

# Outline of Charlie Rhodes' Life

## Plus Comments from Stephen Kerman

By Linley Gumm

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In the early days at Tektronix Charlie was called "Dusty". "Dusty", of course, is a natural nickname of someone with the surname "Rhodes". But, in all the kids cowboy movies, the character "Dusty," was a garrulous person who talked charmingly and often told somewhat problematic stories. In that sense the name "Dusty" fit Charlie as he was charming and always had a story. That is, Charlie always had rampant enthusiasm about what he was doing or wanted to do; an enthusiasm for goals that always seemed impossibly grand at the time, even though he more often than not achieved them. Once he had determined a goal, Charlie used every resource at his disposal to achieve it. That is, he used every resource; as in all of his assets and all of the assets of anyone that he could convince that the goal was worth reaching.

Charlie once told me that if you don't know what to do (i.e. to solve a problem), do something. If the something you tried failed, you would at least know more about the situation. One of the things that made Charlie, Charlie, was his propensity for action.

Charlie was goal driven and enthusiastic, had grand ideas plus a propensity for action. Let's review Charlie's life with those characteristics in mind. Understand that Charlie and I vaguely knew each other during his days at Tektronix and then more closely when we worked together on projects over the last decade of his life. While our relationship was always friendly we didn't share much about our personal lives.

Charlie was born in Buffalo, NY on August 1, 1929. His father was a high school principal, later a minister, and his mother a homemaker. While I am now told that he had a sister who became a pediatric nurse, she never appeared in any of the few stories he told me about his childhood. His grandmother knew the author Pearl Buck and had a house at Chautauqua, NY where the Chautauqua Institution meets every summer. Charlie spent many summers in his youth there on Chautauqua Lake and returned there yearly in recent years. Charlie's grandfather was a professor of literature and a Presbyterian minister.

In his teen years, Charlie focused on chemistry. His father was comfortable enough that Charlie had a well-equipped lab and did rather advanced experiments. He told me once he was once distilling something very poisonous. When the distillation process ran amok and the fumes spread, he had to run to tell his father to evacuate the house and for a few hours. Charlie said his father never said a thing then or later.

From the dates in a TekWeek profile of level V engineers obtained from the VintageTEK web site, after Charlie finished high school, he spent the next three years at UC Berkley. Charlie never said what he majored in nor ever quite said out loud that he hadn't finished college. In that era, male students at a land grant university were required to take ROTC. Trudy thinks Charlie took Naval ROTC. I believe that it was in this period that Charlie hand-built a TV set from scratch. It was apparently pretty rough, but it actually created a picture.

The exact circumstances are unknown, but the profile says Charlie left UC Berkley at the end of what would have been his third year in 1950. It's known that he then joined the Navy; as an enlisted man. Charlie's stories about his naval service were always about him doing some technical job on a cruiser at under the direction of a petty officer. One story was about tending the firing rate of a ship's boiler during maneuvers so that there was a full head of steam but not so much that it tripped the boiler's safety system.

Another story was about wiring a generator set. A third story was about watching the radar display he was monitoring twist when the ship suddenly yawed to steer away from a floating mine.

Charlie married Elizabeth Marie “Betty” Rhiele on Feb 5, 1949, at age 19. He fathered four sons; Wesley Jr., David, Eric and Tom. This marriage ended in divorce. David died in 2004 and Betty died in 2017.

His son Eric does not remember how many years Charlie served in the Navy, but has a very impressive silent home movie of Charlie’s wartime experiences (although Charlie never really saw any battle action). He also remembered that his Dad being a Jr. officer was required to ask for permission from his Commander to get married.

Discharged from the Navy in about 1952, Charlie took a job with a TV wholesale distributor to trouble shoot reception problems in the San Francisco area. (This distributor might have been selling Philco brand receivers.) Much more so than today, this involved making house calls, climbing on roofs to install antennas and in general the rough and tumble required to find and fix problems, including interference problems.

One of Charlie’s stories involved getting a call back from a lady living in an older house saying the set had worked fine when Charlie left but had since developed a severe interference problem. Charlie says he thought a moment and told her that he would be happy to come back and fix the problem at no charge but, before he did, would she please go and see if she had perhaps left the attic light on. The lady called back and said she had found the light turned and the interference problem went away when she turned it off. It was an old house and Charlie had reasoned that the bulb could have a broken carbon filament. It was causing the problem.

Sometime after KPTV started broadcasting in Portland on channel 27 in the fall of 1952, Charlie was sent to Portland by the same TV Wholesale Supplier to deal with reception problems there. He said he worked out of an appliance store on Hawthorn Blvd that had a working TV set in the window which was rare at the time. Once Charlie gave me a half-hour rundown on the schemes the various TV set manufacturers used in that period to tune in UHF signals. By current standards all of the schemes were desperate and barely worked. But, that was also a good description of UHF TV in general at the time: it barely worked.

The TekWeek profile says that Charlie started at Tektronix in 1956. His timing was perfect in that the NTSC standard for color TV had just been adopted by the FCC in the fall of 1955 and at least NBC and Ampex were rushing to build operational color equipment. Charlie came home from a series of customer visits with a vision of the vector scope in mind; that is an instrument that allows one to actually measure the chroma portion of the video signal in detail. He and Ron Olson set out to build the vector scope, inventing the technology as they went along. The 526 NTSC vector scope was introduced in 1959, apparently causing a major panic among suppliers and broadcasters alike as they used the instrument to determine how very bad the early color TV hardware was. But the revolution in color TV signal measurement had started. It is generally thought the invention of the vector scope speeded the adoption of color by about three years.

The next 23 years are a blur. Charlie wisely insisted that Tektronix develop test equipment for all of the TV standards used in the world. The product line expanded to include very compact transistorized waveform monitors, and a complete line of video test signal generators, picture monitors, plus specialty measurement test sets. Tektronix became the world-wide authority of TV test. At the center of it all was Charlie; Charlie having new instruments developed by a very capable design team Charlie had selected and trained; Charlie writing papers; Charlie traveling to give the papers and learn about new market needs; Charlie traveling to attend conferences world-wide; Charlie traveling to give classes on how to

make video measurements; etc. In short, in the world of television, Charlie became a rock star. Tektronix's president was once mildly offended when traveling in Asia when he found everyone knew who Charlie Rhodes from Tektronix was, but few knew who Earl Wantland was.

Charlie introduced vertical interval test signals known as VITS allow test signals to ride along on the video that would be seen by customers. These test signals were hidden in the period when the old analog sets were retracing from the bottom to the top of the screen. Being able to accurately measure the performance of an operating transmitter in real time allowed the FCC to change its rules to allow unattended transmitter operation. At the FCC's request, Charlie wrote a set of rules for monitoring these unattended transmitters that were adopted by the FCC essentially verbatim.

Seizing on SAW filter technology when it was developed at Tektronix, Charlie commissioned the design of the 1450 TV demodulator by Steve Roth et al. This instrument became the world's reference standard for TV reception. From my position in the spectrum analyzer group, I had been nagging Charlie for some years that a TV demodulator was needed, but Charlie wisely resisted until he had the key technology in hand that allowed the construction of a text-book quality receiver that exhibited extremely stable characteristics over time.

Charlie also had a large hand in developing and deploying the VIR (Vertical Interval Reference) signal. TV signals are typically accurate when they leave the transmitter, but they can be distorted by things they encounter on the way to the TV set in the home. The VIR signal allowed the TV set to automatically sense and correct much of that distortion. Charlie hosted a major field trial of the VIR signal at Tektronix to establish that the system worked as planned.

Because of the availability of Tektronix's essentially text-book quality test equipment and because Charlie taught everyone how to use it, TV's end users demanded more out of the operational equipment they purchased. And, because of Tektronix's equipment, the equipment suppliers could develop and provide that equipment. Thus, Charlie was a major factor in the perfection of analog color TV.

Somewhere in this era, Charlie married and divorced his second wife, Maryann. Little else is known about this marriage.

In 1982 Charlie left Tektronix to work for Scientific Atlanta in Atlanta, Georgia. (His patent history shows him living in Atlanta and also in New Salem, NY in this period). He worked to improve the transmission of video signals from satellites to ground terminals. He invented a frequency equalizer that improved the signal to noise ratio of the received video as well as several other improvements to the MAC system.

He moved to Phillips Laboratories in 1986 as a principle research scientist, working on high definition television systems.

In 1988 Charlie left Philips Labs and moved to Edgewater, MD where he became the Chief Scientist of the Advanced Television Test Center (ATTC). The ATTC was created by the television industry to test and compare the various high definition television systems that were vying to become the United States DTV standard. Charlie was the anchor who defined and managed this process, designing the massive system that was used for the tests. This testing program, after a huge effort by the industry, resulted in the adoption of the ATSC 1.0 standard in 1995.

He invented a key device to make the selection process objective. It was a method to record the digital data from a transmission system on magnetic tape suitable for later viewing. This allowed the output from the various vying systems to be objectively compared with each other, eliminating bias. Based on Charlie's concepts, this system was designed by Phil Crosby and Michael Cranford at Tektronix in a

major display of technical ability. Several dozen copies of this system were manufactured at Tektronix. They were sold to the various organizations vying for the DTV standard as well as to the ATTC.

During the ATTC years, Charlie met, courted and married Trudy on Saint Valentine's Day in 1993.

The mission completed, the DTV standard selected, Charlie retired from the ATTC in 1995. After retirement, Charlie and Trudy worked to create the National Capital Radio and Television Museum located in Bowie, Maryland. It opened its doors in 1999 and has been called "one of the ten best museums in Maryland."

Charlie and Trudy moved to Vancouver, Washington in February of 2006.

In Vancouver, Charlie solicited industry support to implement a program to test DTV receivers for their ability to withstand interference from other DTV stations. With the aid of myself (Linley Gumm), an elaborate DTV test system was created over a period of several years. It ultimately was able to measure how well each receiver could withstand interference from up to seven independent ATSC DTV signals on nearby channels. 28 Set-top converter boxes and 24 DTV receivers were tested. In addition, 21 DTV sets were tested using a different test system to determine their susceptibility to interference from LTE cell telephone signals on nearby frequencies. The resulting data was published both by the IEEE and the ITU.

Then tragedy: Charlie fell, severely breaking his hip on March 14, 2018. He underwent a 4 hour surgery for a serious hip fracture, exacerbating an existing cardiac issue. He died six days later on March 20, 2018.

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Publications: Charlie wrote hundreds of items; so many, and over such a long period, that we don't have any real idea of how many. For instance, he wrote a column for TVTechnology from August of 1985 to September of 2017. He also published many papers in professional journals and made presentations at so many TV industry meetings that everyone has lost count.

Patents: 20 US Patents; 5 at Tektronix, 4 at Scientific Atlanta, 11 at ATTC

Awards: Charlie did not keep a list of his awards so we are uncertain of the completeness of this list. We know of these:

- The David Sarnoff Gold Medal Award, Society of Motion Picture and Television Engineering, 1992
- NAB Television Engineering Excellence Award, 1996
- Third Millennium Medal for outstanding achievements and contributions, IEEE, 2000
- Technology & Engineering Emmy Award on "Standardization of the ATSC Digital System", National Academy of Arts & Sciences annual Technology & Engineering Awards, 2009. This Emmy was shared by ATTC, ACATS, an FCC committee, ATSC, and CRC.

And finally, these comments from Stephen Kerman prepared for Charlie's Celebration of Life ceremony.

APRIL 20, 2018

I had the privilege of working closely with Charlie for all of my Tek career.

I don't think Charlie and his TV Engineering team ever received the credit they deserved for first getting Tek into the TV business and then continuing to provide a growing number of innovative, revolutionary, very profitable products.

Depending on when you met Charlie, he was Wes, Dusty or Charlie. As I got to know him, I was able to gauge when people met him by the name they called him. I was in the "Dusty" cohort.

I met Dusty on my first Sunday in Beaverton in July 1960. He, Ron Olson, Doug Dickie (and possibly Phil Crosby) were at the Sunset plant working on a new waveform monitor (527?) It was June; not on a NAB deadline but they were all at work anyway.

In New York, I served the TV networks as a Tek Field Engineer and I worked closely with Charlie and his group. Later in my career, back in Beaverton, I was always connected in some way to TV products.

He had a leather briefcase with "Mexico" emblazoned on it. Whenever he came to New York, I knew the plans for his newest TV product ideas were secreted away in that briefcase.

At first, I dreaded seeing it as I knew he planned to discuss some or all of this vaporware with customers who would then badger me to deliver it. The good news was the products would become available eventually and they would be better than promised because Charlie would first enlighten the customer of their needs and then listen to their suggestions.

### **Some fond tidbits:**

27 NAB Shows

About ten each IBC and Montreux Symposia

### **An historic moment:**

In New York with Dusty when we first saw a Trinitron display. He turned to me and said, "Now we can build a TV Monitor." The 650/670 Series was the result.

### **Hero Worship:**

Having dinner in Louisville with customers from Kentucky Public Television. One of the customers was so enthralled having dinner with THE CHARLES RHODES he could hardly speak. I expected the guy to ask Charlie to autograph his napkin. The customer confided in my saying, "He actually spoke to me" He knew he was in the presence of an icon.

### **And on a lighter note:**

\* Swiss waiters glaring as Charlie added Ketchup to his Chateaubriand.

\* My bringing his forgotten clothes back from our NAB hotel. Our relative sizes made the juxtaposition in my suitcase hilarious.

\* Charlie trying to show me how easy it was to speak to a French waiter responding affirmatively to the waiter's question, "Si, Si, Señor"

\* Charlie planning a visit to Kodak and asking a temporary secretary to book his flight to Rochester. He got a ticket to Rochester Minnesota, not New York.

\* The six months Tom Long swapped his team and Charlie ran manufacturing, Cal Smith was in Marketing and I was in Engineering. Somehow, we and the division survived.

\* Finally, our adventure shopping for a special Swiss Bra. Charlie was on a mission and Alan Pywell's wife Mary (a big woman close to 6 feet tall), and I (about the same height) accompanied Charlie to a department store in Montreux, Switzerland. A very nice, very young clerk, who was a bit confused by these three disparate tourists, was trying to help the shortest of our very strange trio. Mary and I deferred to Charlie as he went about his selection. Finally, the clerk, glancing at Mary, asked Charlie what size he wanted. He turned to her held up his cupped hands moving toward her and said, in his best French accent, "C-Cup. C- Cup". She turned red while Mary and I were convulsed with laughter.

Charlie will be missed but never forgotten.

Stephen Kerman