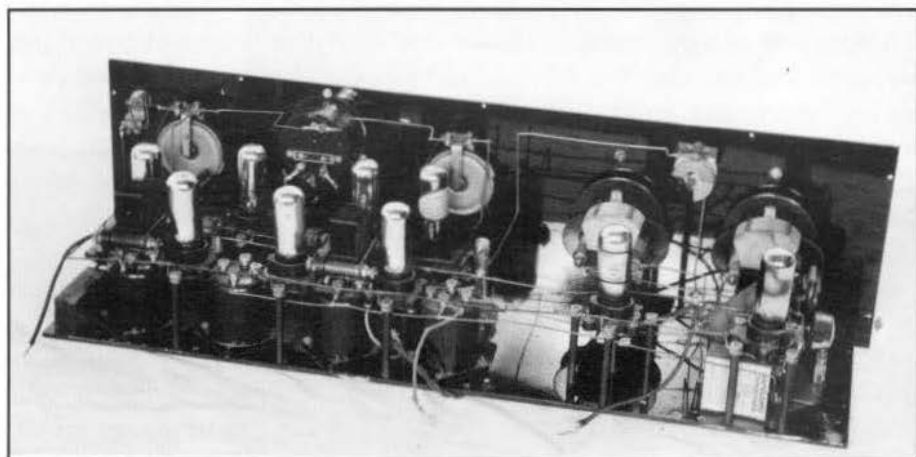




Figure 2. Front view of World's Record Super 9 kit. This set was based on the same design as the set Scott took to New Zealand in 1925.

Figure 2a. Rear view of World's Record Super 9 kit. Note the trimmer capacitors on the IFs, and the fiber posts to raise the tube sockets up to the IF transformers.



THE TECHNOLOGY OF THE E. H. SCOTT RADIO LABORATORIES

Kent A. King
Delaware, Ohio

INTRODUCTION

Ernest Humphrey Scott came to the United States following World War I. A native of New Zealand, Scott was a talented and motivated man, and he saw the U.S. as a place where he could easily pursue his interests in emerging technology. Ironically, Scott entered into the radio business somewhat by accident. One of the best accounts of the company's beginning was written by Scott himself in 1939:

"The business really started in 1924, the year I established four Verified World's Records for the reception of stations 6,000 to 9,000 miles distant, using a superheterodyne receiver incorporating a number of my own ideas. This reception record created world-wide attention, and the publicity given it was what practically forced me into the radio business.

"When these reception records were published in various radio magazines and newspapers throughout the country, I received hundreds of requests for information on the receiver that had accomplished this remarkable reception record, for in 1924 a receiver that would bring in programs from stations over 2,000 miles away was considered a good radio, but one that was powerful enough to bring in stations 6,000 to 9,000 miles distant was sensational.

"I wrote a small booklet giving information on how to construct my receiver, together with a list of the parts used, and sold over 700 copies of it at \$5.00 each. However, many of those who purchased the book and built the receiver, when they found they could not secure the kind of reception I secure with my receiver, called on me for advice and help to make their receiver perform like mine."

World Record Superheterodynes (8 and 9 Tube Models)

As Mr. Scott stated, he did not offer complete sets or even kits of parts initially. To build his set "by the book," there were a couple of components that Scott required the set builder to order from him. Otherwise, the parts required were widely available, including Thordarson audio transformers, Carter rheostats, Benjamin tube sockets, Sangamo condensers and a Jewell "double reading" panel meter. The first set described in the \$5 plan book also used Remler IF transformers.

**Build the Set That
Holds 4 World's Records**



The receiver that brought in stations 6,000 to 8,000 miles distant with loud speaker volume night after night.

Holds World's Records For

- (1) Longest distance ever received on a loop aerial—8,375 miles
- (2) Most consistent reception of stations 6,000 to 8,000 miles distant—117 programs in three months.
- (3) Brought in 6 different stations in 2 1/2 hours—all over 6,000 miles

Full sized blue prints with complete instructions showing how to make exact duplicate of this marvelous receiver.

PRICE \$5

Story of development and proofs of records sent on receipt of stamped and addressed envelope.

Scott Radio Laboratories
35 S. Dearborn St., Chicago
Dealers and Jobbers Write

Figure 1. *The earliest known national advertisement for Scott radios. From Radio Age magazine, November, 1925.*

Scott incorporated several unusual techniques into his set, and he attributed its fine performance to these features. First, the tube sockets are all mounted on posts of fiber rod, providing an almost direct connection from the sockets to the Remler IF transformers. Scott believed (correctly), that by reducing this distance he would realize fewer signal losses and reduce interference. The Scott circuit used two tuned and two untuned amplification stages, while most superheterodynes of the period used three untuned and only one tuned circuit. Scott felt (again correctly) that the second tuned circuit provided better selectivity. Even though the amplification was not as great, the set was still stronger than comparable sets of the day. Finally, Scott had spent considerable time testing radio components, and felt that his list of parts represented the finest materials available at the time.

Building a World Record Super was not cheap, however. Scott ultimately offered a complete kit of parts, including an engraved panel. Without a cabinet or tubes, the parts alone totaled over \$100. Adding tubes and a cabinet, the builder could easily find himself spending about \$125 for the Scott receiver. For this reason, and the fact that a set of this complexity was not easy to build, very few original World Record Super 9 sets exist today. Although Mr. Scott ran ads in a variety of magazines as early as November, 1925, he needed a means to get his designs into more set builder hands. Beginning in the spring of 1926, articles describing his receiver and plans to build it began to appear in several popular radio magazines.

The earliest magazine article discussing Scott radios appears in the April, 1926 edition of *On the Air*. Titled "The Quest for the Ideal Receiver," author Felix Anderson was obviously quite taken with the Scott receiver, as the article is a glowing revue of the set and its capabilities. The writer also emphasized the tonal quality of the radio, a feature that Scott would be most intent upon by the mid-1930s. Although not a construction article, a schematic is shown. It closely matches the original circuit described in the Scott \$5 plans, but the final audio (AF) stages use 201A tubes, rather than a pair of UX-220 tubes as shown in the original plans. (The article itself mentions a final AF of two UX-220 tubes, in contrast to the diagram.)

During these early days, Scott's address in advertisements and articles is listed as 35 S. Dearborn St., Chicago.

By the late summer of 1926 Scott was inundated with requests for plans, additional help and troubleshooting. One of the largest problems was the matching of the intermediate frequency (IF) transformers. Scott had quickly noted that the people who ordered "matched" sets of transformers were less likely to experience problems than those builders who had simply purchased plans, and bought parts elsewhere. Scott commented on this in his 1939 history:

"The secret of my original receiver's performance was the perfectly matched set of four I.F. transformers used in it, and also the fact that for the first time two tuned air core I.F. stages were used in the I.F. amplifier instead of what had been the standard practice up to that time - one tuned air core and three untuned iron core transformers. If these transformers were not perfectly matched, the performance of the receiver was no better than the ordinary set. As it was impossible for the set builder to secure matched sets of these transformers in stores that sold radio parts, I was practically forced to go into the business of supplying them, for at that time I had one of the few pieces of laboratory equipment in the country that was capable of matching these I.F. transformers."

By September, 1926, Scott ran his first ad for Selectone transformers in the *Citizen's Radio Callbook Magazine*. This ad is also the first appearance of "Scott Transformer Company," a name that Scott would use for the next five years. Scott had also moved into larger quarters at 9 S. Clinton St., Chicago.

Mr. Scott's notoriety allowed him to write a description of his set in *The Chicago Evening Post Radio Magazine*. In the issue for October 14, 1926, a ten-tube schematic is shown and described. This set is basically

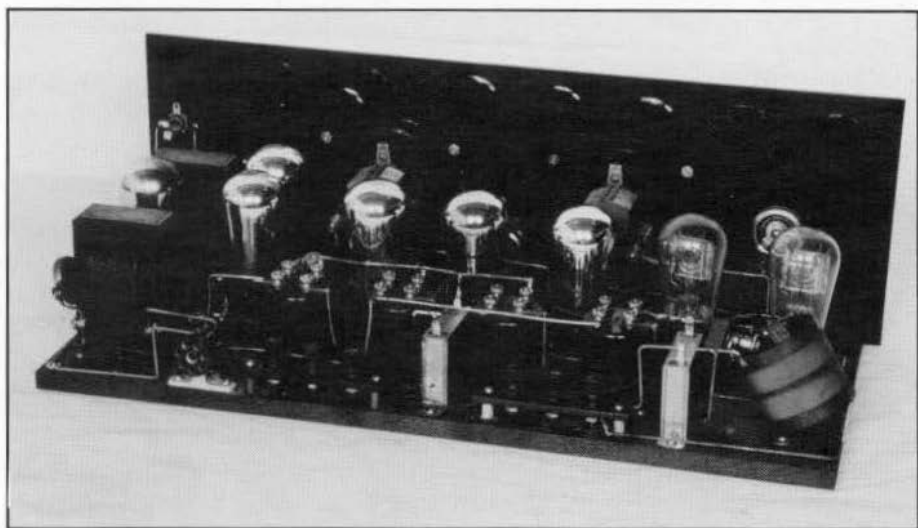


Figure 3. Rear view of World's Record Super 8. This is the first Scott to use the 201A tube throughout.

the same receiver as the earlier nine-tube sets, but has a parallel final output tube, which gives the ten-tube count. It is doubtful that this set is notably better than the earlier versions, except perhaps in battery consumption.

By this time, Mr. Scott had begun to establish a solid reputation for his World Record receiver. How Mr. Scott and the editors of *Radio Age Magazine* came together is unknown today, but Scott obtained considerable coverage in several articles that would generate volumes of business for the Scott Transformer Company in 1927.

***Radio Age*, November 1926**

Entitled "Radio Age Adapts World's Record Super To Storage Battery Use;" the article described the first of several eight-tube variations of Scott's circuit. The tube lineup of this set (and all subsequent eight-tube sets) includes an oscillator, the first detector, and three IF stages, a second detector and two AF stages. The *Radio Age* circuit is the first to show 201A tubes throughout, and suggests either a 112 or a 171 in the final audio stage, claiming this removes any need for a ninth tube. Most of the recommended parts follow previous lists, except that Yaxley rheostats are now specified.

The circuit varies only slightly from the original nine-tube set. In the first set, volume control was obtained by varying the filament voltage of the audio tubes. *Radio Age* added a rheostat across the plate circuit of the second IF tube, effectively grounding the signal. Additionally, the

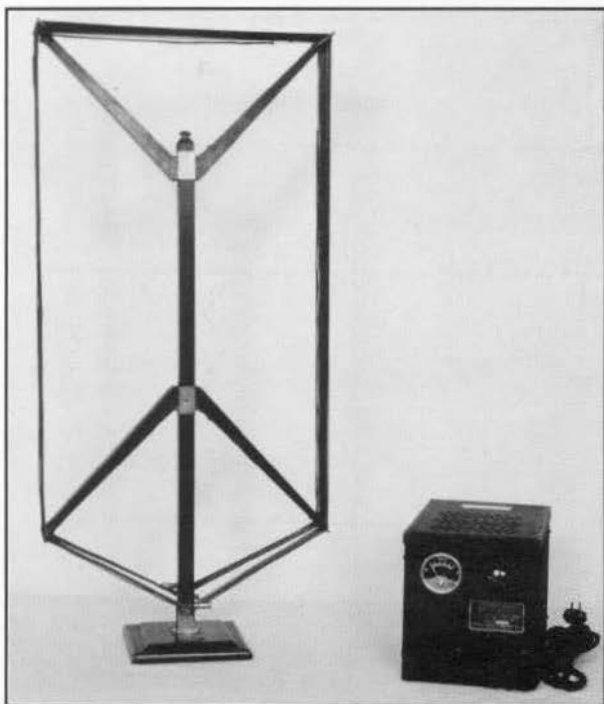


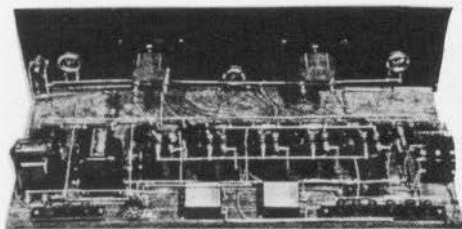
Figure 4.
*Qualitone loop
 antenna and
 Selectone 'A'
 eliminator, circa
 1927. Two
 essentials for
 operating a Scott
 super receiver.*

oscillator and final audio tubes were separated by individual Amperite regulating resistance units, providing better stability, particularly in the oscillator circuit.

Citizen's Radio Callbook, December 1926

Although it is unclear how much of the *Radio Age* design can be directly attributed to Mr. Scott, he obviously felt that an eight-tube design was worth promoting. For Christmas, 1926, Mr. Scott ran a two-page ad in *Citizen's Radio Callbook*. This is also the first ad showing Mr. Scott's new address at 7620 Eastlake Terrace. The ad ran in conjunction with a construction article, entitled "How to Build the Latest World's Record Super." The circuit is virtually identical to the *Radio Age* diagram, although the parts list specified Dubilier condensers, Frost tube sockets and Rauland "Lyric" audio transformers.

One of the most interesting items in the article is the extensive list of "extras" recommended for use with the World's Record Super. Among them are: a trickle charger manufactured by the Storad Mfg. Co. of Cleveland, OH (type 201), a Troubador speaker and the Qualitone loop, both manufactured by Duro Metal Products of Chicago, and cabinets by Signal Electric in Menominee, MI and the Charlotte Furniture Co.



SCOTT'S NEW WORLD'S RECORD SUPER 9 DISTANCE

The New World's Record Super 9 has power "to burn." It brings in distant stations and puts them on the speaker with almost unbelievable volume. It is designed by E. H. Scott who holds four verified World's Records for the reception of stations 6,000 miles or more distant.

SELECTIVITY

Today's conditions demand a receiver that is capable of bringing in without interference stations 10KC apart. The World's Record Super 9 uses five perfectly matched Selectone Long Wave Transformers, two of which are filters. These filters are sharply peaked to a 10KC cut off, thus giving maximum selectivity without cutting useful side band frequencies.

We Have Complete Sets of Parts for This Marvelous Receiver and Can Ship Your Order Promptly

Price for complete set of parts including drilled and engraved panel, \$91.15

FREE: Literature and Information Is Yours for the Asking
Hudson-Ross are headquarters for all leading circuits. Circuits are tested in our own laboratories and must meet a rigid test before we O. K. them for resale. LIBERAL DISCOUNTS TO THE TRADE.

HUDSON-ROSS, Inc.

116 S. Wells St., Chicago

The World Is Our Market—We Ship Everywhere

Figure 5. Hudson-Ross ad for Super 9, *Citizen's Radio Callbook* - March, 1927. Several suppliers offered variations on the Scott circuit to the kit builder.

Radio Age, January 1927

"Unprecedented interest" was how *Radio Age* described the reader response to the November, 1926 article. To satisfy this demand, the article "Full Data on Building World's Record Super 8" was published in the January, 1927 issue. The set is more completely described, and exact component layouts and panel drilling diagrams are provided. To further promote this set, Scott purchased a four-page advertisement for the World's Record 8 and the associated component manufacturers, including the Scott Transformer Co.

Around this time several other companies advertised plans and parts for building "World's Record" sets. The relationships between these companies and Scott are not known, but attest to the popularity of his receivers. Some examples include the M-S Syndicate in Cleveland, Ohio and Hudson-Ross, Inc., of Chicago.

Citizen's Radio Callbook, March 1927

In the March issue of *Citizen's Radio Callbook*, there is an article simply titled "World's Record Super Nine." This variation of the nine-tube circuit is significantly different from the earlier nine-tube sets, and

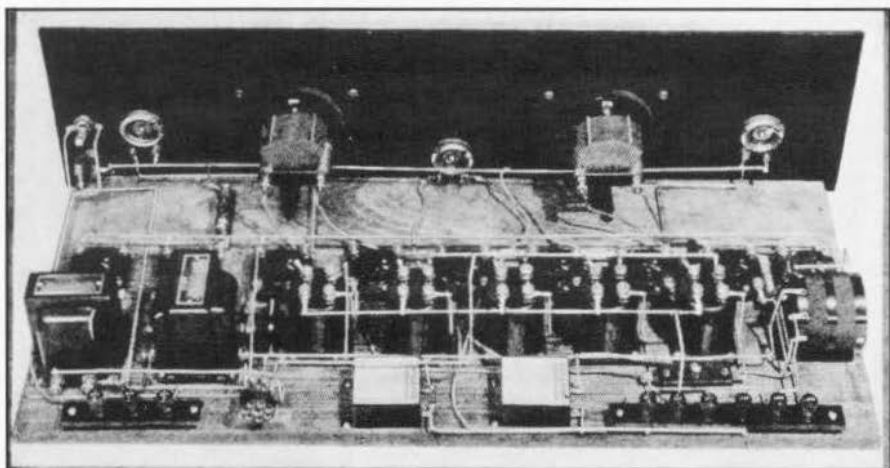


Figure 6. Rear view of Citizen's Radio Callbook set - March, 1927. An unusual variation using WX-12 tubes in the IF stages.

contains the most unique tube lineup of all the Scott battery receivers. Described as a "revised model" from the December, 1926 article, the major revision is the addition of a fourth IF stage. This is accomplished by using WX-12 tubes in the IF, supposedly to lower the grid to filament capacity, reducing the tendency to oscillate. The set uses filament controls for volume, and also returns to the lower ratio Thordarson audio transformers in the audio stages. Including the recommended type 171A final audio, the set uses 201A tubes for the oscillator, first and second detectors, and the first AF stage. Four WX-12s in the IF complete the nine tube lineup. The Qualitone loop is again recommended for use with this set.

Radio Age, March 1927

As if the "new" nine-tube set in *Citizen's Radio Callbook* wasn't enough, *Radio Age* associate editor F. A. Hill published an article in the March issue, entitled "Building Ideal Model of the World's Record Super 8." This article attempts to take the basic Scott circuit and presents the first "sub-panel" construction plan for the set. Previous sets in both *Radio Age* and *Citizen's Radio Callbook* had departed from one of Scott's major themes, short lead lengths to reduce capacitive effects. By using a sub-panel approach, placing the IF transformers underneath the main construction platform, leads between the Selectone transformers and the IF tubes were again brought to minimum lengths. The article also mentioned that the set worked quite well using a type 112 tube as the second detector, especially for strong stations.



TYPE B for Sub-Base Mounting

TYPE B-206. THE NEW SELECTONE HIGH GAIN INTERMEDIATE TRANSFORMER. Designed for use with Selectone Tone Filter. Scientifically tuned and laboratory matched to a precision of less than one-tenth of one per cent in frequency. Tuned for High Gain and voltage amplification which guarantees your reception at 100 stations. Price \$6.00.

TYPE B-216. THE SELECTONE B-216 FILTER is designed for use with High Gain Intermediate Transformer B-206. It is an accurately tested and matched unit designed to impart to the receiver the sharp tuning and selectivity necessary in receiving very long distances. Price \$6.00.

TYPE B-226. THESE RADIO FREQUENCY COUPLERS, listed as the Selectone RF Couplers, Type E-226, are an innovation in radio frequency design, each matched to within one-tenth of a cent of accuracy, enabling them not to be run or individually constructed tuning elements, without trouble in balancing. Price \$3.00.

TYPE B-236. A SPECIAL SELECTONE ANTENNA COUPLING UNIT designed for use with a Twin set of Selectone B-226 RF Couplers. Has a slightly lower inductance value than the B-226 to permit the use of a small variable capacitor across the secondary in addition to the main tuning capacity. For long distance tuning. Price \$2.00.



TYPE R for Baseboard Mounting

TYPE R-246. SELECTONE OSCILLATOR COUPLER. Triples the gain provided connections in all other Selectone products. Price \$3.00.

TYPE R-266. THE BASE MOUNTING HIGH GAIN SELECTONE B-266 is famous among radio enthusiasts for its exceptionally high voltage amplification with gratifying stability. Special shield case construction insulates tray, leads and coupling. Price \$6.00.

TYPE R-246. THE SELECTONE BASE MOUNTING FILTER, designed for use with the High Gain B-266 Intermediate Transformer. These three are precision matched with laboratory equipment, and enable 10 to 20 operation on local stations with great simplicity. Price \$6.00.

TYPE R-246. THE SELECTONE OSCILLATOR COUPLER, designed especially for use with the R series transformers. Price \$3.00.

Free Book

We will gladly mail you our booklet "The Story of Selectone Transformers," also complete building instructions on the World's Record Super" which receives that brings in 100 stations like yours.

Guaranteed Performance

Every Selectone transformer is fully covered by our money back guarantee. You need be satisfied or we return your money. Every set of transformers is given an actual operating test for time, selectivity and sensitivity (see the photograph below) securing perfect performance when you build them into your receiver.

Figure 7. Selectone transformer ad. Citizen's Radio Callbook - November, 1927. In addition to radios, Scott supplemented his sales with individual components.

Another interesting fact with this set is the recommended use of Silver-Marshall audio transformers. Scott's notorious rivalry with McMurdo-Silver did not begin until the 1930s. Since McMurdo Silver was a contributing author to *Radio Age*, it is unclear whether Mr. Scott approved this design change. It may be that the publishers of *Radio Age* used Silver's components to appease McMurdo Silver. This set also returned to Sangamo condensers in the parts list. It is very likely that component choices were significantly influenced by advertising revenue.

This same article also described a "171 Power Compact." The Power Compact is a "B" eliminator using an 85 ma QRS rectifier tube. The Compact also provides a 5V ac filament supply for the type 171A final audio tube. The user must still provide an "A" eliminator for the remaining tubes in the set. The article recommended using a Balkite battery charger, filtered by an "Abox" filter block, manufactured by the Abox Company of Chicago.

Radio Age, May-June 1927

This issue of *Radio Age* contains two articles of interest to Scott collectors. Mr. Hill wrote another article on "Using 9 Tubes on World's Record Super." The circuit is the same as the previous *Radio Age* article, with the addition of a fourth IF stage to make nine tubes. This is also the first sub-panel version of a nine-tube set. It is interesting to note that the parts list again returns to Thordarson audio transformers.

Perhaps more interesting than the construction article is the article on page three of the May-June issue. The article, "Trouble Shooting on Supers" is one of the earliest magazine articles written by Mr. Scott himself. The article is really a "cookbook" of solutions to common problems with any battery superheterodyne. Many of the problem descriptions are based on a Scott nine-tube diagram shown at the beginning of the article. The article is written for novices, but contains data seldom seen at that time, including bandpass curves for IF transformers. This article is quite helpful for the contemporary radio restorer.

Throughout the summer of 1927, Scott continued to advertise Selectone transformers, plans and parts kits to build the various eight- and nine - tube supers. In November, 1927, a final article, "World's Record Super Eight is Economy Model for 1928," appeared in *Citizen's Radio Callbook*. This set is very similar to the previous eight-tube sets, but does recommend Silver-Marshall audio transformers. For almost two years, Mr. Scott had been quite successful with a single basic set. In the fall of 1927, the handwriting was on the wall, as better circuit designs started appearing in various publications. Mr. Scott was ready to meet this challenge with his second major development, the World's Record Super 10.

World's Record Super 10 ***Citizen's Radio Callbook, September 1927***

With a flashy two-page ad on pages 78 and 79, and a detailed construction article beginning on page 92, Mr. Scott introduced the World's Record Super 10. The 10 shows major changes and improvements from the previous eight-and nine-tube sets. The greatest improvement in the World's Record Super 10 is in the "front end." For the first time, we see a Scott set with two stages of tuned RF. This is accomplished with the newly announced Remler "3-in-line" tuner. The tuned RF stages also eliminate the need for a loop antenna to create regeneration as in the previous design. Following the two RF stages, the signal is mixed with the oscillator output and fed into three IF stages. Following the second detector, there are two AF stages, the last being a type 210 power amp. With the additional RF stages and a 210 output, the World's Record Super 10 developed quality sound that was unmatched by other battery receivers of the period.

It is obvious from the plans that keeping the Scott Transformer Co. in business would be easier with the Super 10. The set required eight separate Selectone transformers, all being the new "sub-panel" mounting that Scott was producing. In addition to the Selectone transformers, this set returned to Benjamin sockets, Thordarson audios and Carter rheostats. The one new manufacturer on the parts list is Tobe condensers.

The list of sub-panel transformers required to build a World's Record Super 10 includes all of the following: B-500 IF Transformer, B-510

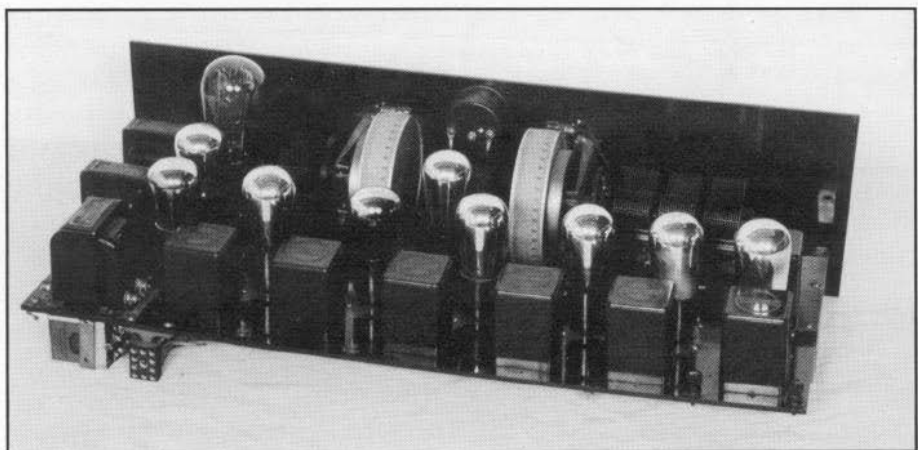


Figure 8. *World's Record Super 10.* Although heavily advertised, there are relatively few examples of the Super 10 in collections today.

Tuned Filter, B-520 RF Transformer, B-530 Antenna Coupler and a B-540 Oscillator Unit. In addition to the sub-panel transformers, Scott also offered the following baseboard mount units: R-400 or R-500 air-core and the R-410 or R-510 iron core. The oscillator coupler was also available in baseboard mounting.

Mr. Scott advertised the Super 10 heavily, running one-, two- and sometimes four-page ads in many radio magazines. He also managed to get larger number of magazines to carry construction plans for the set. World's Record Super 10 articles can be found in all of these publications:

Radio Listener's Guide and Call Book, September 1927.

Citizens' Radio Call Book, September 1927.

Radio Age, October 1927.

WCFL Radio Magazine, October 1927.

Radio News, November 1927.

Radio Listener's Guide and Call Book, December 1927.

Citizen's Radio Call Book, January 1928.

Radio Listener's Guide and Call Book, March 1928.

Radio World (series of articles), March 24, March 31 and April 7, 1928.

Although drawn in different styles, the basic circuit remained the same. Each magazine had some gimmick or modification to the basic set, however. The article in *Radio Listener's Guide and Callbook*, September, 1927, shows a 171A output tube, rather than the type 210. In the December issue, *Radio Listener's Guide and Callbook* provided plans for a "Light-Socket Operated World's Record Super 10." This set was quite unusual,

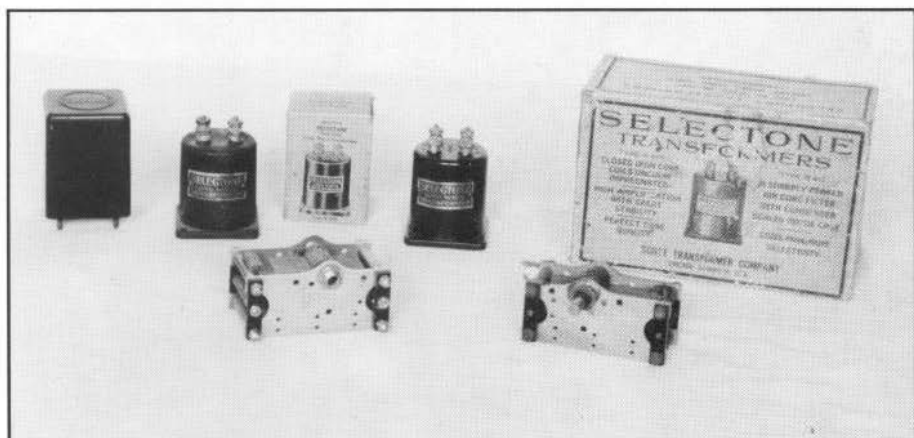


Figure 9. Assorted Selectone parts sold by Scott Transformer Co. The parts business was quite lucrative in the late 1920s.

using Sovereign ac tubes manufactured by Sovereign Electric & Manufacturing Company of Chicago. Plans for a complete “B” eliminator, which also provided filament voltage for the Sovereign tubes (and a type 210 output tube) were given. The Sovereign tubes used a cold cathode, so the diagram is somewhat different from the typical Super 10 schematic. The January, 1928 *Citizen's Radio Callbook* article described how to add a phonograph pickup to the audio section of the set. To boost the AF stages slightly, this article used a 112 tube as the first audio. The 1928 articles mention a Thordarson “A/B” power supply, using two 281 rectifier tubes. This supply also provided filament potential for the 210 output tube. The *Radio World* articles are of particular interest, since E. H. Scott authored them.

Radio parts catalogs and “wholesale” suppliers began to carry Scott sets in their catalogs as well. The Super 8 and Super 10 both appear in a 1928 Barawik Co. catalog. The Barawik catalog also advertises a “Selectone Two Stage RF Super Amplifier,” which will “increase the range of any super.” The list of parts is virtually the same as the RF section of the World's Record Super Ten, built on a bakelite panel approximately seven by eleven inches.

Although there are no sales figures available for 1925 or 1926, the large number of transformers required by the Super 10 obviously contributed to a good year. Scott sales in 1927 were just over \$32,000, which was certainly not bad for a “basement” business. The success of the World's Record Super 10 might allow Mr. Scott to sit back and reap the benefits and profits of another well designed radio receiver, but Mr. Scott was never one to sit still for very long. 1928 would be a very good year for Mr. Scott.

COMPETITIVE TEST

3 STAGES of SHIELD GRID
giving
140 GAIN
Per
STAGE

ONLY 1 Stage of AUDIO Necessary

Actual 10 KC. Selectivity

Shield Grid 9

More Actual Amplification • More Distance and Vol

E. H. SCOTT
The new
world record
set in our
history of
radio
receivers
is the
Shield Grid
9. It is a
new design
and has
been
designed
to give
the best
performance
possible.

Figure 10. Shield Grid 9 announcement ad, *Citizen's Radio Callbook* - March, 1928. Possibly a laboratory prototype, the set appears to be a hybrid from the Super 10 design.

Shield Grid 9

In the March, 1928 issue of *Citizen's Radio Callbook*, Scott announced a "great, new receiver." Looking only at the panel, the set would appear to be a World Record Super 10, but with a new name stenciled in the upper right corner of the panel: "Scott Shield Grid World's Record Super 9". Although no examples of this prototype version of the Shield Grid 9 are known to exist, enough of the set is shown in the ad to make some guesses as to its design and tube lineup. Three facts noted in the ad include "Only 1 stage of audio necessary," "Actual 10 K.C. Selectivity," and "3 Stages of shield grid giving 140 gain per stage." While the last claim is probably somewhat extravagant, it is quite likely that this receiver could obtain 10 kc selectivity.

While no schematic exists, the layout of the tubes and the claims gives us the following lineup: two stages of RF, using 201A tubes, similar to the World's Record Super 10. This is mixed with the oscillator output (another 201A) at the first detector. The first detector could be either a 201A or possibly a 240. The 240 was used in the later versions of the Shield Grid 9, and had been available almost a year (RCA introduction in February, 1927). The signal is then passed through the three IF stages, using the UX-222 screen grid tubes introduced by RCA just six months earlier, in October, 1927. The second detector is another 201A, followed by the single audio stage, which is most likely a type 112A or 171. The set is obviously a "battery" set, but that is hardly surprising, since ac

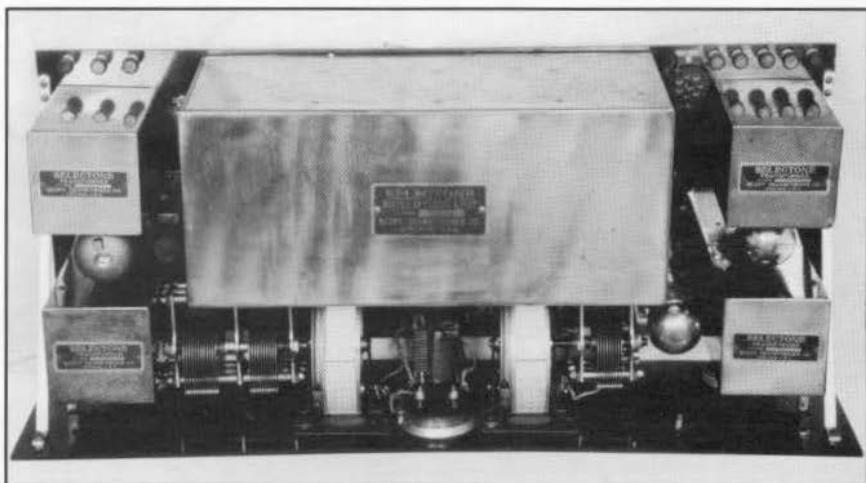


Figure 11. *Shield Grid 9. The first copper clad set sold through local "distributorships" across the country.*

tubes would not appear until later that year. This set appears in one other ad in *Radio News*, May, 1928. After that, we see nothing of the Shield Grid 9 until August.

In the August, 1928 issue of *Radio News*, the full page Scott ad is almost identical to the May ad, but the receiver shown is now the set that most collectors recognize as the Shield Grid 9. The front panel is changed, and the large copper IF section is visible. The other RF and AF transformers are enclosed in larger copper cans as well. Interestingly, the three major "claims" in the ad are now somewhat different. The claim of a single audio stage has been changed to "Can be built by anyone in 4 hours." The 10 kc. selectivity claim has been amended to include "Actual 10 kc. selectivity with perfect tone quality." The 140 gain per stage claim has been changed to "3 stage shield grid amplifier gives tremendous gain." Apparently, the rather extravagant claim of 140 gain was at least somewhat questionable. The ad also mentioned the availability of a new power supply amplifier, using a type 250 output tube. Scott's intention was obviously to enter the AC-set market as quickly as possible.

The August *Radio News* ad is notable for another reason: For the first time, we see Scott has moved his operation to the famed Ravenswood Avenue address on Chicago's north side. Scott would remain in the building at Ravenswood and Sunnyside until he retired from the company following World War II. Early ads give the address on Ravenswood as 4446-4448. Later, Scott advertised from 4450 Ravenswood, the address most Scott collectors recognize today.

The first full description of the Shield Grid 9, and a wiring diagram, appear in the September, 1928, issue of the *Citizen's Radio Callbook*. The final design of the Shield Grid 9 shows that Scott has used only a

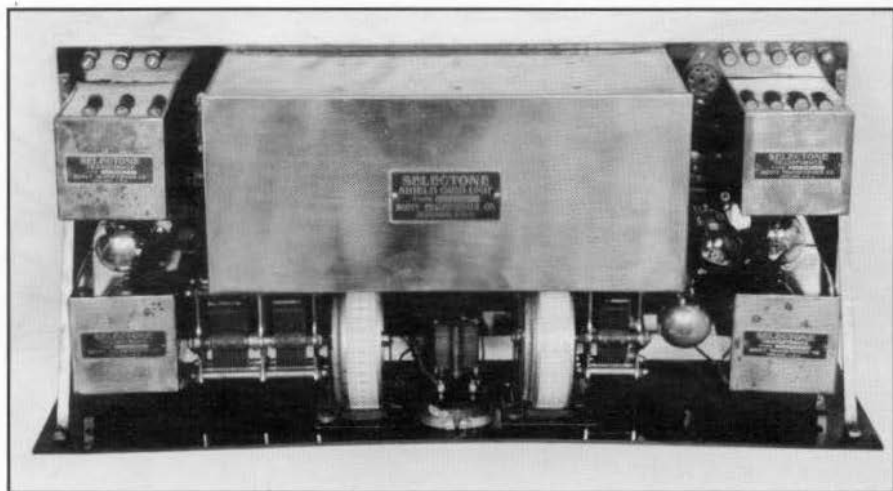


Figure 12. *Shield Grid 9B, a battery-only version of the Shield Grid 9.*

single RF stage, with a small amount of regenerative signal returned from the first detector. The set actually has only eight tubes on the chassis: RF (201A), oscillator (201A), first detector (240), three IF stages (222), the second detector (201A) and an audio stage (112A). The ninth tube is the type 250 final audio on the power supply unit. Scott did not count the rectifier tubes at this time (two type 281 half-wave rectifiers). For the kit builder, the IF unit came as a single, factory sealed installation. The wiring of the set was therefore greatly simplified, and IF alignment problems were eliminated. It is quite likely that a competent kit builder could meet Scott's claim of four hours to build.

Scott continued to promote the Shield Grid 9 with construction articles in several radio magazines. *Radio Listener's Guide and Callbook* had articles on the Shield Grid 9 in both their September and November issues. Scott also ran another article in the November, 1928 issue of *Citizen's Radio Callbook*. This article introduced a slightly different version, called the Shield Grid 9B. Apparently, many of Scott's customers were still without a source of ac power in their homes. The 9B is a fully battery operated version of the Shield Grid 9, with nine tubes on the tuner chassis. Scott's 9B is almost identical to the original 9, but the audio transformer (Scott designation #640) is replaced with a "double audio transformer," designation #641. (The article mistakenly refers to this as the #645 unit, but the parts list and known sets all contain a #641 transformer.) Early samples of the #641 transformer are in a wider than normal, black transformer casing. Later sets have the #641 transformer in a matching copper can. A final audio stage using a 171A output tube

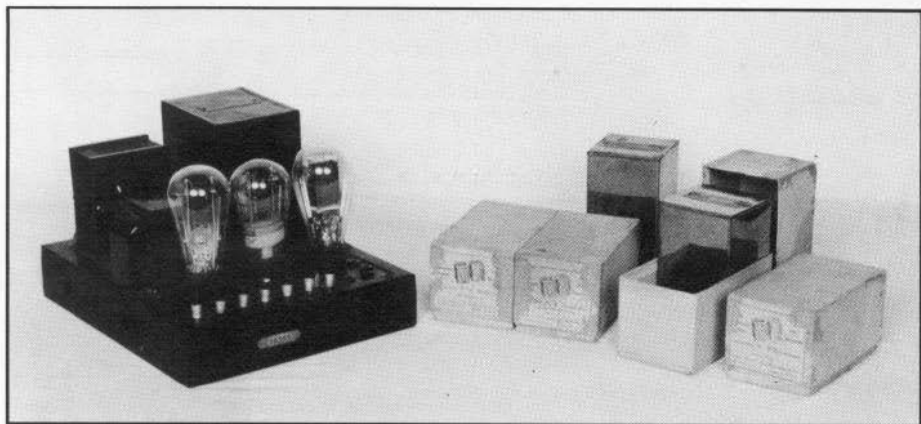


Figure 13. *Shield Grid 9 coils and external power supply. Both items are difficult to locate today.*

is wedged onto the chassis. With this arrangement, full loudspeaker volume is available without the use of the power supply/amplifier unit.

In each of these articles, we see Scott's earliest attempt to capture a new market: The Shield Grid 9 receiver is able to operate not only in the broadcast band (200-550 meters), but also in several short-wave (SW) bands. Three of the square copper cans are actually plug in coils (the can at the right rear of the chassis is the unmoving audio transformer). Interestingly, each article seems to mention a different availability for the SW bands. The *Citizen's Radio Callbook* November article states that coils are available for the 20-50 meter and 35-90 meter ranges (about 6 to 15 MHz and 3 to 8 MHz respectively). The *Radio Listener's Guide and Callbook* article mentions coils for 80, 40 and 20 meters. A W.C. Braun radio parts catalog shows coils for 70-210 m and 30-75 m. (About 1.5 to 4 MHz and 4 to 10 MHz.) Very few SW coils are known to exist today. One existing set, marked as noted in the W.C. Braun catalog, test very closely to the ranges specified in the catalog.

Scott claimed that the Shield Grid 9 was the first truly "All-wave" radio offered to the radio public. The Shield Grid 9 was certainly a very popular set for Scott, and must have sold fairly well, as quite a few examples exist in collections today. Sales figures for 1928 also bear out the popularity of the Shield Grid 9. Sales increased over 500%, totaling \$175,000 in 1928. However, the ac power capability of the set was not a truly "built-in" feature. By the 1928 Christmas season, most large manufacturers were offering fully integrated ac sets. So, in less than a year, Scott found his Shield Grid 9 receiver trailing slightly behind the leaders in ac power. A fully dedicated ac set was needed from the Scott Transformer Company.

Designer of receivers holding practically all the world's records.

The New South Wales Record A.C. Nine which again reports: "An answered challenge to the whole world of radio to equal its performance in any kind of competitive test, is now improved by the embodiment of *Single Dial Control*. Now, by merely pointing into your light socket and turning the dial, you can select any station within 10 kilocycles of any other station is brought in with thunderous volume and with vigorous, life-like, full-bodied tone. Anyone can turn the clock hand to any station and hear the music and its self-detracted but lively range and cover the millions of miles of distant stations with the same ease and accuracy as one might change—perfectly stable on basis—any of the 400 radio stations on the air. Truly, it is all the history, radio has ever offered so much as is available, by this latest one.

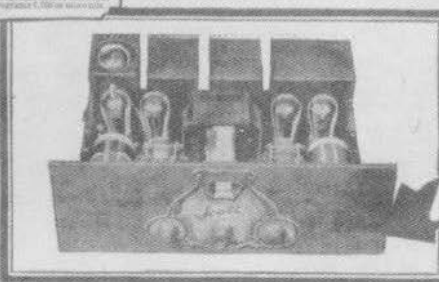
Scott Receivers are designed for those who have tried other receivers and are now looking for something BETTER. They are custom built to your needs and are sold only thru Radio Technicians carefully selected by the Scott Television Company. The Radio Technicians are trained in the Scott system and have the practical knowledge to select the right Scott Receiver for you. They will also give you a free demonstration of the Scott Receiver and will tell you more about the Scott Receiver for you. Trust the Radio Technicians to select the Scott Receiver that will give you the full satisfaction and the nation's many local radio dealers.

Needlers

Q1 A world's record for number of stitches made in 10 minutes by a woman is 1,000 stitches.
1 stitch = 1/100 of an inch.
How many inches of fabric did she stitch in 10 minutes?

Q1 A world's record for number of stitches made in 10 minutes by a woman is 1,000 stitches.
1 stitch = 1/100 of an inch.
How many inches of fabric did she stitch in 10 minutes?

THIS is the New Scott World's Record A.C. Nine with the Single Dial Control. The intermediate amplifier is completely shielded. The appearance of the receiver is that of the fine precision instrument which it is.



To meet the demand for a better performing custom built small receiver which is low in price but high in performance,

To meet the demand for a better performing custom built small receiver which is low in price but high in performance.

The new Scott

Symphony was created. One stage of Shield-Geral Amplification is used, modeling it the equal to many note tube sets and is surpassed in general performance. One dial control—easy tuned to the same quality standard—guarantees of superior

only by the new Scott World's Record A.C. Nine. One dial control—easy to use out the back and brings in distant stations. Engineered to the same quality standards as the nine tube model and backed with the same unqualified guarantee of superior performance and complete satisfaction.

Self-contained power supply in A.C. Model

The D.C. Model of the Scott Supply is equipped with built-in A.C. power supply which supplies filament, plate and grid current to all A.C. tubes used and the 17A power tube. The D.C. Model is so designed electrically, that its current consumption is extremely low, thereby making it the ideal receiver for sections where A.C. current is NOT available or where it is desired to save batteries.

SCOTT

Figure 14. The AC 9/Symphony ad, Radio Listener's Guide - April, 1929. Scott's first venture into ac operated receivers.

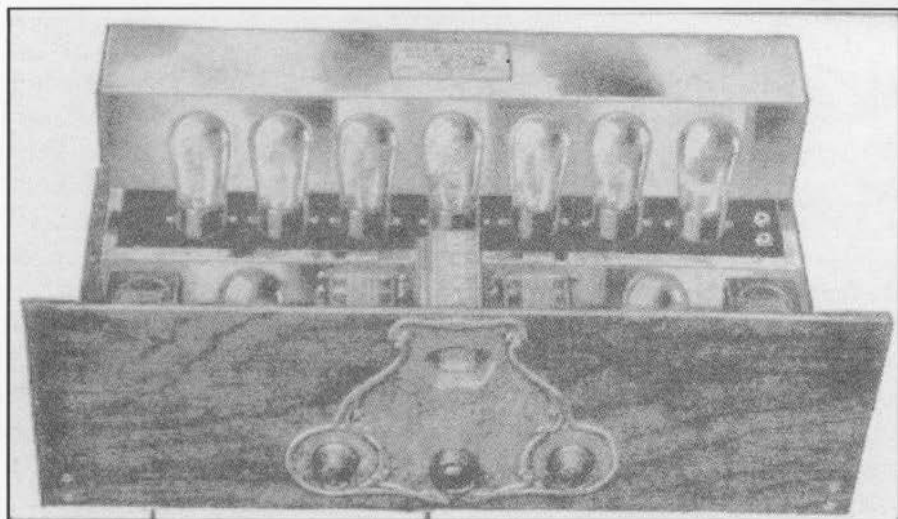


Figure 15. *AC 9 receiver. A unique set, unknown in contemporary collections. (Enhanced view from advertisement.)*

The First AC Only Receivers

A most unusual and informative ad appeared in at least two publications in the spring of 1929. The April issue of *Radio Listener's Guide and Callbook*, and the May issue of *Radio News* both contain a flashy two-page ad for two new Scott "AC" receivers. Dubbed the World's Record AC 9 and the Symphony, these are perhaps the rarest of the pre-chrome Scott sets. Indeed, the author is unaware of any AC 9 receivers in any collection at this writing. There is no other documentation available on the AC 9, and very little on the Symphony.

Worlds Record AC 9

The picture of the AC 9 in the ad shows a rather unique receiver. The tube lineup shows no tubes with grid caps. This leaves one to assume that the set is probably mostly type 27 tubes, except for the output stage, which is likely a type 71A. Two tubes are located adjacent to the tuner in the center of the chassis. Most likely, these are an RF stage and the oscillator. The seven remaining tubes are situated in a line on a slightly raised platform just in front of the "completely shielded intermediate amplifier." This row would include the first detector, three IF stages, a second detector and two audio stages. No mention is made of a separate power supply, but as there is no power transformer on this chassis, the set would probably have had an external supply unit. A close approximation of this circuit would probably be the RCA Radiola 60.

Symphony

Pictured in the same advertisement is the "4 tube" ac Symphony. The Symphony has the distinction of being the only receiver ever offered by Scott that was not a superheterodyne design. Although not a superhet, the Symphony once again shows Mr. Scott pushing the technology of the day to its limits. On April 20, 1929, RCA announced the 224 tube, an ac version of the popular screen grid 222. Scott, however, had beaten RCA to the game: The Symphony ac incorporates a type-222 ac tube, manufactured by the Shieldplate Tube Co., Inc., of Chicago. This tube is electrically almost identical to the 224, but had been introduced in late 1928. Scott used the shield grid tube as the RF amplifier in a highly unusual regenerative circuit. The regeneration is returned from the type-27 detector, via inductive coupling. The remaining tubes are both audio stages, a 27 in the first stage driving a 71A output. The audio transformer used is designated #640-2, and is the same as the double audio transformer on the Shield Grid 9B. The power supply contains a type-80 rectifier, but Scott was not counting rectifier tubes in his lineups quite yet.

The Symphony definitely does not perform as well as previous Scott sets. By all accounts Mr. Scott was not totally pleased with the Symphony, and his lack of enthusiasm is reflected in the very small amount of advertising seen for this set. Although the Symphony does not appear again in magazine advertising, the 1929 Scott full line catalog does show the ac version. Given the numbers that survive in collections today, it is doubtful that Scott sold many of these receivers. The performance of the DC Symphony is unknown, as no known examples exist in contemporary collections. One document states that the DC Symphony required three 01A tubes and a type-71 output, but little more is known.

Worlds Record AC 10

In July, 1929, Hugo Gernsback launched his newest radio magazine, *Radio Craft*. In the premier edition, we find a column ad announcing the new Scott Shield Grid ac 10. A two-page ad also appeared in the July issue of *Radio* magazine, and by September, a complete article and two-page advertisements appeared in the *Citizen's Radio Callbook*. As described in the Callbook article, the AC 10 uses type 224 tubes for the first three IF stages. All other tubes on the tuner chassis are type 27 (oscillator, first and second detectors, fourth IF stage and first audio stage. Final audio amplification is on the power supply, using two of the relatively new type-45 output tubes in push-pull. The two type-80 rectifiers are not counted in Scott's lineup. The amplifier is designed to feed an eight-inch electro-dynamic speaker. At this time, Scott obtained speakers from the

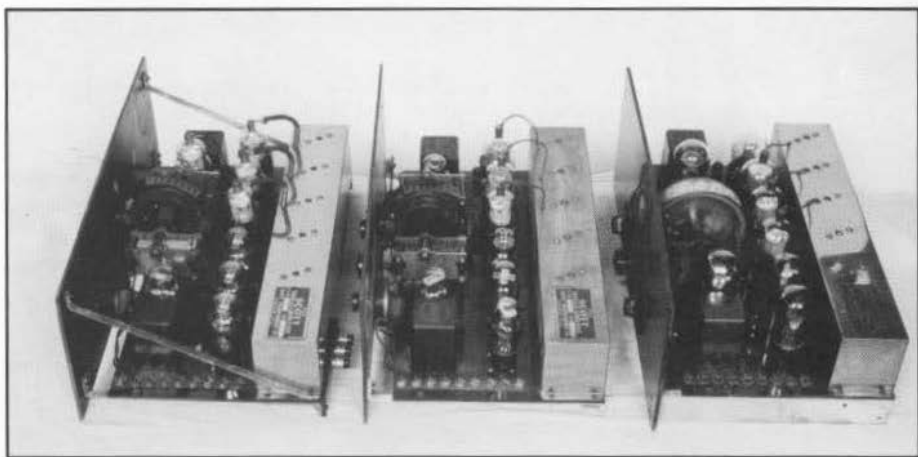


Figure 16. *Three different AC 10 tuner chassis — earliest chassis on right, newest to left. The AC 10 underwent numerous modifications during its two-year run.*

Rola company, but had decals applied to the speaker showing the Scott name.

The AC 10 circuit has a number of changes from the previous designs. Scott has eliminated the separate RF stage, mixing the antenna transformer directly with the oscillator output. Volume control is obtained by varying the cathode bias on the common connection between the three type 24 IF tubes. The set contains a fourth IF stage, and the IF line is peaked at a somewhat non-standard 480 kc. The compatibility of the 222AC and the type-24 tube is also evidenced in the AC 10. One apparently early schematic of the tuner chassis clearly shows 222 ac tubes for the first three IF stages.

The AC 10 survived from its 1929 introduction through the fall of 1930, slightly over a year. Although it coincides with the stock market crash and the onset of the Great Depression, the AC 10 sold well, and underwent some modifications during this time. The first versions of the set sported a large, bronzed face plate covering the entire area around the tuning window and controls. Later versions have a much smaller dial scale, and use a small bronze escutcheon shaped like an inverted cathedral. In early 1930, the circuit was upgraded to use a type-24 tube as the first detector. Additionally, the volume control was extended from biasing the three IF stages to include the cathode of the first detector. The result was a slightly more responsive volume control action. Finally, the transformer coupling between the second detector and the first AF stage was replaced by a resistance coupling, probably to reduce parts costs. The power supply also received an upgrade. The rectifier was reduced to a single 80 tube, and a type-12-20 line regulator tube was added to improve set voltage stability.



Figure 17. AC 10 power supply and speaker. Rola built the speaker, but has a Scott decal applied.

Although the AC 10 enjoyed a long life (as Scott sets go), its success was undoubtedly helped by the variety of accessories that Scott offered for the AC 10. One of these was an "outboard" short-wave converter. Packaged in a copper case not quite six inches square, the short-wave converter used three coils to cover wavelengths from 3.9 Mc to just over 20 Mc (36-76m, 23-40m and 14-25m). User operation wasn't trivial, requiring the user to remove the oscillator tube altogether, and move the first detector from the set to the converter. The converter then plugged in to the first detector socket, and the set was tuned only from the converter.



Figure 18. Short-wave converter and coils. There are two variations of the converter, one with a 4-prong connector for dc sets, and one with 5 prongs for ac sets.

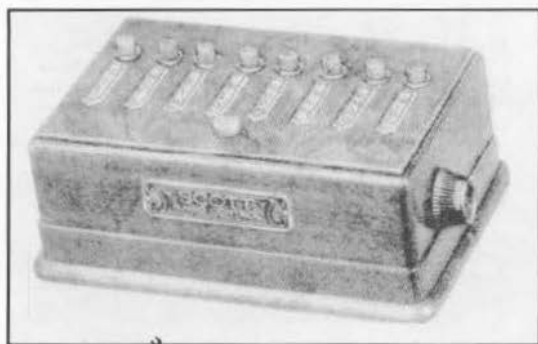


Figure 19. AC 10 remote control. Remote-tuning coils and switches are contained in an attractive walnut box.

Sales literature also states that a dc version of the short-wave converter was produced, to be used with the Shield Grid 9 sets. Why this was done instead of the existing plug-in coils is unknown today, although the performance of the converter might have been better (and covered a wider range) than the Shield Grid 9 coils previously offered.

Another notable accessory for the AC 10 was a remote control. This was not a mechanical remote, but rather an electrical one, have a set of tuned coils to allow user selection of up to eight preset stations. Housed in a walnut box about the size of a cigar box, the first Scott remote control was both functional and unobtrusive. This remote was heavily advertised, appearing in several magazines in the spring of 1930. *Citizen's Radio Callbook* also ran an article "Scott Designs Remote Control for His Screen Grid Super" in the March, 1930 issue.

In addition to the remote control and the short-wave converter, a January, 1930 order form listed the following accessories: A walnut cabinet with dynamic speaker at \$60, a console electro-magnetic speaker at \$15, a Scott radio bench (similar to a piano bench) at \$22, and the short-wave converter and remote control at \$32.50 and \$50 respectively. Given the relatively small volume of Scott sets, these new accessories undoubtedly helped Scott greatly in getting through the first difficult year of the Depression.

Automobile Radio

Another area that Scott delved into rather briefly during this time was automobile radios. Scott was quite qualified to work in this realm, as during World War I he was a troubleshooter of motor vehicles, and patented and built a service device called the Telecator. He had, therefore, a solid understanding of the difficulties in placing electronics in motor vehicles. The only reference to auto radios is found in the September, 1930 issue of the *Citizen's Radio Callbook*. In a single page article entitled "Superheterodyne Circuit Adapted for Automobile Radio Receiver." Scott described his automobile radio.



Figure 20. *Dynamic speaker for the AC 10. The first Scott-sanctioned speaker cabinet available.*

The set is battery operated, obtaining "A" voltage from the ignition battery, and with the "B" cells in the back. The antenna could be either a copper mesh in the ceiling or a wire hidden in the running board. A small schematic is given, showing the following tubes: two type-27 tubes in the oscillator and second detector, three type-24 tubes for the first detector and two IF stages, a 71A as the first audio stage and a 45 as the final audio. Even using these seven tubes, Scott claimed the set only drew 25 mA from the "B" cells. The article leads one to believe that several versions might have been built. The last paragraph states that "later models of the receiver show change in that a 227 tube is used for the first audio, and a 171A for the output instead of the combination shown in the diagram." The article also mentions that a special water- and dust-proof Utah magnetic speaker is used with the set.

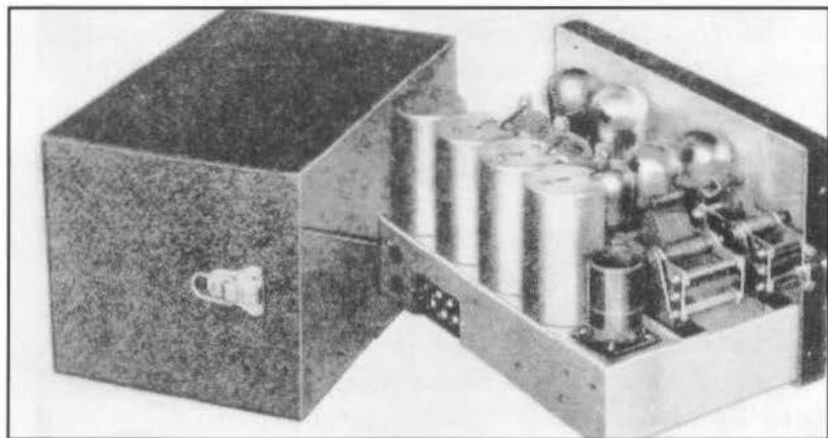
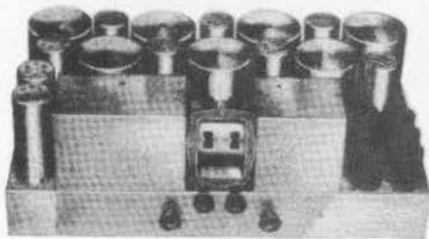


Figure 21. *Scott automobile radio. Whether these were ever produced in any quantity is unknown.*

HERE IT IS!

The New 1931

SCOTT ALL WAVE SUPERHETERODYNE



Our new model is just the receiver thousands have been looking for. The main points are:

- | | |
|---|---|
| (1) Operates entirely from the A.C. line. | (5) 18 K.C. selectivity over complete broadcast band. |
| (2) Completely shielded. | (6) Sensitivity so great distance range is practically unlimited. |
| (3) Covers all wavelengths from 15 to 350 meters. | (7) Full natural tone—not a trace of distortion. |
| (4) Tunes as easily and smoothly on the short waves as it does on the broadcast band. | |

WRITE FOR FULL INFORMATION

THE SCOTT TRANSFORMER COMPANY
4450 Ravenswood Avenue ☿ ☿ ☿ Chicago, Illinois

Figure 22. *Early Allwave chassis, Citizen's Radio Callbook - November, 1930. The final design did not allow sufficient room for coil storage on the chassis.*

Chrome Beginnings

Up to this point in time, Mr. Scott had sold all of his sets through custom "kit-builder" offerings. Scott promised "protected" territories, and strong incentives to sell, assemble and install his radios in a specific area. This also had another welcome (but planned) side effect. By selling kits, Scott was not running afoul of the harshly protected RCA superheterodyne patents. Scott sales continued to improve, rising to \$385,000 in 1929.

The Depression was taking its toll on America, however. Scott's sales were down noticeably, and would total only \$235,000 for 1930. This gave Mr. Scott his first year of decreased sales since his start in radio. Mr. Scott realized that he needed a set that could be sold and installed directly by the consumer. During the summer of 1930, Scott and his staff designed what would become the first of the famed chrome chassis receivers. In building this set, they would also receive the attentions of David Sarnoff's giant legal machine.

All-Wave Superheterodyne

Mr. Scott's first entry into the assembled radio business was also the first chrome chassis set built by the Scott Transformer Company. Announced in the October, 1930 issue of "*The Scott News*," a prototype is shown, with a number of variations from the more widely recognized version of this set. This chassis is arranged differently, allowing room for six holes on the right side of the chassis. These holes were the holders

for three pairs of short-wave coils accompanying the radio. Outside of the description in *The Scott News*, and what appears to be the same picture in the November, 1930 issue of *Citizen's Radio Callbook*, no other mention (or examples) of this set are known. The frequency coverage of this set is also questionable. In a January, 1931 article in *Citizen's Radio Callbook*, coil ranges are listed as follows: 15-21m, 21-31m, 31-51m, 51-105m, 105-200m and the AM band from 200-545m. This selection of frequency coverage apparently changed almost immediately. All subsequent magazine articles and the coils found with sets today cover: 15-21m, 21-27m, 27-38m, 38-84m, 84-184m and the broadcast coils from 200-550m. The small gap in coverage in the latter coil list would allow for the 470 kc intermediate frequency of this set.

Using the short-wave bands on the 1931 "All-Wave" is somewhat tedious. Two coils (oscillator and RF) must be replaced, and two grid caps must be changed for some of the bands. Also, the set does not operate correctly on the short-wave bands if the coil covers over the two replaceable coils are present. To keep the user from placing the wrong coil in the wrong socket, some sets had a four-pin coil form for the oscillator (with a center pin to close a contact switch on some wavebands). The RF coil is wound on a five-pin form. Other sets used the same five-pin coil forms for both coils, but one of the oscillator socket holes on the chassis was riveted shut to prevent insertion of the wrong coil. Some of the very last sets saw a minor improvement in the short wave operation: Scott added a contact switch under the RF plug-in coil. This allowed a single grid cap lead to the RF tube, making the correct setup and operation less tedious (and less error prone) for the user.

In addition to numerous one- and two-page ads in popular radio magazines (*Radio News*, *Radio Craft*, *Citizen's Radio Callbook*, *Radio Callbook Magazine* and *Technical Review*, *Short Wave Craft* and others), several reviews and articles were written about the Scott "All-Wave." *Radio News* ran a two-part article entitled "Stepping Out for World-Wide Reception" in the June, and July (1931) issues. The June article also mentions a unique accessory, the microphone/phono control box. This allowed the user to make pressed recordings using the All-Wave amplifier, in addition to the phonograph connections. *Radio Craft* has an article on "The New Scott All-Wave Superheterodyne" in the July, 1931 issue. This was followed by a DX report written by Marcellus Gernsback, appearing in the September, 1931 issue of *Radio Craft*. Gernsback was very complimentary of the tone and tuning ability of his test receiver. Not to be out-done, *Radio News* ran a DX article "Experimental Reception On the World's Tallest Structure" in the November, 1931 issue. (At that time, the tallest structure was the Empire State Building.) Finally, *Radio*



Figure 23. Allwave tuner and coil set. The first chrome chassis from Scott. The tube shields and coil covers are brushed aluminum, however.

Callbook Magazine and *Technical Review* had a brief analysis in their December issue, including a variety of sensitivity and selectivity curves. Heavy advertising of the 1931 Allwave continued through June, 1932.

The eighteen-month run of the Allwave is notable for any Scott receiver. However, it underwent remarkably few changes during its life. None of the published schematics vary significantly, and the tube lineup remained the same. This included type-24 tubes in the RF, first detector and all three IF stages and type-27 tubes for the oscillator, second detector and a push-pull first audio stage. The three remaining tubes in the 12-tube count are the 80 rectifier and the two push-pull type-45 outputs on the power supply. The set slightly predates the development of an automatic volume control (AVC) circuit. Volume control was obtained by varying the bias voltage on the screens of all the 24 tubes.

Having had some success with “add-ons” and accessories, Scott offered several options to buyers of the Allwave. One is the aforementioned microphone control box, while another was the auditorium amplifier and speaker. The “typical” set came with a large (12”) Rola speaker, with the Scott decal applied. The auditorium option included a larger power supply/amplifier using two type-81 half-wave rectifiers, providing sufficient power to run a pair of push-pull type-50 tubes. The speaker was also upgraded to a heavier pedestal unit. The speaker manufacturer of the pedestal unit is unknown, as no “auditorium” versions of the Allwave have yet been found. Scott also offered a 470 kc test oscillator, and the IF coils on the Allwave are user adjustable. This probably caused frequent service requests to the factory, and all subsequent Scott sets have the IF adjustments well removed from the user.

Although this was Scott’s first chrome chassis receiver, this set differs from all the later chrome sets. On the All-Wave Superheterodyne, the

coil covers and tube shields are brushed aluminum. The chassis and rectangular covers over the tuning capacitors are the only chromed parts of the tuner chassis. The power supply is chromed, but the core of the power transformer is exposed. All later sets have a chrome band between the outer plates to completely hide the transformer core. As previously mentioned, the IF adjustments are available to the user; later sets would not be as easy to adjust.

Even in the depths of the Great Depression, the new Allwave Superheterodyne proved very popular. Scott sales rebounded to \$458,000 in 1931, not quite doubling the 1930 sales figures. However, sales of almost ½ million dollars, and a completely assembled superheterodyne receiver were noticed by RCA. Mr. Scott now had the undivided attention of RCA and their large staff of patent litigation attorneys.

The Patent Situation

During the 1920s, RCA gathered together a large number of key radio patents from GE, Westinghouse, AT&T and their own efforts, and forced many manufacturers to obtain licenses. The primary focus was on large (in excess of a million dollars) corporations, and in fact Crosley, Atwater-Kent, Grebe and many others signed with RCA in the latter half of the 1920s. By offering kit or "custom-builder" sets, and due to relatively small sales volume, Scott remained unnoticed until the introduction of the Allwave Superheterodyne. With this set, RCA took notice, and was probably even more angered that Scott was selling a superheterodyne, since those patents were generally not included in the 1920s licenses. In 1932, RCA took Scott to court, but the case was settled amicably, and Scott now had access to about 140 key patents and designs. Scott also signed with Hazeltine for their patent rights, and so had a free hand in radio design for the remainder of the decade.

Another change at the E. H. Scott Radio Laboratories was the addition of a full-time Chief Engineer. Up to this time most set designs were a collaborative effort between Mr. Scott, Clifford Coon and Arthur Finney, both long time Scott employees. Although the Allwave Superheterodyne was an unparalleled success for the company, the dual dial tuning, plug-in coils and antenna matching all needed significant improvement. In 1932 Scott hired Ernest R. Pfaff away from Silver-Marshall. Pfaff had extensive design experience, having worked for Western Electric and Temple Radio prior to working at Silver-Marshall. Mr. Pfaff's influence was felt almost immediately with the announcement of the Allwave 12 Deluxe in May, 1932.

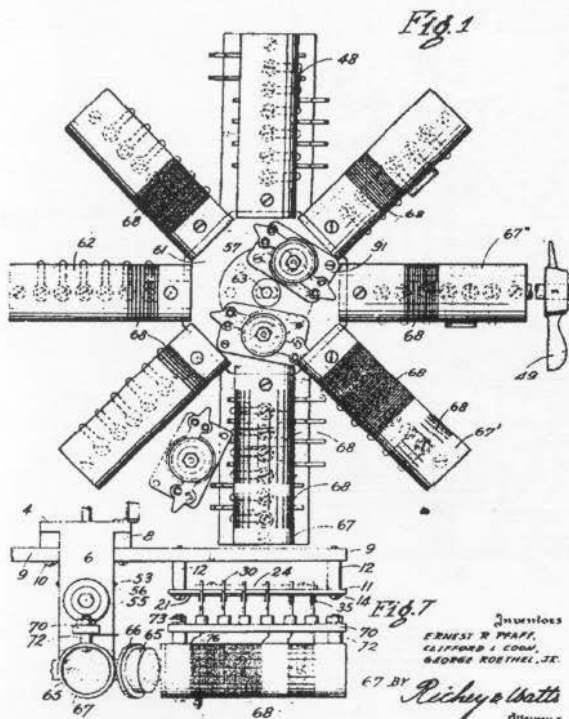


Figure 24. Turret-tuner patent diagrams. This eliminated the plug-in coils and other changes to receive multiple wavelengths.

Allwave Deluxe

The Deluxe model announced in 1932 immediately solved two of the most visible problems with the Allwave. First, the plug-in coils were eliminated by using the new turret tuner designed by Mr. Pfaff. The tuner system resulted in patents #1,986,525 and #2,035,668. A single-dial control was also developed, and Mr. Scott's mechanical engineer, George Roethel, Jr., designed a positive-motion tuning drive with unmeasurable "lost motion" between components. The dial mechanism was also patented, a few months after the turret tuner patents. The first widely publicized picture of the Allwave 12 Deluxe appears in the July, 1932 issue of every major radio magazine.

The circuitry of the Deluxe model is quite similar to the 1931 Allwave. A type 51 replaced the type-24 RF tube. The type-27 tubes are all replaced by the newer type-56 triode. The power supply/amplifier is almost

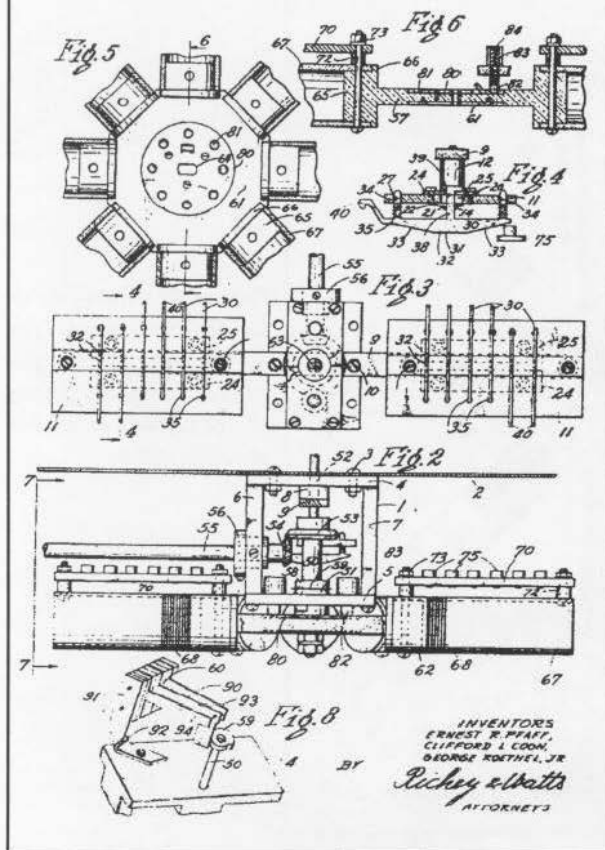


Figure 24a. Turret-tuner patent diagrams.

unchanged, although the early Deluxe sets had a dual speaker, rather than the larger single speaker previously offered. The set does not have any automatic volume control. The most significant difference from the 1931 Allwave is in the audio stage. The second audio stage is no longer push-pull, but is separated into two capacitively coupled single stages, rather than a transformer-coupled push-pull circuit. This gives the Deluxe three audio stages, rather than two as in the 1931 Allwave.

Scott managed to obtain some impressive magazine coverage for his latest receiver. *Radio News* ran a three-article series in the August, September and October, 1932 issues. Author S. Gordon Taylor spends a bit of time waxing on both the DX capabilities and on the set's "fine tone quality and overabundant volume". More interesting is the article in the November, 1932 issue of *Radio Craft*. Written by Scott himself, this article is also

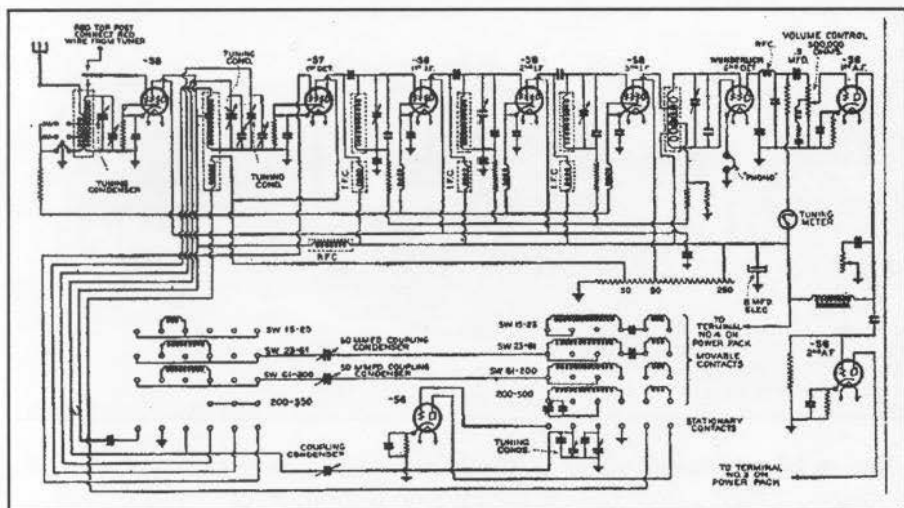


Figure 25. Schematic of Allwave Deluxe AVC, Wunderlich detector circuit. Scott's first set with an AVC circuit. A dramatic improvement from the previous version of the same set.

the only known publication with a schematic of the tuner chassis of the early Allwave Deluxe. With performance curves and a fairly detailed description of the set, Scott provided some of the most complete information on this chassis in a few short pages.

The Deluxe was a hit, but Mr. Scott and Mr. Pfaff were not sitting idly by. With access to the RCA patents, and the development of a new, rather novel tube named after its inventor (Wunderlich), the Deluxe was modified heavily in late 1932. Ernest Pfaff also developed a visual tuning indication (which would later be patented). These changes left the Deluxe almost unchanged externally, but the circuit differences are so vast that it could be argued that the next receiver was a totally new design. Most of these changes came with the addition of an automatic volume control circuit (AVC), driven from the unique Wunderlich detector.

The Wunderlich tube was designed specifically as a superheterodyne second detector. The tube has a cathode, two meshed grids equally spaced between cathode and plate, and a heater. A center-tapped IF output is attached to the two grids. The IF center tap connects to the grid-leak, and through a load resistance also becomes the IF AVC output. The AF signal appears on the plate. This full-wave detection results in a clean separation, with virtually no RF or IF signal entering the audio stage. Coupled with the gain a Wunderlich affords, the resulting quality is indeed high. Until the type-55 dual-diode triode became available, the Wunderlich was an excellent alternative to a typical half-wave detector using a type-27 or 56. In retrospect, the Wunderlich filled the same

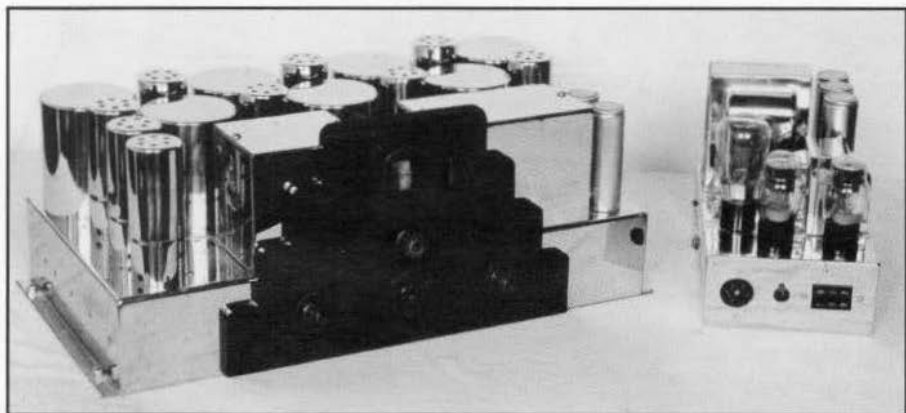


Figure 26. *Allwave Deluxe (AVC) chassis and power supply. Externally indistinguishable from the earlier version without AVC.*

niche that the 222AC had several years earlier. Until a better, more universal choice was available, Scott used “fringe” technology to build the finest radios possible.

In addition to the Wunderlich second detector, the entire RF and IF sections of the tuner were redesigned. The RF amplifier used the new type-58 pentode. The type-58 is also used for the three IF stages. The first detector (mixer) is a 57. The audio stages continued to use the 56 triodes, in a slightly modified circuit that is still capacitively coupled. Volume control is via the more traditional signal level feed into the first audio stage and a tone control is added in the plate circuit of the first AF stage. The tuning meter is connected to the plate circuit of the Wunderlich detector, resulting in a direct measure of the actual signal strength. Finally, Scott moved away from the dual speakers offered earlier, and returned to a single twelve-inch “auditorium” speaker.

Radio News again evaluated the AVC version of the Allwave Deluxe in a pair of articles appearing in March and June, 1933. Again, author S. Gordon Taylor emphasizes tone quality and sensitivity. The action of the AVC also apparently impressed the test listeners, and once again Scott received very favorable reviews for his newest design. This success, and the fact that Scott had not returned to his native New Zealand since the famed 1924 trip led Mr. Scott to decide it was time to take another working vacation. In February, 1933 Scott left from San Francisco aboard the *RMS Maunganui*. He took with him the latest AVC Deluxe set, in the new Napier “consolette.” Mr. Scott documented reception of station WBBM Chicago every single night on the trip. In addition, the set provided ample volume to use the Deluxe as a receiver and amplifier for the evening

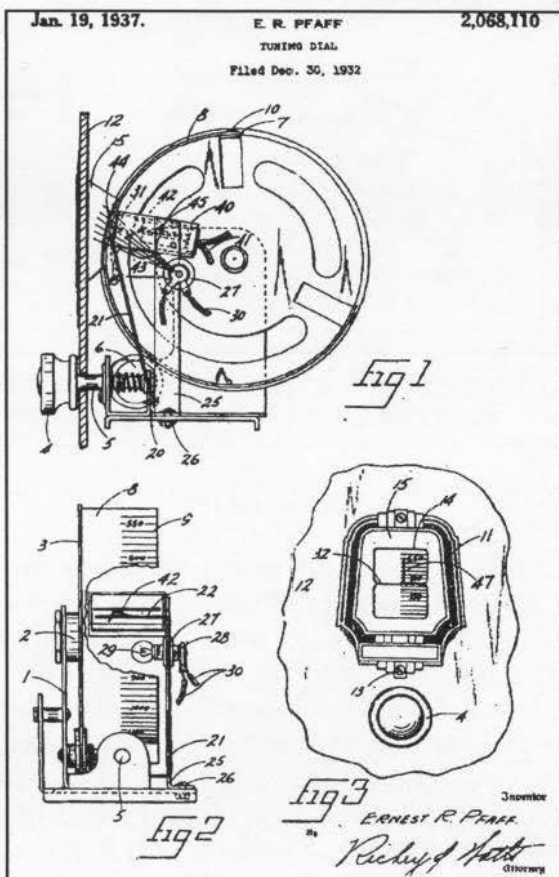


Figure 27. Tuning dial patent drawings. Another design improvement giving the mid-30s Scott sets their unique look and feel.

dance music. These reception reports and testimonials were published in the *Scott News* throughout the spring and summer of 1933, and were also heavily featured in full-page ads in major radio magazines that year.

Mr. Scott's success during this time is notable. Although 1932 sales (\$408,000) were not quite as high as 1931, we see the company absorbing the costs of modifications and new developments in the one and only receiver the company has to offer. Also, there are almost no accessories for the Allwave Deluxe. Gone is the "remote control" tuning of the AC 10, and outboard shortwave converters. It is not even clear that a larger amplifier is available for the Deluxe model. Only one accessory is even mentioned: a "4000-meter adapter," which plugs in to a four-prong female connector on the back of the chassis. Even though Scott had only this one set to offer for calendar year 1933, sales improved to \$482,000.

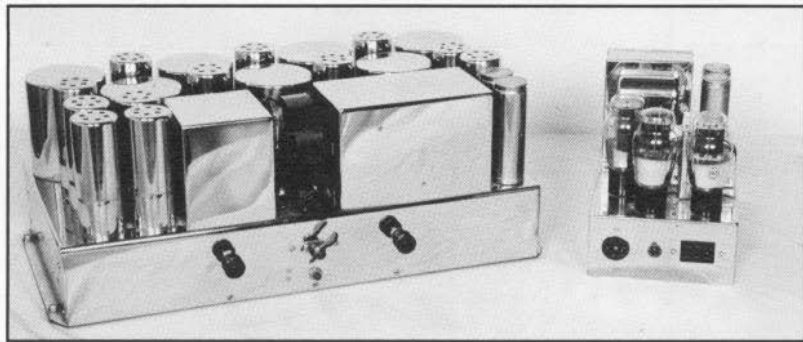


Figure 28. Allwave 15 tuner and power supply. The Fifteen underwent tremendous circuit change while remaining essentially the same cosmetically.

Allwave 15

The Allwave 15 is one of the most volatile sets ever developed by the E. H. Scott Radio Laboratories. Produced from February, 1934 through March or April of 1935, there are more documented variations of the Allwave 15 than any other Scott set. Several Scott brochures describe Type I, Type II and Type III Allwave 15 sets, but four different tube lineups and five schematics have been found through the years. There is no other way to describe the Allwave 15 than as a transition set, moving from the Allwave Deluxe to the Allwave High-Fidelity (Imperial) in 1935.

All variations of the Allwave 15 used a greatly improved power supply/amplifier, with the newly announced 2A3 power triode. The resulting increase in output, and the greater tone of the set can be attributed to the use of 2A3 outputs. The rectifier tube is a 5Z3, providing ample current for the 2A3 outputs as well as the twelve tubes on the tuner chassis. The Allwave 15 supply is otherwise similar in appearance to the Allwave Deluxe supply, built on a chassis frame that is slightly deeper, but otherwise the same size as the Deluxe.

The evolution of the Allwave 15 tuner chassis is best examined by looking at the existing schematic diagrams. Only two diagrams are found in Rider's, simply listed as the "early" and "late" versions of the set. These two diagrams represent the last variants of the Allwave 15. The earliest diagram is dated April 10, 1934, and is probably the first schematic drawn for the circuit. This set is remarkably similar to the Allwave Deluxe, with the addition of three tubes: a tuning meter amplifier, a BFO, and a second audio stage that is push-pull and transformer coupled. This gives a lineup of a 58 RF, four 58s in the mixer and the 465KHz IF stages, a Wunderlich second detector, and 56 tubes in the oscillator, tuning meter amplifier, BFO, and the first and second (two tubes, push-pull) audio stages.

The set began the revision cycle very quickly, and the next schematic is dated May 7, 1934. There are two significant changes in the May drawing. The April diagram has a five-position switch for the sensitivity, varying the antenna coupling and the IF bias simultaneously. The diagram also has a tone adjustment in the plate circuit of the first audio stage. The May diagram eliminates the five-position switch, in favor of a continuously-variable bias adjustment for the IFs. In addition, the tone control is removed, and replaced by a "static control switch," which cuts in a filter in the plate circuit of the first audio stage. This version of the Allwave 15 is easily distinguished by the static control switch, which extends from the tuner chassis on a loosely twisted pair of wires.

The third schematic is much later, dated November 19, 1934. It is quite probable that several other schematics were drawn in the time between May 7 and November 19, since the November diagram states "improved AVC," and "revised." The tube lineup demonstrates some of the changes: 58 RF, 2A7 mixer, three 58 IFs, a 55 detector/amplifier, and the ubiquitous 56 tubes in the remaining functions. The static control switch is gone, replaced by a typical tone control. The sensitivity control is now a two-pole, three-position switch, varying the RF and IF bias on one pole, and the cathode bias of the second detector on the other. The second detector is configured in a half-wave arrangement, with both 55 diodes tied to one end of the IF output, and the AVC voltage and signal developed on the cathode and plate respectively. This diagram was modified again on January 12, 1935, although the only difference appears to be the bias resistor on the second AF stage. The value was lowered from 2000 ohms to 1500 ohms.

The last diagram is the diagram in Rider's, labeled Allwave 15 "late." No other date is attached to this diagram, but it must be one of the last revisions of this chassis. Once again, the sensitivity control is altered, now a simple single three-position switch that varies only the bias on the first and second IF tubes. Also, the second detector circuit is changed, using a center-tapped secondary on the IF output. This creates a full-wave second detector, and the AVC voltage is developed from the center tap through a resistive network. Finally, the cathode bias on the second AF stage is again a 2000 ohm resistor, but 1000 ohm resistors have been placed in the grid leads from the coupling transformer.

Unfortunately, the changes for the Allwave 15 don't stop here. The six-month gap from May to November 1934 probably saw more variations of this chassis. This assumption is bolstered by the fact that these five schematics only represent two different tube lineups. Scott literature lists another tube lineup, referred to as "Type II," which uses a 57 tube in the mixer stage. Another documented lineup includes a 2A7 mixer with the Wunderlich detector tube. The evolution of the Allwave 15 can best

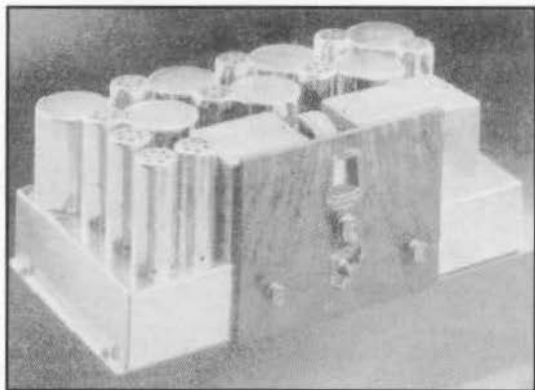


Figure 31. *Allwave Six-Volt battery receiver. Chrome chassis sets for the folks living in non-electrified areas of the country.*

example in a collection demonstrates Mr. Scott's custom built philosophy: The set has a twelfth tube, another type 30, as a BFO. The position and layout of the tubes is almost identical to the Allwave 15, and examples that exist today may well date from that period. This is also evidenced by the schematic drawing in Rider's, dated December, 1934.

The next clue in the dc set mystery is found in a sales brochure from September, 1933. Here, the "Scott Allwave Deluxe Battery Receiver" (at the same \$107.50 price) requires a six-volt "A" battery and three 45-volt "B" cells. Although there is no other documentation on a six-volt set in 1933, one set exists that uses a six-volt filament lineup, and looks like a standard Allwave Deluxe receiver. Although the set was modified in the audio stages, it is not hard to determine the correct tubes: 78 RF, 37 oscillator, 77 mixer, three type 78 tubes in the IF, a six-volt Wunderlich second detector, a 76 first audio and a pair of 38 tubes for the push-pull final AF stage. The extra final audio tube is the only addition to what is otherwise a chassis drilled exactly like the standard twelve-tube Deluxe receiver. The existing set is also identical to a ten-tube chassis that appears in ads in the October, 1932 issues of *Short Wave Craft* and *Radio News*. It may well be that Mr. Scott was building dc sets almost from the beginning of the Allwave Deluxe development.

Several years ago, a schematic was discovered for a "Scott Allwave Twelve 6-Volt Battery Set." Sporting two drawing dates (March and August, 1934), the set could be built on an unmodified Allwave 15 chassis. In fact, an example was found in early 1997, and the component layout is identical to the Allwave 15 chassis. The tube complement consists of type-78 tubes in the RF, mixer and three IF stages, a 76 oscillator, a six-volt Wunderlich second detector, a 30 as a BFO and another 30 as the first AF stage, a 31 second AF, and a pair of 49 tubes in push-pull for the final AF. The set matches the schematic quite closely, according to the owner.

If we engage in some pure speculation, we see three of four possible set arrangements. There could be two dc sets built around the Allwave Deluxe receiver (two-volt and six-volt versions), and two more built on the Allwave 15 chassis. Schematics, an owner's manual, and examples exist for both the "later" versions, built on the Allwave 15 chassis. These are the previously mentioned Allwave two-volt with the added BFO and the six-volt set found recently. The March, 1933 sales brochure provides a clue that a two-volt set existed during the reign of the Allwave Deluxe, but only a six-volt example exists (identical to the "mystery" ads that appeared in October, 1932). It seems likely that a nine- or ten-tube two-volt set could exist, and would "round out" the dc models that Mr. Scott offered during the first half of the 1930s.

Allwave Imperial High-Fidelity

Second only to the Philharmonic, the Allwave High-Fidelity receiver is one of the most well-known classic Scott pre-war sets. In sales volume, the 23-tube Allwave may have even surpassed the Philharmonic, as slightly more Allwave 23 sets appear to exist in collections today than the Philharmonic. Beyond the obvious success of this receiver, no other set sparks as great a debate among collectors than its immediate offspring, the Quaranta. Between the Allwave 23, the Quaranta receivers and the Philharmonic, the period from 1935 to 1941 has to be the pinnacle of development at the E. H. Scott Radio Laboratories.

Under the guidance of Chief Engineer Murray Clay, development of the Allwave High-Fidelity began in the winter of 1934-35. Enough new developments had been tested that the Allwave 15 chassis and design simply could not accommodate the changes required. Scott announced the High-Fidelity in the March, 1935 issue of the *Scott News* as a 22-tube receiver, although there is no evidence that any 22-tube sets were produced. Later that year (in the September, 1935 issue) *Allwave Radio* had an extensive article on the 22-tube Allwave High-Fidelity. The photo with the article does show a 23-tube set, however.

As presented in the *Allwave Radio* article, the High-Fidelity set had a 6D6 RF stage, 76 oscillator, 6A7 mixer, 6B7 RF AVC, three 39/44 IF stages, a 6D6 fourth IF, a 6A6 second detector/first AF, two 76 tubes in a push-pull second AF stage, a 6A6 as the noise suppressor/BFO, and a 6B7 and 6A7 as a tuning-meter amp and signal equalizer. The remaining tubes are the two rectifiers (one 83V and one 5Z3), and four 2A3 tubes in a push-pull parallel final audio stage giving 35 watts class-A output. The tuner chassis also uses two type-NE-42 regulators, making up the 22-tube count. The type-6A6 dual triode was ultimately abandoned in the final design.

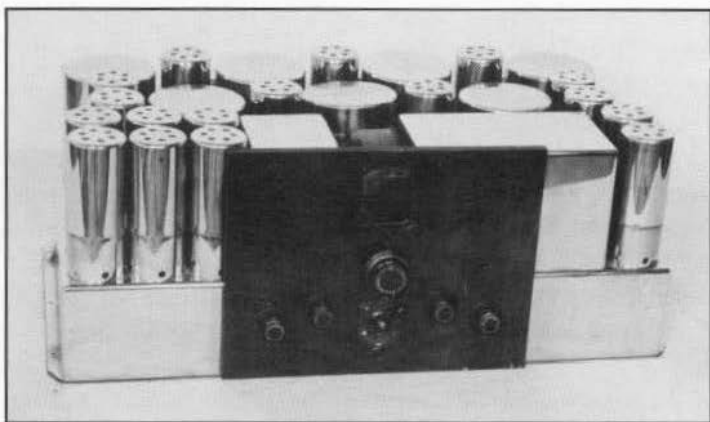


Figure 32. *Allwave High Fidelity (early). The first version of one of the most popular Scott sets.*

The first sets actually delivered to the public were 23-tube sets with five knobs (not counting the bandswitch) and a BFO button. The final tube lineup included the same rectifiers (83V and 5Z3) and four 2A3 tubes on the amplifier. The tuner still used the two NE-42 regulator bulbs, a 6D6 RF stage, 6A7 mixer, 6B7 RF AVC, three 39/44 IF stages, a 6D6 fourth IF, type-76 tubes for the oscillator, second detector, noise suppressor, tuning meter amp and BFO, and three 6C6 tubes in the first and second AF stages. The 6C6 tubes are all tied as triodes, and the second stage is push-pull. Using the 6C6 tubes tied as triodes provides almost 50% more output to drive the 2A3 final stage than using 76 triodes.

The Allwave High-Fidelity had impressive features for a 1935 set: fully regulated local oscillator, separate AVC for IF and RF stages, noise suppressor, and the audio provided from the four 2A3 tubes is 35 watts class A, and 50 watts class AB. Sensitivity is advertised as 0.6 μ V, and the operator has full variable selectivity from 2 kc to 16 kc. An optional tweeter set (\$16 extra) would provide audio response beyond the transmitting capabilities of the day, up to 16 kc. The set also offered a low impedance phono input. The set almost fit on the Allwave Deluxe/15 chassis. The width and height are the same, but the Allwave High-Fidelity is $\frac{3}{4}$ " deeper (front-to-back) than the Deluxe/15. The basic set ranged in price from \$180 to several hundred dollars for very ornate cabinets.

Scott's success led him overseas, and the firm Keates & Co., Ltd. of London was a distributor of the Scott Allwave High-Fidelity in the United Kingdom. The UK sets appear to be identical to the US versions, although the attenuators and trimmers are different values to allow for the 9 kc separation of European transmitters. Scott even managed a feature article

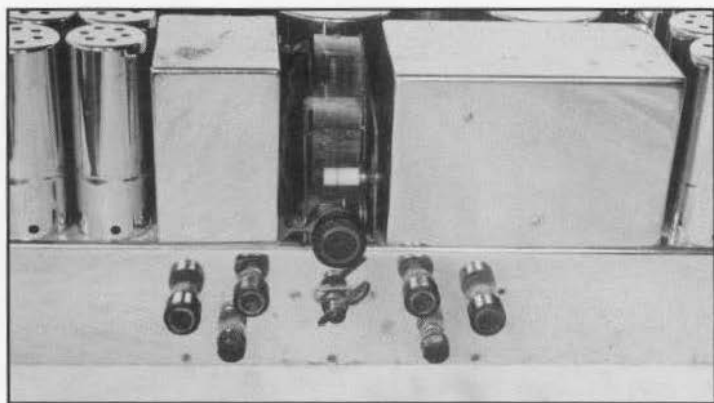


Figure 33. *Allwave High Fidelity (late) — close-up of vernier dial. The improved version, with additional front panel controls.*

in the December 20, 1935 issue of *Wireless World*. After noting that the top model in the Warwick Grande cabinet would cost over 600 pounds, the last few sentences sum up the Allwave quite well: "The privileges of possessing such a receiver are naturally reserved for the few, but the humbler amateur will not, on that account, withhold his appreciation of the technical merit of the design."

In addition to the overseas commentary on the Allwave High-Fidelity, Mr. Scott managed to get extensive magazine coverage on the set here in the US. In June, 1935, both *Radio Craft* and *Short Wave Craft* ran feature articles. *Allwave Radio* ran the article describing the 22-tube set in September (possibly later than the other articles due to publishing delays). *Radio News* ran a two-part description in the May and June, 1936 issues. Scott also returned to extensive full-page advertising, often near the front of major magazines.

In March, 1936, the set underwent some minor changes, including new IF trimmers ("air condensers" in the service literature), changed phono input to high impedance, and added a separate noise limiter control to the front panel. By moving the BFO from a push-button to a symmetrical knob (with the noise limiter knob), the "late" version of the Allwave High-Fidelity has seven knobs on the panel. Many "late" receivers had a drum-wheel "vernier" indicator just below the tuning dial as well. The Scott "*Serviceman's Bulletin*" indicated that warranty repair work after this time should include the new IF trimmers in older versions of the chassis. This same bulletin states that sets with serial numbers greater than 500 have some small change in the parts used. This is the only known indication that Scott did, in fact, use a sequential serial number system.

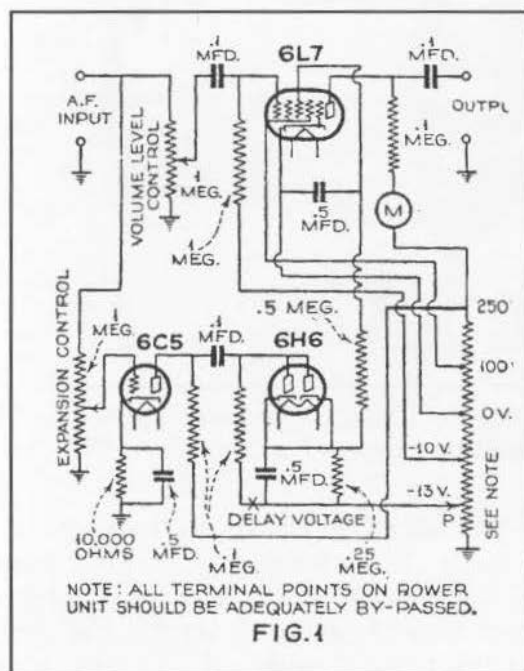


Figure 34. *Volume-expander circuit diagram. The effectiveness of the circuit is questionable, but the concept sold remarkably well.*

In late 1936 Scott offered an outboard "volume expander" to be used exclusively with the Allwave High-Fidelity. During the 1930s considerable development went into volume range expander circuits. The need for a "volume expander" is due to the wide variations in level that a normal musical piece will deliver. A full orchestra commonly has a range of 70 decibels or more between the loudest and softest passages. This represents a ratio of 10 million to one, if we express the output in watts. Typical transmitters of the 1930s could deliver 45 to 50 decibels of volume range, far short of the 70 plus that would be required for full reproduction. So a volume "expander" within the radio seemed to be the answer.

A volume expander circuit could almost be called a "reverse AVC" system. With an AVC circuit, we want to lower the amplification of very strong local signals, and favor weak, distant signals. With the volume expander, we want to amplify loud passages even more, while leaving quiet passages unaffected.

Referring to the basic expander circuit diagram, the input signal is applied to both the 6L7 and to a 6C5 amplifier simultaneously. The output of the 6C5 is rectified in the 6H6, providing a positive voltage with respect to the reference on the voltage divider. This bias signal is applied to the other input grid of the 6L7, where it produces an initial large negative bias. Under normal sound, the amplification factor of the

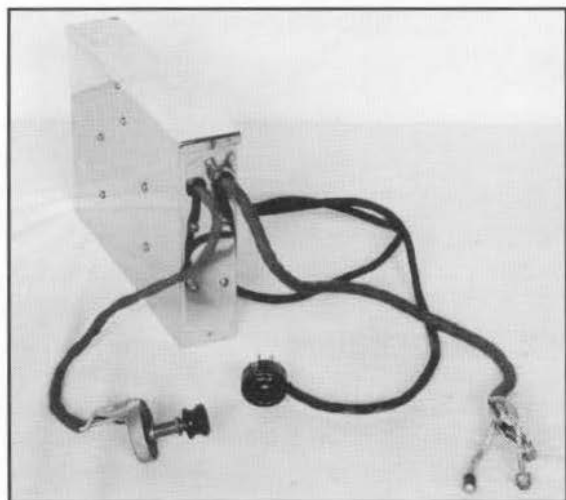


Figure 35. *Outboard volume-expander unit. Hard to identify; there is no external marking with the Scott name.*

6L7 is low, but with louder passages the gain is increased in proportion to the signal strength. Thus, quiet passages are unaffected, while louder passages are "expanded." The amount of expansion can be set by the control. It is also possible to set a threshold signal level; this is done by biasing the rectifier tube to the desired level. There is a required time constant for the control voltage on the 6L7 as well. Typically, the RCA data recommends a time factor of between 250 and 500 ms. If the time constant is too short, speech sounds unnatural. Too long a time negates the desired effect of the circuit.

Scott used two different volume-expander circuits: one for the "outboard" expander sold with the Allwave 23 High-Fidelity, and another incorporated onto the chassis in the Philharmonic receiver. The unusual "Baby Quaranta" or Allwave 27 has the outboard expander circuit built onto the receiver chassis as well. Both of Scott's expander circuits resemble the basic RCA diagram, except that both are built in a push-pull configuration. The Allwave 23 outboard expander uses 6A7s in place of the yet undeveloped 6L7. The expander driver is a 6C6, and is rectified by a type-76 triode tied as a diode. The diagram for the outboard expander can be found in Rider's.

The Allwave High-Fidelity was undoubtedly Scott's greatest success to date. Sales in 1935 soared to \$690,000, a truly impressive number with such an expensive receiver in the Depression. The technology was impressive as well, and the basic design of the Allwave High-Fidelity, the speaker systems and the volume expander all provided a solid foundation for Mr. Clay to build what would become one of the largest radio receivers built by any manufacturer of any time: the famed and mysterious Quaranta.

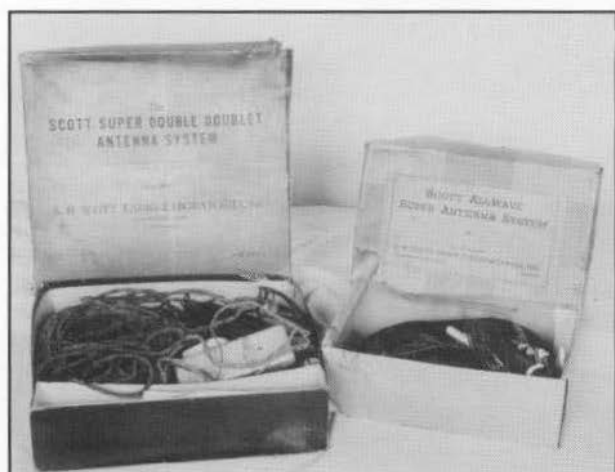


Figure 36. *Scott Antenna System kits. Many variations on the Super Double Doublet antenna exist.*

Quaranta

Although all Scott sets were “Custom-Built,” none were more “custom” than the Quaranta sets. Virtually no verifiable information exists as to the number of sets built or their features. Being extremely wealthy (the lowest known price for a Quaranta is \$2500), most of the purchasers of these sets remain a mystery even today. The whereabouts of one 48-tube set is known, and various component chassis for other units have been found over the years. More recently, Chief Engineer Murray Clay located some of the schematic diagrams for the Quaranta. By using this information and a few photographs, some educated guesses about the composition of the sets can be made. Mr. Clay recalls that less than ten, and possibly only six or seven of the largest sets were ever built. Finally, the smaller 27-tube Allwave set, alternately referred to as the “Baby Quaranta” or Allwave 27, seems to be found with some frequency, but has the distinction of being the only Scott set with absolutely no written information of any kind located to date. So, in order of increasing tube count, here are the few facts known about the Quaranta line.

The smallest of the series is the Allwave 27, or Baby Quaranta. The most noticeable difference between the Allwave High-Fidelity and the Quaranta set is the upgraded tuner chassis. A tuning eye replaces the patented back-lit tuning meter. A second eye tube indicates the volume expander action (in place of the meter in the RCA diagram previously presented). The seven knobs are slightly repositioned, giving the appearance of a larger set. The two eye tubes create a 19-tube tuner chassis. The amplifier for the Allwave 27 is really a “stretched” version of the High-Fidelity supply, to make room for two additional tubes. These tubes,



Figure 37. 40-Tube Quaranta receiver. The smallest of the famed receivers using tri-amplification.

and changes on the tuner chassis, combine the late Allwave High-Fidelity and volume expander into a single receiver.

The lineup on the tuner chassis of the Allwave 27 is identical to the High-Fidelity up through the second detector. In addition to the two eye tubes, the remaining tubes are type-76 tubes as noise suppressor, expander rectifier and first AF stage, and two 6A7 tubes and a 6C6 in the expander circuit. The two additional tubes on the power supply are the 6C6 push-pull second audio stage. The Allwave 27 also appears to come “standard” with a fifteen-inch speaker, rather than the twelve-inch speaker used in the High-Fidelity. The Allwave 27 fits comfortably in the large Ravinia Grande cabinet, which can also house a record player/cutter unit. Two of the known Allwave 27 sets are configured like this.

The Allwave 27 has the distinction of being the only Scott set with no supporting documentation. One reference that might be related to the Allwave 27 is found in the *Scott Serviceman's Notes*, Volume 1, Number 5, dated April, 1936. In this document, a “special amplifier, using an additional pair of 6C6 tubes,” is available for the Allwave High-Fidelity. The \$135 price also includes an eighteen-inch Jensen speaker. The set is supposedly for larger listening areas, such as a theater or funeral home. The basic description fits the Allwave 27 quite well, and the number of sets remaining suggest that if this is the same set, Scott sold a fair number of these “upgraded” receivers. In relative terms, quite a few of these sets exist in collections today. An exact number is not known, but at least seven of the Allwave 27 sets are confirmed.

Although none of the 40-tube sets are known today, this is the set that actually inspired the name “Quaranta”, which is Spanish for forty. The 40-tube set again starts with the 19-tube tuner with the two tuning eyes. All the 40- and 48-tube sets had a large bass/mid-range amplifier that really looks like two Allwave High Fidelity power supplies joined

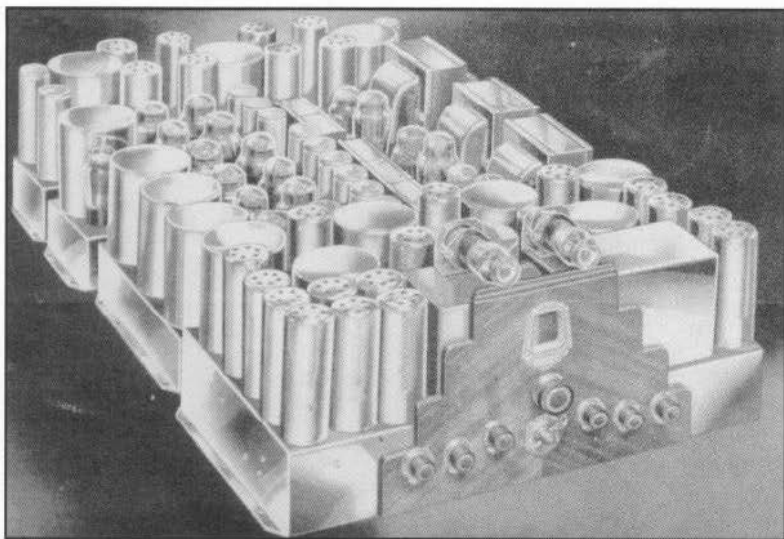


Figure 38. 48-Tube Quaranta receiver. A larger version of the Quaranta, with additional mid-range capabilities.

together on the long side. On a single large frame are two power transformers, four filter chokes, and three interstage transformers, along with eight 2A3 tubes and four rectifiers (two 83-V and two 5Z3s). This arrangement makes one of the heaviest single chassis in any Scott receiver. The 40-tube set also had an eight-tube “mid-amplifier,” which used six 6C6 and two 6D6 tubes as amplifiers for each of the separate audio signals. This gives us 39 tubes, and the 40th tube is most likely a 6F5, found on the “Record-o-Matic” booster amplifier. Two fairly good pictures of the 40-tube sets exist, one in the May, 1936 issue of the *Scott News*, and another in a very brief article in the August, 1936 issue of *Short Wave Craft*. The exact date for the Quaranta is hard to determine however, since the set also appears in a picture of the Scott New York sales studio in the January, 1936 issue of the *Scott News*. The five-speaker complement for the 40-tube set includes an eighteen-inch Jensen bass speaker, two twelve-inch mid-range speakers and a pair of horn tweeters. Scott stated that the combined weight of this set was 615 lbs.

The *Scott News* for April, 1936 shows a picture and description of a 48-tube Quaranta receiver. This set incorporates the same three main chassis as the 40-tube set (the nineteen-tube tuner, the large, heavy twelve-tube main amplifier, and the eight-tube mid-amplifier). In addition, a seven-tube recording amplifier chassis is included. The record amplifier chassis is similar to the Allwave 27 amplifier, but has only one 6C6, rather than the two found on the Allwave 27. To get to 48 tubes (if you’re counting, we’re at 47 right now), the one-tube pre-amplifier is

replaced by a two-tube, push-pull pre-amplifier, using a pair of 6N7 tubes. The 48-tube set appears to use the same five speakers found in the 40-tube set. The 48-tube set is also mentioned (without the Scott name) in "The Latest Radio Equipment" section of the September, 1936 issue of *Radio Craft*.

The Quaranta series offered the wealthy buyer a number of quality features not found on other sets of the day. Scott's extremely high sensitivity, noise limiter and volume expander circuits, and the use of the relatively new tuning eye tube all make for an appealing and functional receiver. The three separate audio amplifier "channels," 30-125 cycles on the bass channel, 100-6000 on midrange and 3000-16000 on the "treble" channel provide the listener with highly advanced audio, rated at 100 watts continuous Class A. No company would build an audio amplifier of such capability and power again until well after World War II.

To conclude the discussion of the Quaranta sets, we must end with a few mysteries. As mentioned previously, two schematic diagrams have been found for the Quaranta. The tuner diagram has a slightly different tube lineup, showing a 6H6 as the second detector. However, none of the known Quaranta tuners (the 48 tube set or the Allwave 27 sets) have a 6H6 as the second detector. The other diagram is for a ten-tube mid-amplifier. In addition to the six 6C6 and two 6D6 tubes, this diagram shows a pair of 6L7s as a part of the expander circuit. Since no examples of the ten-tube mid-amplifier have been found, it is not clear how this would fit into a 40- or 48-tube set. If the two-tube recording amplifier is removed and the eight-tube mid-amplifier is replaced with the ten-tube unit, it does create a 48-tube set without the recording capability. Finally, there are rumors that Scott built at least one set with more than 50 tubes, but no information exists about its chassis configuration.

Each of these sets represents a distinct period of experimentation at the E. H. Scott Radio Laboratories. Chief Engineer Clay used the very expensive, highly-customized sets to design new circuits and improve various features of the Allwave High-Fidelity. Although the number of Quaranta special installations is unknown, the popularity of the basic-23 tube set and the special offerings took Scott sales to a new high in 1936, reaching just above $\frac{3}{4}$ million dollars, to \$786,000. These developments and the introduction of the new octal-based tubes in 1935 and 1936 ultimately resulted in the creation of the most well-known Scott receiver, the Philharmonic.

Philharmonic

In the April, 1937 issue of the *Scott News*, the E. H. Scott Radio Laboratories announced their newest receiver, the Scott Philharmonic. With the exception of the highly custom Quaranta sets, the Philharmonic



THE STRADIVARIUS
SCOTT
OF RADIO RECEIVERS

**Announcing the New
PHILHARMONIC!**

For complete details, including list of dealers, write to Scott Radio Laboratories, Inc., 2425 River Road, Chicago, Ill. 60612. For complete details, including list of dealers, write to Scott Radio Laboratories, Inc., 2425 River Road, Chicago, Ill. 60612.

SEND THIS COUPON!

E. H. SCOTT RADIO LABORATORIES, INC.
2425 River Road, Chicago, Ill. 60612
Please send me your FREE booklet on the new Scott Philharmonic. (One obligation.)

Name _____
Address _____

STURGEON - CHICAGO - NEW YORK - LOS ANGELES

Figure 40. First advertisement with "Stradivarius" logo, *Radio News* – May, 1937.

was the largest and most complex receiver Scott had ever offered. At the same time that Scott sent out the *Scott News* to his customers, he placed "teaser" ads in several national publications. Full-picture ads appeared in the June issues of most major magazines, and by August, 1937, *Radio News* had started a series of three articles describing and testing the Scott Philharmonic. In addition to being considered the finest of the Scott "standard" sets, the Philharmonic enjoyed one of the longest production intervals of any Scott receiver. When launched in the spring of 1937 the Philharmonic would undergo modifications, but remained available until the start of World War II. This was also the first Scott set to incorporate the "Stradivarius" logo, and the May, 1937 teaser ad in *Radio News* is the earliest national appearance of the now famous symbol.

The Philharmonic circuitry is the basis for all Scott sets built between 1937 and 1941, so a thorough examination of the set is required. All other models produced during this time use reduced size variants of the basic Philharmonic design, such as fewer RF or IF stages, and reduced audio amplification. Almost all the previous Scott circuit designs are included in the Philharmonic, including the noise limiter, expander, and variable bandwidth IF and AVC systems for both RF and IF stages. The Philharmonic also used all octal-based tubes (with the exception of the eye tubes and rectifiers). In the sometimes heated discussion regarding the merits of glass and metal octal tubes, Scott always maintained that the glass tubes were superior to the metal designs. Until the FM circuits were introduced, Scott always recommended glass octal tubes in his receivers.

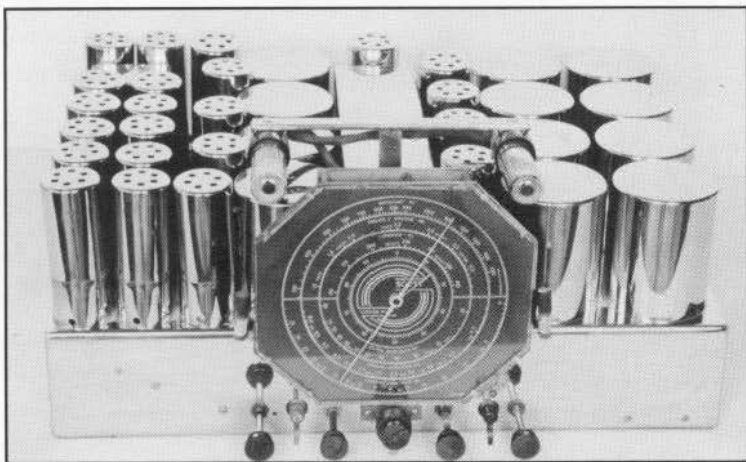


Figure 41. *Philharmonic tuner with early pointer dial. Perhaps the most famous Scott, the Philharmonic is the ultimate collector Scott today.*

The Philharmonic is a large and impressive 30-tube receiver, covering 150 kc to 80 Mc in six bands. With a chassis of 23" W X 17" D X 11" H, and weighing in at approximately 60 lb., the tuner itself is massive. Add in the amplifier (34 lbs) and a three-speaker sound system, and the Philharmonic receiver without a cabinet totals over 125 pounds. The Philharmonic also does away with the original patented drum dial that is found on the Allwave series. The first Philharmonic sets are often called "pointer" sets by collectors today, since they have a metal pointer to indicate the stations on a large glass "airplane" style dial face. Later, the pointer was eliminated, and a projected beam of light indicated the station selection.

The tube complement of the Philharmonic begins with two 6U7 tubes for the two tuned RF stages, a 6L7 mixer and a separate 6B8 RF AVC. The control voltage for the RF AVC is obtained directly from the output of the 6L7 mixer. The oscillator is a 6J5, with stabilized plate voltage provided by a 0D3 (VR150) regulator. There are four IF stages, three 6K7s and a 6B8, which also functions as the second detector. A 6B8 IF AVC is fed from the second IF output, and a 6H6 sensitivity diode/noise limiter complete the RF sections of the receiver. The antenna circuit employed a newly patented noise reduction system, which still maintained 0.5uV sensitivity. The antenna coupling is covered under patent #2,172,923 and the RF rejector is patent #2,226,468. The variable bandwidth IF allowed full 16 kc audio, a feature not seen on AM receivers again until decades later.

Following two 6J5 single AF stages, there is a push-pull volume expander using a pair of 6L7s, and a 6J5 and 6H6 as the expander amplifier

Sept. 12, 1939.

M. G. CLAY
ANTENNA COUPLER
Filed June 15, 1937

2,172,923

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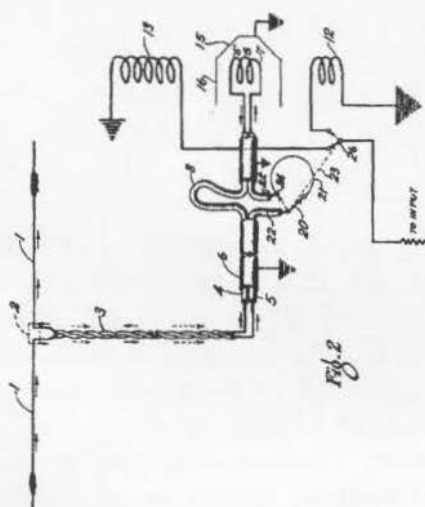


Fig. 2

INVENTOR
MURRAY S. CLAY
Murray S. Clay
ATTORNEY

Sept. 12, 1939.

M. G. CLAY
ANTENNA COUPLER
Filed June 15, 1937

2,172,923

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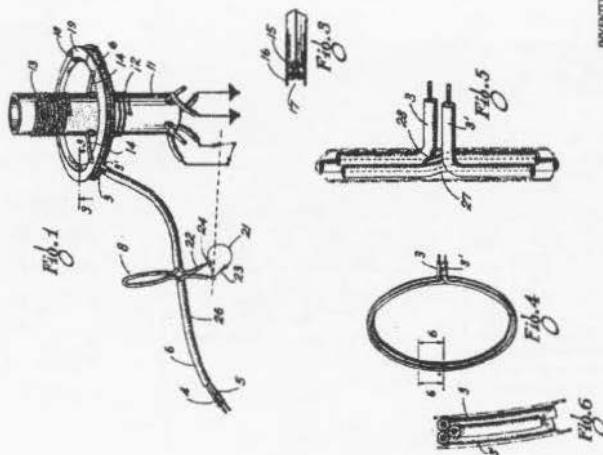


Fig. 1

Fig. 3

Fig. 4

Fig. 6

INVENTOR
MURRAY S. CLAY
Murray S. Clay
ATTORNEY

Figure 42. Antenna-coupler patent diagrams. The improved antenna designs of Murray Clay enhanced the performance of the Philharmonic.

Figure 42a. Antenna-coupler patent diagrams.

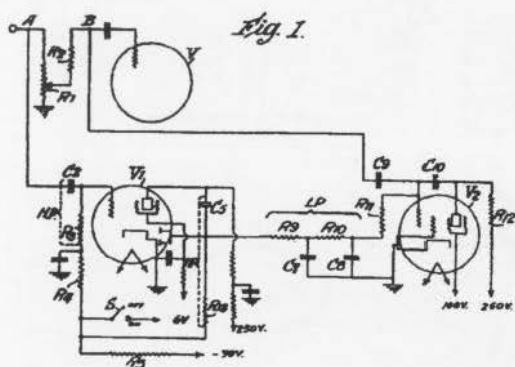
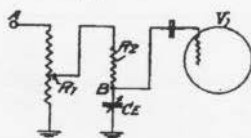


Fig. 2.



(From British Patent #519,486)

Figure 43. British patent diagram for scratch-suppressor circuit. Although not granted a U.S. patent, other manufacturers used this basic circuit.

and rectifier respectively. In addition, a 6B8 and a 6J7 make up a phonograph scratch suppressor circuit. Clay filed for a US patent on the scratch suppressor, but was denied. However, he did obtain a British patent (#519,486) for this circuit. The expander output is fed into a pair of 6J5 tubes used as a push-pull third AF stage, and finally, the signal goes to the power supply/amplifier chassis, where four 6L6 tubes in parallel push-pull deliver 40 watts of class-A audio. The bass adjustment provided ± 20 dB control, and included a 60-cycle notch filter to minimize hum when using increased bass. Like the High-Fidelity, the Philharmonic could be purchased with optional high-frequency speakers, giving the set an audio range from 30 to 16,000 cycles. Advertised at less than 1% THD, the amplifier would not take notice today, but in 1937 the audio capabilities were unmatched.

A set of this size required considerable power (almost 300 watts), and the DC supplies initially used a pair of 83-V rectifiers. A pair of 5Z3 tubes quickly replaced these. The FM Philharmonic sets used a pair

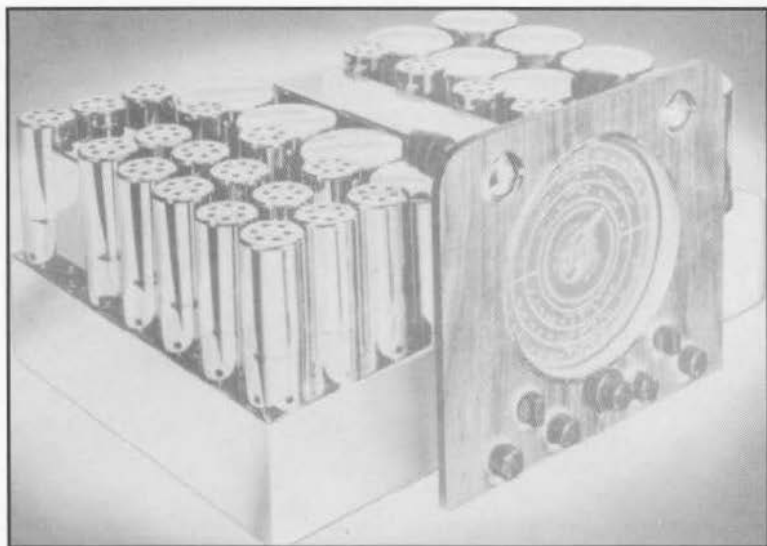


Figure 44. *Deluxe AM Philharmonic (Beam-o-lite dial). The 1939 enhancement of the classic set. Note the lack of moving pointer on the tuning dial.*

of 5U4 rectifiers. A pair of “eye” tubes rounds out the thirty-tube complement, one for the tuning indication, and the second to indicate expander action.

In a comparison of the early schematic (dated May 15, 1937) and the “revised” diagram dated April 4, 1939, a number of changes are obvious. The treble control is changed to a fully variable control, and the bass compensation now uses an R/C network, rather than a choke. Biasing changes for the tuning indicators and the IF AVC circuit improve the action of these systems somewhat. Finally, the UHF band antenna circuit was improved. These changes were probably introduced gradually, but sets without the “pointer” (also called the “Beam-o-Lite” sets) all appear to include these modifications. Additionally, Scott separated the selectivity and fidelity controls, which gave later Philharmonic sets a nine-knob front-panel layout. Finally, the tuning indication with the Beam-o-Lite tuner is not as precise as the pointer dial, and a logging scale was added in a small window near the top of the dial face. The ultimate evolution of the Philharmonic prior to the FM versions is a Beam-o-Lite set, with the logging scale and the nine front-panel controls.

Adding the FM circuits to the Philharmonic required some modifications. While the basic AM section did not change significantly, the Philharmonic was altered to remove the expander circuit, to make room for the FM components. With the expander removal, the first AF stage was changed to a 6K7. The second AF stage is combined with an inverter stage in a 6F8. Another 6H6 is added as a separate Dickert noise limiter. The second tuning eye remained, becoming the FM tuning indicator. The

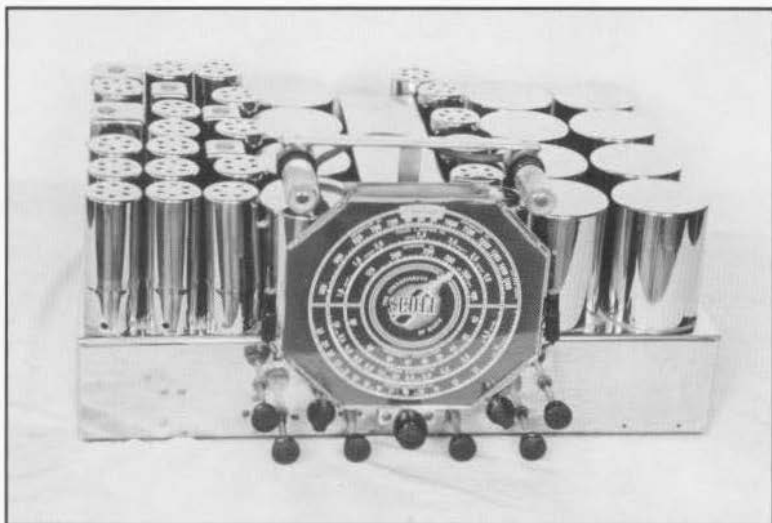


Figure 45. *FM Philharmonic chassis. The FM set lost the volume expander and other features to allow room for Hobb's FM circuit.*

basic FM circuit will be discussed at some length later, but even after the removal of the expander, the FM Philharmonic was still a 33-tube receiver.

Sixteen & Eighteen

With the price of a Philharmonic approaching \$300 without a cabinet, Scott realized that he needed to have a set available at a somewhat lower cost to the consumer. For the first time, the E. H. Scott Radio Laboratories began to offer more than a single model of set at the same time. In June, 1937, the Sixteen was introduced. It is a "scaled down" version of the basic Philharmonic design, and incorporates most of the same tubes. The Sixteen had a direct offspring, the Eighteen, which adds the scratch-suppressor circuit using the 6J7 and 6B8 tubes. Both the Sixteen and Eighteen are quite unique in the late 30' Scott line, as they are the only sets to not have a glass dial face. The Sixteen had a metal dial, reminiscent of the General Electric sets of the period. Not nearly as handsome as the Philharmonic, they are often shunned by contemporary collectors, but are a fine performer nonetheless.

The Sixteen has only one stage of RF, using the 6U7, feeding the 6L7 mixer. The 6J5 oscillator is not stabilized with a regulator, and the IF is trimmed to just three stages (two 6K7 and a 6B8 which doubles as the second detector and the IF AVC). A 6K7 first AF and a 6J5 inverter move the signal into a pair of push-pull 6J5s for the second AF. Final audio is a pair of 6V6 outputs. A tuning eye and two 5V4 rectifiers

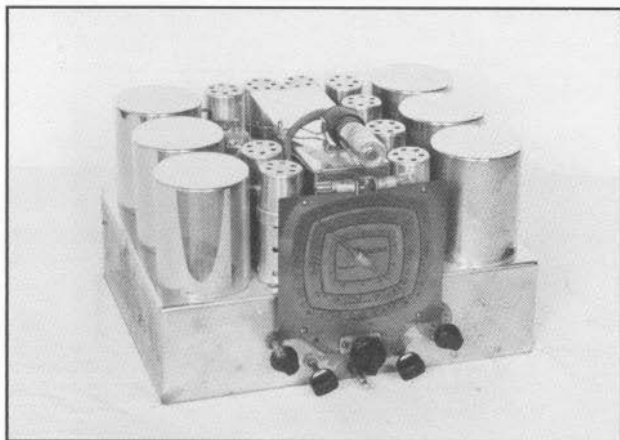


Figure 46. *Sixteen chassis. A "poor man's" Scott, for those who could not afford the best of the best.*

round out the Sixteen tube complement. The Eighteen has the two additional scratch-suppressor tubes, and can be easily identified by two (rather than a single) push-pull switches under the dial.

The Eighteen was offered in a unique phonograph arrangement called the Autotrope. The Scott Autotrope could stack and play both sides of up to thirty albums, providing hours of continuous music. Unfortunately, there are no known units in contemporary collections. The Autotrope was featured in the December, 1937 *Scott News*. A review of the Sixteen appears in *Radio News* in a brief article in the March, 1938 issue. An operating company (British Ozaphane) working under license from the E. H. Scott Radio Laboratories also built the Sixteen in the United Kingdom. Several of the British sets have survived, using 220V, 50-cycle power.



Figure 47. *The Eighteen chassis. A rare variation of the Sixteen, with the phonograph scratch suppressor added.*

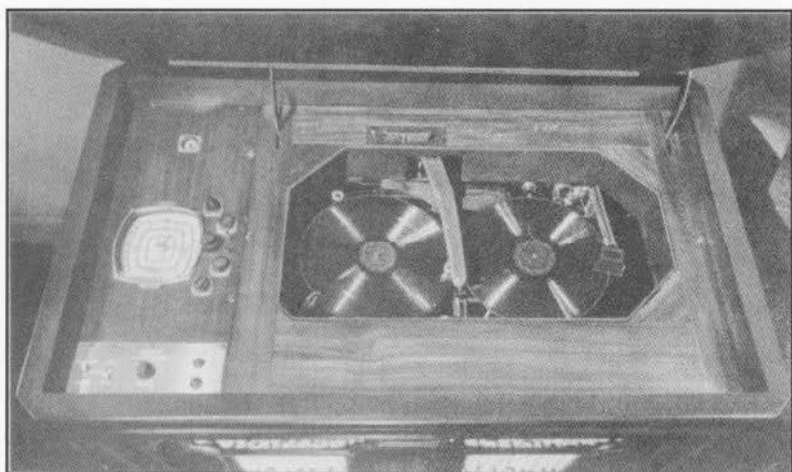


Figure 48. *Autotrope record changer with model Eighteen receiver. The Autotrope could play both sides of a stack of 30 albums.*

The appearance differs slightly from the domestic version, and a long-wave band was available for these sets as well.

Both the Philharmonic and the Sixteen could be obtained with a “Robot Control” feature. Unlike Scott’s earlier remote unit, the Scott Robot Control was a mechanical remote control, with a motor drive on both the volume control and the tuning drive. Station presets were movable “stops” placed on a semi-circular disk mounted on the back of the chassis. The station stops were fine enough to provide very good AM presets, and many shortwave stations could also be programmed. The remote control was a small bakelite control with a long ribbon cable, easily hidden under carpets or furniture. In addition to the push-button remote, a time-clock remote allowed the owner to program the set to come on at a certain time and tune to a particular station. The time clock utilized the same plug connection as the remote push-button unit. The Robot Control must have sold fairly well, as a fair number of Robot Control receivers exist in collections today.

The Philharmonic, Sixteen/Eighteen and the Autotrope made a tremendous offering for 1937. In spite of a dip in the economy that year, sales remained stable, totaling \$780,000. Scott often felt the economic effects in his company a bit later than the rest of the nation, however. This would be seen in the coming year. Even with the introduction of two new receivers, sales would literally plummet in 1938.

Telematic

Scott’s extensive experimentation with remote-control operation gave rise to perhaps the most unique Scott set ever built. The Telematic was

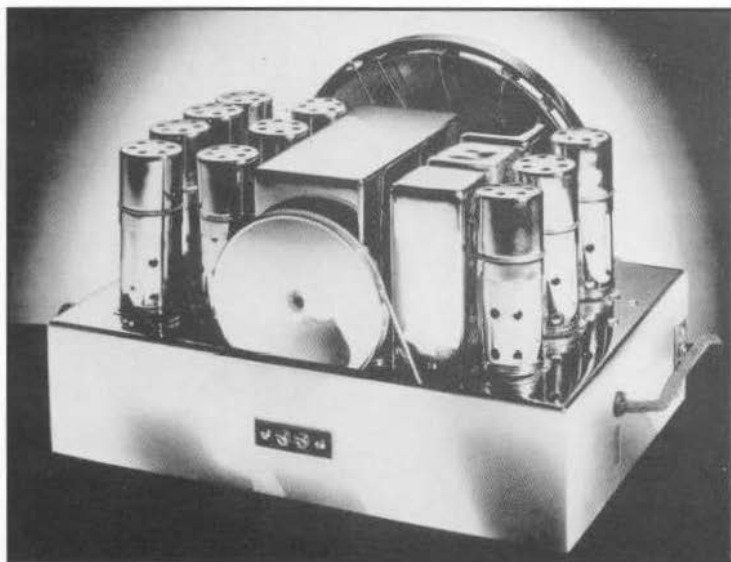


Figure 49. *Telematic chassis. A totally remote control set with no dial face, no Telematic sets have been located to date.*

announced in the March, 1938 issue of the *Scott News*. The set was nicknamed the “Modern Aladdin,” and was a totally remote-control set. The Telematic has no dial face, and did not require a cabinet at all. Very few pictures survive of the Telematic; one picture with Mr. Scott and an unidentified gentleman shows a Telematic in a Braemar console, with only the time clock showing on the cabinet face. The *Scott News* article shows many placements with the receiver unit housed in closets or bookshelves, and the speaker hidden strategically in the listening room. It is probably due to these rather unorthodox placements that no Telematic sets are known to exist in contemporary collections.

Almost all the technical details known about this set are from the *Scott News* description and photographs. The set had the patented phonograph-noise suppressor, giving two of the tubes in the 14-tube lineup. The power supply appears to be identical to the Sixteen, with a pair of 5V4 rectifiers and a pair of 6V6 outputs. The RF appears typical, with a single RF stage, probably the same 6U7, 6L7 mixer and 6J5 oscillator as found on the Sixteen. There appear to be three IF tubes, likely two 6K7s and a 6B8, as second detector and IF AVC. This leaves two tubes on the chassis, and they are quite probably the first AF stage and an inverter to drive the final AF stage. Although purely an approximation, these are probably a 6K7 and a 6F8 respectively.

The Telematic was not heavily advertised, since there really was not a “pretty” radio to place in advertising photographs. Several magazines had small ads with the name of the set, and a picture of the remote-



The Westwood Equipped with Scott Telematic and Automatic Program Selector Clock.

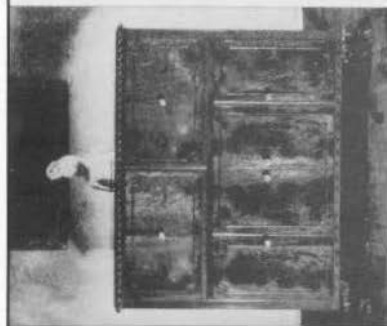
Figure 50. *Telematic and clock in Westwood cabinet. Note the Telematic in the Braemar on the cover of this AWA Review.*

control keyboard. Scott's success with this set is unknown, but no contemporary examples certainly seem to indicate a lack of sales for the Telematic.

Phantom

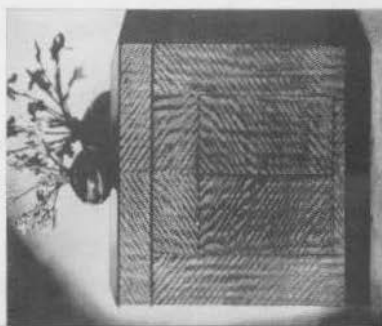
The August, 1938 issue of the *Scott News* features a truly classic photograph of E. H. Scott standing beside his latest creation, the Scott Phantom. It is unclear today whether the set pictured in this issue of the *Scott News* is a prototype. There are several differences, most notably the slide-rule dial face and the picture of the amplifier. The dial face is "reverse" of the typical Phantom dial face (black letters on light background, rather than white letters over black). The power supply pictured clearly shows a 6F5 tube, yet no Phantom schematic exists with this tube in the power supply, and none of these sets are known today. The basic Phantom covered 550 kc to 22 Mc in four bands.

The earliest Phantom diagram (dated October 21, 1938) again resembles the Philharmonic circuit on a smaller scale. The Phantom had a single



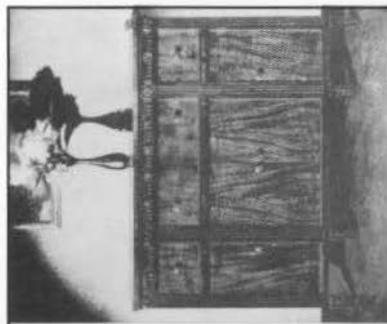
The Chippendale Grande

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



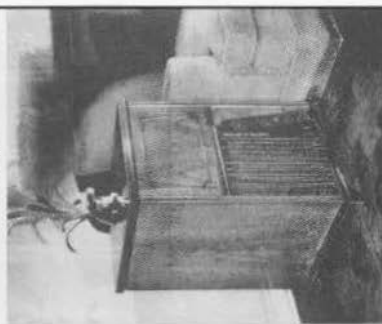
The Linden

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



The Adam

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



The Warwick

Designed as a separate model for the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



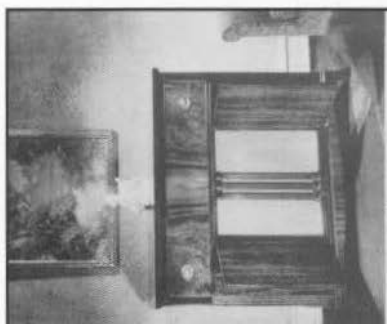
The Sheraton

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



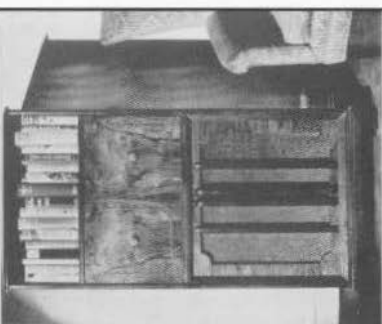
The Buckingham

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



The Sheraton

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.



The Stafford

Designed for the Scott Plantation-Belmont and the Scott Plantation-Belmont. Can be converted with Scott Belmont drawers.

Figure 51. Late 1930s cabinet examples. Changing styles moved the larger sets into "side-by-side" cabinets that became very common in the 1940s.



Figure 52. *An early Phantom. The Phantom was to be a "low-end" replacement for the Sixteen. In the end, the Phantom was not significantly less expensive than the Philharmonic.*

6U7 RF stage, feeding the 6L7 mixer from a 6J5 oscillator. A separate 6B8 provided RF AVC. Three IF stages (all 6K7s) feed signal to a 6H6 second detector. The IF bandwidth is still adjustable, but not continuous. Rather, the Phantom had a three-position switch, to allow "broad," "medium," and "sharp" characteristics. The audio section contains the Scott trademark scratch suppressor, using the 6B8 and 6J7 tubes. The first AF stage is a 6K7, followed by a 6J5 inverter. The second and third push-pull AF stages are on the power supply, and include a pair of 6J5 and 6V6 tubes. A tuning eye and two 5V4 rectifier tubes round out the 19-tube version of the Phantom. A revised version of this diagram (dated March 1, 1939) appears in Rider's as well, but contains few differences. The only real items of interest are that the rectifier tubes are now listed as 5Y3s, and the set shows the optional television band added. For \$19.50, the television band would allow reception from 21 MHz to 60 MHz on a single additional band.

By late 1939, about the same time that Scott introduced the upgraded Philharmonic, the Phantom also received many of the same upgrades. The "Deluxe" Phantom is a 20-tube set, adding a voltage regulator on the oscillator. The third IF tube is changed from a 6K7 to a 6B8, which allows it to double as the third IF and the second detector. The original 6H6 is now used as a Dickert noise limiter, just as in the Philharmonic. Finally, the audio amplifier is greatly upgraded, using 5U4 rectifiers, and using a pair of 6L6 tubes for the final output stage. This boosts the output from the original 13.5 watts undistorted output to 35 watts. In

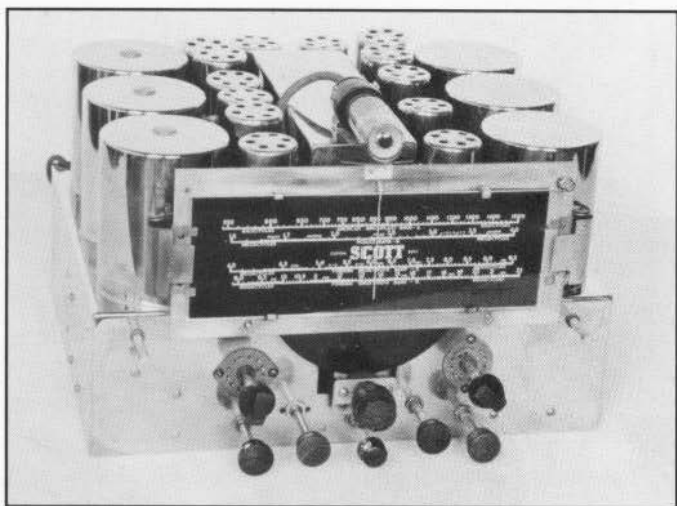


Figure 53. *Phantom Deluxe. Like the Philharmonic, the Phantom was upgraded in 1939.*

early 1940 the semi-circular logging scale appears on Phantom dials, similar to the Philharmonic. The Deluxe Phantom is truly a first cousin to the famed Philharmonic.

An export version of the Phantom is described in the *Wireless World* dated February 2, 1939. This set, also built by the British licensee, is a unique 16-tube set. The tube lineup is as follows: 6U7 RF, 6L7 mixer, 6B8 RF AVC and a 6C5 oscillator. The first and second IF stages are 6K7s, followed by the 6B8 third IF/second detector. The first AF is a 6K7, and the inverter is another 6C5. A pair of 6C5 tubes is the second stage audio in push-pull, followed by a pair of 6V6 tubes. Two 5Z4 rectifiers and a tuning eye make up the 16-tube complement. The export set also operated on a 470 kc IF, rather than the US standard 455 kc. Without cabinet, the set sold for 36 guineas, comparable to the US price.

The Phantom introduces one new “mystery” into Scott set production. In addition to the usual builder and licensing tags found on all Scott receivers, many Phantom tuner chassis have a tag that state “Model A,” “Model B,” or “Model C.” No “models” higher than C have been reported, and the exact differences that distinguish this nomenclature are unknown. These tags and model designations appear on only one other Scott set, the Masterpiece.

With the introduction of the Phantom in 1938, Scott now had a high-priced set (the Philharmonic) and a mid-priced receiver (the Phantom). The US economy however, had not fully recovered from the depths of the Great Depression. Demand for an inexpensive Scott receiver was very high, and the difference in price between the Sixteen and the Phantom

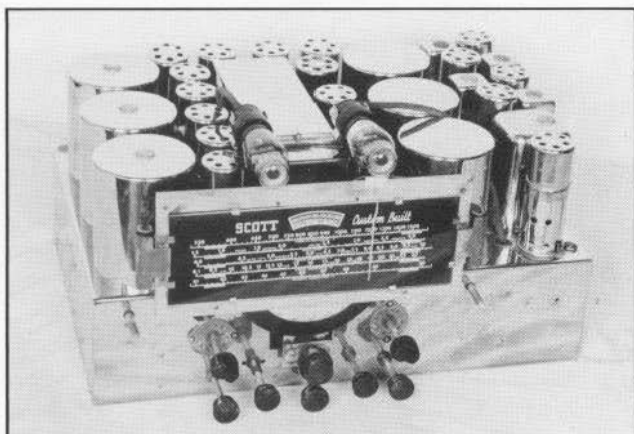


Figure 54. *Phantom FM chassis. The FM Phantom had to be enlarged to accommodate the FM tuner. Note the non-symmetrical chassis positioning.*

was negligible. Sales dropped dramatically in 1938, falling to just \$521,000. Scott attributed some of this downturn to greatly reduced advertising in May, June and July of that year. However, this steep drop in sales forced Scott to borrow \$100,000 to continue his business. A low-priced set could really do no harm, and might bolster sales in the coming year. Therefore, Scott introduced a new “low end” receiver into his 1939 lineup, the Super XII.

Super XII

Offered at the (for Scott) incredible price of just \$99, the Super XII was the smallest Scott receiver offered in almost five years. Giving it an appearance to remind the tight-fisted buyer of the Philharmonic, the Super XII used an “airplane” dial face, rather than the slide-rule dial on the Phantom. The first Super XII sets produced also have the very unique distinction of being the only chrome chassis Scott sets that are completely self-contained on a single chassis. Scott had always argued that by placing the power transformer and rectifier on a separate chassis, ac hum was kept to a minimum. However, Scott compromised this premise to create the very low-priced Super XII.

The Super XII circuit was certainly a no-frills design. The tube lineup is familiar: 6U7 RF, 6L7 mixer and 6J5 oscillator. The first and second IF stages were two 6K7 tubes, the third IF/second detector is a 6B8. The first AF stage is a 6K7, followed by a 6F8 as the second audio and inverter. A pair of 6V6 tubes is the final AF, and a single 5V4 rectifier and tuning eye tube complete the Super XII. The wavelengths covered are the same as the Phantom: 550 kc to 22 Mc in four bands. The fifth

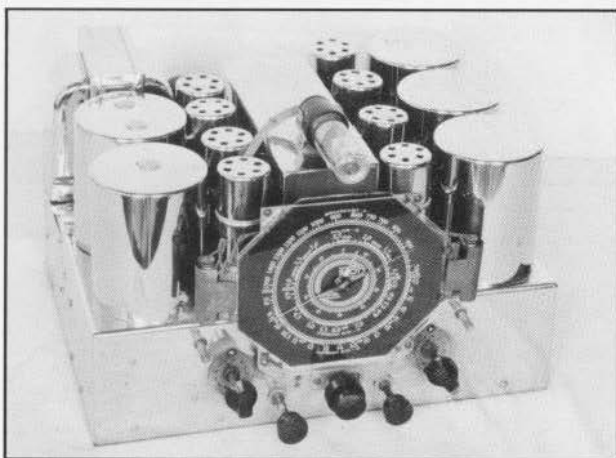


Figure 55. *Super XII receiver. For the poorest of the poor who bought Scott receivers. Selling for as little as \$99, the Super XII was not as popular as one might guess.*

“television” band, covering up to 60 Mc, was also a \$19.50 option on the Super XII.

Whether the chassis-mounted power supply actually caused problems in the Super XII is unclear. However, Scott did not remain with this arrangement for more than a few months. By March, 1939, the Super XII was shipping with the power transformer and rectifier tube on a single, small external chassis. The additional chassis and cable did not come without cost, and the price of the set jumped about \$10.



Figure 56. *Super XII receiver and power supply. Late versions of the Super XII had a very small external power supply.*

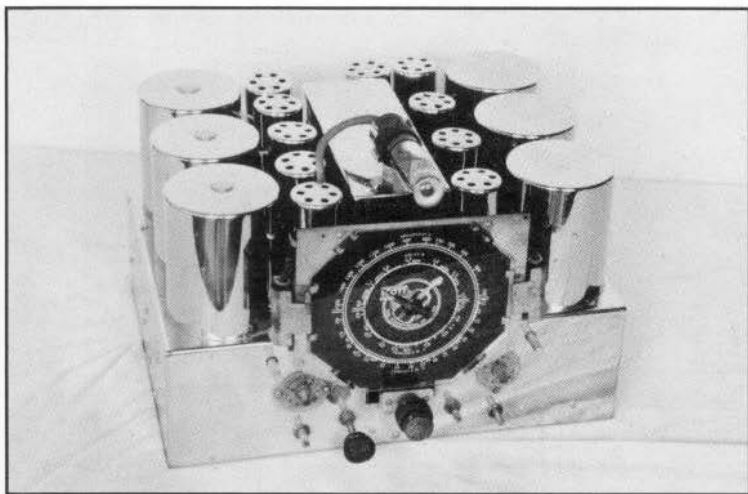


Figure 57. *Masterpiece chassis. After the purchase of McMurdo Silver's company, Scott made the Masterpiece the "low-end" receiver in place of the Super XII.*

Scott was never satisfied with the Super XII, and in a letter to a prospective customer, he stated that the Super XII would be discontinued in July, 1939, after less than a year in production. Scott still needed a "low end" offering, but the recent demise and purchase of the McMurdo-Silver assets allowed Mr. Scott to create a new moderately priced receiver, the Scott Masterpiece.

Masterpiece

Although the Masterpiece carried the famed McMurdo-Silver trade name, the Scott Masterpiece is unlike any of the McMurdo-Silver sets of the same name. In fact, the Scott Masterpiece is really just a Super XII circuit and chassis layout, with the addition of two tubes in the audio stages. Priced near \$170, the Masterpiece was still the lowest priced set in the Scott lineup in 1939 (the Deluxe Phantom was selling for \$250, and the Philharmonic was over \$300).

The tube lineup is typical Scott: 6U7 RF, 6L7 mixer, 6J5 oscillator, two 6K7 IF stages, followed by a 6B8 third IF and second detector combination. The audio stages include a 6K7 first AF, three 6J5 tubes (one inverter and a push-pull second AF stage), and a pair of 6V6 tubes for the final audio. A 5U4 rectifier and the tuning eye round out the 14-tube Masterpiece design. Other than the push-pull second audio stage, this set is effectively the same as the Super XII it replaced. In fact, the schematic indicates that the alignment instructions for the Super XII should be used on the Masterpiece. Frequency coverage is also the same, spanning 550 kc to

22 Mc in four bands. The Television band from 22 to 60 Mc was also available for the Masterpiece.

The Masterpiece leaves contemporary Scott collectors with several mysteries, however. First, virtually every Masterpiece set has an additional metal tag on the chassis, which gives a Model designation of a single letter. Two Masterpiece units in one collection are "Model C" Masterpiece sets. The meaning of the model designations is unknown, and only a single schematic diagram is known for the Masterpiece. The second mystery surrounding the Masterpiece is the FM version of this set, pictured in the March, 1940 *Scott News*. This set might be a "photo" unit, built up for advertising, but not actually containing any circuitry. This practice was used at the Scott Laboratories, as attested by several former employees. However, the FM service manual provides specifications as to chassis size and layout for the Masterpiece FM. However, none of the FM Masterpiece sets is known today. Finally, we may never know why Mr. Scott offered a set with the same name that his main competitor used for many of the preceding years. It may be that Scott truly wanted to honor Silver's sets and competition. The reasoning behind the naming of the Scott Masterpiece will forever be an enigma.

The Super XII and the Masterpiece contributed to a slightly improved financial picture for Scott in 1939. Once again, he had curtailed his advertising during traditionally weak sales months (May, June and July). However, sales still rose to \$685,000, a dramatic improvement from the previous year.

Special Communications Receiver

The Special Communications receiver is the final new design offered by Scott using the Philharmonic circuitry. The "Special" is perhaps the most sought after Scott receiver outside the Quaranta series. Fewer than ten Specials are known in contemporary collections, and each of the known sets seems to have a story or mystery associated with it. The Specials are the only Scott sets that have a builder tag placed in the center of the front panel. Engraved with the name of the owner, only about half of the existing sets have the original builder tag still attached. The serial numbers for the Specials is also one of the more unique sequences; all known Specials are prefix JJ, with the lowest set being JJ-251, and the highest being JJ-271. Although it is purely conjecture, it seems likely that fewer than a dozen Special Communications receivers were ever assembled.

Although the tube lineup is familiar, nothing else about the Special resembles previous Scott sets. In addition, the Special Communication Receiver has features and functions not found on any other Scott set of

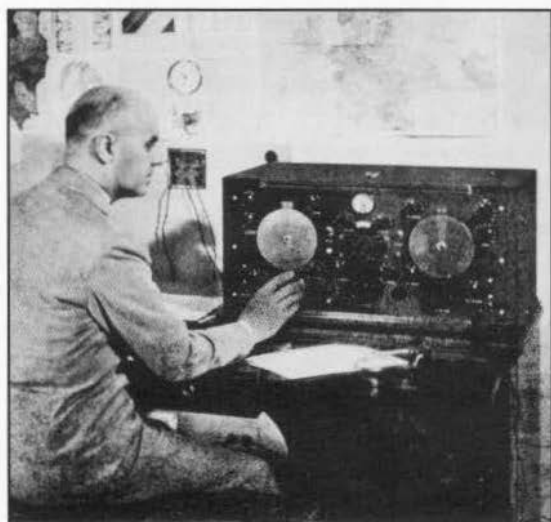


Figure 58. *Mr. Scott with his Special Communications receiver. Covering nine bands from 140 kHz to 64 MHz, the Special is unique even for Scott.*

any time period. The Special is really two totally separate tuners built on the same chassis. Both tuners had two stages of tuned RF, providing superb signal-to-noise ratios. All short-wave bands had full band-spread tuning, the IF has three degrees of variable selectivity, and a continuously-variable crystal filter is provided. The Special also offered a BFO, noise limiter, phono-scratch suppressor, antenna compensation, RF gain, AVC cutout, calibrated tuning meter and stabilized oscillator supplies. Requiring 26 tubes, the Special is not the largest Scott receiver. It was one of the more expensive, however, with a list price of \$650.

The coverage of the Special is handled across nine bands. The right hand tuner covers just two bands, the long wave from 140 to 395 kc, and the AM band from 520 to 1710 kc. The left tuner is the short wave tuner, covering 1.7 Mc to 64 Mc in seven bands. Each of the tuners has the typical Scott "front end," comprised of two 6U7 RF stages, a 6L7 mixer and a 6J5 oscillator. The oscillator tubes are fed from a VR-150 regulator. Thus, nine tubes of the twenty-six are devoted solely to the RF stages of the Special. The Special boasts only three IF stages, all 6K7 tubes. A 6B8 follows as the second detector and also functions as the BFO. A separate 6B8 generates all AVC voltages, and a 6H6 functions as a noise limiter. In addition to the scratch suppressor (a 6B8 and a 6J7), the three stages of audio include a 6K7 first stage, a 6J5 inverter, and a pair of 6J5s in push-pull driving a pair of 6L6 output tubes. The remaining tubes are another 6J5 as the tuning meter amplifier and a pair of 5U4 rectifiers. If the audio lineup sounds familiar, it should. The basic design of the Special audio is identical to the Phantom sets, and most of the known Specials have what appear to be unmodified Phantom Deluxe power supply units.

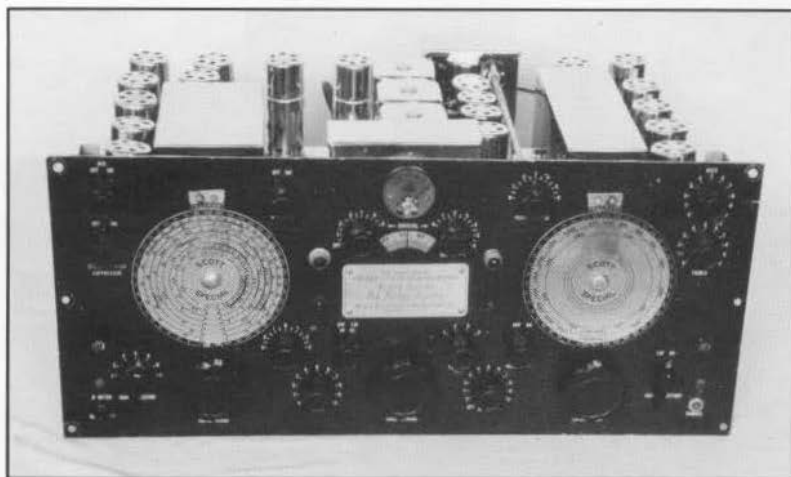


Figure 59. *Front view of the Special Communications chassis. Note the crystal filter and laboratory layout of the front panel.*

As with most Scott sets, the exact end of production for the Special Communications Receivers is unknown. One story by a former employee tells that a cache of components for building Specials was found either during or just after World War II. Supposedly two or three sets were built with these parts, but no corroborating evidence exists for these sets. Photos exist of a set marked "United States Signal Corps," but a set with this tag has never been located. One of the most common photos is the set built for E. H. Scott himself. Of the sets with tags, the set marked "New Zealand Legation" also has a hole punched on the chassis for an additional tube just to the right of the crystal filter. The hole is capped,

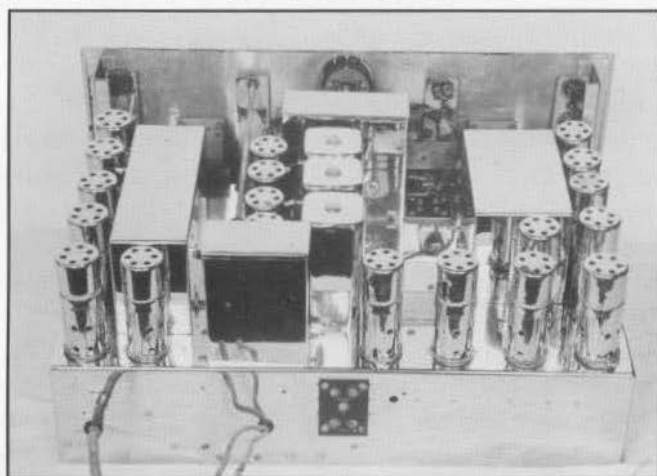


Figure 60. *Rear view of the Special Communications chassis. One of the most massive Scott chassis, the depth and component placements make this a very difficult set to restore.*

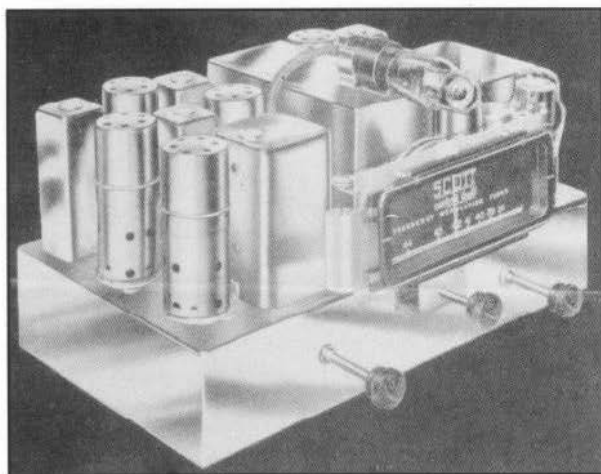


Figure 61. *FM Tuner chassis. A stand-alone outboard version of Hobb's FM tuner. The output is fed into the phono input on any receiver.*

and the possible use for a 27th tube is unknown. Almost no “factory” data exists for the Specials, and with the exception of an article in *Radio & Television News* in October of 1940, no publication other than the *Scott News* discusses the Special Communications Receiver. Truly one of Mr. Scott's most complex offerings, the Special will remain one of the most desired and unique sets built by the E. H. Scott Radio Laboratories.

FM Development at the E. H. Scott Radio Laboratories

In December, 1939, the Scott Radio Laboratories obtained a license to build FM receivers based on the Armstrong licenses. Research began immediately, and by March, 1940, Scott introduced an FM tuner for the 41 to 50 Mc range. This tuner circuit was the last major technological innovation that the company would give to the American public before the United States entered World War II. Credit for this development goes to Marvin Hobbs, who was the chief engineer of the Laboratories during this period. In discussions with Mr. Hobbs regarding the FM development, he described some legal and philosophical opinions on FM circuit design:

“At the time these receivers were developed, a power struggle between RCA and Armstrong had considerable influence on FM receiver design. Both RCA and Hazeltine held large numbers of patents, which covered almost every aspect of radio receiver design. Receiver manufacturers in the USA had to license with them or face lawsuits which would soon close them down. The only defiant company was Zenith, which was willing to commit sufficient resources to fight both RCA and Hazeltine in the courts. They refused to license with them to finally win many years later. The third licensor was Major Armstrong with his FM patents.

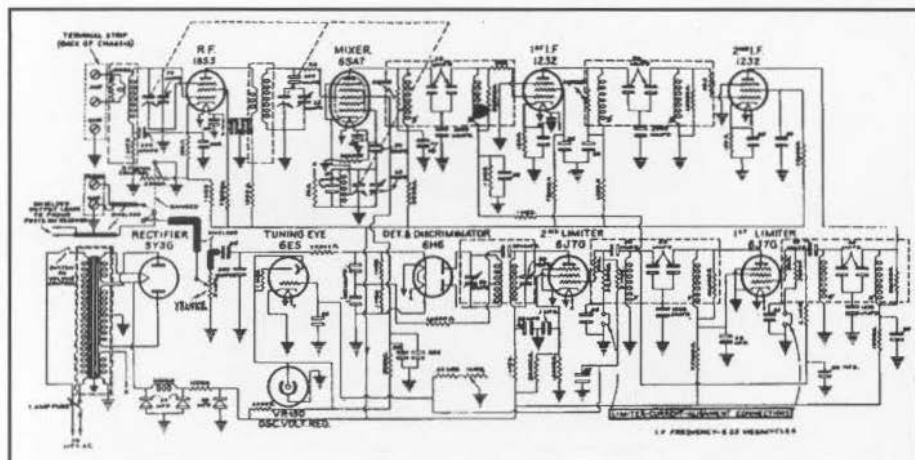


Figure 62. FM tuner schematic. Hobb's unique 41-50 MHz FM tuner.

"The result of this conflict was that there were two methods of handling FM signals. One approach used limiters and a discriminator detector, covered by Armstrong's patents. The other approach used no limiters and a ratio detector, which RCA could use to circumvent Armstrong's patents, and which they recommended to their licensees. Hazeltine went along with the RCA approach. At that time, only a few companies, that aspired to higher quality receiver performance, held Armstrong licenses. These included Scott, Zenith and Stromberg-Carlson. Having an Armstrong license at Scott, we could use Armstrong's circuitry, which consisted of limiters and a discriminator detector.

"When I [Marvin Hobbs] went with RCA to develop the Berkshire receiver, I had to use a ratio detector instead of the Armstrong limiter-discriminator approach. These two methods of amplifying and detecting FM signals are in use to this day, not only in the FM band, but also for detecting the sound signals associated with television signals. Ratio detectors are more widely used because they are less expensive and in many instances the designers have no incentive to refine the FM reception. However, a few quality manufacturers continue to use the limiter-discriminator approach."

The Scott FM tuner starts with an 18S3 high Gm tube as the RF amplifier. The output is transformer coupled to the mixer, a 6SA7 tube. The triode section of the 6SA7 is used as the local oscillator. Scott apparently was pleased with the performance of the 6SA7, both for its stability as an oscillator and its loading characteristics as a mixer. A VR150 regulator stabilizes the oscillator plate supply, providing a stable IF output at 5.25



Figure 63. *FM Tuner in Mode' cabinet. The only cabinet offered specifically for the FM tuner.*

Mc. The IF amplification is passed through four stages. The first two stages are type 1232 high Gm tubes. The IF coupling is unique, using a combination of inductive tuning and capacitive coupling to minimize inductive coupling in the IF transformers. The third and fourth stages are generally referred to as the first and second limiters. This function is obtained from two 6J7 tubes, in a cascade limiter circuit. The grid-leak condenser combinations used in these stages determine the noise limiting time constants. The first limiter has a time constant of 2.5 microseconds. The second stage is at half that value. The discriminator/detector is a 6H6 dual diode. With a well-balanced diode pair, the detector circuit should have a uniform response from 30 to 15,000 cycles. The R/C circuit following the diode load is a correction for pre-emphasis of high audio frequencies imposed at the transmitter. Finally, a 6E5 tuning indicator is fed through a voltage divider/audio filter from the second limiter stage.

The stand-alone FM tuner unit has a 5Y3 rectifier for the power supply. All combination sets derived their power from the set supply. According to the service manuals available, the Phantom and Masterpiece sets were widened 3 5/8 inches to accommodate the FM circuit. This created a rather unique, non-symmetrical appearance to these two FM sets. The Philharmonic chassis remained the same size, but the audio stages were rearranged and the volume expander removed to allow for the FM circuit. The FM circuit of the Philharmonic combination also has two 1853 RF amplifier stages, while all other versions used a single RF stage. The development of the FM receiver led Scott to produce one totally new and final set prior to the start of World War II. This was Scott's first set that was actually designed to be an AM/FM receiver, the Laureate.

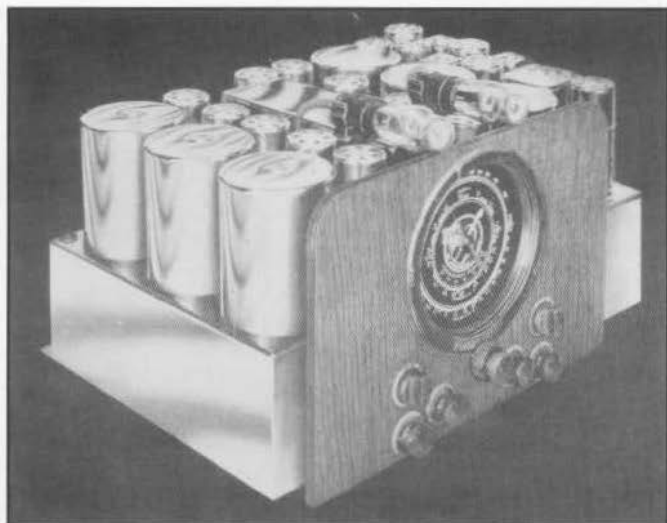


Figure 64. *FM Masterpiece. Having added the FM circuit to the Philharmonic and Phantom, the Masterpiece also would seem obvious. However, no FM Masterpiece sets have been discovered.*

Laureate

During the summer of 1941 the world was beginning to feel the pressure and effect of the war in Europe. With the US role still unclear, the consumer market was actively seeking radio receivers to allow them to follow the situation in Europe. Scott's new FM circuit design was made available in modified Philharmonic and Phantom sets (and possibly the Masterpiece), but the Scott Laureate holds the distinction of being the first Scott set designed to be an AM/FM receiver. An 18-tube set, the Laureate sold for approximately \$250, making it a comparable competitor to the Phantom.

The Laureate competed with the Phantom in appearance as well, with a slide rule dial that looks remarkably similar to the Phantom. However, the Laureate does not have the same coverage as the Phantom Deluxe. The Laureate covers AM and FM, and a single shortwave band from 9.2 to 15.6 Mc. The set is equipped with a phonograph input, and does advertise FM response to 15,000 cps, a better range than allowed by the Philharmonic or Phantom without the purchase of a set of high-frequency speakers and a crossover network.

As a newly designed receiver, the tube complement of the Laureate is quite different from the previous late-1930s sets already discussed. The AM/SW section used a 6SK7 RF, and a combined 7J7 oscillator/mixer tube. The first IF stage is a 6K7, followed by a 6B8 second IF,



Figure 65. *Laureate chassis. The last new Scott chassis introduced before World War II.*

which doubles as the second detector and AVC. The first AF stage is a 6J5, followed by a 6C8 dual triode as a second AF stage and inverter. This drives the push-pull 6L6 final AF stage. The FM circuit is the same as previously discussed, using a single 1232 RF stage, a 6SA7 oscillator/mixer, and two 1232 tubes as the first two IF stages. Instead of two 6J7 limiter stages, a single limiter stage using a 6SJ7 feeds the 6H6 discriminator. Late versions of the Laureate use an 1853 tube as the FM RF amplifier, and the two IF stages are changed from the 6K7/6B8 combination to a pair of 6AC7 tubes. A tuning eye and a pair of 5U4 rectifiers complete the lineup of the Laureate.

The Laureate offered the calibrated logging scale as an integral part of the tuning dial. Additionally, the power supply of the Laureate is noticeably different from previous Scott power amplifiers. First, only the rectifier tubes are present, the final AF stage is contained on the tuner chassis. Also, almost all known Laureate sets have a flat black power transformer, to better dissipate heat. While it is rare today to find a Scott receiver with a burned out power transformer, the shift to a black unit seems to indicate that failures of this sort were a concern. The Laureate also used a new dual-speaker, with a mounted high-frequency unit in the middle of the low-frequency speaker. This also required a crossover network, which contains a 35Z5 tube. (This is the 18th tube, for those who were counting earlier.) The Laureate represents the latest technological innovations at the E. H. Scott Radio Laboratories prior to World War II. The Laureate (and Philharmonic and Phantom sets) were produced into the war until parts ran out sometime in the summer of 1942.

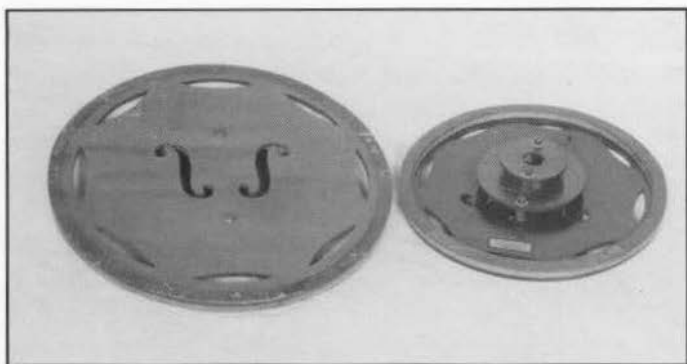


Figure 66. *Tauscher sound boards (12" and 15"). Based on the work of Erno Tauscher, Scott believed these baffles improved overall sound quality.*

Tauscher Sound Boards and Speaker Equalization

In 1940, Scott introduced the Tauscher Sound Board as an option for any of the sets of the line. The sound board was based on the work of Mr. Erno Tauscher, who had obtained patents for his design in 1931. The basic premise is that three baffles of various sizes will distribute and "harmonize" the speaker output. The Tauscher board is placed directly in front of the speaker, and in fact come in several sizes. While there would certainly be questions today about placing baffles in front of the speaker systems, in the early days of radio many new ideas were tested. Scott went somewhat beyond the original Tauscher designs, and in 1940, E. H. Scott filed for his own patent on a "Sound Equalizer Reproducer System". Patent #2,271,100 was granted on January 27, 1942. By the time the patent was granted, civilian radio production had ceased, and it is doubtful that any of the Scott designed sound baffles were ever sold.

Scott Serial Numbers

Obtaining an accurate picture of the distribution and use of Scott serial numbers is difficult. No company documentation exists giving any indication of exact production figures. Conversely, a close examination of the serial numbers recorded today doesn't really provide much insight into the original production figures. However, over the years, many serial numbers have been gathered, and working from a database of approximately 500 serial numbers, a few inferences can be drawn.

First, the Scott serial numbers must be broken into two categories based on the prefix. All Scott serial numbers on the chrome chassis sets from the Allwave Deluxe through the Laureate are of the form: PREFIX-NUMBER, where PREFIX is either one or two letters and NUMBER is

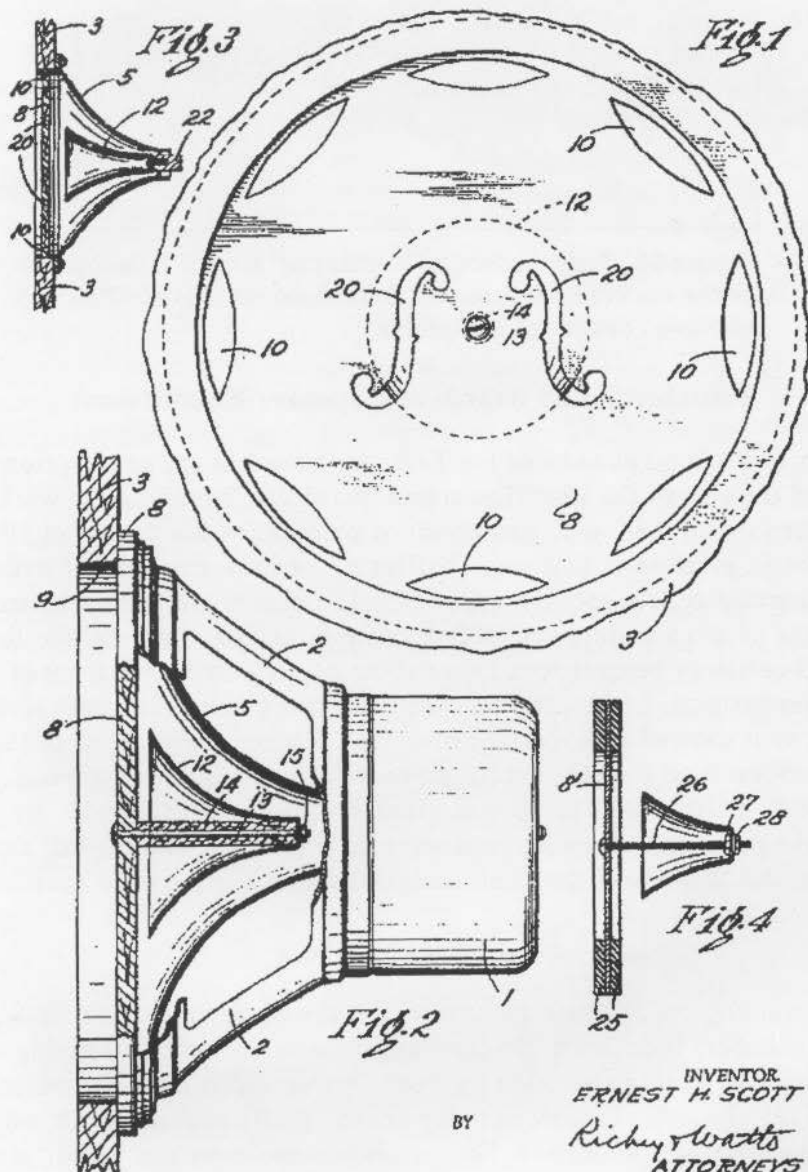
Jan. 27, 1942.

E. H. SCOTT

2,271,100

SOUND EQUALIZER REPRODUCER SYSTEM

Filed Dec. 24, 1940



INVENTOR
 ERNEST H. SCOTT
 BY
 Richy & Watts
 ATTORNEYS

Figure 3A Elements of Mr. Scott's Sound Board Invention

Figure 67. Patent diagrams for Scott's "Sound Equalizer." Scott's own implementation of the Tauscher patent, claiming significant enhancement.

a number greater than 10 and less than 900. If two letters are used, they are the same. Examples of serial numbers are G-242 and AA-589. All sets produced from the Allwave Deluxe (1932) through the first Philharmonic sets (1937) have a single prefix letter. Within each single letter prefix, the sets do appear to have chronological numeric assignments. However, the numbers don't match up with different prefixes. Just because G-242 is an Allwave Deluxe does not mean that M-242 would also be a Deluxe; it might well be an Allwave 15. Interestingly, the first Philharmonic sets (the ones with single-letter prefixes) are all prefixes D, E or F.

The chart on page 80 summarizes the distribution of serial numbers for the sets with single-letter prefixes (Allwave Deluxe to early Philharmonic). Multiple examples (ranges) of numbers are indicated by "to" within the appropriate boxes. Numbers without a "to" indication are single serial number examples. The Allwave Deluxe sets are split with 1932 given to known early (non-AVC) sets, and the 1933 numbers given to the AVC Deluxe receivers. Similarly, the Allwave 23 is separated into the early and late variations. Once again, the Allwave 23 service manual indicated that all High-Fidelity sets above serial number 500 have the upgraded IF trimmers and other modifications. It is apparent from this table that those changes are present in a majority of the High-Fidelity sets.

At some point in the latter half of the decade, Scott began using the double-letter prefixes. Why this was done is not clear, but it seems to coincide with the selling of more than a single model at the same time. From the introduction of the model Sixteen, and up to World War II, only a few early Philharmonic receivers have single-letter prefixes. All "late" Philharmonic sets (all FM Philharmonics, for example) have double-letter prefixes. Proving that numeric values were chronological within each double-letter prefix is a bit more difficult. One reason is the "blocks" of numbers that appear in the later serial numbers. The Special Communications receivers provide an excellent example. As mentioned previously, all the Specials have prefix JJ. The low set is JJ-251 and the high set is JJ-271. No other sets fall within this range. All the stand-alone FM tuners have prefix HH, as a second example. Finally, sets are interspersed within each prefix: AA-214 might be a Philharmonic, and AA-253 might be a Phantom, followed later in AA by another Philharmonic. This makes set estimations very difficult using these serial numbers. It may be that there is a different significance altogether to the double-letter prefixes.

The War Years and Scott's Contribution to the Allied Effort

One of the worst hazards for the Allied effort in the early days of World War II was the threat of the German submarine fleet. Equipped with highly sensitive radio direction finders, the German submarine

	Allwave Deluxe		AW 15	Allwave 23		Philly
Prefix	1932	1933	1934	1935	1936	1937-38
A		229	263	458 to	883	
B		208	261 to 304	460 to	651	
C	70	123	146 to 416	550 to 588		
D	53 to	151	269 to 366	507 to 543		617 to 834
E	74 to	137	301 to 437	511 to 574		660 to 845
F		247	431	497 to 589		689 to 834
G	150 to	242	285 to 428	492 to	620	
H	71 to	136	314 to 417	460 to 533		
J		142 to 204	261 to 427	468 to 598		
K			273	492 to	692	
L	84		252 to 444	472 to	640	
M	108 to	231	254 to 334	459 to	649	
N	94 to	233	254 to 319	458 to 519		
P		212		457 to	646	
Q	71 to	245	261 to 417	483 to	620	
R		159 to 215	435	479 to	626	
S		112 to 208	259 to 400	503 to	572	
T	117 to	229	242 to 345	585 to 649		
U	66 to	239		466 to	650	
V	89	231		453 to	633	
W	78 to	243		479 to	645	
X	145			406 to	631	
Y		208		276 to	619	
Z		64 to 98	138	251 to	640	

The distribution of serial numbers for the Scott radios with single-letter prefixes.



Figure 68. *RBO-2. The RBO family had several variations, differing only slightly in tube lineups.*

commanders were able to locate military and supply vessels by simply scanning for radio emissions from a receiver being used aboard a ship to obtain news or instructions. These emissions were due to the radiation leaked from the local oscillator of the now omnipresent superheterodyne receiver. Due to the incredible loss of materiel and lives on merchant ships in particular, the Navy requested that all radio manufacturers work to eliminate the problem of oscillator emissions. To that end, Chief Engineer Marvin Hobbs worked throughout early 1942 to create what was dubbed the SLR (Super Low Radiation) receiver design. This research resulted in patent 2,314,309, which was granted on March 16, 1943.

The basic problem to be solved was how to limit the transmitted radiation of the local oscillator back through the antenna circuits. Physically, the SLR sets are different from other contemporary designs, particularly in the “front end” stages of the receivers. While much of the theoretical work behind the SLR receivers was beyond the understanding of the average person, Mr. Scott did write a good layman’s description of the problem. The article, “How Ship Receivers Give Away Their Positions,” was published in the November, 1942 issue of *Radio Craft*. The Merchant Marine purchased a truly amazing number of Scott SLR receivers during the War, and almost every Merchant Marine model was also offered in a Navy version.

In addition to the SLR receivers, Scott produced two solely military, ultra-high-frequency receivers as well. In early 1943, the government purchased a number of Scott’s new receiver, the RCK. Assigned Navy code CZC-46223, the RCK covered 115-156 Mc, in an eighteen-tube



Figure 69. SLR-F. The Merchant Marine version of the RCH.



Figure 70. RCH. The Navy version of the SLR-F.



Figure 71. SLR-12B. Although most Merchant Marine sets had a Navy variant, the SLR-12B is an exception



Figure 72. SLR-H. A first cousin to the SLR-12B, no Navy version of this set was ever built.

design. The following year, the RDO made its appearance. The RDO is a far more complex receiver, having separate power supply (CZC-20314), IF/AF (CZC-50198) and preselector (CZC-10369) units to comprise a single receiver. The frequency range of the fourteen-tube RDO was also quite impressive, operating from 40 to 3400 Mc.

The chart on page 85 summarizes much of the information on the World War II Scott receivers.

AR-1

The Scott Model AR-1 is perhaps the most unique Scott set known, because it is certain that only one AR-1 was built. The reason was the application, in that it was the personal radio of the President of the United States, to be used when flying in the newly-christened presidential aircraft. The Scott Model AR-1 is a special seventeen-tube superheterodyne receiver covering the frequency ranges from 150 kc to 23.6 Mc in five bands. Marvin Hobbs developed the set during the autumn of 1943. It was designed for operation in aircraft on a 115V, 400-cycle single-phase ac source and a 24 Vdc supply. The five wave bands covered are 150-400 kc, 540-1550 kc, 1.6-4.3 Mc, 3.5-9.9 Mc and 8.8-23.6 Mc.

Only thirty days were given to develop the set. This was made even more difficult by the fact that neither Marvin Hobbs or E. H. Scott had attempted to build an aircraft receiver before. They decided not to develop a totally new set, but to simply modify the existing marine application designs. In studying the parts list of the AR-1, the use of "off the shelf" components is evident. The short-wave bands and the long-wave band use RF and oscillator coils from the SLR-F receiver. The broadcast coils and the IF transformers are the same part numbers used in the RBO receivers. The power supply was more unique: the 24 Vdc supply fed all the filaments except the rectifier, the third AF stage and the tuning eye. The 115 Vac, 400-cycle supply fed a transformer that provided B+ potential as well as filament voltages for the tubes.

As installed, the set resembled an automobile radio of the period. It used flexible shafts and couplings to operate the receiver from a small control panel in the President's cabin. The set itself rode in a baggage compartment just below the cabin. The total distance between the control panel and the set was less than six feet. The space for the control panel was small, requiring the use of the rather unusual 6AF6 eye tube. This tube did not perform as well as the 6E5, so a 6SJ7 amplifier was used to boost the signal to the eye tube, giving it better action for the user. Even in this small space, the control panel had the tuning indicator, a fidelity control, selectivity, volume, noise limiter and power on-off. The noise limiter switch also operated the A-N Range switch, which allowed the user to filter out the code signals on the long-wave weather-band broadcasts.

Set Name	Set ID	Contract	Tube Complement
RBO/SLR-12A .53-1.6, 5.5-15.6Mc	CZC-46139 (set) CRV-49131A (spkr/amp)	NXsr-99260 (18 Mar 41)	6E5,6H6,6J5(2),6K6,6K7 6SA7,6SJ7,6SK7(2),6X5(2)
RBO-2 .53-1.6, 5.5-15.6Mc	CZC-46225	NXsr-38078	5Y3(2),6E5,6H6,6J5(2),6K7, 6SA7,6SJ7,6SK7(2),6V6
RBO-3 .53-1.6, 5.5-15.6Mc	CZC-46225A		5Y3(2),6E5,6H6,6J5(2),6K6, 6K7,6SA7,6SJ7,6SK7(2)
RCH/SLR-F 80-560Kc, 1.9-24Mc	CZC-46209 (set) CZC-49587 (spkr)	NXsr-45471(1 Sep 44) NXss-24276	5Y3,6H6(2),6J5,6K7,6SA7, 6SJ7,6SK7(2),6SQ7,6V6
REE/SLR-M .54-18.6Mc	CZC-46270	NXsr-87719 (22 Jan 45) NXsr-88836 (6 Feb 45)	6K7,12H6,12J5,12SA7, 12SK7(2),12SN7(2),25L6(2), 25Z6,1629
RCK 115-156Mc	CZC-46223	NXss-26192 (23 Mar 43)	5U4,6AB7(8),6H6(2),6J5, 6V6,717A(3),956,VR150
RDO 40-3400Mc	CZC-10369 (preselector) CZC-50198 (IF/AF) CZC-20314 (P/S)	NXsr-48318 (7 Feb 44)	5U4,6AB7(7),6AC7(2),6H6, 6SN7,6V6,VR150
SLR-12B .53-1.6, 5.5-15.6Mc			5U4,6E5,6H6,6J5(2),6K7, 6SA7,6SK7(2),6SN7, 6V6(2)
SLR-H .53-1.6, 5.5-15.6Mc			5U4,6E5,6H6,6J5,6K7,6SA7, 6SK7(2),6SN7(2),6V6(2),

The Scott World War II receivers.

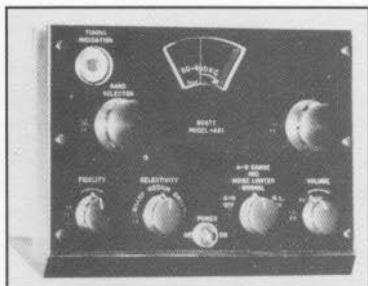


Figure 73. The AR-1 Control panel. It is possible that Franklin Roosevelt operated these dials.

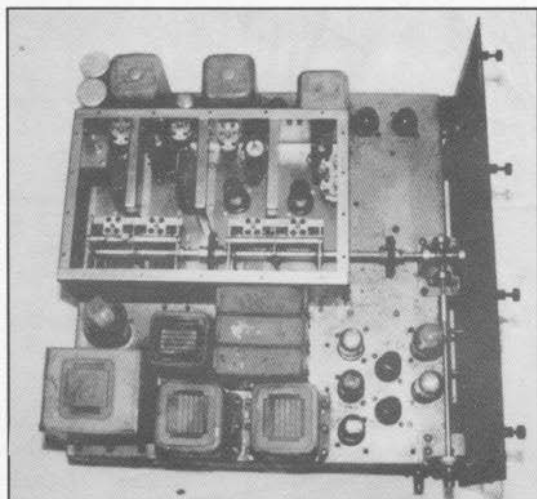


Figure 74. AR-1 tuner chassis, top view. Held in a hold below the President's cabin, the tuner is built like the SLR receivers it is modeled after.

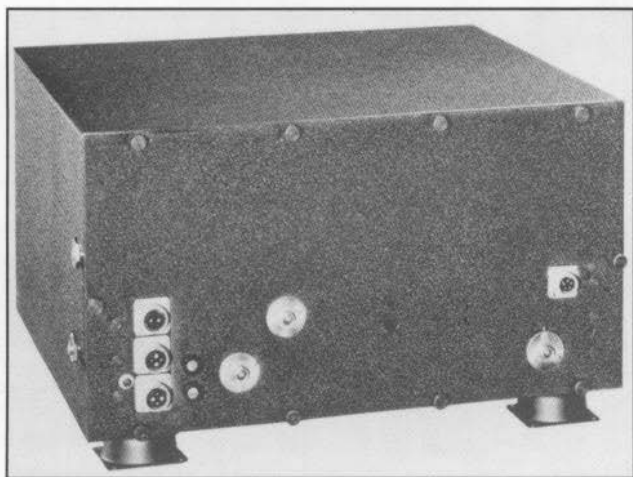


Figure 75. AR-1 tuner chassis.

The circuit description is given in the instruction manual. The antenna input is coupled to high impedance antenna transformers on all bands. Two tuned RF stages (two 6SK7s) provide the first signal amplification. The output of a separate 6J5 oscillator tube is fed into the 6SA7 mixer. By using a VR-150 voltage regulator and a separate oscillator, a much higher degree of stability was obtained. The IF signal (455 kc) was then fed into a two-stage IF amplifier (two 6SK7s). The second detector was a 6H6, which also doubled as the AVC. A second 6H6 provided a noise limiter stage before entering the AF amplifier circuits. The first audio stage is a 6SK7. The AVC voltage is applied here, realizing a better AVC action. The second AF stage is a 6J5, with a second 6J5 as an inverter to the third AF amp. The final AF stage is a pair of 6V6s in a push-pull configuration. The output was rated 10 watts from 50-15000 cps. The three remaining tubes are the 5U4 rectifier, the 6AF6 eye tube and the 6SJ7 tuning eye amplifier. The receiver chassis measured 19" W x 11" H x 18" D. The aircraft (and its radio) are fully restored and on display at the United States Air Force Museum in Dayton, Ohio.

The Post-War Era and the Departure of E. H. Scott

Over the years, quite a bit of material on E. H. Scott and his company has been written. However, very little information is found on the post-war receivers. This lack of information is partly due to the fact that Scott was no longer affiliated with the company after the summer of 1945. Near the end of the war, Scott traveled again to New Zealand. The trip followed on the heels of a deal made between Mr. Scott and Hal Darr, who had just purchased controlling interest in the E. H. Scott Radio Laboratories. However, when Mr. Scott returned to Chicago, he found that Darr and the officers had issued more than 200,000 shares of public stock, and Scott was no longer president of the company. Scott denounced this move, and took out full-page ads in the major Chicago newspapers. He informed everyone that he was no longer associated with the company. On August 14, 1945, the name of the company was legally changed to Scott Radio Laboratories, Inc. The removal of his initials (E. H.) from the name mark the start of the decline of the company. Ernest and his wife Jessie purchased a home in Saanich, British Columbia and retired. Ernest died on October 27, 1951. Perhaps fortunately, he did not live long enough to see the final demise of the great company that he started.

Undoubtedly the best known post-war Scott receiver is the 800B. This set, first offered in 1946, is usually considered the last of the "classic" sets by most Scott collectors. Designed by chief engineer Marvin Hobbs, the 800B is a fine set, with motor-driven, push-button tuning. The set employs 24 tubes, and covers AM, modern (88-108 Mc) FM, and the short waves from 5.9 to 18.2 Mc. If the 800B wasn't large enough for the average homeowner, Scott later sold the 800BT, which was an 800B with a built-in projection television. This is a set that absolutely requires disassembly before moving! Due to the size and price, only a few examples of the 800BT remain in collections today.

Technically, the 800B was advanced for its day. The set offered sensitivity and selectivity controls similar to the pre-war sets. Separate base and treble controls allowed excellent audio response, and a powerful coaxial speaker, driven by push-pull 6L6 output tubes created a rich sound in a monophonic receiver. The AM/SW section of the 800B was comprised of the following: 6SK7 RF amplifier, separate 6J5 oscillator, 6SA7 mixer, two 6SK7 IF stages, a 6H6 second detector and a 6E5 tuning indicator. The FM portion of the receiver consisted of a 6AG5 RF amplifier, 6C4 oscillator, another 6AG5 as a mixer, two 6AC7 tubes as first and second IF stages, followed by two 6SJ7 limiters, a 6H6 discriminator and another 6E5 for FM tuning indication. The audio section



Figure 77. *The 800BT Radio/TV combination. A very expensive set in its day, few examples survive in collections.*

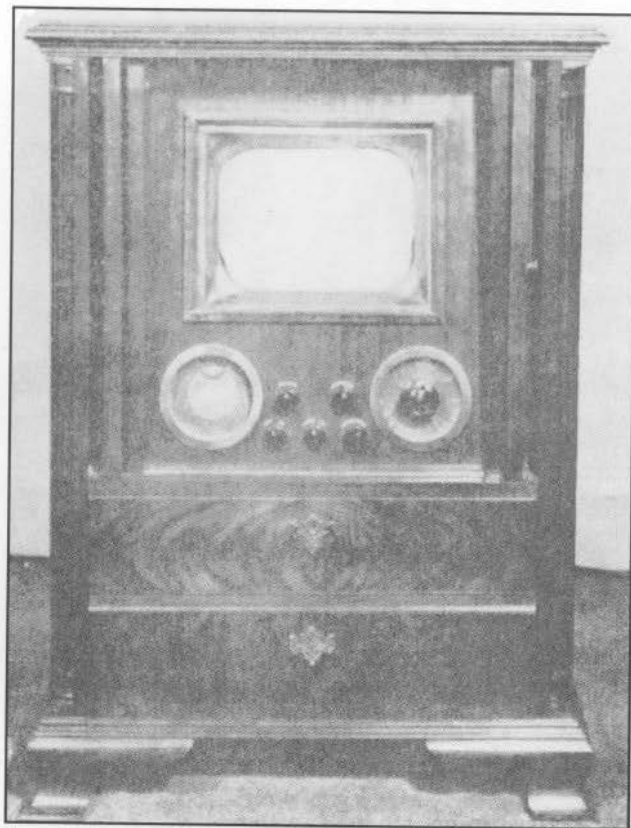


Figure 78. *Scott Video receiver (model 13A). Not a complete television, the 13A is an outboard TV receiver.*

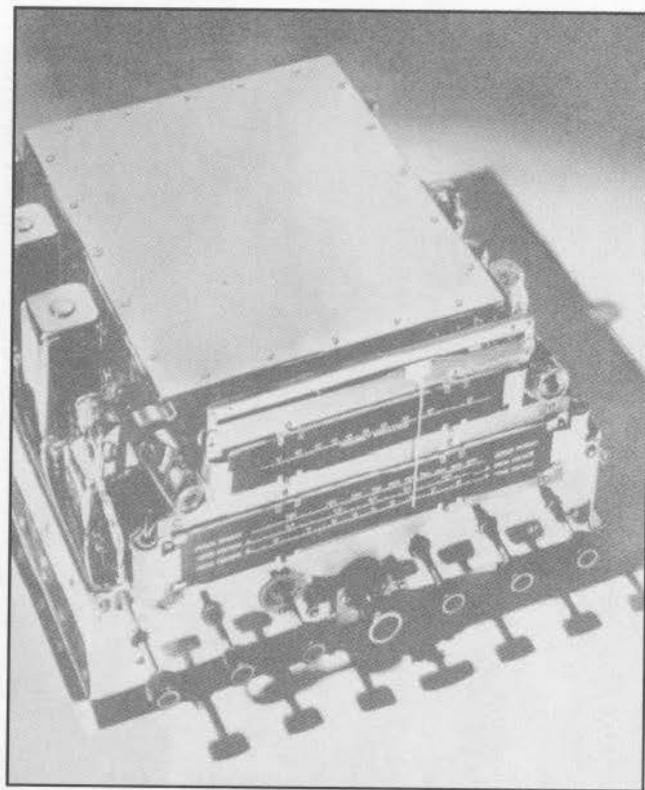


Figure 79. *Possible prototype set or, post-war chassis "re-use" in home application.*

uses 6J5 tubes for the first two audio stages, followed by a 6SL7 inverter feeding the two 6L6 output tubes. A pair of 5Y3 rectifiers and a 0D3 (VR-150) voltage regulator provides power for the set.

Other 1940 Scott Radio Laboratories Products

The late 1940s provide us with two more Scott "mysteries." One such, introduced in late 1946, is the "Scott Video Receiver." The set looks like a typical console TV of the period, but is not a complete set. Rather, it is an outboard television receiver and it required connection to a Scott (or other) radio for audio amplification. It was a large set, using 32 tubes, including a 12JP4 picture tube. It also included an audio tuner for the modern FM band. The set covers early VHF (1-13) channels. In addition, the 13A was a receiver for FM (88-108 Mc), and 108-174 Mc, which covered amateur, aviation and some government traffic. No examples of this unit are known today. The set appears in Rider's TV-1 as the model 13-A, and a Scott factory service manual was located about a year ago. It is certainly possible that some of these sets are still around.

The second mystery is obviously an attempt to utilize an excess of military receivers that were built but not sold to the government. At least one example exists of a set with the tube lineup and chassis layout of the SLRM radio. The front of the set is very different, however, with a large glass "slide rule" dial and knobs similar to the 800B. The set also has an extra SW band, giving it AM and SW coverage from 3.5 to 23 Mc. Unfortunately, the one known example of this set, while in a cabinet, has no model indication.

In 1947, the Scott Export receiver was announced. The Export was a much smaller, twelve-tube set. It covered AM, and short wave from 3.2 to 23.5 Mc in four bands. The RF is an older 6K7, the oscillator is a 12J5 and the mixer is a 12SA7. This is followed by two 12SK7 tubes as the IF stages. A 12H6 second detector drives two stages of audio (both 12SN7 tubes). The final AF is a pair of 25L6 tubes in push-pull. Because the set is an ac/dc design without a power transformer, the set uses a 25Z6 rectifier. The Export is also one of the first Scott sets to use a permanent-magnet speaker.

Late in 1947, the Metropolitan 16A was announced. This is probably the second most common of the post-war sets, and could almost be listed as one of the Scott "classics." Interestingly enough, the Metropolitan began with a different name. One set that was apparently purchased quite early has a manual that was written for the "Laureate 600B." It is almost certain that the Laureate name created confusion with the pre-war set of the same name. It isn't clear why the 600B was dropped, however.

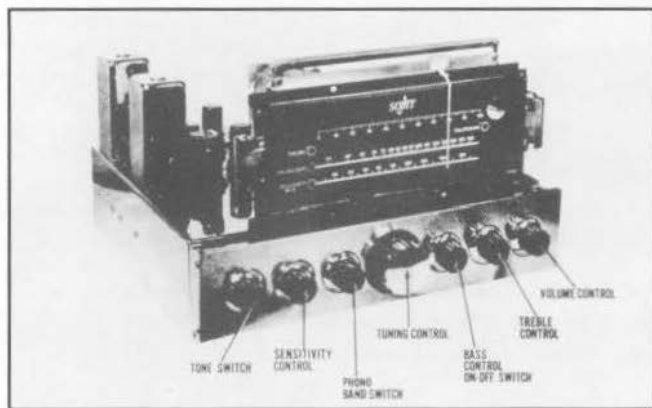


Figure 80.
Metropolitan 16A. A popular and common set, the 16A uses the dynamic noise-suppressor circuit designed by H. H. Scott.

Figure 81.
Musicale amplifier. A separate amplifier incorporating the H. H. Scott Dynamic Noise Suppressor circuit.

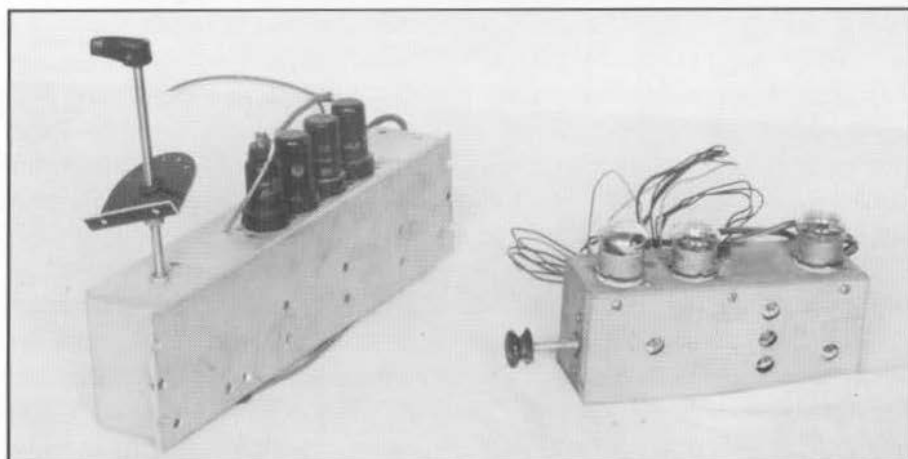
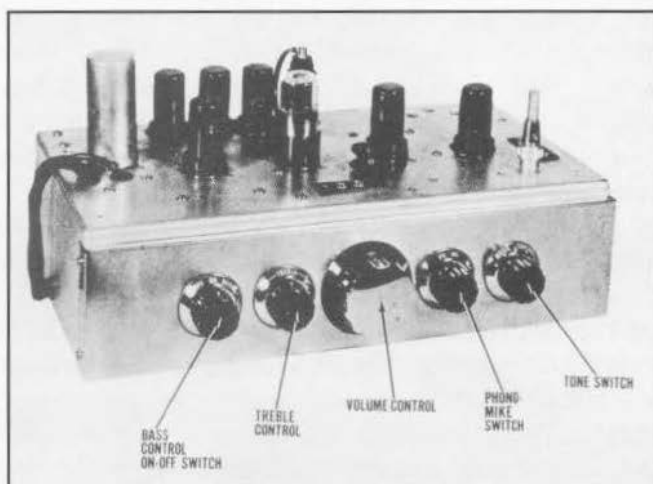


Figure 82. *Noise suppressor (left) and FM converter (right). The FM converter is not marked with the Scott name, and is often overlooked.*



Figure 83. *The name plate with license notice from the noise suppressor. The only connection between E. H. Scott's company and H. H. Scott. (The two men were not related.)*

A large, two-chassis set, the Metropolitan 16A employs 28 tubes. However, it covers only AM and FM bands. The tube lineup includes an AM section of a 6SK7 RF amplifier, 6SA7 oscillator/mixer, a 6SG7 IF stage and a 6H6 second detector. The FM tuner consists of a 6AU6 RF amplifier, 6C4 oscillator, a 6AG5 mixer, and a pair of 6SG7 IF stages, followed by two 6SH7 limiters. The audio stages included the circuitry of an improved noise-suppression system, including two 6SG7 treble controls, a 6SJ7 bass gate and a 6SJ7 microphone amplifier. Final audio was provided by four stages, including a 6SJ7, a 6SL7, a pair of 6J5 tubes and finally a pair of 6L6 outputs. A pair of 5U4 rectifiers, a 0D3 (VR-150) regulator and a 6E5 tuning eye rounds out the tube complement.

There are three other items marketed in the 1940s that are worth noting. The Musicale is a fourteen-tube phonograph amplifier only. A two-chassis unit, the audio section consists of a 6B8, three 6SG7 tubes, two 6SJ7 tubes, a 6SL7 and a 6J5 to drive the output. The power supply/output chassis has a 6J5 driver, and a 6SN7 phase inverter to drive a pair of 6L6 output tubes. A pair of 5Y3 rectifiers provides dc voltage for both chassis. Another sought-after piece is the modern FM (88-108 Mc) to old FM (41-50 Mc) converter. This unit is a small (7.5" x 3" x 2.5") unit using three Western Electric 717A tubes. It is a difficult item to spot at a meet, since there is no Scott name on the unit. Data on the converter can be found in Rider's volume 15.

The last item is a phonograph Noise Suppressor. This uses four tubes, including a 6B8 AF amplifier, two 6SG7 tubes as treble gates, and a 6SJ7 bass gate. The notable item on the noise suppressor is found on the label: "Precision built by Scott Radio Laboratories Inc. Licensed under Hermon Hosmer Scott Patents Pending." The noise suppressor is the only item known that connects the E. H. Scott company with the later H. H. Scott company. This same circuit is used in the Metropolitan 16A and the Musicale chassis.



Figure 84. 6T11 TV. A tabletop projection set from the late 1940s.

The only other 1940s television (other than the 13A and the 800BT) was the 1948 6T11. The 6T11 was basically the same television in the 800BT. The projection television was repackaged into a table top set, using 31 tubes. It tuned the VHF channels (2-13); the picture tube used was the 3NP4. Outsourcing of key components was now fully developed at Scott Radio Laboratories, and the 6T11 can be found with either Sarkes-Tarzian or General Instrument tuners. Further data on the 6T11 can be found in Rider's TV-2.

The decade of 1950 and the closing of Scott Radio Laboratories

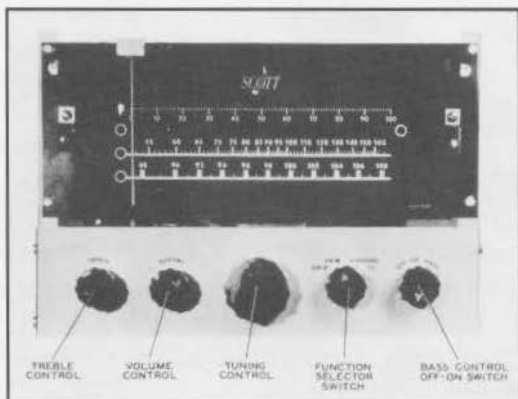
The decade of 1950 saw the demise of the Scott Radio Laboratories, Inc. In April of 1950, the John Meck company announced the intended purchase of Scott. On October 15, 1951, the purchase was official. Meck also moved the company from the famed Ravenswood Avenue address to Plymouth, Indiana. The company would remain there until August, 1956, when the company was forced to declare final bankruptcy. On October 31, 1956, just five years after Ernest's death, the remaining assets of the company were sold, marking the end of the Scott Radio Laboratories, Inc. During the 1950s about a dozen different receivers were sold, and several televisions.

All of the 1950s radios (and 1940 post-war sets too, for that matter) have the same "look" about them. All have a slide rule dial, with the control knobs located in a row below the tuning scale. Most are two-chassis units, although some of the smaller sets are single chassis. All included the regular AM band and *either* the modern FM band or some SW bands. None had AM, FM and SW. With few exceptions, data on all these sets can be found in various Sam's folders. Generally, these sets are not easy to find. Gathering a complete collection of the 1950's Scott sets would be a serious challenge to the contemporary collector.

The first 1950s set is probably the model 510. It is a simple fourteen-tube set, but it does use 6L6 outputs. There are two chassis, and coverage

is AM and FM only. A new Scott television appears next. This TV is listed in Sam's as the model 710, 910 and the "Ravenswood." It is a 21-tube set, using a 16KP4 picture tube, and tunes the VHF (2-13) channels. The model 310 radio came out in late 1951. It is very similar to the 510, but used only twelve tubes, including 6V6 outputs, on a single chassis. Late in 1950, Scott offered the model 100 "power amplifier". The amplifier is comprised of five tubes including a 6SQ7, a 6SN7, a pair of 6V6 tubes and a 5Y3 rectifier.

Figure 85. *Model 510.*



The year 1952 was probably the last "busy" (and profitable) year at the Scott Radio Laboratories. Three radios and several TVs were announced. The first was the 515 radio. Making its debut in the first half of 1952, this receiver is notable by marking a return to short wave reception. In addition to AM, the set tuned two short wave bands covering 2 to 18 Mc. It did not offer FM, however. The set used twelve tubes, including 6L6 outputs. The next 1952 receiver was the model 1000. A 16-tube set on two chassis, it tuned only AM and FM bands. The 1000 did have a sensitivity control and a tuning eye, two items not found on a Scott

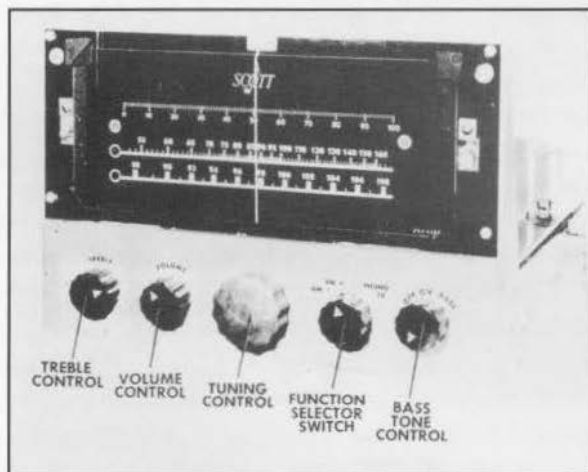


Figure 86. *Model 310*

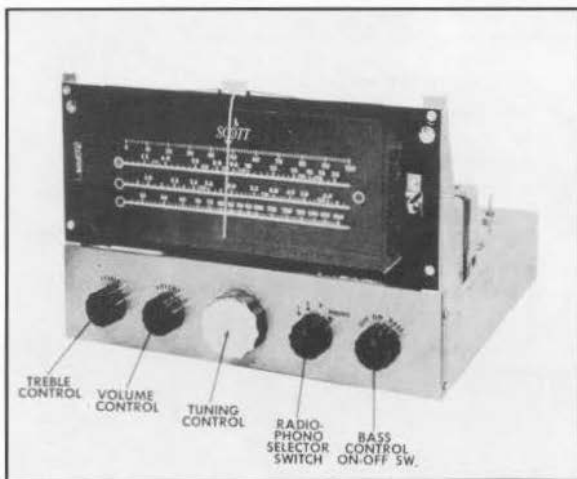


Figure 87. *Model 515.*

Figure 88. *Model 1000.*

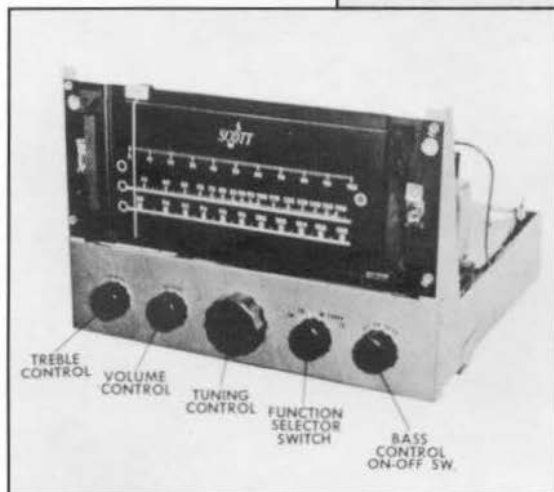
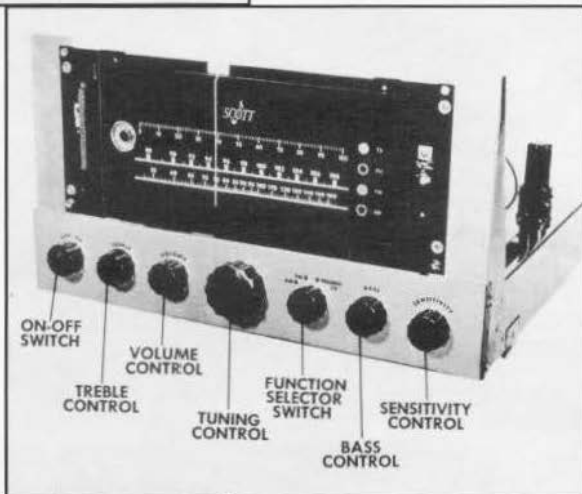


Figure 89. *Model 1510.*

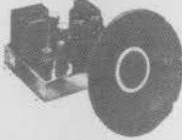
Features of
SCOTT Model 510TA

Ashby

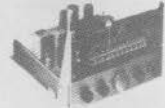
TV COMBINATION



The SCOTT Audio and Power Supply Chassis



The SCOTT PALM Tone Unit



510TA ASHBY Complete 20" TV, AM-FM Radio-Photograph Combination. **SCOTT SILVER ANNIVERSARY TELEVISION CHASSIS** includes 30" rectangular black-face picture tube. All arranged 12 channels with provision to add UHF at a later date. Special socket on rear of cabinet for attachment of color TV slave unit, requiring no rewiring of set. Two principal features: (1) Channel selector, (2) Picture control and sound volume in a convenient control. Misc. service controls under small section. Four stages of video IF amplification, together with a high gain channel selector, give TV reception in most receiver areas. Instant on sound system permits tuning for best picture, with maximum high-fidelity sound. Highlight Control is added for the best picture during a SCOTT exclusive. Chassis size 18" wide-17 1/2" deep-10 1/2" high. **RADIO CHASSIS:** Dual class A arrangement with separate power amplifier. Polished chrome finish. Three-gang condenser on AM and FM. Separate tone and treble tone controls. External reproduction of separate sound channel. Five controls: (1) Station selector, (2) Volume, (3) Frequency, (4) Treble, (5) Off-on key. Push-pull audio output system. Tuner chassis 12 1/2" wide-6 1/2" high-11 1/2" deep. Power amplifier chassis 12 1/2" wide-5 1/2" high-8 1/2" deep. (Side-note dial with counterbalanced control. Logging scale provided for additional tuning convenience). **CABINET:** ASHBY lined oak finish in modern design. Two full-height doors. Larger record album compartment. Record player installed in drawer, making cabinet top solid. **PHONOGRAPHS:** Automatic single speed motor, growing long play changer for 7", 10", or 12" records. Special phono amplifier makes possible use of a high-fidelity, variable reluctance pickup in place of ordinary crystal pickup for greater tone range and more reproduction of high notes. Permanent needle. **SCOTT COAXIAL SPEAKER:** This high-fidelity 12" coaxial P10 speaker, illustrated at left, gives full range of sound frequencies discernible to the human ear. **ANTENNA:** Built-in AM loop, FM dipole and TV antenna. Provision made for auxiliary antenna connection. **GENERAL SPECIFICATIONS:** Black-face rectangular tube high-quality SCOTT Television, AM-FM radio-lar separate high-power, high-fidelity amplifier. Triple-speed automatic photograph, three growing long play high-fidelity reluctance pickup. 107V ac operation. Radio requires 175 watts. Television requires 300 watts. Over-all size 39" wide-36" high-11" deep.

SCOTT RADIO LABORATORIES, INC.
1919 North LaSalle Street, Chicago 14, Illinois

Pat. No. 712

Made in U.S.A.

Figure 90. Ashby combination. Early radio/TV combinations were expensive but quite popular.



The SCOTT Kensington

Here is traditional cabinet beauty... dark mahogany, with antique fittings. Hand-rubbed surfaces and care of detail work the SCOTT KENSINGTON a Radio-Photograph instrument of precision.

Scott Kensington - Pattern 1322-C

Standard. Remarkably only 24 1/2" high x 24 1/2" wide x 17 1/2" deep. Ideal for the display in rooms with where true beauty of performance can be enjoyed. Single space for record album change is provided in a lower instrument model. The KENSINGTON the primary in home entertainment. The SCOTT 12" black face with chrome scale tone and power amplifier chassis provides a tone range of 70 to 30,000 cycles, full power at burn-out 6.6 tubes is available. **General Features:** The KENSINGTON features an infinite recorded dual frequency, one for true picture, one for true higher frequency of the both range and the other is tone reproduction, repeated at 10 cycles. These Special Charger-work reluctance pickup, has a variable needle with separate permanent magnet for standard and magnetic records. Record size can be increased.

SCOTT Series 1310 AM-FM Tuner



SCOTT RADIO LABORATORIES, INC. 1929 North LaSalle Street, Chicago 14, Illinois

Pat. No. 712

Made in U.S.A.

Figure 91. Kensington combination. The large size of combination sets has left very few of these surviving in contemporary collections.

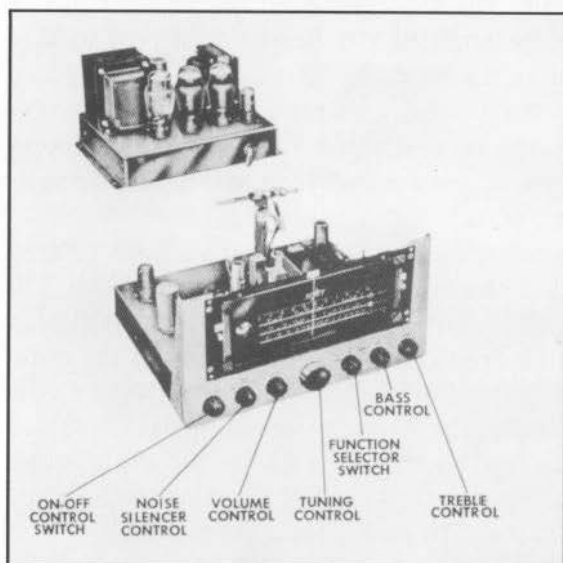


Figure 92. *Model 2000.*

Figure 93. *Model 2510.*

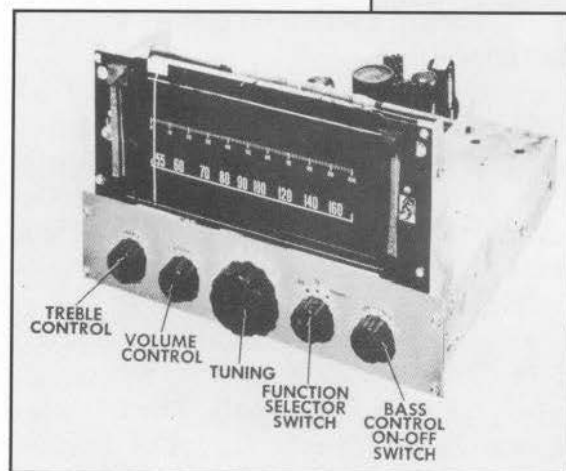
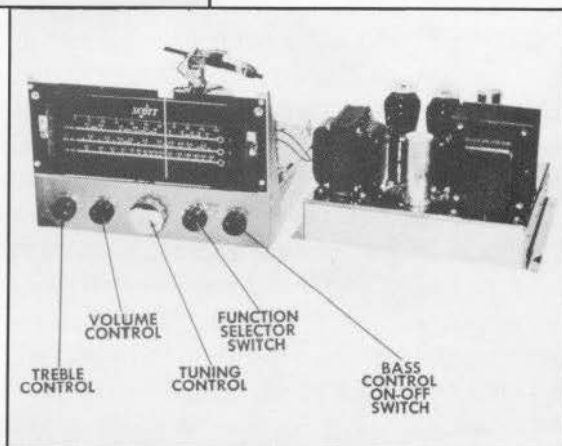


Figure 94. *Model 9052.*

receiver since the Metropolitan. The 1510 came out late in 1952. It is a fourteen-tube set, and is a slightly modified 510. Scott also offered another audio amplifier around this time. Dubbed the 6001 series, the amplifier was a two-chassis affair, with the pre-amp circuits using a 6SC7, a 6SQ7 and a 6SN7 on one chassis. The other chassis was the power supply/final amplifier, using a 6SN7 phase inverter to drive a pair of 6L6 outputs. A 5U4 rectifier completed the 6001.

Several televisions were offered in 1952. Generally, Scott offered 17-, 20- and 24-inch television chassis. The model numbers (924, 820 or 817) indicate the picture tube size. Dates of introduction for the television sets are not known. All sets covered channels 2-13. Many of the radio receivers were offered in a combination with a television. In the model 1000 "Chippendale," for example, the 24-inch television was combined with the model 1000 radio. The total package cost a hefty \$1595 suggested retail. For those with a smaller budget, the "Ashby" combination included a 20-inch television and the model 510 tuner, for a mere \$895.

In early 1954, two new receivers appeared. The first was the model 2000. The 2000 had fourteen tubes, and tuned AM and two short wave bands covering 2 to 20 Mc. A larger than average (for this period) two-chassis set, it also returned to the 6L6 output tube for audio quality. The next receiver was the 2510. The 2510 is similar to the 510 and 1510 in appearance, but rather than an AM/FM tuner, it is an AM/SW tuner. Like the 2000, it covered AM and short wave from 2 to 20 Mc. The 2510 used twelve tubes, including push-pull 6L6 outputs. It is unclear why so many short wave sets were offered at this time, when FM tuners were certainly more popular. It may be that Meck was hoping to tap a vertical market, but a high-end short-wave receiver was not well received by the American public. Sales of these sets were disappointing, and from 1954 to 1955 Scott sales declined from \$2.1 million to just under \$900,000. This resulted in a net loss of just under \$200,000, and sounded the death knell of Scott Radio Laboratories.

In 1954, Scott television sets were updated to include the new UHF channels 14-83. Only one radio chassis appeared in 1954, and it is a disappointing little set. A seven-tube, single-chassis set, the model 9052 is a simple AM-only receiver. It is an ac/dc design, using a 117Z6 rectifier and push-pull 35L6 outputs, truly a far cry from the quality and commitment demonstrated in the Allwave and Philharmonic sets twenty years previous. The failure of the company becomes obvious when looking at a set of this caliber. The year 1955 saw a slight improvement, with the introduction of the Model 2100 receiver. The 2100 is a fourteen-tube, two-chassis set, again with AM and SW coverage (2 to 20 Mc) only. The following chart summarizes the models, wavebands and tube lineups of the post-war radio sets described previously.

Model	Coverage	Tubes
310	AM (530-1620) FM (88-108)	5Y3, 6AL5, 6AU6 (2), 6BA6 (2), 6BE6, 6C4, 6SN7, 6SQ7, 6V6 (2)
510	AM (530-1620) FM (88-108)	5Y3, 6AL5, 6AU6 (2), 6BA6 (2), 6BE6, 6C4, 6L6 (2), 6SN7 (2), 6SQ7, 25Z6
515	AM (530-1620) SW (2-6, 6-19 Mc.)	5U4, 6BA6 (3), 6C4 (2), 6L6 (2), 6SC7, 6SN7 (2), 6SQ7
1000	AM (530-1620) FM (88-108)	5U4, 6AL5, 6AU6 (2), 6BA6 (2), 6BE6, 6CB6, 6E5, 6L6 (2), 6SC7, 6SN7 (2), 6SQ7, 12AT7
1510	AM (530-1620) FM (88-108)	5U4, 6AL5, 6AU6, 6BA6 (2), 6BE6, 6CB6, 6L6 (2), 6SC7, 6SN7 (2), 6SQ7, 12AT7
2000	AM (530-1620) SW (2-6, 6-20 Mc.)	5U4, 6AT6, 6BA6 (3), 6C4 (2), 6E5, 6H6, 6L6 (2), 6SC7, 6SN7 (2)
2100	AM (530-1620) SW (2-6, 6-20 Mc.)	5U4, 6AT6, 6BA6 (3), 6C4 (2), 6E5, 6H6, 6L6 (2), 6SC7, 6SN7 (2)
2510	AM (530-1620) SW (2-6, 6-20 Mc.)	5U4, 6AT6, 6BA6 (3), 6C4 (2), 6L6 (2), 6SN7 (2), 6SQ7
9054	AM (530-1620)	12A6, 12AU7, 12BE6, 12SQ7, 35L6 (2), 117Z6

Early in 1956, John Meck decided it was time to let the Scott Radio Laboratories go peacefully. He sold his holdings to a west coast consortium, the Monogram Manufacturing Company of Culver City, California. By September, 1956, what was left of Scott's company was placed in receivership, and a receiver's sale was held on October 30 and 31, 1956. The Scott name, (officially, "Successors to Scott Radio Laboratories, Inc.") was sold to a group of investors who also owned the Liberty Music Shops. Liberty Music was a large radio and television outlet in the New York City area. Liberty produced a few sets bearing the Scott name and the trademark music note symbol found on the 800B and other post war sets. Liberty also advertised Scott as "The Oldest Name in Hi-Fi." With some legal maneuvering, a new corporation in Annapolis, Maryland continued to market the original Scott Radio Laboratories name. Although none of these companies offered any sets worthy of note, all were hoping to capitalize on the name recognition.

In the latter half of the 1950s, the H. H. Scott company began marketing a line of high-fidelity receivers, turntables and amplifiers. Founded by

Hermion Hosmer Scott (no relation to E. H. Scott or his family), the H. H. Scott company was not a descendant of the Scott Radio Laboratories of Chicago. However, the H. H. Scott product line was confused by consumers with the earlier Scott receivers. To avoid further confusion, H. H. Scott filed suit against those using (or abusing) the original Scott name. On June 16, 1961, H. H. Scott won his battle to stop the other organizations from using the Scott name. With that action, it can reasonably be stated that the original Scott Radio Laboratories was gone forever.

POSTSCRIPT

The legacy that Ernest Humphrey Scott left the world can be seen in the polished chrome of any of the great receivers. Many of his designs and basic principles survive today. E. H. Scott radios have been discussed in modern magazines outside the antique hobby. Many non-radio people still remember the Scott sets of the 1930s, and all those who find one today can still appreciate the workmanship and quality present in his sets. There is little doubt that Scott will be remembered well into the next century and beyond, for there is truth in his statement that "The Fine Things are Always Hand Made."

Author's Note: Due to the wide variety of sources of information about Scott and his radios, I cannot even begin to make a claim that this represents a complete list of all Scott sets or variations on the sets. Mostly, this paper represents years of research, notes, and a bit of luck to compile this information. I offer it to readers for what it is...the information known as of this writing. Something new may be learned tomorrow, and undoubtedly, many facts will surface in the coming years.

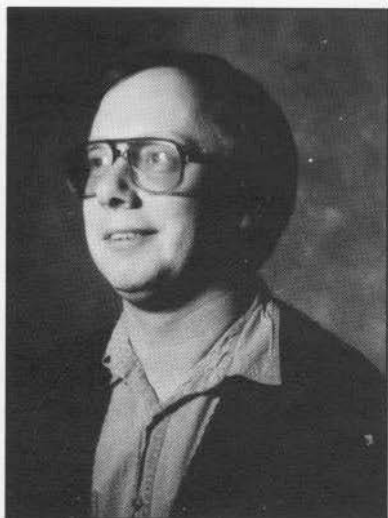
I owe thanks to many people for much of the data presented in this article. This effort would not have been possible without the assistance and resources of Jim Clark, Marvin Hobbs, and John Meredith. And a special thanks to my family for the many hours I spent researching and writing. Finally, for those that are inspired by this material, for more information please contact the E. H. Scott Historical Society, Inc. As a founder of this organization, I can promise that we will endeavor to provide whatever information and knowledge we can.

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Kent A. King
337 York Avenue
Delaware OH 43015
740-363-0445



Kent's interest in antique radios goes back twenty years to a few tubes and parts that an aunt gave to him. Reading Jim Fred's Antique Radio Corner in *Elementary Electronics* ignited his hobby. After joining AWA, ARCA, IHRS and the Michigan Antique Radio Club in the early 1980s, his collection grew to several hundred radios. Ten years ago, the focus became only Scott radios, especially examples of different versions of the same set. In addition to Scott radios, Kent maintains an extensive radio magazine collection and a number of late 30s Supreme test instruments.

Kent is a co-founder of the E. H. Scott Historical Society, and is the librarian and editor of the *Scott News*, the newsletter of EHSBS. When not restoring or researching Scott radios and their history, Kent is the manager of network security for a large Internet service provider. He has a Bachelor's degree in Computer Science from the Ohio State University College of Engineering, with a minor in Electrical Engineering. Kent lives near Columbus, Ohio with his wife Michele, and his sons Matthew, Ryan and Michael.