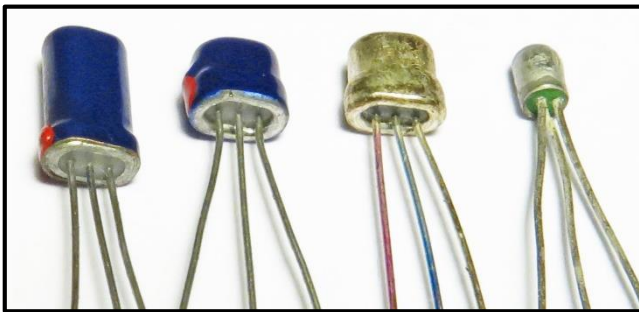


Mr. Ray Brack
TRANSISTOR MUSEUM DONATION
March 2016



Transistor Description:

Red unit is silicon transistor in standard TO-5 case. Date code is 1959, week four.
Blue/silver units are miniature and subminiature germanium transistors in unique Raytheon cases. These are unmarked types from the mid-1950s.

Raytheon Reds and Blues

TYPE

Silicon PNP Alloy Junction Transistor
Germanium PNP Alloy Junction Transistor

USAGE

General Purpose/Hearing Aids

DATE INTRODUCED

Mid to Late 1950s

AVAILABILITY

Rare (Red) - Common (Blue/Silver)

DONATION COMMENTS

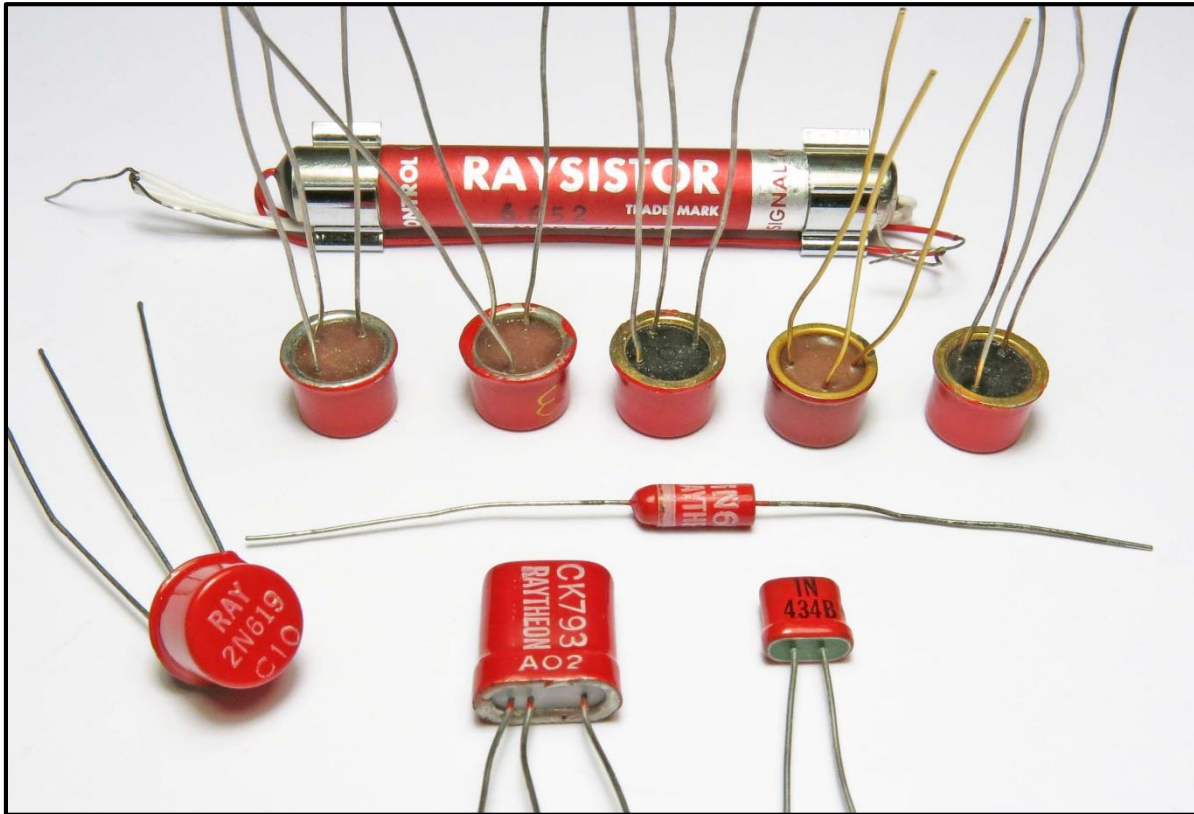
"My interest is mostly what can I make using this old tech that I can actually use. It just looks neat to make something with these colorful parts. Also liked getting those large lots to see if anything that I never knew existed. Also you making this website to catalog past parts and making sure it doesn't get lost forever. It is our electronic history, and I find very few anymore who actually care."

HISTORIC NOTES

Raytheon was the early industry leader in germanium transistor production, beginning in 1953 with high volume production of hearing aid transistors. This was a ready market for Raytheon because of years of earlier experience producing miniature electron tubes for hearing aid use. Transistor technology was rapidly evolving during this timeframe, and Raytheon pioneered the development of ever smaller devices, all intended to shrink the overall size of the resultant hearing aids. The four units shown above illustrate the substantial reduction in case size from the "miniature" blue case unit at left to the "subminiature" silver unit at right. Raytheon also entered the silicon transistor market during the mid to late 1950s, and the 2N328A above left is an example of a rare alloy junction silicon device. For historians and collectors, Raytheon devices from the 1950s and 1960s offer a very broad range of unique case shapes and colors - and especially sought after are the iridescent "Blues" and vibrant "Reds". Mark Burgess' [Transistor History](#) website is an excellent resource on early Raytheon devices.

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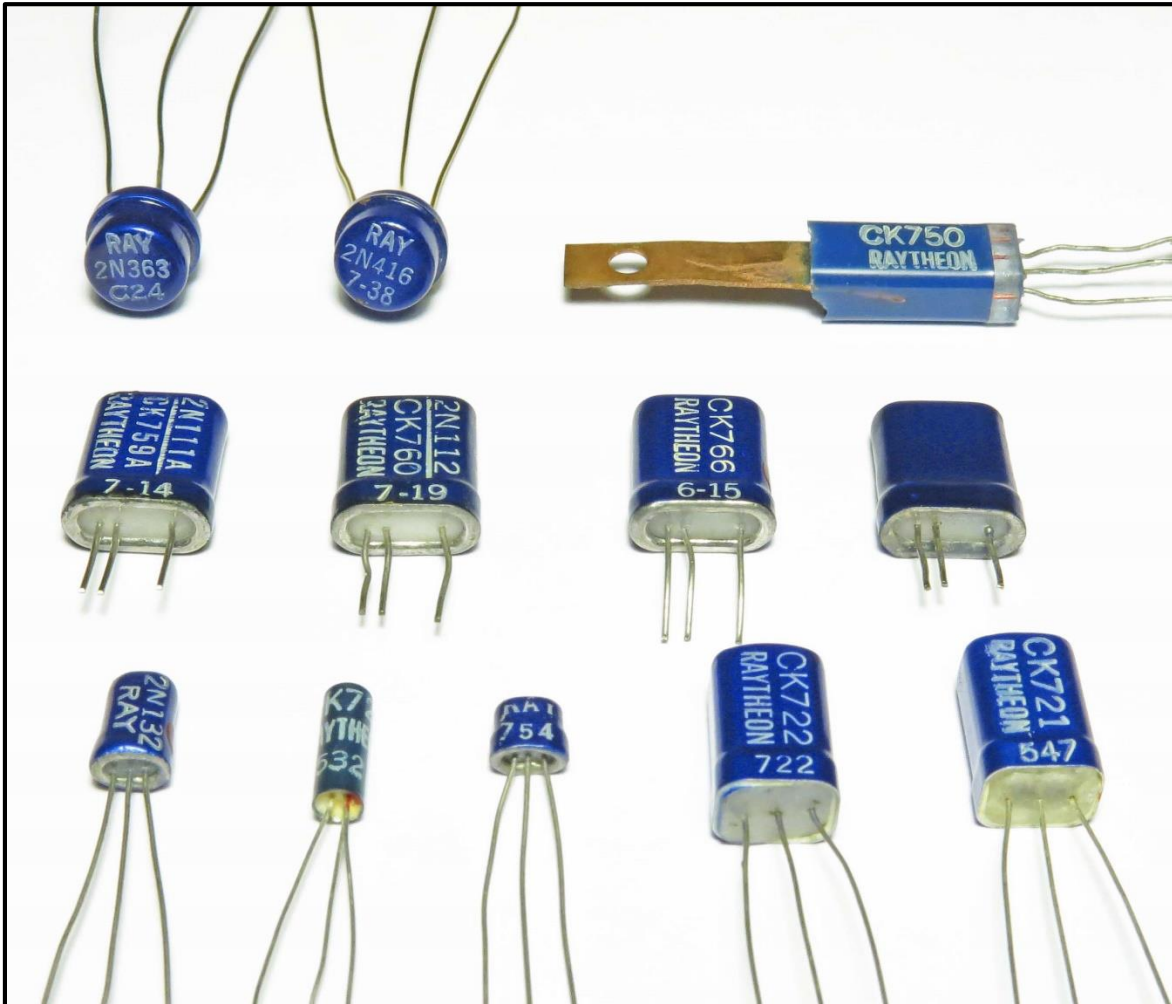
Raytheon Reds and Blues



Raytheon "Reds": The use of case color to more easily identify and market early transistors was a technique used by several 1950s device manufacturers. This technique was short-lived, as the cost of including a painting process in transistor production became prohibitive when continued improvements to manufacturing processes resulted in substantial overall price reductions. The first Raytheon transistors, such as the 1952 CK718 hearing aid transistor, used molded black epoxy cases. Raytheon soon began using an iridescent blue paint for its follow-on metal cased germanium devices. In addition, a unique and striking red paint color was used on a variety of devices from the mid-1950s to the mid-1960s, with examples shown above. Most commonly, red case color was used to identify a Raytheon silicon device. The bottom row in the photo shows silicon transistors (2N619 in a standard TO-5 case and the [CK793](#) in a unique Raytheon "tall" case style). The 1N434B is a silicon rectifier. The row of transistors across the middle of the photo illustrate the lack of standard sealing materials in 1950s silicon transistor production. The 1N66 diode from the 1950s and the Raysistor from the 1960s are both germanium devices, so the use of red paint to identify silicon devices was not universally applied. Due to historical significance, most Raytheon "Reds" are collectable.

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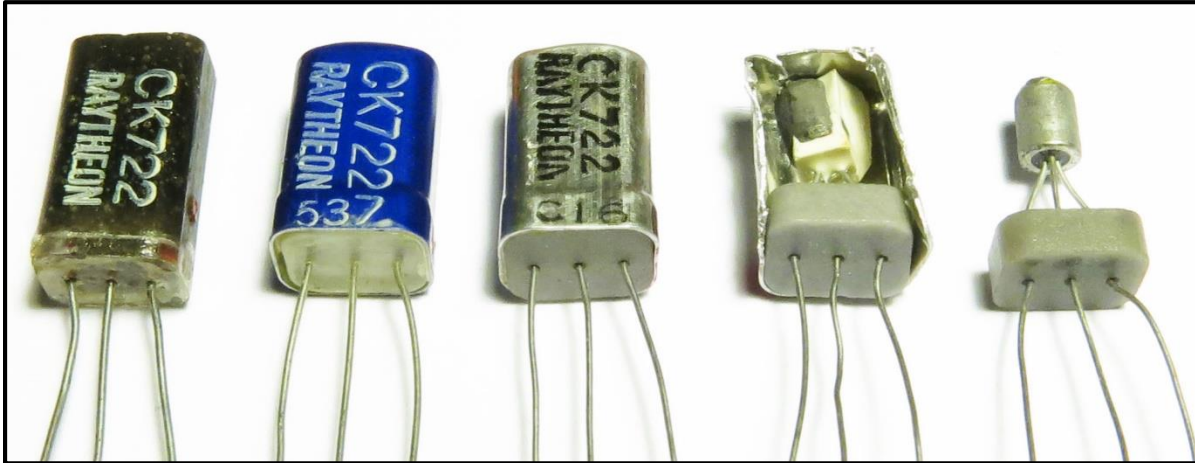
Raytheon Reds and Blues



Raytheon "Blues": For about five years, beginning in the mid-1950s, Raytheon's produced a broad range of iridescent blue germanium transistors in a variety of unique case styles and performance specifications. These devices found high volume use in commercial applications, such as hearing aids and radios, and were also suitable for industrial, military and hobbyist applications. The five units in the bottom row are hearing aid, audio and hobbyist devices. The "tall boy" cased units in the center row are higher frequency transistors, suitable for radio front ends and computer switching applications. The industry standard TO-9 cased units at top are "2N" JEDEC registered types, and the odd shaped CK750 is an experimental power transistor from 1955. The above photo shows only a sample of many [Raytheon "Blues"](#) transistor types, many with the unique case styles and proprietary "CK" numbers that made such a notable impact on transistor history.

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Raytheon Reds and Blues



The Magical CK722 with a Surprise Inside: One of the best remembered and widely used 1950s transistors was the Raytheon CK722. This was the first transistor available to the general public at reasonable prices, costing \$7.60 when first introduced in 1953 and dropping to less than \$1 in a couple of years. Thousands of hobbyist projects were built with the CK722 over the next twenty years, based on construction projects published in radio hobbyist magazines of the time, including the venerable Popular Electronics and Electronics Illustrated. The first CK722 transistors, example shown at left, were black epoxy cased devices that were selected and relabeled rejects or "fallouts" from the CK718 hearing aid manufacturing lines. Early transistor production processes were not well understood or controlled, with a resultant large percentage of out-of-spec devices. [Mr. Norman Krim](#), the VP of Raytheon Semiconductor Division in the 1950s, developed the CK722 series to establish a profitable market for the CK718 fallouts and is credited with launching one of the most famous of all transistor types. As Raytheon made improvements to their hearing aid transistors and developed smaller case types, the very successful CK722 product line was extended by embedding the smaller hearing aid transistor fallouts inside a thin metal case with the same dimensions as the original black epoxy CK722. The first metal CK722 transistors appeared in 1955 and were painted the easily recognized Raytheon iridescent blue color. In the early 1960s Raytheon discontinued the use of painted cases for transistors, and the silver CK722 made its appearance at that time. Shown above at right is a 1960s CK722 with the case opened to reveal the presence of an embedded smaller hearing aid transistor - the rightmost photo shows the extracted submini transistor. Original CK722 transistors can still be found, and collecting the complete series is a fitting way to commemorate this unique and historic semiconductor.