New Products

Comtal Delivers First
1024-Line System

Comtal, a subsidiary of 3M Corporation, has delivered the first 1024 x 1024 interactive, stand-alone digital image processing system. Although a 1024 x 1024 resolution has been accomplished on computer-linked digital image processing systems, this marks the first time it has been accomplished on a stand-alone system. Shown is Comtal’s Vision One/20 with multiple terminals, each with the 1024-line display capability. Typical image processing displays are 512 x 512. The 1024-line capability is required in applications where extremely fine graphic resolution is desirable. Comtal/3M, Altadena, CA.

Reader Service No. 1

CP7COM

A new communications package which provides distributed control between multiple EPTAK (R) 700 Controller Systems, between EPTAK 700 Systems and computers, or between EPTAK 700 Systems and other devices with an RS-232C or current loop interface, has been introduced by Eagle Signal Industrial Systems, a division of Gulf + Western Manufacturing Company. Designated CP7COM (pronounced “CE PE SEVEN COMM”), the new communications package makes possible full duplex communications with a speed of 9600 BAUD at distances up to 10,000 feet without communications adapters, and to much longer distances using current loop interfaces or RS-232C communications adapters. Up to 16 CP7COM packages can be used with each EPTAK System. Eagle Signal Industrial Systems, Davenport, IA.

Reader Service No. 7

Lorain Products

The new Lorain ConstAC® 1, 3, 5, 7.5 and 10 KVA uninterruptible power systems assure continuous operation of essential equipment, during blackouts, brownouts, interrupts and line transients. When ac power is available, the compact unit functions as a battery charger and ac line filter. Automatic transfer occurs in the event of ac line disruption providing no-break, 120 VAC power through the ConstAC UPS from standby batteries. Optional accessories include remote alarm/status panel, batteries, battery enclosure (1KVA Model only), and meters for monitoring AC and DC load functions. Lorain Products, Lorain, OH.

Reader Service No. 13

PROFITMASTER 5001
Process Management System

The Industrial Systems Group of LFE Corporation, Waltham, Massachusetts, announces the introduction of the PROFITMASTER 5001, a new generation of Process Management Systems backed by LFE’s exclusive Six Star Warranty. The PROFITMASTER 5001 will have a wide variety of process control applications in plastics extrusion, calendering, coating, paper making, textiles, nonwovens, carpeting, and converting industries. In these industries, the PROFITMASTER System will provide extremely fast payback periods from improved productivity, material efficiency, and quality performance on the process. The PROFITMASTER 5001 represents the broadcast choice of functional capability available today. Utilizing a new “smart module” architecture, individual Performance Packages can be purchased to add functional capabilities to the basic system, as these capabilities are needed by the customer. With this multiple microprocessor approach, users will have more flexibility with this system. The pricing of the new system reflects the spectrum of choice. The PROFITMASTER 5001 can be configured to deliver substantially more functional capability than its predecessors, or it can be “unbundled” to be substantially lower priced. For ease of use, the PROFITMASTER 5001 offers not only interactive color video for display and alarms, but also an innovative alphanumeric entry panel. Customer product names can now be entered directly using existing nomenclature, eliminating confusion between customer codes and the numeric codes required by previous systems. A major design objective for this system was to lower users’ total cost by dramatically simplifying maintenance and troubleshooting. The system features
automatically diagnostic routines built in to each smart module. If a module fails, a plain English message directs the replacement of that module from a 100% spares complement provided on site. This maintenance-oriented architecture and on-site spares philosophy enable LFE to offer the system backed by a revolutionary new warranty. The PROFIT-MASTER Six Star Warranty will offer customers a money-back guarantee of systems performance. Further, it will guarantee system reliability over a five-year period. The cost for on-going maintenance will be dramatically lower than competitive rates, and the customer will be protected from sudden and unwarranted increases in maintenance cost. LFE Corporation, Waltham, MA.

Reader Service No. 19

Automated Scalar Network Analyzer

The 5600 family of Automated Scalar Network Analyzer Systems measures transmission loss or gain, return loss (SWR) and absolute power and produces hard-copy output of memory-corrected test data. Consisting of six models with an overlapping frequency range of 10 MHz to 40 GHz, the new series measures coaxial devices with type N, GPC-7 and WSMA test port connectors up to 18 GHz and waveguide devices from 18 GHz to 40 GHz. The dynamic range is 66 dB up to 26.5 GHz. Amplitude and frequency resolution is 0.01 dB and 1 MHz respectively. Each system includes a scalar network analyzer, sweep generator, a desktop controller and all required measurement components. A preprogrammed cartridge is also supplied which guides the system through measurements and prompts the operator for simple inputs, such as device name and serial number, test range limits, number of test points, and format of the hard-copy output. Residual errors contributed by the system are automatically subtracted from test data to enhance measurement accuracy. Since the system’s internal memory for calibration data is not affected by sensitivity scale settings, front panel controls can be adjusted to obtain an optimum display on the CRT without having to recalibrate or change data already stored in memory. This is especially useful for production line applications where the test device is adjusted before final test data are taken. Because the 5600 uses Wiltron SWR Autotesters which have unmatched high directivity, return loss measurement accuracy is exceptional. The Model 5647 with its GPC-7 test port connector has a directivity of greater than 40 dB from 10 MHz to 18 GHz. Furthermore, to avoid the use of error-producing adapters, SWR Autotesters with type N and WSMA test port connectors are also available, both with greater than 38 dB directivity. A recently introduced Accuracy Enhancement Program and Component Option P-1 achieves return loss measurement accuracy which is equivalent to that of a test system with 60 dB directivity. Operating over the 10 MHz to 18 GHz range, the system measures return loss from 0 to 55 dB, providing hard-copy plots of error-corrected data. Prices vary from $25,520 to $47,410. Delivery: 90 to 120 days. Wescon Booth #1856-1858. Wiltron Company, Mountain View, CA.

Reader Service No. 25

Size 15 Variable Reluctance Stepper Motor

A new size 15 stepper motor, ideal for use in industrial, medical, and peripheral equipment that require a small, lightweight digital drive motor, is now available from The Singer Company’s Kearfott Division. The CT4 0195 009 is a four-phase unit that features 24 steps per revolution, 7 inch-ounces holding torque, and a maximum stepping rate of 500 steps per second. Variations in mechanical shaft and winding characteristics can also be provided. Kearfott’s universal stepper motor driver C70 3531 007 is available for use with these units. The Singer Co., Little Falls, NJ.

Hughes Millimeter-Wave Network Analyzer Offers Computer Control and AFC Options

A complete computer-controlled millimeter-wave test system, that permits the user to measure return loss, insertion loss and gain over full waveguide bandwidths up to 110 GHz with a 0-to-25 dB measurement range, is the latest addition to Hughes Aircraft Company’s line of solid state instrumentation products. A special feature of the system is an optional automatic frequency control that allows the frequency of the test generator to be set with ±0.01 percent accuracy. The new automatic network analyzer, designated the 4788XH series, consists of the Hughes 4772XH millimeter-wave sweep generator; a Hewlett-Packard HP-85 computer; a full-band reflectometer with 40 dB directivity couplers and calibrated standard, and an analyzer with built-in display. Heart of the test system is the Hughes 4772XH full-band sweep generator, which incorporates the new Hewlett-Packard HP 8350A main frame. This unit, with high-resolution digital displays, gives total computer control of all front panel function settings. The sweeper consists of a sweep source, leveling loop, and sweep plug-in, and makes all features of either main frame available over full feature.
Interactive Computer-Aided Design of Control Systems*

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Abstract

We describe four computer packages for interactive computer-aided design of control systems. DIGICON (digital control) is a computer aid to the design of digital controls for single-input single-output (SISO) systems using the state-space techniques of pole and zero assignment. CONCON (continuous control) is a similar package for the design of SISO continuous systems using the same techniques. The program DOPTICON (discrete optimal control) is a computer aid for the design of discrete optimal control systems using the linear quadratic Gaussian (LQG) theory and OPTICON (optimal control) is its continuous-time counterpart. All four packages contain algorithms for the computation of poles and zeros of the resulting designs as well as programs for evaluation of their transient responses. In the sequel we describe only two of the packages, namely DIGICON and DOPTICON, as the other two packages have very similar descriptions.

DIGICON [1] assumes that the dynamic object to be controlled is the plant, described by the equations:

\[ \dot{x}(t) = Fx(t) + Gu(t - \lambda) \]
\[ y(t) = Hx(t) + Ju(t) \]

where

- \( x \) = state vector, \( N_x \) dimensions*
- \( u \) = control vector, \( N_u \) dimensions
- \( y \) = output, \( N_y \times 1 \)
- \( \lambda \) = time delay
- \( F \) = system matrix
- \( G \) = input matrix
- \( H \) = output matrix
- \( J \) = direct transmission matrix

Since we are interested in digital controls, we require a sampled-data or discrete model of the plant. Usually we will assume that \( u \) is piecewise constant as occurs with a controller acting via a zero order hold. In any event, the discrete evolution of (1) is given by

\[ x(k + 1) = \Phi x(k) + \Gamma u(k) \]
\[ y(k) = Hx(k) + Ju(k) \]

*If \( \lambda = 0 \), \( x \) is not really the state, but rather the state has infinite dimensions in this case.

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