



# ***Exploding The Phone***

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Bibliographic Cover Sheet

Title **Tiny Tube Speeds Telephone Dialing**

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Abstract Describes the invention of the "silicon alloy junction diode" and says it "opens the way to operating telephone systems and computers with a speed 1,000 times faster than that of mechanical switches now in use."

Keywords Bell Labs; Bell Telephone Laboratories; Bell Laboratories; transistor; pnpn; diode

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# TINY TUBE SPEEDS TELEPHONE DIALING

**Device, Also for Use in 'Memory'  
Calculators, Developed by  
Bell Laboratories**

A new electronic device about the size of a match head opens the way to operating telephone systems and computers with a speed 1,000 times faster than that of mechanical switches now in use, it is reported by the Bell Telephone Laboratories, which has developed the apparatus.

Described as a "silicon alloy junction diode," the device has neither filament nor vacuum as in the ordinary radio tube, is ready to operate instantly because there is no warm-up period and has a calculated life span said to be almost unlimited.

~ If built into a central telephone switching system or electronic computer such devices would, it is believed, far outlast the machines themselves and revolutionize upkeep and service problems.

Technically a diode is a rectifier which, in its highly specialized sphere, performs almost exactly like the rectifier vacuum tubes in home radios and television sets. It is one of the newest by-products of the transistor invention and subsequent developments produced at the Bell Laboratories since the late Nineteen Forties.

## **Acts Like a Check Valve**

In an electronic circuit a diode acts like a check valve in a water pipe, allowing an electric current to flow in one direction only. In automatic dial lock-ups, diodes can increase greatly the over-all speed of operation, both for local and long-distance dialing.

In electronic computers the device will be used in the "memory organ" of transistor-operated systems, where "brain" numbers are retained or "remembered" as minute electrical charges stored in condensers.

When such electrical charges leak off, the machine "forgets" its message. Diode-equipped systems, however, avoid this "amnesia" almost entirely, it was said, because of its near-perfection as a check valve. When set to allow an electric current to flow in one direction, the flow in the other direction may be held or checked to within "one ten-thousand-millionth of an ampere."

Another way of describing the performance of the new diode is to say that the "ratio of its resistance is about 100,000,000 to one." Compared with this, the "back leakage current of an ordinary vacuum-tube diode rectifier may be a thousand times greater." Thus, a long-time electronic memory may be achieved.

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