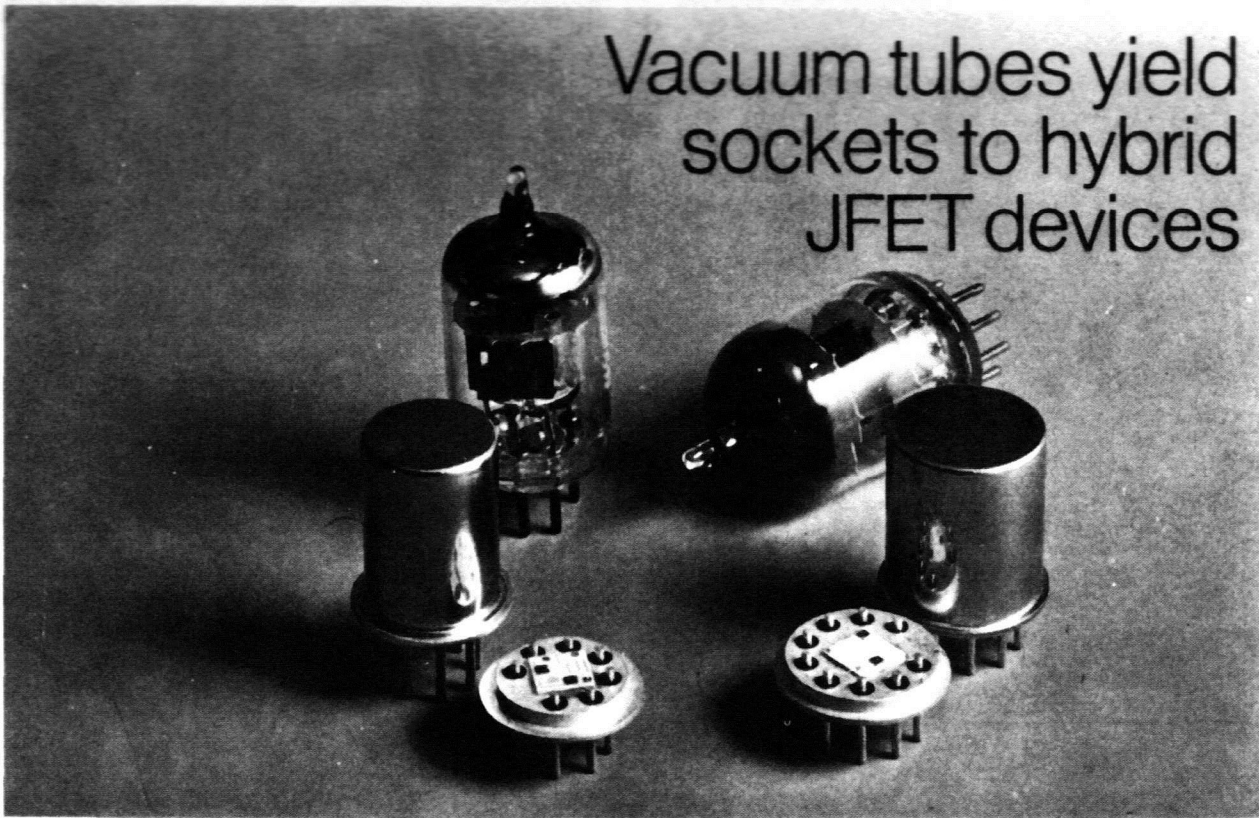


Vacuum tubes yield sockets to hybrid JFET devices



Thanks to high-voltage JFET technology, hybrid circuits called Fetrons exhibit virtually no aging, and also offer higher gain than do their vacuum tube counterparts

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□ A junction-field-effect device called a Fetron has been developed that replaces a vacuum tube in a circuit directly, without requiring major modifications in the circuit. To withstand the tube's high voltage supply (the B⁺ voltage), the device is built with the high-voltage JFET technology that was developed more than five years ago for military systems requiring breakdown voltages of 200 to 300 volts.

The Fetron package can be either a single JFET or two cascode-connected JFETs in a hybrid IC. Each kind is now being built as one-for-one replacements for such widely used tubes as the 6AK5 and 12AT7, and each goes into an oversized IC metal can that has the same pin configuration as the tube it replaces.

Why the Fetron?

From a design point of view, Fetrons make good sense as replacements for tubes in much communication equipment:

- Having no drift or aging, they can be locked in place for years, whereas the transconductance of many tubes degrades, often making monthly or quarterly adjust-

ments and periodic replacements mandatory.

- Their improved performance includes higher amplification factors and lower noise than many tubes.

- Their low-power operation derives from the absence of heater or screen grids and the power supplies that run them. They also operate at 65 degrees centigrade, instead of the 100° C of tubes.

- The lifetimes of Fetrons are orders of magnitude longer than those of typical tubes—an estimated 30 million hours for Fetrons, 10,000 hours for tubes.

- They're physically tough, too—there's no glass to break in a metal can.

Fetrons make good sense in terms of sales, too. Billions of tubes that the Fetron could replace are still being used in communication and radar equipment. For instance, the utility telephone network in the U.S. alone contains about 150 million tubes within the Fetron's capabilities, creating approximately a \$100 million-a-year market. And the maintenance bill of another major

Tubeless. Hybrid JFET devices shown above replace tubes on one-for-one basis. Called Fetrons, they plug into unchanged circuit.