself) did not. In the mid-1980s, compact discs and satellite-delivered formats were beginning to replace reels of tape for music broadcasting. Because of the high cost of

converting the CDs, Wagontrain/Drake-Chenault didn't join the trend. Instead, they added a satellite format division by partnering with Jones-Intercable. D-C provided the programming; Jones-Intercable provided the satellite uplink facilities and satellite time. As time went by, D-Cs reel-to-reel programming clients began to diminish in numbers, even after D-C purchased the tape clients of TM Programming. Eventually all of the tape clients were purchased from D-C by Broadcast Programming Inc. in Seattle, WA. The satellite programming clients remained, but they were eventually purchased by Jones, and the "original" Drake-Chenault organization pretty much disappeared.

Overall, Drake-Chenault was a fun place to work. For a Director of Engineering (me), it was all the "fun" aspects of working at a radio station, with none of the headaches (FCC, transmitters, calls at 3 am). There were no inflated egos, and everyone seemed to get along well. To this day, I stay in contact with many of the friends I made at D-C. I'm always interested in hearing from other former Drake-Chenault employees! Write to me at: [henryeng@aol.com](mailto:henryeng@aol.com).