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# Transistor radio mini-history

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## TRANSISTOR RADIO MINI-HISTORY

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Much in the same fashion as Luigi XIV, King of France, who maintained that the sun never set on his empire, the American Lee DeForest proudly declared that his invention THE VACUUM VALVE would never be replaced.

Notwithstanding his affirmation three USA research scientists of Bell Laboratories, [Shockley, Bardeen and Brattain](#) managed, in December 1947, to invent a solid state device that they called [THE TRANSISTOR](#). They succeeded in creating a completely new amplifying device just by adding a second contact point to the already popular CRYSTAL DIODE based on a piece of germanium crystal with a pointed "cat's whisker" touching its surface. In 1956 in recognition for their extraordinary work they were awarded the Nobel Prize.

Unfortunately the practical application of the transistors was somehow slowed down by their manufacturing difficulty and by their cost. When in 1952, mainly due to the new junction method developed in their construction called diffusion transfer, their price managed to climb down, the first possible application appeared to be in the hearing aid market. The fact was that their low frequency cutting made them suitable only for audio applications and also their high cost appealed only to products with a high price target.

This suited well the hearing aid manufacturers as they had been trying for some time to lower the size and the battery consumption of their products. Also the high price target of these medical apparatus made possible the use of an otherwise too costly component and also allowed them to absorb the extra cost of the new solid state device.

By 1956 Western Electric was ready to supply possible future manufacturers with their "key in hand" transistor manufacturing plant while other firms, like Raytheon, managed to produce their own line of transistors.

## THE FIRST TRANSISTOR RADIO

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By 1953 a firm called TEXAS INSTRUMENTS was already producing its own line of transistors under Bell Laboratories licence and their president, P.E.Haggerty, decided that the time for producing a transistor radio was ripe. They quickly managed to design a prototype set and began searching for a suitable manufacturer who would use their transistor in the manufacture.

Most of the big firms were not interested, as happens when something drastic comes along to disrupt their peaceful life. Also many of them like RCA, Sylvania, Philco etc. were producing their own transistors and so could see no future for the TI offering. In the end TI

managed to find a small TV boosters manufacturer who was keen on the idea and their name was, by coincidence, IDEA based in Indianapolis. Its president Ed Tudor figured out that with the cold war going on at the time and with the fear of a nuclear attack from USSR the transistor radio was going to become an essential life survival item. He projected sales of at least 20 million sets in three years. Unfortunately it was not going to be an easy task as, apart from resistors, there were virtually no miniature components to build their radio with. Furthermore many of the components manufacturers were not keen on building miniature replicas of their best product for fear of losing their hard earned reputation.

Anyway, in less than six months, IDEA, TEXAS INSTRUMENTS and PAINTER, TEAGUE & PETERTIL, an industrial design firm which was put in charge of the design of the case, managed to reduce the number of transistor from the original six to only four and to squeeze all the components into the small cabinet. A vague idea of what this effort should have meant at the time is shown by the small dimple that had to be machined inside the case in the effort to accomodate the adjusting screw of the tuning capacitor.

Finally in November 1954, just before the Christmas shopping season, IDEA managed to put the first transistor radio, the [REGENCY TR-1](#), on the market at a price of \$49.95 excluding the leather case (another \$3.95) and the earphone (another \$7.50). The Regency was the first one on the market but not by much. In February 1955 Raytheon, another transistor manufacturer, introduced their first portable radio: the model 8TP-1. It was a much larger wooden set covered in the, then, fashionable leatherette vinyl. It sounded much better than the TR-1 but it was much bigger and much more expensive (\$80: about \$450 at to-day's price).

Notwithstanding the poor market sales record of the TR-1 other American manufacturers began to flood the market; ZENITH announced their ROYAL 500, Emerson their model 842, RCA the BT-10, General Electric the 675, but the TR-1 remained the only shirt pocket set on the market (as opposed to the coat pocket size of the other makers).

The diffusion and popularity of the transistor radio coincided luckily with the new Rock and Roll revolution and it is hard to say which one of the two helped the other one to succeed as many young persons regarded as a boon the possibility of taking with them the music that Elvis and others were throwing at them. Their parents were only too happy to let them have their own personal set which made the home valve radio free again for the domestic use. Also the fact that many of these small receivers could be listened to with an earphone made them attractive to those who wanted to listen to them in privacy and at their own volume level.

## THE JAPANESE INVASION

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But back in Japan not all was peaceful and quiet. A small tape recorder manufacturer called [TOKYO TSUSHIN KOGYO LTD.](#) managed in 1953 to convince the Japanese Minister of Trade and Industry (MITI) to let them acquire the transistor manufacturing licence from WESTERN ELECTRIC and the Bell Laboratories patent.

After some struggle to understand and learn the technology and the manufacturing process (the Western Electric licence did not include the know-how) TOTSUKO (as SONY was

known at the time) managed to produce their own transistors and, in August 1955, their first coat pocket size transistor set (the model [TR-55](#)). Unfortunately the TR-55 was produced in small quantities and only for internal consumption and is therefore very rare.

Their second serious set was big wooden affair (model [TR-72](#)) which apparently was only exported to Canada under the name of their local distributor: GENDIS (GENeral DIStributors). Their third model (TR-6) did not do much better as this too was a heavy large coat pocket set (but the first one to use the revolutionary MITSUMI tuning condenser).

The [TR-63](#), their first really "pocketable" transistor set, was produced in March 1957. It was a real revolution, a new way to see technological and esthetical design. The consumers liked it and it was a worldwide success. Contrary to the TR-1 which inside had a mixture of new and old technology and was made with Texas Instruments transistors, the TR-63 was manufactured with purposely made miniature components and with SONY made transistors.

After the great success of the TR-63 Sony managed to produce an even smaller shirt pocket set called [TR-610](#). This was (and is) the most typical of all transistor radios, the one by which all the others were going (and are) to be judged. Sony sold so many of them (nearly half a million) that the American manufacturers started fearing for their life.

## SOCIAL CHANGES

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And indeed the hearts of the consumers stayed with the Japanese shirt pocket sets. From 1958 up to the mid sixties an unbelievable and bewildering variety of models in all shapes, sizes and colours were produced by dozens of large and small Japanese manufacturers.

This irrepeatable period of technological advancement and esthetic innovation brought out the most astonishing transistor radio designs of all time. In fact the transistor radio transformed entirely the way radio was regarded and used. It made it possible to take the set with you and to listen to it everywhere. From a piece of furniture the radio set had become a personal accessory. This also meant that the radio, which was regarded essentially as a home accessory, which was controlled by the head of the family, could now go out of the house and reproduce itself for each individual. It also meant that the new way to see this new personal piece of equipment contributed to escalate the demand from one set for each house to one set for each person.

## THE SIXTIES

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At the beginning of the sixties Japanese manufactured sets became even smaller by reducing the size of their components and by cleverly redesigning their electronics circuits so as to be able to use lower levels of voltage and current and therefore smaller batteries. From the 22.5 volts of the first Regency TR-1, the battery voltage was lowered to the 9 volt used in the SONY TR-63 and then to the single 1.5 volt cell used by certain manufacturers in the early sixties. This was an extraordinary achievement for an industry that had only been going for a few years since 1954.

The third Japanese wave came with the advent of the mini-micro radios barely larger than their smallest loudspeaker. The most notable example of these were the now famous STANDARD make which with their incredible minute series of MICRONIC RUBY radios were unsuccessfully challenged by all the other manufacturers except SONY which only succeeded in making a smaller set (the [ICR-120](#)) at the end of the decade by using the INTEGRATED CIRCUIT, the new solid state device which combined transistors and passive components in the same package. By about 1963 it was all over.

The Japanese invasion had killed off many American manufacturers and even glorious names like RCA, General Electric, Philco etc. were forced to use Japanese made components or to have their sets made in Japan altogether. Some of the Japanese transistor radios had to bear American sounding names in the effort to disguise their origin for the hard core nationalist consumer. Brand names like "Trans American", "Americana", "Lafayette" and more were nothing else than sets made in Japan.

### DATING AND IDENTIFYING

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The first thing you must look for in a transistor radio for dating purposes is to see if the dial has any, so called, [CD marks](#). These were in the shape of little triangular marks which should appear in all the transistor radios made up to 1963. These marks were meant to show the frequencies for the emergency tuning of the radios in case of nuclear attack from the USSR. It was about the time of the cold war and the American authorities were much concerned by the fact that known frequencies could have been used to guide intercontinental missiles to their destination. The scheme called CONELRAD (CONTRol of ELECTromagnetic RADiations) was a typical example of the Civil Defence system still, even if in a different way, in use to-day in the USA. This does not mean that you might not encounter the odd sets made within this period which lacks these marks but this is a reasonable way of dating period radios (valve from 1953 and tr from 1954).

Then you should look and see if you can determine if the set has been made in the USA or in Japan or indeed somewhere else. Generally speaking historical sets were made in the USA from 1954 to 1961 and Japanese ones from 1956 to 1966. Then came Hong Kong which roughly covers the period from 1964 to 1970s.

Subsequently you should look inside and see if you can recognize the style of design and construction. Generally speaking the early sets had a case made with thicker plastic than the later ones. The Japanese sets used the incredibly small encapsulated tuning condensers made by a firm called [MITSUMI](#) which gave them the name of Polyvaricons while the American sets were still using the open air style variable condensers. The early transistors can be recognized by their ["funny" shapes](#): oval, oblong, with a lower flange or with a top nipple.

All in all as the technology improved the printed circuits were "machine" soldered as opposed to the early manufacturing processes which called for "hand" wiring. Early USA made transistors used models starting with 2N numbers and, of course, the lower the number the older the date of manufacture. Early Japanese transistors bear the 2S number series and later ones 2SA and 2SB. Some transistor manufacturers used their own

numbering system, the most typical being the [CK series](#) by Raytheon and the OC by Philips and Mullard.

If you are lucky enough to find the case as well, this could give you a clue for dating the set as early production were enclosed in real leather while later ones used simulated leather or vinyl. As for their value one should naturally think that the older ones are the more valuable but this is not always true nowadays as the keen collector seem to prefer the shirt pocket sets instead of the bigger portable ones. Maybe one day this situation will be different but to-day's interest is for the early miniature Japanese production. Then, of course, there are the specialized interest areas; for example, the German collector would be naturally keen to collect German sets or you might want to find that nostalgic set that you had when you were at college etc.

To-day is still a good time to start collecting as the more seasoned wireless collector still regards the transistor radios as a sort of novelty set without realizing the enormous importance that tr sets had in changing the social behavior and the history of communications.

If you are really serious you should start by trying to get hold of the few sources of information available to-day and by joining the only club known at the moment. This at least for the present time and up until the appreciation level will start to pick up and transform what is still a handful of nostalgic people all over the world into an avalanche of collectors.

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