What are computerized systems looking for?

How "moist" is the moon dust?

Of the 142 scientists analyzing moon dust brought to earth with Apollo 11, one, at least, will be searching for signs of water. Using Nuclear Magnetic Resonance and computer techniques, Dr. Stanley L. Manatt at the Jet Propulsion Laboratory will be characterizing the kind of hydrogen in moon dust and how much of it might be ascribed to water. He'll also be looking for the hydrogen-deuterium ratio; signs of heavy hydrogen might contribute to historical tracing of the bombardment of the moon's surface by solar high energy protons and deuterons.

In his experiments, Dr. Manatt will be using Hewlett-Packard computerized instrumentation. He'll first use a Hewlett-Packard programmed frequency synthesizer to sweep his magnetic resonance spectrometer over the range of resonance interest. Then a Model 5480A Signal Averager to enhance the signals resulting from resonance and resonance decay by lifting them out of their noisy environment. His Hewlett-Packard 2115A computer, besides controlling the experiment, will perform integration and lineshape analyses functions to give him quantitative information and Fast Fourier Transforms to produce precise visual readouts in the frequency domain of other nuclear magnetic resonance properties.

Through computer manipulation of statistical data in non-destructive nuclear magnetic resonance spectrometry, studies of moon dust samples may reveal information on lunar water availability and on the origin and history of the moon.

We'll be happy to send you more information on the 5480A, $9950, and our mini-computers, starting at $9950.

How to make the sound of music sweeter.

While integrated and thick film circuitry has contributed much to the listening pleasure you receive from ever smaller and more durable AM/FM radios, it's also introduced new problems with testing.

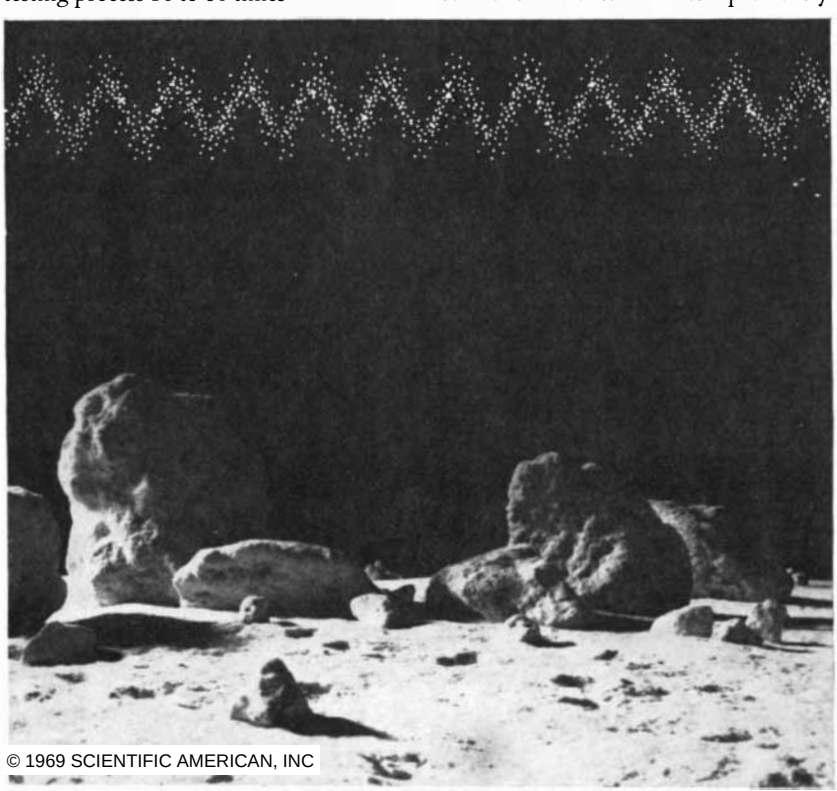
In the manufacture of quality radio sets, complete, lengthy testing of each IC added substantially to the manufacturing costs, and many of the high-density circuits were actually too small to test completely.

But now there's a system that makes possible and economically feasible complete checks of all IC's. One major manufacturer is using it to make the testing process 10 to 60 times faster than previously possible.

Complete circuit tests, including RF, IF, audio, local oscillators and other stages, can be made in less than 10 seconds. Individual steps can be checked in milliseconds. And the beauty of this fast, extensive testing is that it also improves the quality of the set. The tests are designed to give the entire circuit very narrow performance parameters. This inevitably means a better product. In these inflationary times, the cost saving in the production is important in enabling radio manufacturers to hold the line on price.

The automatic test system is the 9500A, typical of those delivered by the special HP Systems Division. It consists of several standard Hewlett-Packard instruments, controlled by one of our computers. The computer controls stimuli and the IC connections to which they're applied, then accepts and records measurement data.

This computer-controlled stimulus-response system can be applied to a wide range of production and quality control situations. It makes a previously



complicated task a simple matter for any technician.

A detailed report on the 9500A system, which costs from $50,000, is given in the August 1969 Hewlett-Packard Journal. Write us for a copy.

How to make an ally of the undersea world.

With hydrostatic pressures up to 10,000 psi and near-freezing temperatures, the ocean depths pose as great a problem for exploration as they hold promise for mankind's future.

The promises include aquatic farming, underwater communications and transportation, perhaps even marine colonies when the earth becomes too crowded to support us all. To find out what's possible and what isn't, new ways to accumulate accurate data have had to be devised.

This data collection includes acoustic noise studies, internal wave observation, seismic refraction operations and studies in temperature changes. Measurements in these areas require a stable ocean surface vessel that can probe the depths in all weather conditions.

This stability has been found in the FLIP ship, operated by the Marine Physical Laboratory of the Scripps Institution of Oceanography, University of California, San Diego. FLIP resembles a ship for its forward 50 feet. The final 300 feet look more like a cigar tube. When FLIP's in position, ballast tanks are filled and the vessel floats in a vertical position, bow up, with very little motion, even in rough seas.

To help this floating laboratory get maximum information in the shortest possible time, Scripps' scientists needed a real-time computation ability. A Hewlett-Packard computer is being used to fill this need and has become an important part of the fact-finding missions.

This system, with background as well as foreground capabilities, performs three jobs at the same time. In the foreground, it collects data with programmed tests; simultaneously, in the background, it facilitates development of new programs for subsequent tests and processes the data from the continuing tests. Previously, data could only be processed on shore. This ruled out the practicality of on-line repetition of the dynamic ship board experiments, results of which are subject to the changing conditions of the seas and to navigational repeatability. In addition, the computer is rugged enough to perform even under the most adverse climatic conditions.

This 2005A Real-Time Executive computer, which is just as much at home in a factory as it is at sea, is priced from $75,000. A brochure on this foreground/background computer system is yours for the asking.

The growing rate of computer uses might be of interest to you. Whether your problem is manipulation of statistical data, production line testing, or the solution of complex measurement and analytical problems. Hewlett-Packard is deeply involved in computer techniques for acquiring data and making it more useful. If you could use some computer assistance, give us a call. Hewlett-Packard, 1506 Page Mill Road, Palo Alto, California 94304; Europe: 1217 Meyrin-Geneva, Switzerland.

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Measurement, Analysis and Computation