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Early Plastic Radios



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The Knight-Kit Saga

By Jim Addie N9SSD

(All graphics courtesy the author)

With your dad at your side, you've put in hours of careful assembly, followed the written and pictorial instructions, and checked off each step as you progressed. You've just completed the wiring and assembly, put on the bottom cover, and installed the tubes in their sockets.

Now, one hand poised on the control knob, you do one final check of your work. The instructions cautioned that this is your last opportunity to check your craftsmanship before initiating the "smoke" test – or hopefully, the "non-smoke" test. No cold solder joints, no wires touching other wires they shouldn't, all hardware tight. It's the moment of truth. Your father inserts the power cord into an outlet, gives you a wry wink, and you rotate the control knob clockwise.

"Click!" Suddenly, the filament of the 12AX7 tube flashes as bright as a light bulb! Could something be wrong? Have you made a fatal error? Is the tube about to explode? Moments later, you take a deep breath and calm down. You've witnessed the first of several quirks of the Knight-Kit Broadcaster and Amplifier: the filament in-rush flash. But soon all is well, filaments settle into a dull orange glow, and you're on the air.

But now the question is, where is the signal on the dial? Excitedly, you reach for the volume control on the nearby AM radio and turn it up to hear a little static and atmospheric noise in the dead spot you found on the dial. You place a small screwdriver in the slot of the tuning capacitor and turn it slowly. The static on the radio is silenced to a low 60Hz hum. You really are broadcasting! You jam the mic connector into the XTAL Mic input, turn up the Broadcaster's volume control, and speak into the crystal mic, "Hello? Testing? 1, 2, 3?" Your voice is heard coming from the radio, thin and creaky, as only a crystal mic can be, but still audible. Wow. *Wow!*

Quickly, you plug in a phonograph or put the mic in front of a record player speaker, put on a record, grab a transistor radio, and now you are running around the neighborhood to see how far your signal goes. This ritual was no doubt repeated by each and every builder of the Knight-Kit Radio Broadcaster and Amplifier.

Birth of Many Radio Careers

From this humble kit sprang untold careers in radio, communications, broadcasting and electronics. It provided key exposure to these fields. The kit was first produced in 1955 by

Allied Radio, Chicago, through its Knight-Kit division in Franklin Park, Illinois. When it was introduced, the kit sold for \$9.50, eventually topping out at \$12.95 before being discontinued in 1965. The little blue three-tube AM transmitter used a 12AX7 for a preamp and a 50C5 audio power amp and modulator for another 50C5 oscillator tube.

The circuit used "Heising" modulation, basic plate-modulation driven by a Class A audio stage, which also drove an output transformer for a speaker. The claim was "high modulation levels" and low distortion through the use of negative feedback. The final version of the kit was built in an enclosed steel chassis box painted hammer-tone blue with the three tubes, audio transformer, and tuning control mounted to the top surface. The design was simple, yet elegant.

The Broadcaster was just one of many kits, which ranged from the application-specific (a "crystal calibrator" and "grid-dip meter"), to the educational (12-in-1 and 100-in-1 Electronics Labs), to the practical (automotive ignition analyzers, and Vacuum Tube Volt Meter and test gear), to the entertaining (amplifiers, stereo and mono, tube and solid state) to the ambitious: you could actually buy a kit to build your own reel-to-reel tape deck.

One thing every kit had in common – beyond detailed step-by-step instructions with pictorials – was the aspect of electronics education. You *learned* something building these kits! Actually, you couldn't help it. You had to inventory the parts before you started, which meant identifying each one. You had to learn to solder, typically point-to-point, then later, PC boards. You were offered as much theory as you could assimilate in the "How It Works" sections of the manuals. But perhaps most importantly, building a kit taught persistence, patience, diligence, and pride in your work. There was a label included with each kit: "Custom Built By: _____," on which you wrote your name and affixed to the bottom or back of your prized project.

The fact that a kit became the launching pad for a career in electronics, communications, or even broadcasting is confirmed by the stories that flow in via email to the Knight-Kit web site I established: www.knightkit.com. Kits seem to have been quite an influence!



Showroom: The "New" Knight-Kit showroom at 100 N. Western Ave., Chicago, circa 1955. (1955 Allied Catalog)

I've heard from broadcast engineers, communications technicians, even a broadcaster who now works for a former employee of Radio Caroline (the real "Pirate Radio" ship). My own career path had a big nudge from the Knight Broadcaster, as I have been a broadcast engineer for the past 37 years. Though the broadcast industry of today bears little resemblance to the one I first entered, I can easily point my finger at that little blue hammer-tone box and credit (or blame) it for the direction I took.

Dawn of the Radio Era

Allied Radio was launched back in 1928 by Simon Wexler as a mail-order electronic parts division of Columbia Radio Corporation, and it immediately found favor with experimenters and amateur radio operators. If you're a film buff, the Wexler name should have a familiar ring: Haskel Wexler was an Oscar winning cinematographer ("Who's Afraid of Virginia Wolf?," "One Flew Over the Cuckoo's Nest," and 67 more films); and his son, Jeffrey Simon Wexler, was an Oscar-nominated sound engineer. They are the son and grandson of Sy Wexler, Allied's founder.

Starting a new venture in 1928 could be viewed as the height of bad timing, with the crash of 1929 just a year away. Yet, as the world toughed out the Great Depression, Sy Wexler built Allied into one of the most recognized names in electronics, and he wasted no time in supplying parts and kits to amateur electronics enthusiasts. In fact, it was a newfound fascination with radio communications that kept Allied afloat during those years.

The Knight line of products is traceable back as far as the first year that Allied Radio



Broadcaster turn-on: Current surges through the 12AX7 tube as the Broadcaster is turned on for the first time. (Courtesy: Author)



Span Master: Many young short-wave fans accepted Knight-Kit's invitation to "Log the World" with the futuristically styled Span Master. At \$25.95, or financed for "only \$2 down" who could resist? (1961 Allied Catalog)

existed, as the company's first house brand. The first radio in their 1929 catalog bears the Knight badge, as do many products in their line-up that year. Though the Knight-Kit name variation wouldn't emerge until decades later, the company produced several kits in their first year.

The post-war 1949 catalog shows a handful of kits, but by the early 1960s, the kit product line was staggering. The company enhanced the desirability by slapping imaginative names on their radios, like "Ocean Hopper," "Space Spanner," and the popular 5-band flagship, "Star Roamer."

Their line of ham radio gear was fairly complete too, if less whimsically named, but some of their designs more than made up for it. The formidable and somewhat daunting T400, for example – a 400-watt transmitter capable of CW, SSB, and AM in the 80, 40, 20, 15 and 10 meter bands – was billed as pumping out up to 600 Watts PEP in SSB mode. It sported an optional three-inch scope for modulation monitoring, and had a special keying network to control the keyed wave envelope shape.

The built-in output matching network was happy to drive any load from 40 to 600 ohms. This beast was a foot high and two feet wide, weighed 140 lbs, and with all four optional modules would have cost \$657! That's *if*, in fact, it was ever actually produced. Though it can be seen in at least two years of catalogs in the early 1960s, Knight-Kit collectors suspect that it never made it beyond prototype stage, as



C11: C11 CB Radio Kit circa 1961. Tunes all "23 channels" continuously, but you get to pick your one favorite transmit channel crystal. (1961 Allied Catalog)

there has been only one unit ever reported on the used market.

The T-400 may indeed have been a bit rich for the average ham's blood, but the modest and capable T-60 transmitter and R55 receiver were their most popular rigs. The R55 receiver demands respect for its five-band coverage from 530 kHz to 56 MHz, with double slide-rule dials for frequency and band-spread.

For the code-phobic (in those days Morse code was mandatory to get any ham license), there were CB transceiver kits as well. In 1961 you could choose from one base station that had a continuously tuned receiver and a single transmit frequency, and a modest two-channel mobile rig. By 1966 you had a bit more to pick from: four futuristic looking models with all 23 channels that could be used as base or mobile radios, and three different walkie-talkies. The gutsy 1-watt, top-of-the-line unit was so big it was like holding a shoe box full of bricks to your face! And remember, when you brought any of these home and opened the box, all you had was a pile of parts. Your work had just begun!

Behind the Scenes at Knight-Kit

Tremendous effort went into producing a Knight-Kit for sale. A marketable product had to be designed and perfected, with attention to performance and value – with the least possible parts. Prototypes had to be assembled and tested. Then it had to become a kit, which meant writing a manual. For this, expert technical writers teamed with graphic artists to create an easy to follow manual that hit the target of Allied's core marketing strategy, "Electronics for Everyone."

For the first-time kit builder, Allied offered these words of reassurance: "Thanks to Knight construction manuals, even those with no previous experience will find assembly a marvel of simplicity...For proof positive of the clarity of Knight manuals, drop a card to Allied – we'll send you a free copy of the construction manual for the Knight VTVM." Now that's confidence! Seems almost like they were giving away their secrets, but you could buy any manual for ten cents.

New kits were added aggressively in the 1950s and early 1960s. Older, solid sellers continued, some being updated with refinements, and placed alongside new futuristic designs.

The Competition

Knight-Kit was far from the only kit producer. Their most formidable competitor was Heathkit, perhaps an even more familiar name. Heathkit products were more expensive and their designs more refined. Construction was more complex, but reflected depth in engineering and features. For those who were drawn to kit building for economy, Knight-Kits had greater appeal; Heathkit attracted builders wanting higher quality without as much concern for cost. Heathkit was a kit-only company, though, and stores were very sparse. Their catalog could be digested in less than an hour.

Heathkit also enjoyed at least another decade or so of active kit production, crossing into

KIT-RELATED WEB SITES

Knight-Kit

www.knightkit.com

Radio Broadcaster site, plans, collectibles, fan stories

Carl's Electronics

www.electronickits.com

Wide range of kits

Nostalgic Kits Central

www.nostalgickitscentral.com

Virtual Kit Museum, Heathkit, Eico, Dynaco, etc. Be sure to click on General Info, find the Modern Kits link for tons of kit suppliers!

Antique Electronic Supply

www.tubesandmore.com

Tube-centric supplier with some kits

Ramsey Electronics

www.ramseyelectronics.com

AM/FM radio broadcasters, ham and audio kits

Can Kit

www.canakit.com

Transmitters, hobby kits, electronics labs

Hobby Engineering

www.hobbyengineering.com

Impressive array of useful items and gadget kits

Vintage Manuals

www.vintagemanuals.com

Source for old kit manuals

Allied Radio

www.alliedelec.com/alliedhistory.aspx

History site of today's Allied Radio (industrial electronic supplies)

Heathkit Educational Systems

www.heathkit.com

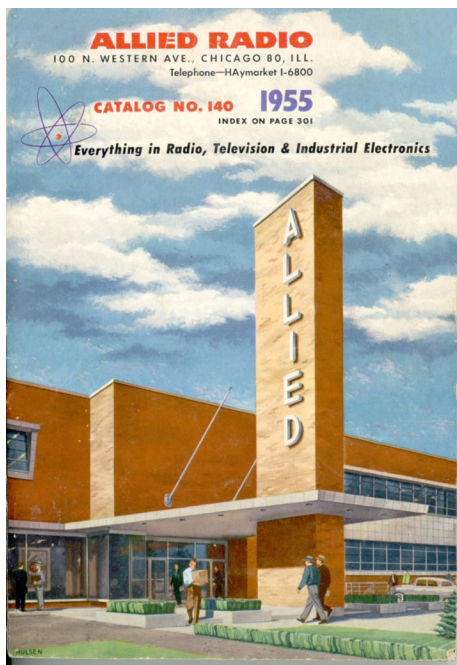
What Heathkit has become

the hobbyist computer age and beyond. Today, Heathkit produces educational and training kits, having left consumer kit products behind in the early 1980s. A search of today's vintage equipment market will turn up hundreds of Heathkit devices, but only dozens of Knight-Kits. Perhaps cost established value and people hung onto their Heathkit products, while the lower cost projects went to the dust bins.

Electronics supply companies such as Lafayette had their own kit products. Other kit companies, such as Eico and Dynaco, narrowed their focus to test equipment or audio equipment. With half a dozen or more prominent kit companies, and dozens of minor players, the kit business was thriving by the early 1960s.

Allied Catalogs: Your Electronics Bible

As the electronics industry developed at the rate of a barely-controlled explosion, Allied added retail stores to cater to hobbyists and burgeoning HiFi and TV market as well. Their annual catalog went from a scant 100 pages to almost 500, fairly bursting with illustrations and detailed write-ups about all things electronic. The catalog itself became a text book of sorts to anyone thirsting for electronic knowledge. Catalog pages included



1955 catalog: *Allied's motto started out as "Everything in Radio and Electronics," then added Television and finally ended as "Electronics for Everyone." The 1955 catalog cover shows the brand-new headquarters and retail store at 100 N. Western Avenue, Chicago. (1955 Allied Catalog)*

detailed photos, lengthy descriptions and huge blocks of specifications that included everything from the rather inflated "IHF Music Power" ratings to the exact tube compliment. Yes, there was much to be learned by reading the Allied catalog.

And read it we did, from cover to cover, hardly skipping even the pages of parts listings. The 1949 Knight-Kit section even invited customers to mail in any radio-building problems they may have and receive a personal response from L. M. Dezettel, Chief of Allied's Technical Staff. You may recognize the name as the same Louis Dezettel, as a prolific technical author, who wrote books about electronics, photography, masonry construction and much more. Talk about personal service!

If the catalog was the consumer electronics bible of the time, then the main retail store at 100 N. Western Avenue, Chicago was the Temple of All Electronic Holiness. There, if you planned your pilgrimage, you could spend the day communing with every significant device pictured in the catalog. There were ham shack style displays with the latest transmitters, receivers, keyers, and monitors. There were HiFi demo rooms with the latest components feeding our quest for audio nirvana: stereo systems. There were color TVs (where we learned that NTSC stood for Never Twice the Same Color), and radios of all shapes and sizes. There were rooms with antennas hanging from the ceiling, racks with reels of wire and cable, and of course Knight-Kits for our lusting eyes to devour.

For parts or catalog-only items, there were counters with copies of the catalog next to order forms that could be filled out, then sent via a vacuum-powered message tube to the warehouse in the rear of the store. When your order was

ready, your name or number was called over the PA system, and you went to a huge counter to pick up your order.

A repeating tape loop announcement reminded you that there was an "express" counter for tubes, batteries, and self-serve items, though the "express" part of it, on a typical Saturday, was a bit optimistic.

Finally, on your way back to the parking lot, you'd walk through the close-out room, where there were displays of items at reduced prices to tempt one last time before you headed out the door.

But, as you left the building, you walked right past your car, and crossed the street to visit Olson Electronics, their neighbor and an Allied wannabe. Olson was far more densely displayed and carried a noticeably less expensive array, but also did a pretty fair business. Olson carried the new, up and coming product lines from companies in Japan such as Teac and Sony.

Allied, however, seemed to focus on US made products from Marantz, H.H. Scott, Fisher, Dynaco, Hallicrafters, Johnson, Hammarlund and the ubiquitous house brand, Knight. Later there appeared components bearing the Allied brand name, which were actually rebranded Japanese products, but by this point change was in the air of the electronics industry.

So, What Happened?

As the years marched forward, kit popularity declined. The reasons were complex, and no doubt included competition for attention by TV and the higher value and fuller feature sets of pre-made products from overseas. For example, the Knight-Kit receivers were either specialty products for hams or serious shortwave listeners or very simplistic AM radios.

These were in competition with the short-wave crossover radios of the time, the multi-band transistor sets that covered AM and FM with two or three shortwave bands thrown in. While those units didn't live long in the market, bigger multi-band radios began to appear. Then, for the first time in 1970, the police receiver poked its head out, almost simultaneously with the first "police scanners" from Regency and Electra. But Knight never produced a scanner kit and by that time the writing was already on the wall.

Allied was sold to Tandy (LTV) in the late 1960s and the new owners made the decision to terminate the kit portion of the business. There was internal talk about continuing the kit business in Japan, but the idea never materialized.

By 1970 Allied had changed significantly. The annual catalogs started dropping tube-type equipment and adding solid-state gear. Kits began to vanish, too. The Broadcaster was dropped by 1966 and never replaced. All of the kit ham gear was gone by 1970, save a couple of 6 meter rigs. The only shortwave radios left were the nameless R-195 communications receiver and the Star Roamer. The 1970 catalog was perhaps the last of its kind, owing primarily to the sale of the company to Tandy Corp., parent company of Radio Shack.

The industrial division of Allied continued to publish a large annual catalog, but the days of the big Allied Radio consumer catalog were at an end.

The smaller retail stores, usually found in malls, became Allied Radio Shack. These were disappointing days. The Radio Shack catalogs were little more than fattened-up circulars containing mostly low-cost electronics of questionable percentage. The quality of merchandise carried in the old Allied stores followed that trend, though for a time the stores still handled some pretty notable brands like Ampex and Wollensak tape decks, and products by Craig, Sony, Drake and Electro-voice. Yet that soon faded, too.

Of all the electronics kits produced by Knight Electronics, the Broadcaster perhaps had more impact on its builders than any of the others. It let you live a dream, and dreams have a way of taking flight. From the young boy barely able to read trying to produce his first newscast by reading a newspaper to his radio audience (parents in the next room), to the teenager who built a complete radio studio with turntable, tape machine, mic and a mixer... to the youthful experimenter creatively ignoring the instruction book to hang a really long, long wire antenna on the Broadcaster in an attempt to extend his signal. FCC? What FCC? The dream was made alive through that simple kit.

Building Electronics Kits Today

Though kit building is far from the popular hobby it once was, it is still possible to build something useful from a kit. In fact, a few of the big kit names are still around, or perhaps around again in a new form. Dynaco amplifier kits are available from Triode Electronics and Dynakit. Not surprisingly, Triode offers a grouping of tube-based audio kits, and replacement parts for original Dynaco products. Dynakit offers replicas of the original Dynaco amplifiers as well, along with replacement parts.

In the high-end audio arena you'll find Audio Note Kits, offering some rather serious audiophile products in kit form. Setting Google loose on the search "ham radio kits" unearthed a surprising list of things to build, even beyond the expected ham transmitters and receivers.

How about building a clock that uses an oscilloscope to display a simulated analog clock? Sound cool? At \$24.95, it did to me, too. Clearly, the Internet can open the kit world to you. Though the days of single large suppliers with big retail stores are gone, your virtual world is crammed with interesting projects.

Yes, the nostalgic days of kits in the mainstream may be gone, but the underground is huge. If you have even a mild interest in electronics ... oops, this is *Monitoring Times*! Sure you do! ... Go find a kit, set aside some quality time with your soldering iron, and build something!

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