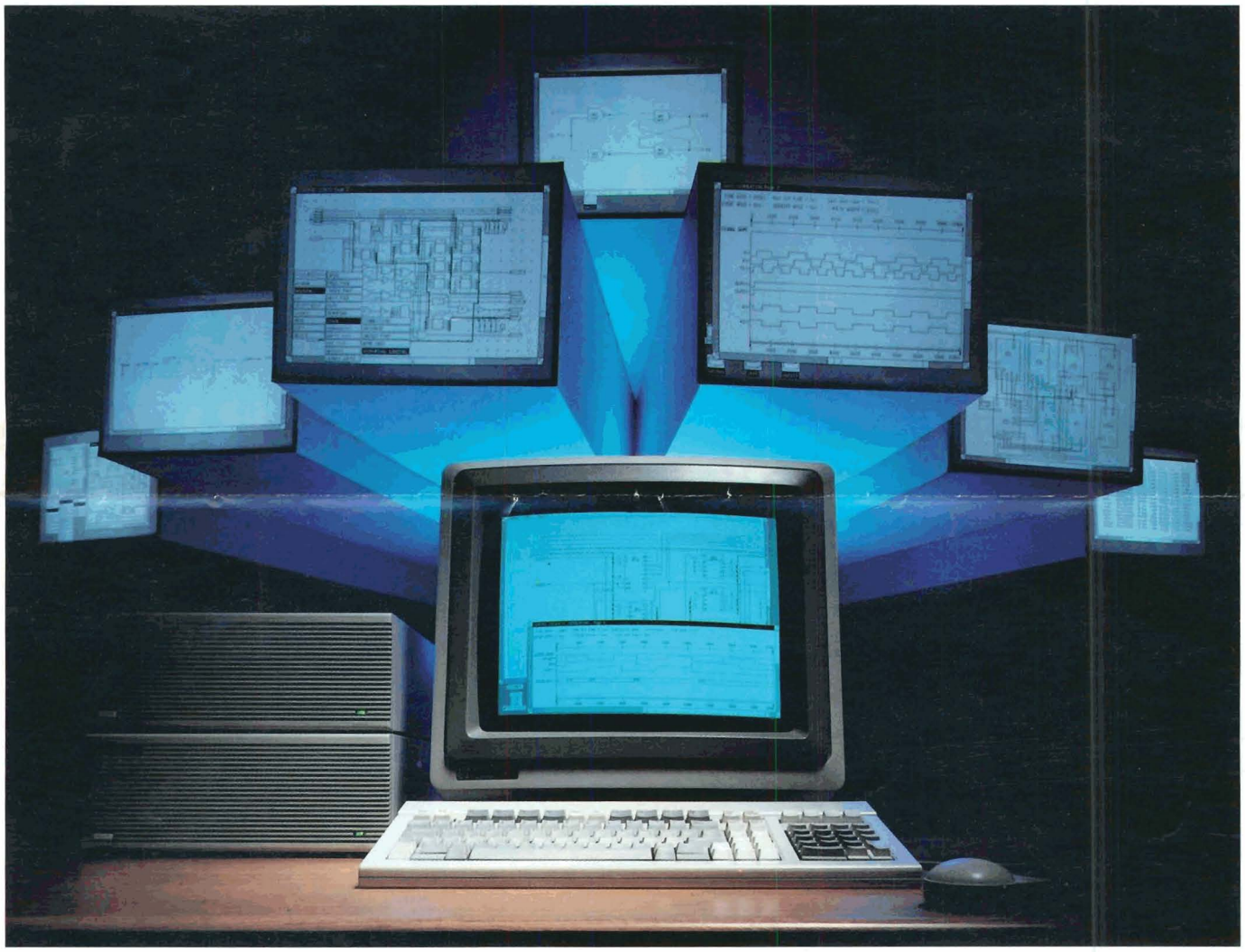
MEASUREMENT COMPUTATION news
product advances from Hewlett-Packard

JANUARY/FEBRUARY 1986



HP introduces new CAE systems for electrical engineering design

Two computer-aided engineering (CAE) systems—the HP Logic DesignStation and HP Personal DesignStation—perform logic design capture and verification in electrical engineering applications. They are part of the HP DesignCenter Series that includes mechanical and electrical CAE products.

The HP DesignCenter lets you integrate design, manufacturing, and business functions to improve the productivity and quality of the total design process. It includes design-automation software as well as tools for data management, documentation, and communication.

The Logic DesignStation uses the HP 9000 Series 300 high-performance engineering workstation and the HP-UX® 5.1 operating system in conjunction with the HP Design Capture System and GenRad's HILO-3®-based verification-system software packages. The Personal Logic DesignStation uses either the HP Vectra PC or the IBM PC/AT and runs the same HP Design Capture System as the more powerful Logic DesignStation.

Design capture system

A common user interface provides easy access to the design capture and design verification environment. Design entry and testing are simplified with the use of icons, a mouse, pop-up menus, and multiple window management. The sys-

(continued on page 2)

Two new ME systems provide full range of design solutions

HP DesignCenter ME Series 10 is an advanced, workstation-based 2-D design and drafting system for mechanical engineering applications. It operates on the HP 9000 Series 300. The ME Series 50 is a comprehensive system of mechanical computer-aided engineering products that provides design solutions through the entire product development process. It runs on the HP 9000 Model 550.

Advanced 2-D design and drafting

The ME Series 10 model-oriented data structure allows the user to define an object's geometry, dimensioning, and other attributes for comprehensive design and manufacturing-processing tasks. Nesting and sharing parts simplifies complex assembly designs and allows parts-list generation.

The ME Series 10 has direct links to HP-FE for finite-element analysis, and design geometry is compatible with numerical control systems. Data transfer for technical documentation is a key feature of the ME Series 10.

In addition, an entry-level system (the ME Series 5) is available which has many of the features of the ME Series 10.

High-level ME design solutions

For 3-D design, the ME Series 50 Geometric Design System (GDS) features many geometric constructs, which can be positioned and edited through coordinates, geometric relationships, or specified screen positions. There are more than 20 analytic and sculptured-surface techniques. A fully associative 3-D data base allows easy integration with all applications software.

Solid Modeling Design (SMD) has all the features of GDS, with the accuracy of advanced solid-model-based design. It uses a boundary representation modeler, which supports solid primitives and edge-based construction. Common data structure allows easy movement from solid design to other applications.

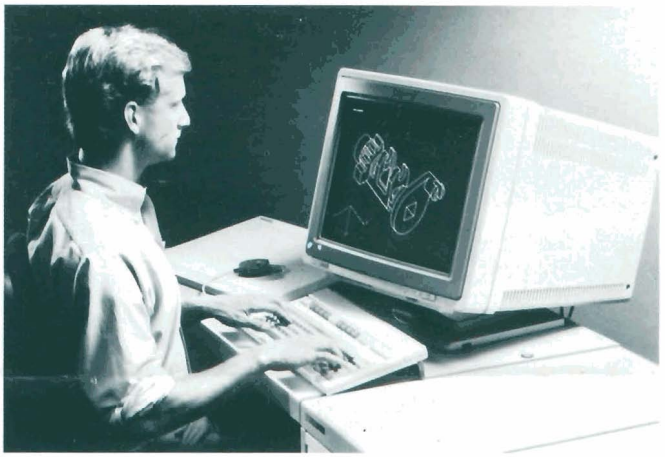
The NC Tool Path Development package provides strong links to manufacturing. Parts are modeled with any combination of 3-D wireframe, surface, or solid primitives.

There are also other packages available for the ME Series 50. And HP has agreements with a number of independent software vendors, who offer products that complement or enhance HP's offerings.

With DesignCenter ME Series 10 or 50, you can purchase an entire solution from HP. All of the software and system hardware are supplied and supported by HP. And HP's customer support, training, and service cover all these products.

Prices for these products vary according to the selected configuration.

For more information, check **B** *on the HP Reply Card.*



DesignCenter ME Series 50 is a complete system of high-level application software, technical workstations, and related peripherals. The system's common data structure allows solid or 3-D based design.

HP introduces new CAE systems

(continued from page 1)

tem supports top-down, bottom-up, and flat design in addition to on-line electrical rule checks that discover potential design errors before simulation. Changes in a design are automatically reflected in documentation, in which text and graphics can be combined on the same page. An HP Design Database Language provides access to the captured design data, along with the ability to reformat data for use with external tools.

Design verification

Based on the HILO-3® system, the verification tools support a wide range of digital technologies including MOS, TTL, ECL, and microprocessors. The logic simulator features a five-state, 15-logic-value algorithm for accurate modeling of MOS bidirectional gates, ANDs, wired ORs, and tri-state pullups and pulldowns. HILO-3® also performs accurate, nominal, and worst-case timing analysis during logic simulation.

For initializing memory contents in the captured design, the Design Verification Interface provides a parser facility by which simple memory patterns can be entered into a standard ROM/RAM content file and converted into memory data. For more extensive memory programming, the HP 64000 microprocessor software development tools can be used. Code is passed to the design verification tools through the HP Software Link included in the Design Verification Interface. HP Software Link supports all the HP 64000 assemblers and compilers.

Design interfaces to physical layout systems

HP Logic DesignStations provide physical links between the logic design environment and industry standard printed-circuit board layout systems. Interfaces to SCICARDS® and Calay are available for physical-design implementation.

Both the HP Logic DesignStation and the Personal Logic DesignStation are equipped with Design Capture and Database Language software. HILO-3® software is optional on the Logic DesignStation.

For more information, check **A** *on the HP Reply Card.*

HP-UX is HP's version of the UNIX operating system. UNIX is a trademark of AT&T Bell Laboratories. SCICARDS is a registered trademark of Scientific Calculations, Inc. HILO is a registered trademark of GenRad, Inc.

HP-UX pulls it all together on your HP 9000 workstation

While CAD/CAM software gives you a tremendous boost in technical productivity, you still can spend over 50% of your time in support-related activities such as documentation, analysis of data, team communication, and presentations to various audiences.

Alis™/HP-UX is an integrated office automation package that meets the needs of the technical office environment. Using the HP-UX Applications Execution Environment, Alis™/HP-UX runs on the same systems that support your technical CAD/CAM packages.

Alis™/HP-UX offers you:

- Document Composer: pulls together text, graphics, spreadsheet, and database information into a single document.
- Spreadsheet: combines the functions found in Lotus®1-2-3® and simple equation-solving.
- Graphics Editor: creates business/data graphics from spreadsheet data and provides freestyle drawing capability.
- Personal Database: pulls together information, from project team lists to assembly material lists.
- Calendar/Time Management: improves efficiency through scheduling and prioritizing.
- Electronic Mail: pulls your team together to share ideas and information efficiently.
- Data Exchange: combines information from other HP-UX products such as MicroTrak™/HP-UX for schedules and TK!Solver®/HP-UX for advanced equation solving.

Alis™ is available on the HP 9000 Series 200 computers running HP-UX 5.1, the Series 300 running HP-UX 5.0 or 5.1, and Series 500 running HP-UX 5.0.

If you don't need the full power of integrated software, HP also has new, stand-alone software packs for the HP 9000 family of technical workstations.

For more information, check **C** *on the HP Reply Card.*

HP-UX is HP's version of Bell System V Unix Operating System. UNIX is a trademark of AT&T. Alis™ is a trademark of Applix, Inc. Lotus® 1-2-3® are U.S. registered trademarks of Lotus Development Corporation. MicroTrak™ is a trademark of SofTrak Systems, Inc. TK!Solver® is a registered trademark of Software Arts, Inc.

Next-generation HP computers

The January 1986 *Hewlett-Packard Journal* carries an article on the compiler system for HP's next generation of computers, which are now under development. (The development project is known internally as the Spectrum program.)
For a free copy (English only), check **D** *on the HP Reply Card.*

Software for demanding scientific applications

ASYST® is a fully integrated software system for the HP Vectra PC that may meet most of your scientific and engineering needs. It offers powerful graphics, statistics, and data analysis capabilities plus full HP-IB interface control. ASYST® is easy to use and execution is fast because the HP Vectra PC uses the 80287 math coprocessor. ASYST® also runs on the IBM/PC, PC/XT, and PC/AT.

Graphics. With ASYST®, one-word graphics commands reduce and transform data into easy-to-analyze displays such as line graphs, scatter plots, bar charts and/or pie charts. Data can be presented using linear or logarithmic scales and in both Cartesian and polar coordinates.

Statistics. ASYST® supports many statistical and arithmetic functions using integer, real, and complex numbers. Programs can use arrays of up to 16 dimensions and can be as large as 64K bytes. All arithmetic operators work directly on the array elements which can be edited with an array editor. Single-word commands are used for basic statistics, distributions, random number generation, and sort and index.

Analysis. ASYST® provides many powerful built-in analytical functions such as least-squares approximation, convolution, integration, smoothing, and fast Fourier transform. Most of these can be executed with a single command.

Instrument control. ASYST® commands support the HP-IB protocol including communications in three modes: synchronous, asynchronous, and DMA. This feature allows ASYST®'s capabilities to be combined with HP-IB instrument control.

Full programmability. Programs can be written interactively for easy coding and debugging or compiled for fast execution. You can create structured programs with program syntax similar to other high-level languages such as BASIC, Forth, Pascal, and APL.

ASYST® software integrates instrument control with analysis and graphics to help you quickly develop solutions to applications requiring precision and high performance. ASYST® runs on the HP Vectra PC and the IBM PC, PC XT, and PC AT.

Fully integrated. ASYST® is contained on one disc and once booted, all capabilities reside in memory. It also has a built-in menu-driven text editor. All functions, including HP-IB, can be accessed without changing discs.

For more information, check **E** *on the HP Reply Card.*

ASYST® is a registered trademark of MacMillan Software Company

Letter-quality printer offers higher capabilities at a lower price

The HP 2603A is a new low-priced letter-quality printer. Along with a triple-bin sheet and envelope feeder and tractor accessories, the HP 2603A letter-quality printer offers hands-free printing for office and administrative professionals. It offers the speed and capabilities of higher-performance daisywheel printers at a low price. At 48 characters per second, it accommodates the needs of most office users.

Designed to meet the needs of many different types of office users, the HP 2603A is a fast, quiet, and low-priced letter-quality printer.

The HP 2603A uses a single daisywheel layout to support many Western languages through the HP Roman8 extended character set, as well as offering a subset of the IBM PC's character set. International language support is offered through composition printing.

The HP 2603A is complemented by the HP 26030E Triple-Bin Sheet Feeder. The feeder allows you to produce complete documents and correspondence using a combination of letterhead, bond paper, and envelopes. The feeder is user-installable and nonelectrical. A range of paper sizes can be fed in either portrait or landscape mode.

Convenient, quiet, and well-supported

Convenience features include drop-in print wheel (10, 12, 15-pitch and proportional spacing), long-lasting snap-in ribbons, and an easy-to-use front control panel. Forms length, print pitch, and feeder selection are designated without raising the cover. Single sheets and envelopes can be fed and automatically aligned on the first print line.

Because a sound dampening carpet is included at no charge, the printer can be used without a sound cover.

The HP 2603A is supported by most of HP's key office and word processing software, as well as MultiMate™, MS™WORD, WordStar®, and WordStar/2000®. Use of the Diablo 630 API2 command language also allows the HP 2603A to work with many other word processing packages.

For more information, check **F** *on the HP Reply Card.*

MultiMate™ is a U.S. trademark of MultiMate Corporation. MSWORD is a U.S. trademark of Microsoft. WordStar® and WordStar/2000® are U.S. registered trademarks of MicroPro International Corporation.

New ½-inch tape drive suited for all applications

Do you need a start-stop tape drive for data logging, batch processing, and system restores instead of a streaming tape drive designed for fast system backups? Instead, consider the new performance-enhanced HP 7978B as your one general purpose system drive. This new ½-inch tape drive offers the same high density and high-speed backup performance as its predecessor, the HP 7978A. At the same time, design enhancements give the new drive better performance during stop-start applications, when the system is busy, or in shared interface configurations.

Matched to systems with 400 megabytes or more of disc storage, the HP 7978B operates at a tape speed of 75 inches per second and offers dual density 6250 GCR and 1600 PE formats. High reliability remains a key feature and is reflected in the same low monthly maintenance costs.

Larger buffer improves performance

The primary difference between the HP 7978A and the HP 7978B is the larger internal data buffer which has been expanded from 32K bytes to 256K bytes. The increased buffer, together with the software features of Immediate Response and Read-Ahead, allow stacking of up to 70 data blocks in the buffer. This makes the drive less sensitive to variations in the timing of data transfer requests to and from the host system and minimizes repositions. Thus, premium performance results during applications previously thought better suited to a start-stop drive. (Labeled tapes or jobs that do not implement the Immediate Response feature, such as the TF utility on the HP 1000 or the CPIO utility on the HP 9000, will not realize these performance improvements.)

The HP 7978B is supported on the following systems: the HP 3000 Series 37, 39, 4X, 58, 6X (MPE V/P Delta-1, MPE V/E), the HP 1000 A-Series (RTE-A.85), and the HP 9000 Series 300 and 500 (HP-UX). A field upgrade kit (HP 88702A) is available to convert an existing HP 7978A to an HP 7978B.

For more information, check **G** *on the HP Reply Card.*

General-Purpose Electronic Instruments and Systems

Digitizing oscilloscopes

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of 1 MHz and simultaneous, differential-input channels.

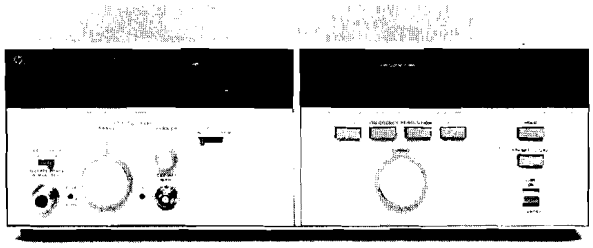
In addition to a standard 64K-word/channel memory, the HP 5183T offers an optional 256K words/channel and a new feature, Adaptive Sample Rate (ASR), which provides effective memory lengths of up to 30 million words. This makes it suitable for low-frequency automatic test systems and characterization of complex modulated signals such as floppy disc, sonar, and high-resolution radar signals.

For more information, check **R** *on the HP Reply Card.*

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

New synthesizer generates quality CW signals at an affordable price



Unmodulated, synthesized signals now cost less with the HP 8671B.

For many communications and automatic test applications, a continuous-wave signal may be all you need. AM, FM, and pulse are just excess functions. The new HP 8671B Synthesized CW Generator offers unmodulated signals from 2 to 18 GHz and from +8 to −120 dBm.

In a general-purpose measurement role, it serves as a low-noise down-converter for modulation, spectrum, network, and waveform analysis at microwave frequencies, and for noise-figure work. It has low SSB (single-sideband) phase noise of −78 dBc/Hz at 6 GHz and 1-kHz offset.

Like the field-proven HP 8672A, this generator enjoys the same mean-time-between-failure expectations of 9000 hours. In addition, all applications software previously written for the HP 8672A Generator runs directly on the HP 8671B for all like functions.

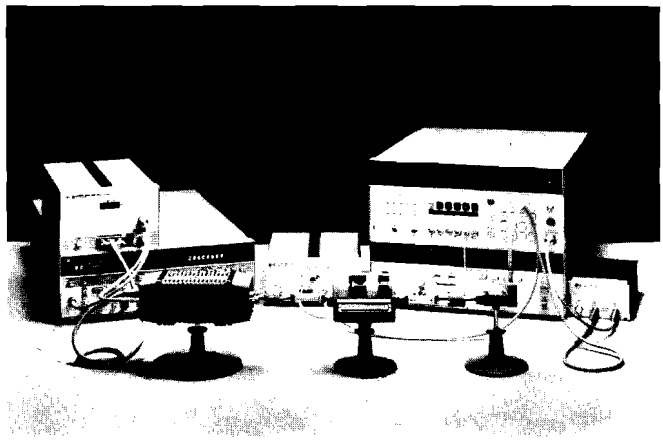
For more information, check **H** *on the HP Reply Card.*

Calibrate signal generators and attenuators to millimeter-wave frequencies

You can now easily characterize signals at millimeter-wave frequencies with an HP 8902A Measuring Receiver. Using a harmonic-mixing technique, you can accurately measure frequency, modulation, and low amplitude level. Add a waveguide power sensor and you can make absolute power measurements. The combination of these measurement functions in one instrument makes the HP 8902A an excellent solution for millimeter-wave calibration of signal generators and attenuators.

Product Note 8902-2 describes how measurements are made at millimeter-wave frequencies using the HP 8902A and points out typical uncertainties that can be expected when making these measurements. The Product Note discusses configuring a system from 26.5 to 40 GHz, 33 to 50 GHz, and 40 to 60 GHz, using Hewlett-Packard instruments and commercially available waveguide hardware. Operation to 110 GHz is also discussed.

For a copy of Product Note 8902-2, check **I** *on the HP Reply Card.*



Accurately characterize signals at millimeter-wave frequencies with the HP 8902A Measuring Receiver.

More microwave network analysis applications described

If you need to make radar-cross-section (RCS) measurements or characterize the dielectric constants of materials, you'll want a copy of two new product notes recently developed for the HP 8510 Network Analyzer.

With the configurations and measurement procedures described in HP Product Note 8510-2, you'll learn how the broadband, wide-dynamic-range performance and built-in processing capability of the HP 8510 can enhance your RCS measurements. For example, real-time error correction can be used to subtract out background clutter of an anechoic chamber and pull the RCS responses out of the noise. It can also normalize the results to the response of a reference target. This corrected data can then be transformed into the time domain to display RCS versus range. Gating can be used to remove the effects of unwanted responses, and the gated results can be viewed in both time and frequency domains simultaneously.

Characterizing the dielectric constant of materials is a requirement over a broad spectrum of applications. Product Note 8510-3 discusses how network analysis techniques can be used for measuring the complex permittivity and permeability of solid materials. The note contains a brief overview of the microwave theory that relates complex permeability and permittivity to S-parameters, a discussion of the measurement system, and an overview of fixturing considerations. Measurement results are presented for some representative materials and compared to theoretical values. Other topics include measurement system speed, accuracy considerations, and accuracy enhancements.

For a free copy of Product Note HP 8510-2, check **J** *on the HP Reply Card. Check* **K** *on the Reply Card for Product Note HP 8510-3.*

Two new products expand HP's spectrum analyzer line

Microwave spectrum analyzer has lab, production, and field applications

A new, medium-priced, bench-top spectrum analyzer that measures the 10 MHz-to-22 GHz frequency range is now available. The HP 8570A Microwave Spectrum Analyzer is designed for R&D, manufacturing, and field-service environments. Its applications include microwave component tests, communication-system monitoring and servicing, radar-system evaluation, and general-purpose lab measurements.

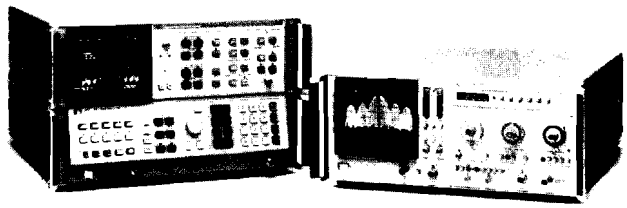
The HP 8570A features a digital display with analog sweep capability, digital trace processing, and easy three-knob operation. At the push of a single button, the 1.7 to 22 GHz frequency range can be viewed for easier broadband and surveillance operations. For close-in analysis, there is a wide selection of resolution bandwidths, to a 1-kHz minimum. Third-order intermodulation distortion products are down by more than 100 dB for signals separated by 100 MHz or more. Average noise level at 18 GHz is −90 dBm/kHz.

You can use HP-IB features and a computing controller to improve your measurement efficiency.

RF spectrum analyzer delivers high performance at a low price

The HP 8567A RF Spectrum Analyzer has the speed and accuracy required for demanding measurements from 10 kHz to 1.5 GHz. It features easy, three-step operation for basic signal analysis, but includes many computational functions to simplify measurements and reduce test time. Marker and trace functions let you control the processing and display of measurement data. A fast Fourier transform function allows accurate resolution of close-in amplitude modulation signals.

Custom measurement routines can be stored in the 16K bytes of RAM and called from a computer or the HP 8567A front panel. You can add scalar measurement capability at minimal cost with the HP 8444A Option 059 Tracking Generator, or combine the HP 8567A RF Spectrum Analyzer with the HP 85650A Quasi-Peak Adapter and the HP 85685A RF Preselector to make an EMI test receiver for FCC, VDE, and MIL-STD conducted and radiated emission testing.



These new RF and Microwave Spectrum Analyzers deliver higher performance than previous analyzers in the mid-priced range.

The HP 11940A Close-in Probe is a useful companion to the spectrum analyzer for repeatable relative EMI measurements. You can automate your emission testing with the HP 85864B EMI Software and an HP 9000 Series 200 Computer. For automated spectrum monitoring and surveillance operations, the HP 85865A Signal Monitoring Software is available.

For more information on the new Microwave Analyzer, check **L** *on the HP Reply Card. For information on the RF Spectrum Analyzer, check* **M** *on the Reply Card.*

New audio analyzers expand measurement capabilities

HP announces two new products for audio analysis—the HP 8903B Audio Analyzer and the HP 8903E Distortion Analyzer. They offer enhanced measurement capabilities for consumer audio product manufacturers, professional audio equipment manufacturers, and professionals in the recording and consulting businesses.

The HP 8903B and HP 8903E provide unparalleled versatility and performance for audio measurements from 20 Hz to 100 kHz

The HP 8903B costs less than the HP 8903A but offers even more features. Like the HP 8903A, the HP 8903B has the following functions: audio source capable of swept distortion measurements down to -90 dB, high-performance ac voltmeter, dc voltmeter, fully automatic distortion analyzer, signal-to-noise meter, audio-frequency counter, and SINAD meter.

The HP 8903B extends these capabilities by adding the following features:

- Balanced audio input. Handles input signals up to 300 volts differentially and can measure bridged amplifiers and other balanced audio equipment.
- Plug-in filters. The filters available are 400-Hz high-pass, CCITT, C-message, CCIR, CCIR/ARM, and A-weighting. Each analyzer has two internal plug-in filter positions.
- Increased dynamic range for distortion measurements as a result of lower noise floor. Noise is specified at the higher of -85 dB or 17 microvolts in an 80-kHz bandwidth.
- 600/50-ohm switchable audio source output.

The more economical HP 8903E, which has only audio measurement functions, is for customers who already possess an audio source but are in need of sensitive test capabilities.

For more information, check **N** *on the HP Reply Card.*

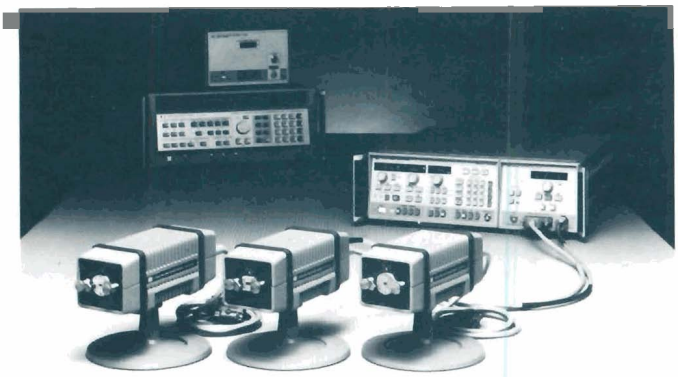
New millimeter-wave signal sources operate to 60 GHz

Three new millimeter-wave source modules, the HP 83554A (26.5 to 40.0 GHz), the HP 83555A (33.0 to 50.0 GHz), and the HP 83556A (40.0 to 60.0 GHz), extend the frequency coverage of HP's microwave signal sources to millimeter-wave frequencies. The modules are frequency multipliers driven with 50 milliwatt, 11 to 20 GHz signals.

There are two ways to configure a millimeter-wave source to suit your specific needs. For swept-frequency testing, choose the new 8-to-20 GHz HP 83550A RF plug-in for the HP 8350B Sweep Oscillator mainframe as the source driver. Its output exceeds 50 mW. Lower-power HP swept or synthesized microwave sources coupled with the 2-to-20 GHz HP 8349B Microwave Amplifier can also drive the new source modules. Examples are the HP 8341A Synthesized Sweeper and the HP 8673B Synthesized Signal Generator.

Using frequency multiplication means that most of the performance and features of the microwave source driver are translated up to millimeter-wave frequencies. For instance, the phase noise of the HP 8341A, 8349B, and 83555A is typically less than -63 dBc in a 1-Hz noise bandwidth at 10-kHz offset from a 44-GHz carrier.

The HP 83550-Series millimeter-wave source modules offer high power and excellent performance, versatility, and reliability at a reasonable cost.



Millimeter-wave source modules for 26.5-40.0, 33-50, and 40-60 GHz waveguide bands: the driver can be the HP 8350B/83550A Sweeper or HP 8341A Synthesized Sweeper plus the HP 8349B Power Amplifier.

For more information, check **O** *on the HP Reply Card.*

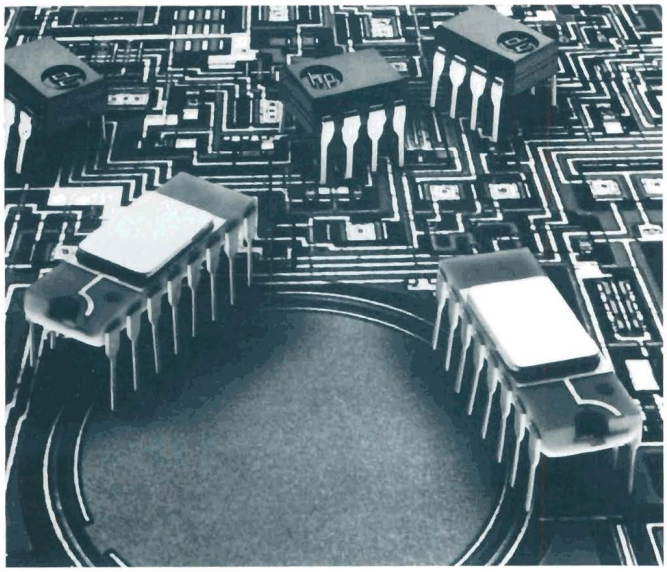
Tougher testing helps HP optocouplers solve your problems

A new high-voltage plastic optocoupler option, Option 010, and a new 6N140 optocoupler, the 6N140A, meet many of your severe application requirements.

Option 010 features special construction and testing for all of HP's plastic optocouplers, except the SL5505. Testing recognized by Underwriters Laboratories proves these Option 010 components can withstand 2500Vac input-to-output for one minute.

Full military extended temperature testing from −55°C to +125°C is done on HP's new 6N140A. There are two new high-reliability versions from which to choose, the 6N140A/883B, tested to MIL-STD-883 Class B specifications, and DESC part 8302401EC, following the DESC drawing that includes additional temperature testing.

Four-channel and pin-for-pin compatible with the earlier 6N140, these new optocouplers are useful for low-power logic interfacing as well as higher-voltage CMOS logic systems.



HP optocouplers for severe conditions. Front: new 6N140A features full military extended temperature testing. Rear: Option 010 HP plastic optocouplers feature special construction and high-voltage testing.

For more information, check **P** *on the HP Reply Card.*

Surface mount optocouplers save you time and money

A new option modifies HP optocouplers so that they can be mounted on printed-circuit boards using surface-mount assembly processes. All of HP's high-performance plastic optocouplers can now be ordered with this new Option 100.

Option 100 can be used for high-volume applications that take advantage of the increased assembly-rate potential. Automated manufacturing for high-volume production can lower your manufacturing costs. You can use vapor-phase-reflow or wave soldering. The leads are trimmed for butt-joint connection. No through holes are necessary, reducing board costs. These new optocouplers sit flat within 0.004 inch (0.01 mm).

Electrical specifications remain unchanged from the standard product. You get the traditional guarantee of performance.

For more information, check **Q** *on the HP Reply Card.*

New digitizing oscilloscopes increase productivity at the bench and in systems

Three new digitizing oscilloscopes, the HP 54110D, HP 5180T/U, and HP 5183T/U, expand your HP digitizing oscilloscope choices to nine powerful models.

On the bench, these new oscilloscopes provide measurements, data storage, and data analysis in one package, resulting in a faster understanding of your product or system problems. At the touch of a front-panel button, automatic answers, such as complete characterization of pulses, rms and peak-to-peak voltage, and frequency and period, are displayed immediately for easy bench-top operation.

You can also use the built-in analysis functions to preprocess data, freeing an ATE host computer for higher-level tasks. This reduces traffic on the HP-IB data bus, increasing communication efficiency between your controller and other instruments. Employing built-in analysis functions to replace analysis subroutines in automatic test programs simplifies customized analysis.

New color digitizing oscilloscope

With a 1-GHz repetitive bandwidth and a full-color, high-resolution display, the HP 54110D provides precision time domain measurements for high-speed logic design, data communications, and general-purpose applications.

The introduction of functional color in the HP 54110D allows you to:

differentiate between overlapping, superimposed, or similar waveforms

associate displayed information with corresponding data or waveforms

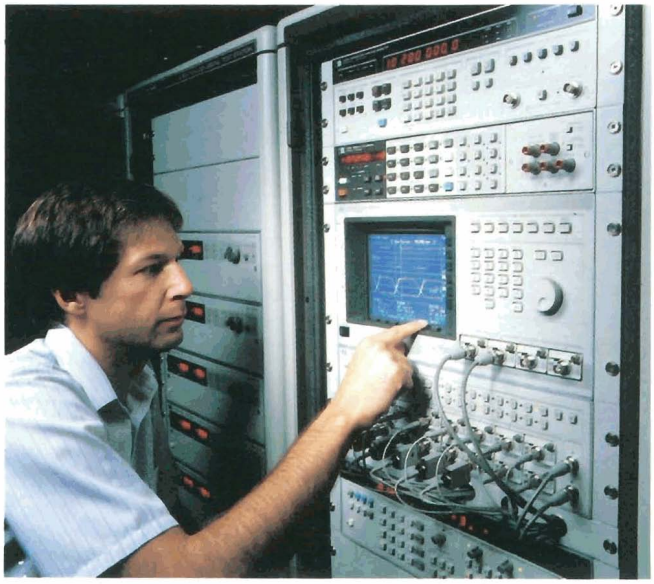
emphasize displayed information

compensate for color blindness, ambient conditions, or special test requirements

With its full programmability, push-button parametric answers, and digital storage capabilities, the HP 54110D is a key instrument in high-speed time domain measurements.

New precision digitizing oscilloscopes

In addition to the above measurement capabilities, the two new precision digitizing oscilloscopes, the HP 5180T/U and 5183T/U, provide frequency spectra, integration and differentiation, and the ability to add, subtract, and multiply waveforms.



With a powerful feature set and a full-color display, the HP 54110D is designed to increase the productivity of engineers working with high-speed logic families and data communications.

The HP 5180T/U is a 20-megasample per second, 10-bit digitizing oscilloscope with a large dynamic range (60 dB), flexible triggering, and a large memory (16K words). It provides comprehensive analysis of single-shot and repetitive analog signals. Applications for the HP 5180T/U include measuring video, disc, and radar-video signals.

The HP 5183T/U is a 4-megasample per second, 12-bit, high resolution digitizing oscilloscope with an input bandwidth

(continued on page 4)

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