

The Crystal Detector Diode Signal Rectifier Started the Electronics Age

OddMix.com Crystal Radio Note - CRN0802 - by Karl Nagy



Picture 1. Crystal detector crystals

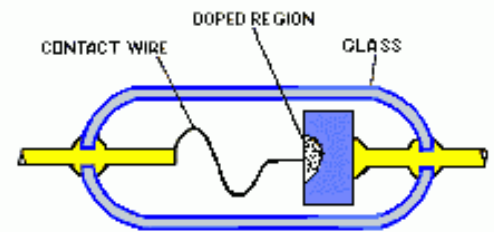
Most of us under the impression that all semiconductors are the achievement of the latest scientific age and development. Far from it, not only the humble diode is the most numerous semiconductors our industrial society ever made, but also it proceeded the electronics age by more than a hundred long years. It even preceded the vacuum tubes by a quite a few decades. **Picture 1.** shows pyrit crystals, one of the best [crystal detector](#) material.

Pyrite - is available from **OddMix**. A pocket of three small crystals is **\$6 shipping included** within the continental United States. [Click here to order the crystals.](#)

The very first radio receivers were all built with a single, adjustable contact point diode the crystal detector. The crystal detector is the special, adjustable form of the present days diode. This diode or detector was used to separate the lower frequency sound waves from their higher frequency carrier wave.

Crystal detectors underwent many years of development. Many different materials were tried and multitudes of experimenters, the early radio amateurs, spent thousands of lifetimes to discover the best methods that work. See the article of the [best detector crystals](#) found by 1925.

As its name implies, the diode is a two wire rectifying electronic component. And the crystal detector is precisely that, a two-wire rectifying device. The main difference of currently available diodes and the crystal detector are that in the diodes, because they are sealed devices, no contact adjustments are possible.



Picture 2. Point contact diode

From such humble beginning comes the current bewildering variety of the diodes. As seen from the table, diodes are in use in many categories.

- 1 - **General purpose diodes** - these are used for many overlapping purposes
- 2 - **Reference diodes** - mostly Zener, Avalanche and temperature compensated devices
- 3 - **Switching diodes** - they are the most numerous by any count
- 4 - **Photo diodes** - this group also includes the huge emerging field the solar cells
- 5 - **Tunnel diodes** - also known as Asaki diodes mostly used by the microwave industry
- 6 - **Varactor diodes** - used as variable capacitors in modern radio and electronics
- 7 - **Power rectifiers** - these are truly everywhere in any electronics items power supply
- 8 - **Over-voltage protector diodes** - these are seldom encountered by home experimenters
- 9 - **Thermoelectric diodes** - Peltier and other special junction devices
- 10 - **Special diodes** - Schottky, PIN, and anything not included in the other categories

By construction, diodes are usually and presently almost always made as PN junction devices. These types can have, but not limited to, grown, mesa, planar or epitaxial type junctions. In the beginning most of the diodes were little more than fixed-point crystal detectors, in which a small block of germanium was touched by a sharp wire point contact. On **Picture 2**. Shows a point contact diode cross section. These point contact "cat's whisker" devices occasionally still made, and because of their small capacitance, they are useful in high frequency electronics.

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