

## **Cable Tester**

Sonics Associates Inc., Birmingham, Alabama is a multifaceted corporation involved in design, manufacture and installation of professional audio-visual-video systems. Among other activities, Sonics supplies the audio—including several company-developed specialized components—for the giant Imax® and OMNIMAX® motion picture theaters on five continents (Sonics and Imax Systems, Toronto, Canada work closely together and Imax Systems recently acquired half ownership of Sonics). At right is the Imax theater at the Maryland Science Museum in Baltimore; a Sonics Associates engineer is checking a segment of the miles of ribbon cables running throughout the theater.

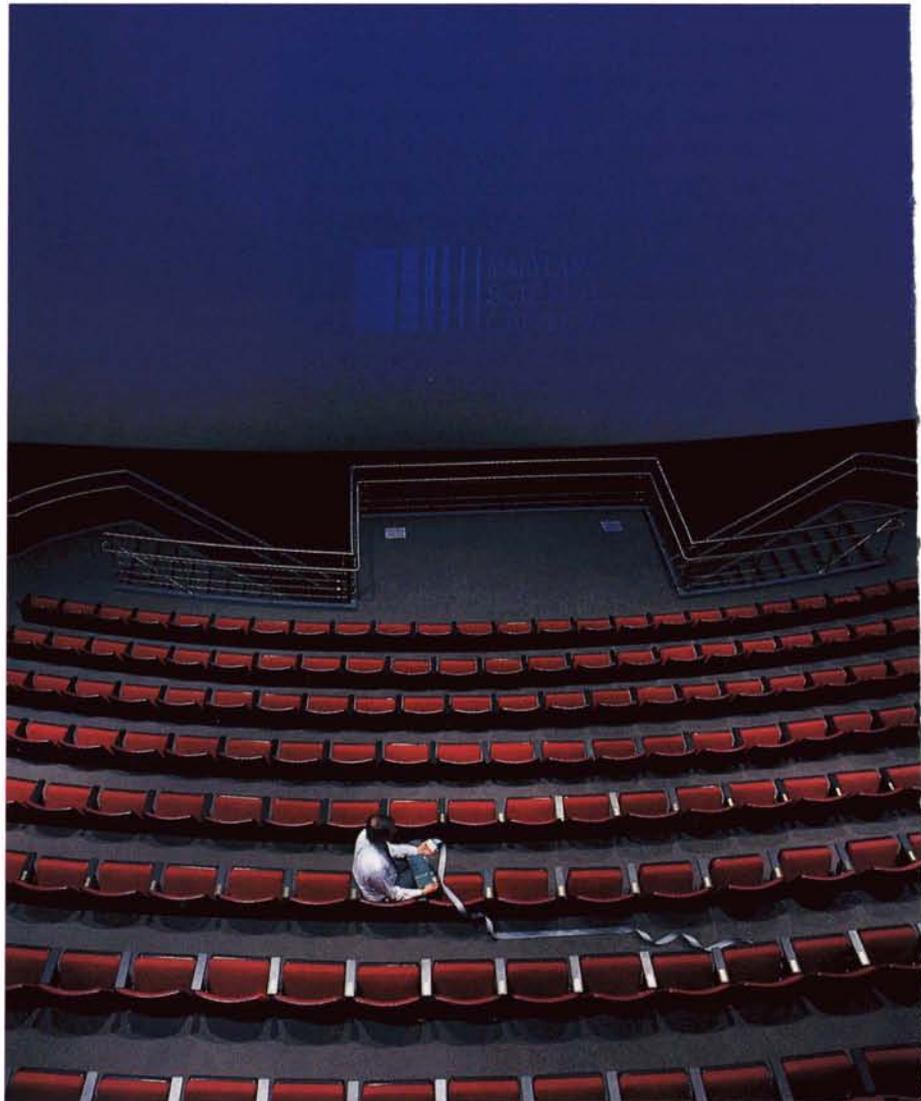
Sonics Associates' Imax and OMNIMAX Theater Sound Systems are required to deliver sound to complement motion picture images that may measure more than 70 feet high and 100 feet wide. Imax/OMNIMAX sound tracks are very dynamic and often simulate such dramatic effects as cannon fire, avalanches and rocket launches at sound levels approaching those of the actual event.

The production and installation of such sound systems demands a great many cables and connectors, and there are hundreds of separate conductors to be assembled and verified before connection to the equipment. This poses a problem: often the wiring must be done by local labor not as familiar with proper procedures as might be desired. Unless each cable connection can be verified, there is high risk of improper operation and damage to costly equipment.

Over the years, Sonics has sought to minimize the problem by employing a great variety of techniques and equipment for field testing interconnection cables; they range from ohmeters, lights, buzzers and telephones to sophisticated microprocessor-based testers. Each is generally effective but each has drawbacks. The

simplest systems demand at least two people and considerable time, the more complex systems require fewer people but a disproportionate amount of expensive equipment.

NASA technology provided Sonics a means of saving countless hours of testing time. Ames Research Center had a similar problem: when computer communications cables are installed to connect remote terminals with a central

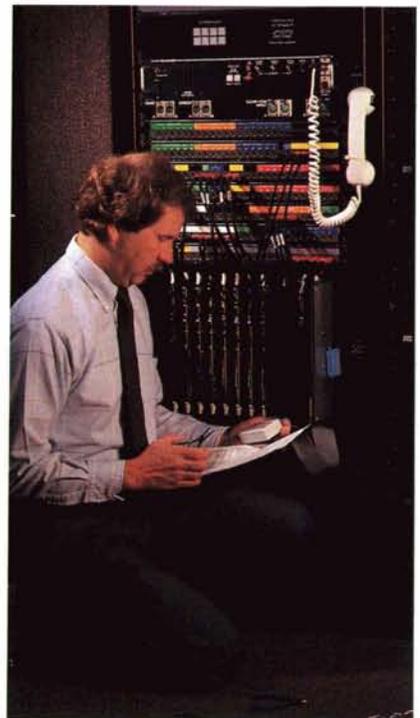
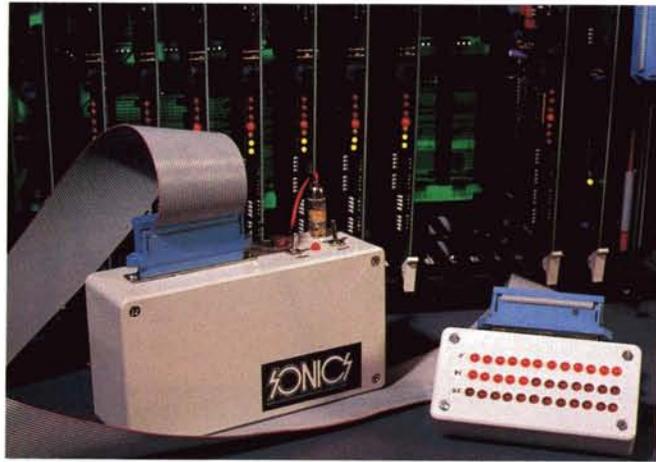


computer, errors frequently occur in installing multipin connectors and often the required functional signals are hooked up to wrong pin locations in the connectors. Such misconnections cause malfunction of the computer terminal, sometimes damage to the terminal or computer. To combat this problem, Ames developed a simple, two-part cable testing device that included an active part plugged into one end of the cable and a passive part at the other end.

Sonics vice president James B. Cawthon read about the Ames device in NASA Tech Briefs, a publication that describes technology available for transfer. He requested and received from NASA a Technical Support Package that provided extensive detail of the technology. Sonics made several changes to the design to adapt it to its own needs and came up with an inexpensive but highly effective tester that uses a clocked shift register to apply a voltage to a cable under test; this is the active part of the Ames development. The passive companion to the test generator is a small box containing light emitting diodes (LEDs). When connected to the other end of the cable being tested, the LEDs light in the same sequence as the generator. This simple procedure allows a technician to observe the sequence of the applied test voltage and note any discrepancy that would indicate a miswired cable.

The two units of the Sonics testing device are shown at top. At far right, Sonics' James Cawthon is using the device to check one of the control panel circuit boards at the Maryland Science Museum Imax theater to make sure nothing is cross-wired. At right center and in closeup at lower right, Cawthon is checking the synchronization of the film projector and the audio tape.

The NASA technology has saved Sonics a great deal of time and money, according to



Cawthon, who adds that the tester can be built for about \$25 and it takes minimal space in a tool box. "We haven't documented total time saved," he says, "but suffice to say that the device reduces the time to test a single cable from 12 minutes for two technicians to less than one minute for one technician."

\* Imax and OMNIMAX are registered trademarks of Imax Systems Corporation.