

History of The Early Days of Ampex Corporation

As recalled by

JOHN LESLIE and ROSS SNYDER

Alexander M. Poniatoff founded Ampex in 1944, primarily to manufacture small motors and generators for military applications. When WWII ended, the military contracts dropped off, and Alex had to search for a new line of business to continue his company's existence. He and his small group of engineers heard a demonstration of a Magnetophon, a German magnetic tape recorder used by Hitler during WWII. The demonstration quickly convinced Alex to redirect his company and soon it was designing and manufacturing professional-quality magnetic tape recorders. Bing Crosby was a great help in Ampex's early years. The company grew quickly and, within a short time, dominated the magnetic tape recorder market in radio, television, the record industry, and industrial and military markets for instrumentation recorders

0 INTRODUCTION

It has been amazing how many people today are asking questions about Ampex and the Company's contribution to the music recording industry, the radio and television broadcast industry and the stereophonic home entertainment field. There is no question that Ampex was a major factor in each of these areas, but that was some 50 years ago.

The Company was founded in 1944 and had established an outstanding reputation as a producer of high-performance, magnetic tape recorders by 1950. Today, only four of the original engineers are still alive: Frank Lennert, John Leslie, Walter Selsted and Myron Stolaroff. The four of us know that 50 or more years ago, we made a contribution to the world, but as we look back today, we see ourselves as having been in the "Model T Ford" days of electronics. Another key person, during the early days, was Ross Snyder. He joined Ampex in 1952, and quickly made contributions as product manager of audio, theatre, and video products. We (John Leslie and Ross Snyder) with much help from our colleagues, will recall here the people and the events of Ampex's early years.

1 ALEXANDER M. PONIATOFF—THE COMPANY FOUNDER

Any serious discussion of Ampex must bring Alexander M. Poniatoff into the picture. He was the founder of the Company and a major stabilizing force through both the good times and the not-so-good times of the early years. He was an excellent listener, and as an engineer, was always looking for something new on the forefront of technology. He was a role model for the rest of us; we not only respected him as the President of the company, but we liked him and enjoyed working with him as well.

Alex was born in Russia in 1892. His father was well-to-do, and sent Alex to Germany for an education in engineering. After college, he returned to Russia only to see his country become engaged in a civil war. Alex escaped to China, where he went to work for the Shanghai Power Company. He immigrated to the United States in 1927 where he worked for General Electric, Pacific Gas & Electric, and the Dalmo Victor Corporation in San Carlos, California.

1.1 Manufacturer of Small Motors and Generators

Alex was an expert on electric motors and generators, and helped Dalmo Victor develop a product line of small motors and generators for use primarily by our military during World War II. Alex and company president Tim Moseley thought it best to set up a small operation outside of the mainstream of Dalmo Victor to manufacture these motors and generators. In 1944, Alex and Tim established Ampex Electric and Manufacturing Company. "AMP" are the initials of Alexander M. Poniatoff, and he liked to say that "the EX was for excellence." They split the ownership so each owned 50 percent. The new company moved to 1155 Howard Ave., San Carlos, CA—about a block from Dalmo Victor. In 1946 they shortened the name to Ampex Electric Corporation, and in 1953, the name was shortened still further to Ampex Corporation.

The little company did quite well, but as World War II came to an end, so did the bulk of the military contracts. Alex knew he had to develop some new motors in a hurry to keep his company alive. He turned to nearby Stanford University for help and was able to obtain, as a consultant, a professor with expertise in motor and generator design. It soon became apparent that Ampex needed a full-time motor specialist, so he asked the professor if he thought any of his graduate students

were both outstanding in motor design and possibly available to be hired.

Alex was very lucky! The professor recommended Myron Stolaroff, who was born in 1920 and had received a Master's degree in electrical engineering in 1942. At that time, Myron was working for the US Navy's Bureau of Ships in Washington, DC. With the war ending, Myron was eager to return to California, and as luck would have it, he had contacted his old professor friend to ask for suggestions about where he might find employment.

Alex telephoned Myron, and he was hired on the spot. This was 1946. Myron thinks he was the only person ever hired by Ampex without a face-to-face interview. Myron made major contributions to the motor business and became a key advisor to Alex in helping point the company in a new direction.

1.2 The Search For a New Business Opportunity

With the war over, Alex and Myron both anticipated that the key motor-manufacturing companies would likely get into the business of producing small motors and generators—which had been Ampex's specialty—and there was no way that little Ampex would be able to compete. Ampex had to look for a new business opportunity. This is the time when Harold Lindsay entered the picture.

Back when Alex was still at Dalmo Victor, one of his neighbors was Charlie Litton, owner of Litton Industries, then a manufacturer of vacuum tubes and other electronics. Sadly, one night the Litton building caught fire and burned to the ground. Afterward, Alex talked to Charlie and said, "If you have any good engineers who will be looking for a job, have them apply at Dalmo Victor". Harold Lindsay did and was hired.

Harold was born in 1909 and was an excellent mechanical engineer. He had worked for both Shell Development Corporation and the Radiation Laboratory of the University of California (now the Lawrence Berkeley National Laboratory) prior to joining Litton Industries. His personal interests were in high-quality sound systems, including phonograph pickups, turntables, amplifiers, and loudspeakers. Harold was an absolute perfectionist in everything he did. Alex and Harold became very good friends. Early in 1946, Alex and Myron thought Harold would be an excellent person to join them in thinking of new product areas to consider. Harold—although still working for Dalmo Victor—was happy to help his friends.

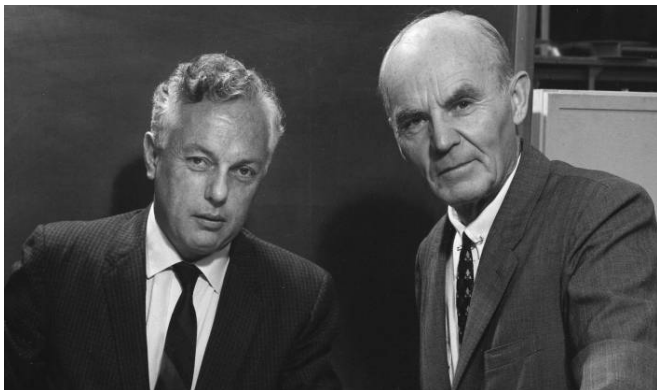


Fig. 1. Harold Lindsay and Alexander Poniatoff.

One of Harold's hobbies was to set up his sound system at Tilden Park in Berkeley and play records of classical music. Harold's system had a transcription turntable and dynamic phonograph pickup, which were the same as those used by the best broadcast stations of the era. He had power amplifiers with extremely low distortion and coupled them to Altec Lansing Iconic loudspeakers, which at the time were widely considered to be the best money could buy. It was truly a treat to hear music played over his system, and his Tilden Park concerts attracted huge crowds.

Walter Selsted also became very active at Ampex. John Leslie first met Walt in 1935, when they were both 14 years old. Both had an interest in radios, amplifiers and loudspeakers, which became the starting point of their lifelong friendship. Walt graduated from the University of California, Berkeley with a degree in electrical engineering in 1944 and worked for the Radiation Laboratory at UC for the rest of the war years. Walt and Harold Lindsay became good friends during their time together at the Radiation Laboratory. At the end of the war, Walt became chief engineer of a new company, Pacifica, which was attempting to open an FM station in the San Francisco Bay Area. Walt designed and supervised the construction of FM station KSFH, one of the first five FM stations built in the Bay Area. Walt was assisted in this work by another friend, Frank Lennert.

Harold Lindsay introduced Walt to Alex Poniatoff, and Alex asked Walt to become part of his brain-storming group—along with Myron and Harold—to explore new product areas. The group seriously considered products for the high-end consumer high fidelity sound system market. John Leslie was not a member of the group, but did visit with them and met Alex, Myron, and Harold in the process. Harold pushed very hard for Ampex to go into the high-end consumer market because of his love for such products. Soon though, thoughts of going into that market were scrapped.

1.3 Magnetophon Demonstration

On May 16, 1946, Jack Mullin, an associate of Palmer Films in San Francisco, gave a demonstration of one of two German Magnetophons that he had brought back from Germany. His presentation was made at meeting of the Institute of Radio Engineers (IRE, now the IEEE) meeting in San Francisco. Harold Lindsay, Walt Selsted, Frank Lennert and John Leslie were all in attendance. (Alex and Myron were not able to make it). Along with everyone else in the audience, we were overwhelmed by the wonderful sound quality.

During WWII, Jack Mullin was a major with the US Army Signal Corps and was stationed in England. He often heard classical music on Germany radio that sounded as if it were being performed live for broadcast. He couldn't believe that all of what he was hearing could be live, and questioned what was really happening.

After the war, the Signal Corps asked Jack, who was then stationed in Paris, to go to Germany and explore their electronic activities. Jack, an electrical engineering graduate from Santa Clara University, welcomed the chance. Once in Germany, he and a colleague found magnetic tape recorders and tape that were used by the Germans for the "live" broadcasts. The mystery was solved! (It has also long been rumored that the Magnetophon was used by Hitler to record

performances, including his speeches, and then broadcast them under the pretense that they were “live.”)

Jack received permission to take two recorders (there were many) and ample rolls of tape home for his own use. He disassembled the mechanical parts, including the motors, heads, and so on, and boxed them for shipment to San Francisco. He also included instruction manuals and schematic diagrams so he could duplicate the electronics back in California using American components.

A day or two after Jack’s Magnetophon demonstration, Walt took Alex Poniatoff to Frank Lennert’s home to show him a record player that Frank had built. (Frank was born in 1924. He had been interested in electronics since his early high school days.) He designed and built his own recording equipment so he could record programs off the air. After he received a degree in electrical engineering from University of California in 1947, he went to work at a recording studio. He also worked with Walt at KSFH.

Alex was interested not only in Frank’s record player but also in Frank’s overall abilities. Walt and Frank spent much of that evening telling Alex about the Magnetophon demonstration. Alex was intrigued and called Jack Mullin, who was going to give another presentation in Los Angeles. Alex went to hear it and was very impressed.

A few days later, Alex, Harold, and Myron went to Palmer Films for a private showing. Jack told us, sometime later, that Harold wondered if the great sound wasn’t because of the speakers. It was only after they found out that the German speakers were rather ordinary that they were able to come to the consensus that the Magnetophon was indeed the outstanding component in the chain! Then it didn’t take long for the group to decide that Ampex would be going into the tape recorder business.

Jack Mullin felt obligated to help anyone who could use his knowledge of the Magnetophon because his work in bringing it out of Germany was performed at the taxpayer’s expense. Jack never received any financial compensation from Ampex for his help. He became a very good friend and eventually became chief engineer of Bing Crosby Enterprises—a company that later became a sales representative for Ampex.

1.4 Ampex Going to Manufacture Magnetic Tape Recorders

Once the decision was made to go into the magnetic tape recorder business, a number of months went by as Alex, Myron, and Harold established a plan to make it happen. Harold was convinced that if he could be successful in making a playback head (he thought it would be more difficult than the record head), he could design the rest of the tape transport. In early fall, Alex hired Harold on a full-time basis to start the head development. By December, 1946, Harold had constructed a playback head that could be interchanged with the one on the Magnetophon. He took it to Palmer Films. They first played a recording using the German head, and again with Harold’s playback head. Everyone cheered—Harold’s sounded better!

1.5 Design Of The Ampex Model 200A Begins

Now that Alex, Harold, and Myron knew that they could produce the playback head, they began in earnest to design and build the rest of the machine. Harold was responsible for the mechanics and Myron the electrical and electronic parts. They had a couple of technicians on hand to assist, but it really was a two-man development. Harold and Myron both realized that they needed to produce a machine that was superior to the Magnetophon. (Several run-of-the-mill tape recorders that used magnetic oxide-coated paper tape were already on the market, such as the Brush BK-401. These recorders had already given magnetic tape a poor reputation among professional users.)

Harold and Myron worked 12 to 14 hours per day for a period of over a year to reach their goal. Harold concentrated on the heads, capstan and other mechanical details. Myron used his motor expertise, and collaborated with motor manufacturers (who, at the beginning, were reluctant to participate) to develop reel motors and capstan motor that were close to flutter-free when moving the tape. Myron also developed the electronics even though it wasn’t his specialty. Jack Mullin proved to be a great help, making available the circuitry of the Magnetophon and offering suggestions for improvements to that circuitry.



Fig. 2. Magnetophon demonstration, 1946 May 16. Jack Mullin is third from left.

Harold's and Myron's progress was rapid, and by October 1, 1947, they had a prototype that resembled the eventual Ampex Model 200A. It worked very well when playing back Magnetophon recorded tapes but it had a problem making its own recordings.

Despite that minor setback, Jack Mullin encouraged them to take the prototype to Los Angeles and set it up in Bing Crosby's studio at the American Broadcasting Company (ABC) at Sunset and Vine in Hollywood. Jack thought it would be a perfect time to demonstrate the Ampex machine to Bing and his associates because this was the first night of the 1947—1948 Season, and Jack could play back a portion of the first night's recording prior to air time. The recording had been made on one of the two Magnetophons that Jack was using to record Bing's radio shows. Jack played it on the Model 200A prototype and everyone was very impressed. Fortunately, no one asked Jack to record anything.

Bing Crosby knew that it was imperative for him to have his shows recorded in such a way that no one would be able to tell that his show wasn't live. Jack Mullin had made it clear that his two Magnetophons were mighty tired and difficult to keep working properly. The Ampex 200A was the answer to Bing's dream. In those days, Bing had to do two "live" shows, one for the Eastern time-zone and the second, three hours later, for the Pacific time-zone. Bing, being a rather laid-back individual, knew he had difficulty enough getting through one show error-free, so repeating it three hours later would be next to impossible. Obviously, being able to record and edit was a necessity.

1.6 Bing Crosby Places an Order For Ampex Recorders

Crosby placed an order for 20 recorders at \$4,000 each with a 60 percent down payment; he wanted them as soon as he could get them. In this way, Bing helped finance Ampex's first production-run of 20 recorders. When ABC learned how well the Ampex 200A performed and how reliable the recorders were, they were eager to purchase units for use in similar coast-to-coast time delay of other broadcasts. Bing helped them by selling many of his 20 recorders to ABC.

Harold and Myron still had a lot of work to do to get the Model 200A into production. Myron was quite pleased with the electronics he had designed. The schematics of the Magnetophon and other information provided by Jack Mullin were especially helpful, as was the work Jack had done to improve the Magnetophon's record/playback electronics.



Fig. 3. Harold Lindsay with Model 200A in the lab.

Harold was able to solve the record problem mentioned earlier, by seeking help from Walt Selsted.

1.7 Change in Ownership Helps Finance Future Growth

In 1948, Tim Moseley decided that he wanted to sell his half of Ampex. He sold to Joseph and Henry McMicking and their Ayala Associates. This arrangement was a good move for Ampex because the McMickings were venture capitalists, had connections to other sources of funding, and were able to take the company public when the time was right. They helped provide the necessary capital to meet the company's expanding needs, as well as experienced management personnel that helped steer the company toward future growth.

In early 1948, Ampex was ready to start production. They had only a half dozen people in the plant, so were greatly concerned as to how they would make it happen. They didn't even have enough technicians in their employ to assemble and test the electronics that Myron Stolaroff had designed. They sub-contracted the electronics to a small company in Lafayette, California, about 40 miles from San Carlos. That company was Pedersen Electronics which was owned and operated by Rudy Pedersen; he and John Leslie were classmates at UC Berkeley. At the time, both of them were only a year away from receiving their electrical engineering degrees. Rudy and John teamed up to assemble and test the electronics for the Model 200A (and later, for the Model 201).

Alex then asked Frank Lennert for his help, and Frank joined Ampex in early 1948. He was the company's first electrical engineer with an electronics background. Frank helped greatly in checking out the machines. He also worked closely with 3M to evaluate new batches of tape that they were developing for use in the exciting new field of professional magnetic tape recording. By the time Frank checked out the first production 200A, he was using 3M's new RR tape which was better than the tape Jack Mullin had brought back from Germany. Frank also relieved Myron of some of his electronic responsibilities, so that Myron could begin concentrating on both sales of the Model 200A and planning for products beyond the 200A.

1.8 Model 200A Shipments Begin

Ampex delivered the first production Model 200A in April, 1948, to Jack Mullin; the second recorder followed a few days later. Jack used serial numbers 1 and 2 for recording the Bing Crosby Show. Many of the rest of the first production run of 20 went to ABC in Chicago where they were used mainly for broadcast time delay. This was a revolutionary change for the



Fig. 4. Model 200A.

broadcast industry, because they now could replace their disk lathes with Ampex recorders that provided much better sound quality, were easier to operate, and used a recording medium (magnetic tape) that could be erased and reused many times.

It is interesting that Ampex put Serial Numbers 13 and 14 into portable cases (movable would be a better word; they were large and heavy) and shipped them to Bing Crosby Enterprises. Jack Mullin had now become chief engineer there, and he proceeded to cannibalize one of them and modify it to work as a transport for a video recorder he was developing. It was an interesting experiment although it was a failure, and the idea was abandoned. Serial Numbers 13 and 14 became historical units as they were the only two “portable” Model 200A recorders ever made!

Although everyone seems to talk about the “Model 200”, each recorder shipped was a Model 200A. This recorder used 14 inch open flanges (See Fig. 4), 1/4-inch tape with oxide facing outward, and ran at 30 ips. Frank tried operating the recorder at 15 ips, with a suitable change in equalization, but felt the results were not of professional quality, mainly due to the limitations of 3M RR tape. 15 ips remained impractical until about a year later when 3M introduced its 111 tape. (There is some confusion in the industry about 3M RR tape and 3M 112 tape. RR was the designation of an experimental batch of magnetic tape. 3M later listed it as 112 so the latter tape actually preceded the introduction of 3M’s much improved 111.)

2 INTRODUCTION OF MORE PRODUCTS

Myron, wearing his sales hat, thought Ampex should take advantage of the knowledge they had gained with the Model 200A and have the second product be a less-expensive recorder that would have a target sales price of \$1,500.

2.1 Models 300 And 301

Harold and Frank went to work on this new product—what would become the Model 300—when they could find time. Harold was building heads for a 200A in the morning and Frank was checking out the recorder in the afternoon—and shipping it that evening.

For the Model 300, Harold did the mechanical part and Frank did all of the electronics, including the record/playback electronics.



Fig. 5. Model 300.

It used 10.5 inch reels, 1/4-inch tape facing inward, and was a two-speed machine switchable to either 7.5 or 15 ips.

Harold designed a new head that, when compared to the one for the 200A, was less expensive, performed better and was more uniform from head to head. The new head made tapes more easily interchangeable from machine to machine than was possible between 200A recorders. The first production Model 300 was shipped in late spring, 1949. A 15/30 ips version, the Model 301, was introduced shortly after that. The 300 transport became the platform for many versions of both audio and instrumentation recorders. Overall about 20,000 of these transports were produced.

Tapes were not interchangeable between the 200A and the 301 due to several factors. First, the tape on the 200A had the oxide facing outward, whereas on the 301 it faced inward. Second, the record equalization was different, and the 301 was designed to use 3M 111 (again, the 200A used the 3M RR/112 tape). It became embarrassing that the Model 301 had better frequency response, lower noise, and lower flutter than the 200A. Sales of the Models 300 and 301 quickly outstripped those of the 200A, which was soon phased out; in the end, a total of 112 Model 200A recorders were manufactured and shipped.

2.2 Model 201—An Upgrade for the 200A

Frank became concerned about all those 200A recorders that were being used in the field, now that the 301 was available. He decided to make a conversion kit for the Model 200A that would solve these problems—at least to a great degree. This different configuration became known as the Model 201. The kit consisted of a 301 head assembly, new electronics that had circuitry similar to Models 300 and 301 and that would plug into the same slots as the original in the 200A cabinet, and finally, a two-speed motor conversion for 15 ips or 30 ips—the same as the Model 301. The 201 then required the use of 3M 111 magnetic tape—again, the same as the Model 301. Frank also included a provision for equalizing for RR/112 tape if required.

By early 1949, the financial situation for Ampex had improved considerably as a result of shipments of the Model 200A and Model 201 conversion kits. Alex was now able to do something he had wanted to do for some time: hire Walter Selsted.



Fig. 6. Models 201 and 300 in use at Capitol Records.

As Walt tells the story, after joining Ampex, Alex Poniatoff virtually locked Harold and Walt into a room and said “Don’t come out until you have solved the flutter problem on the Model 300.” They not only solved the 300 problem but also found a way to reduce the flutter greatly on the Model 200A’s that had already been shipped. The latter required a field retrofit kit.

2.3 Instrumentation Recorders

Shortly after the Model 301 was released, Myron received an order for a special 301 that was to be used for recording telemetry data where the power level was constant across a 30 to 15,000 Hz bandwidth. The special 301 also had to record seven separate channels of this data simultaneously. Walt Selsted found that the concept Harold Lindsay had used for his most recent head design for the 300 and 301 could also be applied to the development of a head assembly that could record and playback seven tracks on a 1/2-inch wide magnetic tape. Walt also learned that the 301 tape transport could be modified to work perfectly with 1/2-inch tape.

The standard 301 electronics were designed for audio recording, where high frequencies are preemphasized during recording and equalized in playback to provide a flat frequency response with reduced audible noise. (This is practical because the power level of high frequencies is much lower than the power level of mid and lower frequencies.) Walt modified the transport for 1/2-inch tape, put on a 7 track head assembly, removed the preemphasis in record (for instrumentation applications, the power level is often constant across the frequency spectrum) and re-equalized the playback for flat frequency response on all seven record/playback electronic assemblies.

The recorder was shipped in late 1949, and was both Ampex’s first multi-channel recorder and its first instrumentation recorder shipped by Ampex. It was the beginning of a highly successful instrumentation business that Ampex was to enjoy for many years to follow.

Myron Stolaroff then went to New Mexico to drum up more sales. He stopped by to see a former classmate from his days at Stanford. His friend worked at the White Sands Proving Grounds (now White Sands Missile Range). Myron learned that their method of recording data, from rocket launches and other research projects, was by optical recorders and pen recorders. Each was a seven-channel recorder, and once you had a recording, all you could do was look at it. Myron’s friend asked if an Ampex machine could record seven channels on a magnetic tape where the frequency response was DC (0 Hz) to a few hundred Hz. He said that if he had such a system, it would make a world of difference in their analysis work because they could connect the magnetic tape recorder’s electrical output signals to a computer. Myron returned to Ampex and discussed the subject with Walt. His answer: “How soon do they want it?”

Orders for special recorders were coming in rapidly and engineering was having trouble keeping up with the workload. Alex Poniatoff telephoned John Leslie and asked how soon he could come and help. John Leslie joined Ampex in February, 1950 and became employee number 32 on the payroll. As mentioned earlier, John had helped build the 200A electronics while finishing his college education. He was born in 1921

and built his first radio when he was nine years old. He built his first 60 watt power amplifier when he was fifteen. Electronics were always his hobby—even today! In 1942, John enlisted in the Navy and they saw fit to put him immediately into teaching electronics in the Radio Materiel School on Treasure Island in the San Francisco Bay. He is one of few who never went through boot camp. After the War, he returned to Berkeley to earn his degree in electrical engineering. Upon graduating, he became a field engineer for the Radio and Television Division of Bendix Aviation Corporation and covered California and Nevada.

In addition to the White Sands order, Myron had landed a number of other orders for instrumentation recorders. One was a recorder designed to withstand very high air blasts and record from DC to 3,000 Hz. It was to be used to record atomic bomb blasts. Another was a recorder designed to record many channels of geophone signals used for oil exploration. Still another was an eight-channel recorder—seven for data and one for voice—for use by the Army. The recorder could be mounted on any vehicle—tank, truck, troop carrier, and so on—that they wished to test on their Aberdeen Proving Grounds. The vehicle may be destroyed, but the recorder must provide data on what happened during the process. That eight-channel recorder was John Leslie’s first project at Ampex. He had an excellent team working with him. One real standout was a 17-year-old high-school student who worked part-time. His name: Ray Dolby.

In 1950, Walter Selsted took on yet another project: an extremely low-flutter recorder for the Navy. It used Walt’s concept of a capstan drive system in which the heads contact the tape right at the capstan. It was the first of its kind and especially important for instrumentation recorders using an FM recording technique. In that case, flutter constitutes undesirable noise, which of course is the major factor in a signal-to-noise measurement. This recorder became the Ampex Model 500 and was, we believe, the lowest-flutter recorder made for many years.

Many of the instrumentation recorder projects in 1950 involved recording down to DC. Ampex developed an FM recording system using a multivibrator to provide a carrier frequency to be recorded, and that frequency could be modulated at any rate from 0 Hz (DC) to the maximum required. Of course, the signal then had to be demodulated in playback. This same FM record/playback system was used for a decade or more in Ampex instrumentation recorders. A variation of it was used in the Ampex videotape recorder introduced in 1956.

2.4 Model 400—Smaller and Lighter

Not long after joining Ampex, John Leslie teamed up with another Ampex engineer, Al Dinsmore, to build a tape recorder of their own design. It was not a secret that they were doing it, but they chose to do it outside of Ampex activities. Al had a rather complete machine shop in his garage, and they worked evenings and weekends to complete it. It had two motors and used a tape-pusher approach into the head assembly. Compared to the 300, it was much smaller, much lighter and less expensive to build. The electronics were simpler than those for the 300 and worked well.

They demonstrated it to Alex Poniatoff, Walt Selsted, and others. They were impressed and decided that it provided the basis for another new Ampex recorder. Harold, and the rest of his team, designed the transport and Frank designed the electronics. The combination gave Ampex the Model 400. It was introduced to the world in late 1950. It could be either a full-track recorder or a half-track. It was a two-speed machine, switchable to either 7.5 or 15 ips. In early 1951, Frank tried an experiment on the Model 400; he mounted two half-track heads on the transport with one for the upper track and the other for the lower. This was Ampex's first venture into stereo recording of audio, but it was with staggered heads which was the industry practice at the time. It wasn't until the summer of 1952, that Frank used in-line heads on the Model 400 for stereo recording and playback and established a new industry standard.

1951 was a year of catch up! Myron brought in even more contracts for special instrumentation recorders. Ampex was having hiccups putting the Model 400 into production. It was a machine that would be excellent if appropriate tooling could have been afforded for high volume. Unfortunately, there was too much variation between batches of the same parts. Also Ampex was expanding so fast that it was necessary to move to larger quarters. This was a year that Alex Poniatoff made another of his excellent decisions: he asked Walt to become chief engineer.

By 1952, Alex's financial partner, Joe McMicking, had greatly improved the cash reserves of the Company by making an initial public offering of Ampex stock. Joe also picked Wells Fargo bank executive George Long, to become vice president and general manager—and later, president and general manager.

Alex became chairman of the board and president—and later, chairman of the board and president emeritus. Myron became an assistant to Alex to do long-range corporate planning. George Long set up separate divisions for sales, manufacturing, quality control and accounting. George asked Frank Lennert to become manager of manufacturing and Harold Lindsay to become manager of quality control. About a year later, George selected Harold to become his special assistant. Bob Pappas then joined Ampex to become head of quality control. In 1952 Ampex moved to 934 Charter Street in nearby Redwood City. Walt Selsted remained chief engineer and John Leslie became assistant chief engineer.



Fig. 7. Model 400A portable.

2.5 Model 450—Was it the Right Decision?

In 1952, Al Dinsmore was developing the new Model 450—a long playing, inexpensive answer to continuous music applications, such as elevators. The advent of the Model 450 raised serious concern among many in Ampex management as to whether Ampex was moving too fast in developing new products for markets that it didn't really understand. The conclusion was that Ampex had to hire a person who would take the time to research a market and determine the best product to fulfill the needs of that market. Ross Snyder was asked to join Ampex and become that product manager.

After joining, Ross became involved with every new audio and video product introduced in the early years. He studied the markets and helped engineering to come up with the proper product for a respective market. In addition, anyone who ever used one of Ampex's early standard tapes—or demonstration tapes—heard Ross. He was the “voice” of Ampex. He knew the broadcast field very well, having been chief operator of an FM station in San Francisco, and one of only five in the bay area in the late forties. (KSFH was also one of those five.)

2.6 Two-Channel and Three-Channel Stereo

In 1952, Ampex introduced its first production run of inline-head-stereo recorders. Both two-channel and three-channel versions of the Models 300 and 400 became available. Bill Cara, an audio salesman with Kierulff Sound in Los Angeles (and later with Ampex) used a three-channel Model 400 to record his famous train demonstration tape. Cara's demo tape also included music from a Wurlitzer pipe organ and classical material played by the Santa Monica Symphony. The tape was played every hour during the Audio Fair in Los Angeles the following January. That demonstration is often cited as the catalyst that moved the audio profession into stereo. To support the demand for stereo tapes, Ampex introduced the Model 3200 high-speed duplicator. It was an easy adaptation of the Model 300 with two transports operating at high speed.

2.7 Model 600—A Popular Professional Recorder

The same year, Jack Wernli started development of the Model 600 series of products that was eventually introduced in 1954. The 600 used 7-inch reels. It was both portable and light weight at only 27 pounds. At 7.5 ips, its recording/playback quality equaled that of the Model 400.



Fig. 8. Model 600.

A companion to the Model 600 was an amplified loud speaker in a matching portable case, the Model 620, designed by George Brettell. To this day, many audio enthusiasts consider the 620 one of the most natural-sounding speaker systems ever made.

2.8 Exploration of Recording Video on Magnetic Tape

In early 1952, Ampex decided to explore recording video on magnetic tape and hired Charles Ginsburg to become project engineer. He had been an engineer at radio station KCBS in San Francisco. There may be no one more famous today in the television broadcasting industry than Charlie Ginsburg. He is acknowledged as the father of video recording. We assigned student and part-time employee, Ray Dolby, as the only other member of the team in those exploratory days. Of course, Ray is famous today as the founder of Dolby Laboratories.

2.9 Model 350—An Ampex Success Story

1953 was quite a year with projects started in 1952. As mentioned earlier, Ampex was having production problems with the Model 400. Frank Lennert, although he was head of manufacturing, decided to do some engineering on his own. One weekend, he took the reel motor assemblies from the Model 300 and the capstan, head assembly and electronics from the Model 400 and machined a new top plate. He had Jay McKnight handle the electronic details. They then put it all together, and this recorder became the Model 350 of which more than 6,000 were sold. It is a proud Ampex success story.

3 TODD-AO AND CINEMASCOPE THEATRE PROJECTS

In 1953, engineering matters became much more complicated when the cinema world hit us! Michael Todd of Broadway fame, a principle of Todd-AO and using a fake name, came to Ampex to talk us into assisting him in the development of a six-channel, magnetic recording and reproduction system that would use three magnetic stripes on each side of a 70 mm film. Ampex accepted the challenge. Ross Snyder was appointed chief coordinator of the project. He not only worked with engineering and manufacturing to define hardware to be developed and manufactured, but also with Mike Todd both at Mike's Broadway loft and at a theatre nearby in Buffalo, New York.

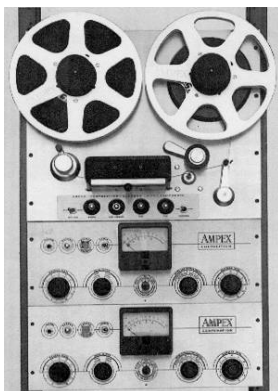


Fig. 9. Two-channel Model 351, rack mounted.

Ross outfitted the theatre with Ampex equipment to carry out sound experiments. Among other things, Ross and Mike Todd proved that the standard Todd-AO system should be five on-screen loudspeakers for a firm center and leave one channel designated for surround sound.

Todd was adamant that his system be better both with picture and sound than any competing system; this included Cinerama which he had helped develop. His success with Cinerama can best be stated by fact that his film *Around the World in 80 Days* won the Academy's Best Picture award in 1956—1957.

Richard Rodgers and Oscar Hammerstein gave Todd permission to produce *Oklahoma* in Todd-AO, a decision based in part on the superb sound system that Ross Snyder had installed in the theatre in Buffalo. Ross had gone to Far Rockaway, New York, and recorded a roller coaster and a carousel for the demonstration.

In the midst of the crash project to assist Michael Todd, George Skouras, CEO and controlling stockholder in United Artists, approached Ampex for equipment to produce three-channel stereo sound with a fourth for surround for 20th Century Fox's CinemaScope process. CinemaScope used 35 mm film, with reduced-size sprocket holes. The widescreen picture was compressed horizontally on the film, and restored to a 2:1 aspect ratio with an anamorphic lens attached to a standard 35 mm projector. Much of the hardware for both the Todd-AO and the CinemaScope project was similar. The big difference was that CinemaScope required the development of a special adapter, nicknamed a "sandwich" which was mounted on a standard 35 mm projector to pick up the magnetic signals from a multi-track magnetic strip along the edge of the film. The "sandwich" had to deliver those signals flutter-free, in spite of the sprocket holes in the film. The resulting device employed the industry-standard Davis drive.

We had to develop special pre-amplifiers, power amplifiers, and loudspeaker assemblies. And do all of it in a matter of months. The time restriction was so great that we even had to take Charlie Ginsburg and Ray Dolby off of their video recorder project to design a 120-watt audio power amplifier. Ross Snyder was both project coordinator and product manager on the whole theatre affair for CinemaScope and Todd-AO. He supervised installation of the Ampex theater equipment in 45 United Artists theaters. The first CinemaScope film, *The Robe*, opened on schedule in all 45 theaters on Christmas Day.

4 TIME FOR REORGANIZATION

In 1954, Ampex reorganized again to meet the growing demand of orders that the company was receiving. Two divisions were set up: Professional Products, which included audio and video, was headed by Vice President Phil Gundy, and Instrumentation, which was headed by Vice President Bob Sackman. The two divisions moved to 860 Charter St., Redwood City. With this new organization, Walter Selsted became corporate director of research, Frank Lennert continued as the miracle-making manager of manufacturing and John Leslie became chief engineer of Professional Products.

This year, engineering was stepped up in the video project to make up for all the starts and stops that management had to

force upon its development. Charlie Ginsburg and his team were moved to 820 Charter St. (next door to 860). They had a small building all to themselves.

5 FIRST VENTURE INTO THE CONSUMER MARKET

In 1955, Ampex took its first venture out of the professional product arena by starting the development of a consumer-oriented stereo tape recorder. Austin Ellmore was the project engineer. Austin had been vice president of engineering of Crescent Industries, a successful consumer products tape recorder company in Chicago, and welcomed the chance to combine his talents of producing low-cost products with the technology of Ampex.

Also this year, the theater business had become so great that Ampex found it necessary to buy part of a loudspeaker business from Jim Lansing. John Leslie became chief engineer of the new loudspeaker company in North Hollywood as well as chief engineer of professional products in Redwood City. It was Tuesday and Thursday in North Hollywood and the rest of the week in Redwood City. John was spread so thin that it became expedient to have Charlie Ginsburg report directly to vice president Phil Gundy. John was fortunate to have both an excellent new-product engineering team and a separate custom engineering team; the latter with Byrne Hull and Mort Fujii. These two had developed a special recorder offered first to Les Paul. It had eight tracks that could be recorded simultaneously, on one or more at a time, while retaining synchronism. When one or more tracks were played back, they could be combined in perfect synchronism and then be recorded together on another track. This came to be known as a "Sel-Sync" system. It was a concept developed and named by Ross Snyder. It was a much-improved way for "sound-on-sound" or "overdubbed" recordings. The "Sel-Sync" system was adaptable to any Ampex professional multi-channel recorder and became a standard feature available for them.

John Leslie took on another project and did much of the work at home. He, and others at Ampex, had become convinced that the quality and uniformity of our professional audio recorders was so good that we were now limited by the magnetic tape itself. John contacted each of the four tape manufacturers that existed at the time in the US: 3M, Audio Devices, Reeves Soundcraft, and Orradio (Irish Brand). No one was very quick to admit that their tape might have a problem. He told all four that he was going to conduct a thorough analysis of their tape, and would share his results with them. All he needed were samples of what they considered their best product. They were quick to flood him with samples!

6 VIDEO RECORDING BECOMES A REALITY

1956 was the year of the video recorder. But first, a brief history: As mentioned earlier, we hired Charles Ginsburg in 1952 to explore the possibility that Ampex might become successful at recording video on magnetic tape. Ray Dolby, who at the time was still a student and part-time employee, worked with Charlie. They explored both high-speed tape systems with stationary heads and slower speed tape systems with rotating heads where the heads are mounted on a drum

rotating in a plane parallel to the tape. They had only limited success. The project had a series of starts and stops both because of higher priority projects in Engineering and lack of conviction by management that videotape recording would actually become successful. The project received a major blow in 1953 when Ray Dolby lost his draft deferment and had to report for a two-year tour of duty. In spite of the setbacks, we—and especially Charlie Ginsburg—were convinced that we could both staff the project and succeed in developing a video recorder.

Walt Selsted provided the breakthrough. In 1954, he presented the concept of using a high-speed rotating drum mounted at a right angle to the tape. The drum would have four equally-spaced heads mounted on its outer edge that would record video transversely across the width of the tape as the tape moves forward at a tape speed of 15 ips. Charlie Ginsburg (aka Charlie G) and his newest team member, Charles Anderson (aka Charlie A), proved that Walt's concept was the answer. The right-angle-head approach needed to be refined, and Alex Maxey joined the team and proved himself to be a mechanical genius. Among his many accomplishments, he developed a special "shoe" that cupped the tape so that the rotating heads would contact the tape over the full width of the sweep with equal pressure. He also developed a special vacuum system to hold the tape in place in the shoe. The mechanical precision required for the parts associated with the head assembly was a real challenge to the team's master model-shop machinist, Shelby Henderson, and he consistently achieved what seemed to be the impossible.

Now the pressure was on, and it was self-inflicted! Charlie G gave Charlie A the assignment to develop the signal electronics as quickly as possible. This included electronics for amplifying and switching the outputs from the rotating four-head assembly to achieve an uninterrupted single video signal. The latter would be comparable to what could be achieved from a conventional recorder, with special heads, running at a very high speed. He considered using amplitude modulation recording, but such an approach would require a very elaborate automatic gain control system to eliminate a "venetian blind" effect when viewing a picture. Charlie A studied the possibility of using frequency modulation rather than amplitude modulation as a means of eliminating the effect. He concluded that vestigial sideband FM recording would be the practical answer. He began work immediately, on the design of a classic reactance tube and heterodyning FM system.

Ray Dolby completed his military tour of duty and returned to the team in 1955. He returned just in time to dive deeply into the development of the electronics, along with Charlie A. Ray reviewed the approach that Charlie A was taking for the FM system and thought of a design that might prove to be less complicated and more quickly put into operation. Charlie G gave him the go-ahead, and so the project had two competing FM electronic systems under development. Ray's system used a frequency modulated multivibrator similar, in principle, to the approach that he had seen used for instrumentation recording when he joined Ampex in 1950. Ray designed a special version of the multivibrator so that it would work at video frequencies. Ray's approach proved to be exactly what was needed for the video recorder. Charlie A's

design, not yet completed, was set aside for another day. Ray's return from the military was welcomed by all—including Charlie A.

Fred Pfof had the daunting task of developing a removable head assembly—complete with a motor that rotated at 14,400 rpm, a drum with quad heads that did not fly apart at the high rotational speed, slip rings, and a shoe that supported the tape as a head would contact it. The head assemblies had to be easily removed because the heads would wear out fairly quickly and a new or refurbished assembly would have to be installed. And tapes had to be interchangeable between recorders. Alex Maxey worked with Fred on head design to improve performance and reduce wear. Shelby Henderson made the intricate parts for the prototypes.

One bit of comedy occurred when the prototype was demonstrated to the Ampex Board of Directors in early 1956. Charlie Ginsburg and his team of six gave a wonderful showing of video on tape and everyone was impressed—until one of the directors asked “Where’s the sound?” Charlie G and his team had forgotten about that trivial thing called “audio”. Everyone had a good laugh. A few days later, Charlie A borrowed the circuitry from the Ampex Model 350 to use for audio recording along one edge of the tape. The other edge was used for a control track.

6.1 Video Tape Recorder Introduced to the World

The videotape project climaxed in April 1956! Phil Gundy and Charlie Ginsburg introduced one of two existing video recorder prototypes to the National Association of Radio and Television Broadcasters (NARTB) Convention in Chicago, later renamed the National Association of Broadcasters (NAB). The second prototype had its introductory demonstration simultaneously in Redwood City.

What was unforgettable about the 1956 introduction was the event that occurred the day before the opening of the convention in Chicago; the Columbia Broadcasting Company (CBS) scheduled its annual meeting for television personnel at the same convention center for that day.

This was to be a “state of the company” presentation by Bill Lodge who was head of television affairs at CBS. The meeting was to be held in a small auditorium that was about 100 feet deep and maybe 70 feet wide. Three television

monitors were spaced along each side, so that all in the audience could see and hear Lodge as he spoke at the podium. There was a curtain behind him as he stood at the podium. CBS personnel and affiliates began to stream in and take their seats—maybe 200 in total. Little did they know what Bill Lodge and Ampex had in store for them!

Earlier that morning, Charlie Ginsburg and Charlie Anderson had set up their Ampex videotape recorder behind the curtain so it would not be seen by the audience—at least at first. Fred Pfof arrived a short time later. Together, they checked out the system, and it was working perfectly; they were ready! Pfof started the recording as Lodge made his introductory remarks, continued with his presentation of what CBS had accomplished in the current year, and described his plans for the coming year. He mentioned a rumor that many had heard—that Ampex was working on a videotape recorder—and said that he had visited Ampex and was impressed with their development project, and had given them a small contract to help finance their development efforts.

Then, Bill Lodge opened the session to questions and answers. That was the signal for Fred Pfof to rewind the tape. When Bill received the signal that the tape was ready to play, he concluded his presentation with much applause. That was Fred's cue to press play: when the audience saw the replay on the same monitors as the original presentation, they went wild with shouting, screaming, and whistling. When the curtains were opened to show the Ampex videotape recorder, some stood on their chairs to get a glimpse of it. These television people realized that what they were seeing for the first time was a recorder that would greatly simplify production of video programs and also be an excellent answer for recording delayed television broadcasts.

What Ampex had just done for the television industry is the same thing it had done for both the radio and audio-recording industries some seven or eight years earlier. This was truly a revolutionary moment for television. Fred Pfof has said that every time he tells the story of this event, it brings tears to his eyes. He still feels it is one of the most exciting moments of his life.

When the Convention opened the following day, everyone had heard about the introduction of the Ampex videotape recorder at the CBS meeting, and Phil Gundy announced that



Fig. 10. Videotape recorder introduction, 1956, April 14.



Fig. 11. CBS news anchor Douglas Edwards.

presidents of the major television networks from around the world were standing in line to see the recorder—and learn how soon they could purchase it.

In less than a week, he received orders for 45 Model VR-1000 recorders at a price we recall to be \$45,000 per each. Phil also received a contract from CBS for modified prototypes (similar to the one shown at the Convention) with the proviso that the network get them soon as possible. These required custom engineering, and cost considerably more.

CBS received the first of its modified prototypes, and went on the air on November 30, 1956 with a first-ever, nationwide tape-delayed broadcast. They showed *Douglas Edwards with the News* from CBS Television City in Hollywood, California.

With the introductions over, we now had to redesign the prototypes for production, tool them, produce them and ship them all by April, 1957 in order to meet the beginning of daylight saving time that year. John Leslie headed an overlay team that bridged application engineering, product engineering, manufacturing engineering, manufacturing and quality assurance. We shipped the VR-1000 recorders on schedule. John had, and still has, nothing but praise and profound gratitude for the superb teamwork that made the project such a success. It was, he feels, truly the essence of what made Ampex great in those early years.

1957 was also the year that Ray Dolby received his BS in electrical engineering from Stanford University, and left Ampex to attend Cambridge University. He received his PhD degree in Physics in 1961. Thereafter, Ray became founder of his world-famous Dolby Laboratories.

6.2 Recognition of Ampex Engineering Accomplishments

The extraordinary professional achievements of the six-member Ampex video project team were recognized by The National Academy of Television Arts & Sciences first in 1957, and again on September 29th, 2005 at the Technology & Engineering Emmy Awards ceremony in Princeton, New Jersey, where individual Emmys were received by Charles Anderson, Ray Dolby, Shelby Henderson, and Fred Pfof, and posthumously for Charles Ginsburg and Alex Maxey.



Fig. 12. The video project team, 1957, with Ampex Emmy and an early version of the videotape recorder.

From the left: Charles Anderson, Ray Dolby, Alex Maxey, Shelby Henderson, Charles Ginsburg and Fred Pfof.

Outstanding credit also goes to Vice President Phil Gundy, who never lost confidence in the video project and put his job “on the line” with the board of directors many times to insist on financial support for Charles Ginsburg and his team. Phil was a great motivator and friend for everyone associated with the video project.

More recently, on February 9th, 2008, the Recording Academy awarded Ampex a Technical Grammy at its Special Merit Awards Ceremony in Los Angeles, California. Myron Stolaroff, Jay McKnight and John Leslie joined Gordon Strickland—CEO, President, and Chairman of the Board of Ampex Corporation—in receiving the Award on behalf of Ampex. The awards committee concluded that Ampex’s original reel-to-reel tape machines are still considered the gold standard among analog recording devices. They referenced the Model 200A which was used for magnetic tape delay for the *Bing Crosby Show*, multitrack recorders for stereo, sound-on-sound recorders for Les Paul, and videotape recorders that revolutionized the television broadcasting industry.

7 FORMATION OF AMPEX AUDIO CORPORATION

Now back to audio. In 1957 the consumer-oriented tape recorder that Austin Ellmore developed was such a success that Phil Gundy decided to set up an Ampex subsidiary called Ampex Audio Corporation. Phil wanted all consumer products, including the North Hollywood loudspeaker operation, under one roof in Sunnyvale, California. Austin Ellmore became its chief engineer.

With Phil’s move to Sunnyvale, Neil McNaughton, formerly with the NAB, took over as head of professional products, and John Leslie reported to him. John continued his work on analysis of magnetic tapes, and it became apparent that the only way Ampex could really improve the quality and performance of magnetic tape would be to either start its own tape company or buy one of the four existing ones—and improve its product. Ampex looked at all four and began negotiations to purchase Orradio.



Fig. 13. Grammy award ceremony, 2008 February 9.

From the left: Glen Lorbecki (presenter of Grammy award), Gordon Strickland (Ampex CEO), Jay McKnight, Myron Stolaroff, and John Leslie.

8 AMPEX BEGINS MAGNETIC TAPE MANUFACTURING

In 1957, Ampex acquired a 25 percent stake in Orradio with the mutual understanding that Ampex would take the company over completely if everything worked out well. They also stated that Ampex would assume general management of Orradio starting in 1958. John Leslie was picked to move to Opelika, Alabama to assume that duty. John's analysis of the tapes of the four manufacturers had shown Orradio to have the most consistent performance when comparing the quality of multiple record/playback cycles. Orradio achieved its consistent performance by using a unique process (called FerroSheen) that it had developed to treat its tape after the tape had been coated.

Orradio was currently operating three shifts per day, five and a half days a week. Orradio's Irish Brand had a large consumer market. There were many cheap, consumer-quality, audio recorders on the market, and Orradio's products, as well as those of the other three tape manufacturers, were satisfactory in quality and performance for that market.

The task ahead was to educate and help the company move to a higher quality level and make a line of tape for the far more critical professional tape market. John and his wife moved to Alabama. Neither had ever been in that part of the country before. John was somewhat shocked by the first question asked of him when he walked into Orradio: "Are you a Southern Baptist or a Southern Methodist?" The second question was, "Are you going to vote for Jack Kennedy or Richard Nixon?" He struck out on both questions. He said he was a Unitarian and that stopped them—until someone said, "Those are the people who go to church in Birmingham and have pointed heads." Then he told them that he was a Republican, but he was going to vote for Kennedy. That was a major strike against him, because Kennedy was a Catholic—and that was taboo in Opelika. Other than that, he felt that his introduction to the tape company went rather well.

John was confronted immediately with two cultural problems that had to be resolved. One involved the accuracy of the inventory figures on the books. Shortly after arriving, he called for an inventory count and quickly learned that the white folks would tell the black folks to count the stacks of tapes and other items. The black folks didn't want to say anything that would upset the white folks, so they would say what they believed the white folks wanted to hear. There was little or no correlation to what the count really was. He overcame that problem by making everyone understand that John Leslie was the person who had to be satisfied that the count was correct—and no one else. This same problem carried over into many other operations in the plant, and each had to be resolved in turn.

The other major issue was that the plant shut down at noon every Wednesday for a prayer session that lasted the entire afternoon—at company expense. That was a bit more difficult. The Company wouldn't answer the telephone Wednesday afternoons to take orders, and furthermore, it didn't seem to be a concern to most of the employees. So John moved the prayer session to Saturday mornings which was a normal paid work period. Then with help from Redwood City, productivity was increased to the point where Orradio could produce more and better product with fewer man-hours of labor. John cut the

operation to two shifts per day, five days/week, but kept the conference room open on Saturday mornings so that those who wished to attend the prayer meeting, without pay, could do so. He found very quickly that no one attended.

John found that he needed help—there was just too much to do. So he called his pals in Redwood City, and talked to both Walt Selsted and Frank Lennert. Walt was willing and able to come down himself. Frank wasn't able to get away, but he offered his right-hand man in manufacturing, Andy Anderson, to help. Both Walt and Andy came down for several weeks. They were a tremendous help!

In 1959, John Leslie set up two marketing teams: one for the Irish Brand consumer-oriented magnetic tape, and the other for the professional brand named Ampex Magnetic Tape. The former was headquartered in Opelika and the latter in Redwood City, where the tape sales people could interface directly with their tape recorder counterparts—be it the Professional Products Division or the Instrumentation Division. John increased the Opelika engineering staff and made sure the new people thought as he did about quality and how to achieve it. The biggest issue was to establish a more professional and critical outlook toward every detail of research, engineering, manufacturing and quality assurance. The personnel had to improve their way of thinking about making tape.

Progress was made in manufacturing Ampex tape and that progress also helped in manufacturing Irish tape. The board of directors of Orradio was sufficiently pleased with what John had accomplished that they elected him Executive Vice President along with his existing General Manager title.

In late 1959, Ampex had completed its acquisition of Orradio. The name was changed to Ampex Magnetic Tape Company. John Leslie's title became Vice President of Ampex and General Manager of Ampex Magnetic Tape Company. At the same time, Walter Selsted was made Vice President of Ampex and Director of Corporate Research. John still had a lot of work to do to improve the tape products. With further help from Walt Selsted, and others from Redwood City, John made significant improvements in the ball milling, coating and slitting operations. It quickly became apparent to John that, in the manufacturing of magnetic tape, you can always make it better, regardless of how much you have already improved it.

In 1961, John Leslie returned to Redwood City to manage the Ampex Military Products Company. Bob Pappas had been its general manager, and in prior years had been head of the Ampex quality assurance operation. He was a natural to take over the Ampex Magnetic Tape Company. So John and Bob switched jobs. Military Products was really a custom engineering operation that worked on contracts from US government agencies. It was rather typical of some of John's earlier engineering days at Ampex.

9 THERMOPLASTIC RECORDING ANNOUNCEMENT DIDN'T HELP

When John returned to Redwood City, he was shocked at how much the employee morale had deteriorated since he had left in 1958. It just wasn't the same atmosphere that he remembered. He had been aware that there was a lot of unrest at Ampex because the stock had fallen considerably from its high. In past years, Ampex had been a darling of Wall Street

with its stock rising rapidly. Due to stock purchases, the majority ownership of Ampex was now in the hands of large banks and other financial institutions.

In 1960, John Leslie gave a presentation before a large audience at the Rotary Club in Montgomery, Alabama. During the question and answer period, he was asked what he knew about General Electric's introduction of thermoplastic recording, and had to admit that he was not aware of it. GE had made the announcement that very day—and Ampex stock took a great hit. It turns out that GE didn't follow through with their development, but the damage was already done to the price of Ampex stock.

The strain was great! George Long resigned as president in June 1961. The board of directors then brought in Bill Roberts from Bell & Howell to replace him. Both Frank Lennert and Ross Snyder resigned in 1960, and Myron Stolaroff left in 1961. John Leslie stayed until 1962, and Walter Selsted left in 1963. Harold Lindsay stayed with Ampex for the rest of his life. Sadly, he suffered from cancer and passed away in 1982.

10 FINAL THOUGHTS

The most difficult part of recalling this history of the early days of Ampex was the frustration of remembering how, beginning in about 1960, the camaraderie we had developed over the years began to unravel. It just wasn't the same feeling that existed earlier.

During those early days, we had such a wonderful group of employees, beginning with Alex Poniatoff and continuing right down through engineering, marketing, manufacturing and accounting. We had the team spirit and teamwork that enabled us to set the stage for the development of outstanding products. Our hope is that Ampex will once again regain the spirit of its glory years.

11 ACKNOWLEDGMENTS

The authors had tremendous help in recalling this history of Ampex. We thank and give great credit to Walter Selsted, Frank Lennert and Myron Stolaroff who worked many long hours assisting us in triggering our joint memories on what we and others did so long ago. They also were our most critical reviewers and correctors of our written words. We also thank and give credit to some other ex-Ampex people who helped us very much in keeping the facts straight. They were Charles Anderson, Don Flanagan, Peter Hammar, Jay McKnight, Larry Miller, Fred Pfof, and Robert Smits.

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THE AUTHORS



Ross H. Snyder

The late Ross H. Snyder was born January 5, 1920 in Cheyenne, Wyoming and passed away January 1, 2008 at his home in Woodside, California. Ross's family moved to California in 1922. Ross was educated in Berkeley schools and studied physics and mathematics at the University of California in Berkeley. World War II interrupted his education. He served as a B-29 pilot in the U.S. Army Air Corps and flew many missions in the Pacific theater. After the war Ross became a radio announcer and newscaster for several radio stations including WOR and later KJBS-FM where he also became chief operator of the station.

In 1952, Ross joined Ampex Corporation as product manager for audio products. He became heavily involved with market-planning, development and promotion of all Ampex professional audio and video products for many following years.

In 1961 Ross left Ampex and joined Hewlett-Packard where he became an important part of their publications and public relations operations. He was on the editorial staff of the Hewlett-Packard Journal 1967 to 1974 and served as editor 1969-1972. He retired in 1986 after a 25 year career at Hewlett-Packard.

Ross was very active in the AES in its early days. He was an AES Life Charter Fellow, AES vice president, an awards chair, banquets toastmaster, and an AES governor. He was chairman of the San Francisco Section in 1950. He also led a symposium on stereo tape standards in 1957, which was reported on in the April 1958 Journal. He was recipient of the AES Award (now called the Bronze Medal Award) in 1962.



John Leslie

John Leslie was born June 22, 1921 in Springfield, Missouri. His family moved to California in 1926. John was educated in Berkeley schools and had one year of electrical engineering at the University of California before his education was interrupted by WW II. He enlisted in the U.S. Navy and when they learned he had considerable knowledge of electronics (it had been his hobby since he was a kid), they assigned him as an instructor in the Radio Materiel School on Treasure Island. John continued teaching until the war ended and left the Navy in 1946. He returned to the University of California at Berkeley to complete his education. He received his BSEE in 1949.

In 1950 John joined Ampex as a project engineer. He had been a sub-contractor to Ampex starting in 1948. John became assistant chief engineer in 1952, chief engineer of Professional Products in 1954, and vice president of Ampex & general manager of the Ampex Magnetic Tape Company in 1959. In 1962 John left Ampex and enrolled in Stanford University where he received both a master's degree and engineer's degree in mechanical engineering. He then went on the teaching staff in mechanical engineering.

In 1966 John left Stanford and joined Hewlett-Packard as manager of engineering of the Mountain View division. In 1969 he became co-owner of a startup company called Pemtek which he and his partner sold in 1976. He then joined United Scientific Corporation as senior vice president of engineering and soon became president and general manager of the Analytical Instrument Division which developed, manufactured and sold energy dispersive x-ray analyzers. The Division was acquired by Tracor Corporation in 1981 and renamed Tracor Xray. John continued as vice president and general manager of Tracor Xray until his retirement in 1984.