



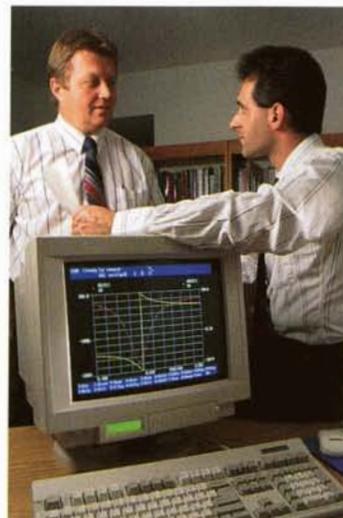
VOLTAGE-CONTROLLED OSCILLATOR

Integrated Component Systems, Inc. (ICS), Coconut Creek, Florida designs and manufactures synthesizers and oscillators used in wireless systems, modems, test equipment and related products. ICS products range in size from inch-square surface mount units to full-size boards for frequency-hopping communications systems.

ICS president Eliot Fenton describes his firm as "an innovative high technology company with very limited financial resources, always looking for outside information to assist in the development process." He found a valuable source in *NASA Tech Briefs*, a monthly publication

used as a problem solving tool by more than 200,000 government and industry subscribers (see page 137). A *Tech Briefs* article provided information incorporated in an ICS custom design.

One of the company's customers wanted a synthesizer with wide phase modulation characteristics, yet low noise. The problem was that the two requirements are inherently incompatible in a single loop design. An ICS engineer suggested an approach, but Fenton wanted confirmation of the validity of the method. The *Tech Briefs* article described research at Jet Propulsion Laboratory (JPL) resulting in a modified configuration for a phase-locked angle modulator that makes it possible to design the filters in the modulating portion of the circuit independently of the filter in the phase-locked



loop portion; applied to a phase-locked oscillator, it offers superior phase noise performance.

"The article gave my engineer valuable insight into how the process works," says Fenton, "and substantiated our method as viable for wideband phase modulation." The technology is incorporated in the ICS series of phase-locked loop synthesizers. Fenton (hand on console) talks with a company engineer **above**; **at left** are a pair of representative ICS oscillators.

