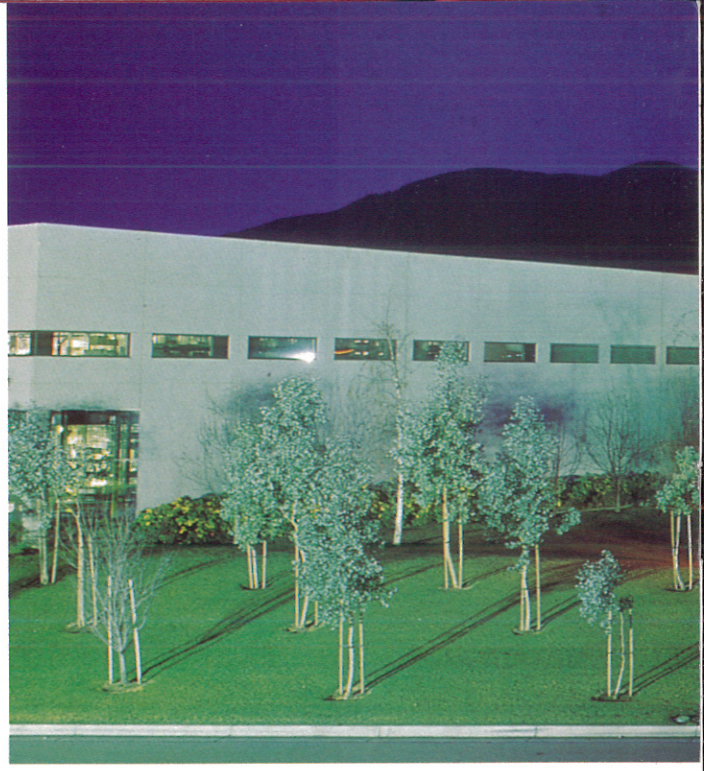
SHAPING THE

FUTURE OF

INDUSTRIAL



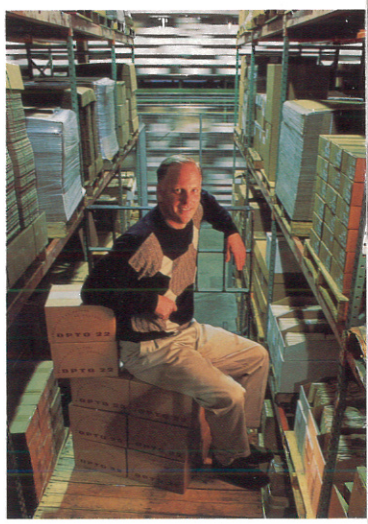
AUTOMATION



OPTO 22 PIONEERS OF INNOVATION

Opto 22's mission to shape the future of industrial automation is driven by the vision of its founders - pioneers in control automation and solid-state electronics, and achieved by the market-winning strategy of the management team and the consistent delivery of the creative, committed workforce. Opto 22 is dedicated to providing the most innovative total control solutions available —today and tomorrow.







It takes more than vision, strategy, and delivery to prevail. It also requires courage, commitment, and credibility; courage to lead and innovate, commitment to follow through, and credibility built one customer at a time.

At Opto 22, we not only provide total control hardware and software products for our customers, but we use Opto 22 technology across our own manufacturing enterprise as well. The Opto 22 factory ships more than 500,000 items per month and is fully automated and controlled by Opto 22 systems. All of our internal systems, from accounts receivable to inventory control, are fully integrated and custom-built by Opto 22 on a Microsoft® Windows®, Microsoft Office Professional, and Microsoft BackOffice platform. Opto 22 was awarded the Microsoft® Leonardo medal in 1996 for Technical Innovation in Manufacturing based on our success in developing and implementing our fully-integrated enterprise-wide system. Our experience and success at Opto 22, combined with our track record in the marketplace over 22 years, are the basis for our confidence in asking our customers to commit their businesses to our products, platforms, and technologies.



All Opto 22 products are manufactured in the United States at the company's headquarters in Temecula, California, and are sold through a global network of partners, including distributors, systems integrators, and OEMs.

Opto 22's quest to deliver total control to industrial automation customers goes back to our beginnings in 1974. Since then, Opto 22 has pioneered consistently and achieved an unparalleled reputation for quality and service. Opto 22 was founded on innovation - a superior way to produce the new optically-isolated solid-state relay - and we have continued to lead the industry through successively more advanced generations of hardware and software.



1974



1976

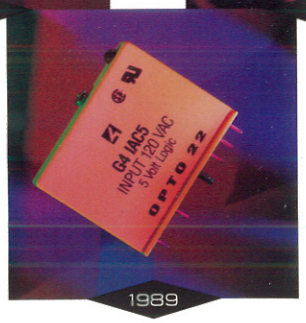


1978


1979


198


1988



1989

A CONTINUOUS TRADITION OF INNOVATION AND LEADERSHIP

1974

In 1974, Opto 22 introduced a complete line of optically-isolated solid-state relays (SSRs) for the Component OEM market. The manufacturing technique, developed by Opto 22, utilized liquid epoxy fill, greatly increasing the reliability, and reducing the cost of volume production.

1976

The world's first Flat Pak SSRs for printed circuit boards were introduced in 1976. Their 3/8-inch-thick packaging and 3-amp rating dramatically expanded the use of SSRs in many OEM applications. In 1977, a smaller footprint packaging was introduced to allow for even higher density implementations.

1978

In 1978, Opto 22 created the first generation digital I/O modules with plug-in racks for microprocessor-based control. This quickly became the world standard form factor for I/O and created the component market for computer-based I/O. The red-black-yellow-white color-coding scheme remains the standard today.

1979

High density Quad Pak digital I/O and mounting racks were introduced in 1979, virtually doubling I/O density. The Opto 22 family of I/O mounting racks was also expanded to include direct connections to the wide range of readily-available microprocessors.

1981

Pamux™, the first addressable, expandable computer-based I/O system, allowed the multiplexing of hundreds of points of digital I/O from a single microprocessor parallel port. The extremely high-speed read and write capabilities of Pamux, coupled with the increased performance of microprocessors, enabled the use of computer-based control in large system-oriented applications.

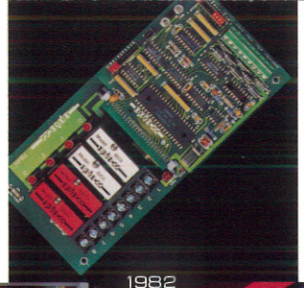
1982

Optomux™, the first intelligent, serially-addressable I/O system, using a simple open ASCII protocol, was introduced in 1982. The Optomux protocol soon became an industry standard for the distributed intelligent I/O market. Optomux allowed thousands of points of I/O to be distributed anywhere along a mile-long serial communications link. On-board intelligence off-loaded processor-intensive tasks, such as counting and latching, to the individual I/O racks. This made system performance independent of the number of I/O points.

1983

Opto 22 created the first optically-isolated analog I/O modules with intelligent racks, marking the beginning of a new era in computer-based automation. Analog modules feature factory calibration for guaranteed lifetime accuracy, and optical and transformer isolation for trouble-free installation.

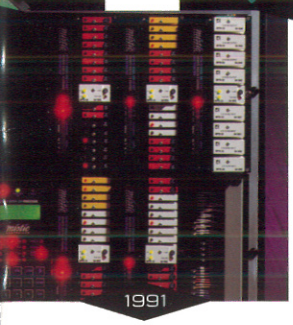


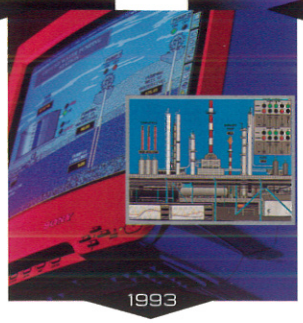
















1983

Opto 22 introduced PC-based control with a complete line of drivers and adapter cards for the PC in 1983. This facilitated the development of the first control applications using compiled and interpreted PC-based programming languages and established the foundation for the PC-based control and data acquisition market that is predominant today.

1985

Opto 22's line of local controllers, introduced in 1985, were small, rugged disk-less industrial single-board computers. The local controller allowed programs developed on the PC to be executed on the factory floor prior to today's acceptance of PCs as a reliable industrial platform.

1988

Cyrano™ was the first graphical flowchart-based development environment for the PC. Cyrano allowed real-time programs to be created by simply drawing flowcharts. These charts were then compiled and downloaded to Opto 22 controllers for real-time multitasking and distributed control. The animated interactive debugger allowed the execution of flowcharts to be viewed and manipulated from a PC. Cyrano provided a viable user-friendly alternative to the then standard relay ladder logic programming model.

1989

New Generation4 digital I/O provided increased density while maintaining single channel flexibility. The LED and fuse were relocated to the module from the rack to increase visibility and serviceability.

1991

Mistic, the first complete, PC-based control system from a single source combined Cyrano software, powerful 32-bit controllers, the new Mistic protocol, and a revolutionary multi-function I/O system. This new I/O system included software-selectable features that were currently only available from a diverse group of vendors at a high cost. Mistic also represented a quantum leap forward in distributed intelligence and incorporated on-board PID and event reactions, high speed counting, temperature conversions, and engineering unit support at the I/O level. Mistic's ability to manage the distribution of processing across the control system broke the link between performance and system size.

1993

The introduction of the Mistic™ MMI (Man Machine Interface) in 1993 provided a Microsoft Windows-based graphical interface to the Mistic control system. The Mistic MMI was fully-integrated with Cyrano down to the database level and featured point-and-click connection to real-time control data. The Opto 22 Mistic system, with its new MMI, represented the first integrated total control solution for manufacturing.

1996

Opto 22's FactoryFloor™ suite is a Windows 32-bit total control solution that includes OptoControl, a graphical, flowchart-based development environment; OptoDisplay, a graphical multimedia operator interface; and OptoServer, a robust data server. OptoConnect provides bi-directional data flow between the FactoryFloor network and the rest of the enterprise.

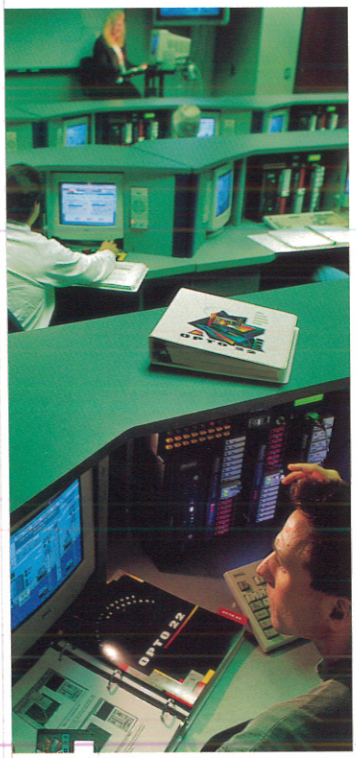
1996

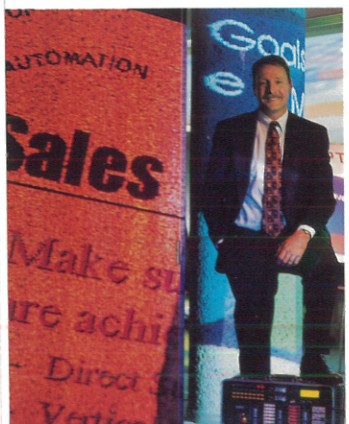
SNAP™ I/O represents the culmination of 22 years of experience and innovation and will become the worldwide standard for I/O systems. SNAP introduces a new form factor that reduces the I/O footprint by 60 percent and includes standard fuses, pluggable field connectors and versatile DIN rail and panel mounting capabilities, with a quick and easy snap together design. A universal I/O processor allows any combination of digital and analog modules to share the same rack. SNAP Analog is both intelligent and software-configurable, making it ideal for OEM solutions.

LEVERAGING THE POWER OF PARTNERSHIP

For Opto 22, partnerships are a key element of our mission. From our customers to our channel to our third-party partners such as Microsoft, Opto 22 recognizes that partnership helps everyone.







OptoInfo

OptoInfo Services are designed to provide information about Opto 22 products, partners, and programs. OptoInfo Services includes the OptoInfo CD, Opto 22's WWW site, and the OptoFaxBack service. The OptoInfo CD delivers pertinent information quarterly to subscribers. Data sheets, configuration information, third-party product data, customer references, case studies, application notes, white papers, vertical market information, event schedules, and OptoNews are examples of the items included in the OptoInfo CD.

OptoInside
SALES SERVICES

OptoInside Sales is the team of Opto 22 professionals focused on pre-sales support. OptoInside Sales provides technical support, including hardware and software configuration assistance, and delivers information relating to Opto 22 products, pricing, and availability. Opto 22's order entry department is part of OptoInside Sales. OptoInside Sales provides support not only for customers directly, but also for various OptoChannel organizations to enhance and enable their support of Opto 22 customers. Inside Sales also acts as a referral center to connect customers with OptoPartners.

OPTO U CERTIFIED TRAINING

Opto 22 is expanding the scope of customer training by packaging the same high-quality classes that have traditionally only been available at the Opto 22 training center in Temecula, California. Opto 22 trains and certifies instructors to deliver classes at OptoCertified Training Centers worldwide. Strict certification requirements guarantee that OptoCertified Training Centers are staffed and equipped to deliver factory-quality OptoCertified classes.

OptoProduct
SUPPORT SERVICES

The Opto 22 product support team is dedicated to resolving product issues in an effective, responsive, friendly, and helpful manner, with the customer's perspective in mind. This team is made up of highly skilled hardware, software, and communications engineers that are ready to tackle any challenge - from basic hardware installation to complex enterprise-wide control systems support.

OptoChannel

Opto 22 has strategically-located Regional Technology Centers (RTCs). Each RTC has sales and technical support personnel, including Regional Channel Managers who are responsible for developing, maintaining, and supporting OptoChannel members and OptoPartners. Opto 22 supports industry vertical initiatives in water and waste/water, energy, and high-tech manufacturing with focused industry vertical managers and targeted marketing programs. Opto 22's worldwide sales channel is made up of distributors, systems integrators, OEMs, and Certified Training Centers. OptoChannel members are eligible for nomination into the OptoPartner Program.

OptoPartner

OptoPartners are recognized as having a special affiliation with Opto 22 and must be nominated by one of Opto 22's Regional Channel Managers. OptoPartners have factory-trained technical and sales personnel on staff and have a proven track record in supplying and supporting Opto 22 solutions. The OptoPartner marketing program is designed to provide OptoPartners with the information required to promote, sell, and support Opto 22 hardware and software products. The OptoPartner CD delivers logos, photographs, presentations, graphics, demos, and various other sales tools to OptoPartners worldwide. OptoPartners are provided with subscriptions to the OptoInfo CD and will also be eligible to participate in special Opto 22 events, advisory councils, and beta and marketing programs.

OptoCustomer

Opto 22 has always recognized the critical importance of our relationship with our customers. The OptoCustomer program includes product and technology briefing sessions, advisory councils, beta programs, and special promotions and events.

Microsoft®
SOLUTION PROVIDER

Opto 22's partnership with Microsoft is an excellent example of synergy. Opto 22's core competencies in industrial automation solutions - when combined with Microsoft's core competencies in infrastructure, tools, and applications - provide the solid foundation required to deliver a total control solution. Opto 22 is a Microsoft Solution Provider and works closely and consistently with Microsoft as a key Solution Developer Partner. Opto 22 plays an active role in Microsoft's marketing programs and industry vertical initiatives.

OPC
OLE for Process Control

OPC stands for "OLE for Process Control." OPC is a communications standard based on the Component Object Model (COM) that fosters great interoperability between automation/control applications, field systems/devices, and business/office applications. Opto 22, together with Microsoft, was instrumental in the formation of the OPC taskforce, a consortium of five companies committed to the rapid development and promotion of the OLE for Process Control standard. Consistent with Opto 22's commitment to its OptoOpen Integration philosophy, Opto 22 is a key contributor and leader in the OPC initiative.



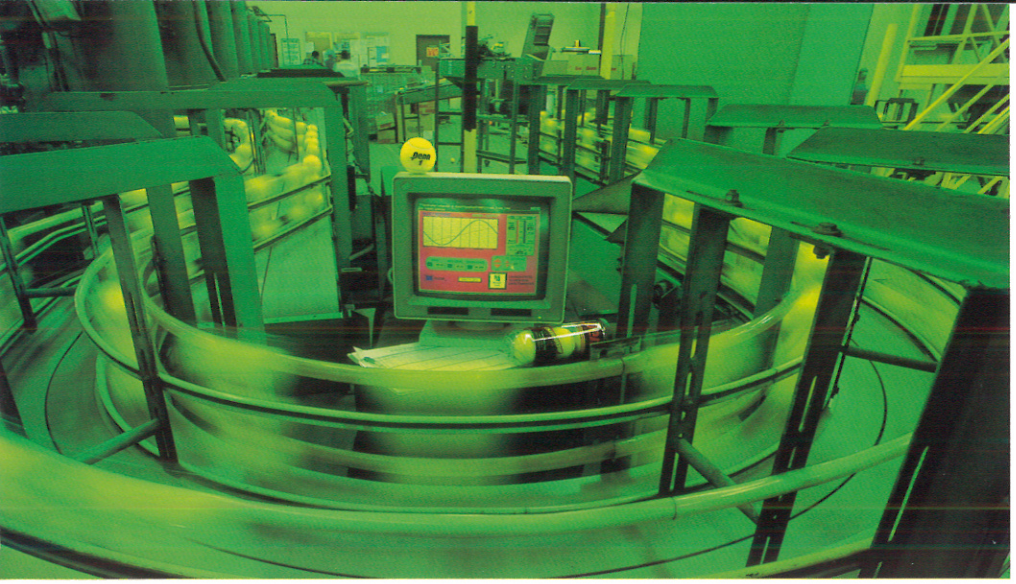
Opto 22's products are organized in a comprehensive, 7-layer architecture that establishes the foundation for future innovation and provides strong support for today's customers. Opto 22's customer-centric focus is reflected in our four markets: systems, enterprise, verticals, and components.

DELIVERING WORLD-CLASS HARDWARE AND SOFTWARE

OPTO 22'S 7-LAYER ARCHITECTURE

SOFTWARE
CONTROLLERS
INTERFACES
BRAIN BOARDS
RACKS
I/O MODULES
SOLID-STATE RELAYS

- At the top level is our software, including FactoryFloor, our innovative suite of Microsoft Windows 32-bit control automation products
- The next layer is Opto 22's controllers, which use the power of 32-bit micrprocessors to deliver fast, powerful, flexible solutions
- The interface layer connects our controllers to networks and to I/O and supports a wide variety of communications solutions
- Brain boards, our distributed I/O coprocessors, connect to the I/O racks and provide local intelligence for Opto 22 distributed intelligent I/O systems, giving even more power and cost-effectiveness. These brain boards take advantage of the open Opto 22 protocols such as Optomux, Pamux,and Mistic
- Opto 22's flexible I/O systems are exemplified by the wide variety of I/O racks available
- Opto 22's line of digital and analog I/O modules is #1 worldwide
- Finally, there is the extensive line of Opto 22 optically-isolated solid-state relays.





Opto 22's Systems Markets

Systems Market

- SOFTWARE
- CONTROLLERS
- INTERFACES
- BRAIN BOARDS
- RACKS
- I/O MODULES
- SOLID-STATE RELAYS

Opto 22's combination of integrated software and world-class hardware delivers the most reliable, easiest to implement and maintain, and most cost effective total control solution for the system market. Opto 22's FactoryFloor is a tightly-integrated 32-bit software suite designed to take full advantage of Opto 22's controllers and distributed intelligent I/O architecture. OptoConnect provides a new dimension in data management to FactoryFloor. Opto 22 also provides the powerful communications and networking required to deliver open, scalable, high performance total control to a wide range of applications, including semi-conductor manufacturing, material handling, process and discrete control, machine control, injection molding, water and waste/water, rotating machinery, pipeline monitoring, and sub-station automation.

Enterprise Market

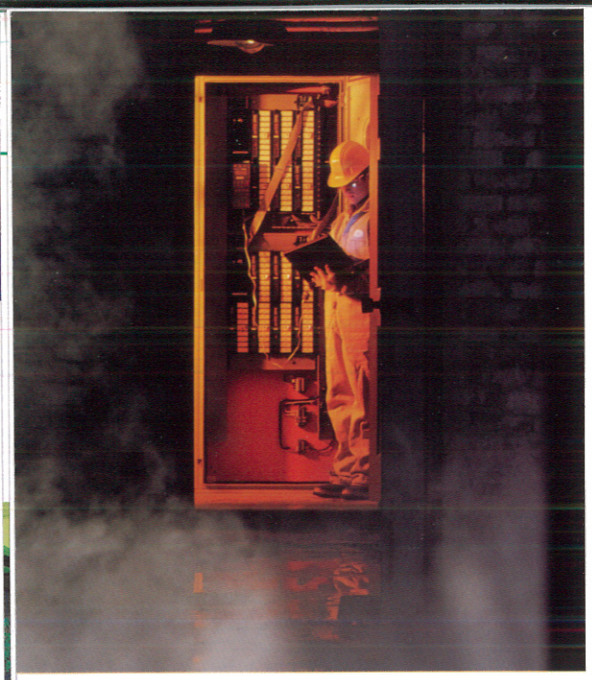
- SOFTWARE
- CONTROLLERS
- INTERFACES
- BRAIN BOARDS
- RACKS
- I/O MODULES
- SOLID-STATE RELAYS

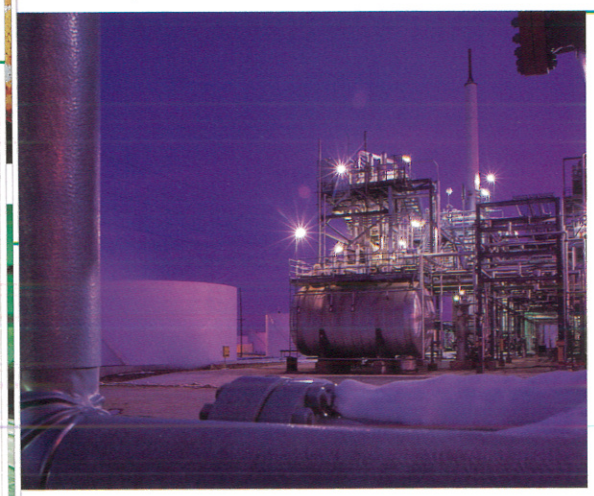
In today's fast-paced competitive marketplace, the free exchange of factory floor information is critical to the success of customers in manufacturing and business environments. The key to making factory floor information useful to customers lies in making it easy to access and easy to understand. Whether it is access to production data moving upstream to business systems or scheduling data flowing downstream to the factory floor, the entire enterprise benefits. OptoConnect enables factory floor information to be moved to and from the Microsoft SQL Server™ or JET database so that it can be easily used by both the manufacturing and business systems environments. OptoConnect utilizes Microsoft SQL Server and standard infrastructure and communications technologies to deliver this solution.

Vertical Systems Market

- SOFTWARE
- CONTROLLERS
- INTERFACES
- BRAIN BOARDS
- RACKS
- I/O MODULES
- SOLID-STATE RELAYS

Opto 22's vertical markets include water and waste/water, high-tech manufacturing, and energy. Each vertical market is supported by application engineers and vertical managers with high levels of industry-specific experience.





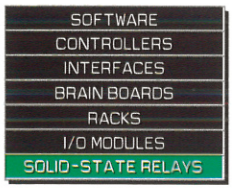


DELIVERING WORLD-CLASS HARDWARE

We meet the needs of all of our chosen markets by supplying our customers with the specific products and technologies they need for advanced, cost-effective control automation. This has always been our philosophy. Today more than 45 million points of Opto 22 I/O are at work around the world. Each Opto 22 hardware product is 200 percent tested before it leaves our factory. We never statistically test any hardware product.

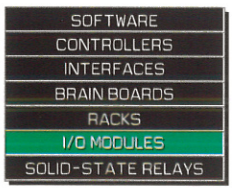
Opto 22's Component Markets

Solid-State Relays



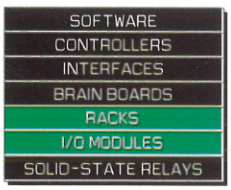
Opto 22 has delivered more than 20 million solid-state relays to date worldwide. Opto 22's solid-state relays are sold to customers who require reliability in switching AC and DC loads from 3 amps to 45 amps. These customers include a large number of OEM manufactures across a multitude of vertical markets. These manufacturers design Opto 22 solid-state relays into their hardware products. Some examples include elevators, computer peripherals, cash registers, gas pumps, medical equipment, office equipment, and vending machines. Optical isolation provides a high degree of protection against adverse environmental conditions. Extreme attention to quality has allowed Opto 22 to offer a no-fault warranty and provide the customer with a lifetime of trouble-free operation.

I/O Modules



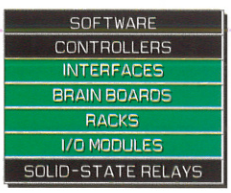
Opto 22's full range of analog and digital I/O provides an optically-isolated reliable solid-state interface between real-world devices and microprocessor-based control systems for OEM customers. The standard Opto 22 pin out, footprint, and developers kit allows OEMs to easily design Opto 22 I/O modules directly into their proprietary systems. Opto 22's new serially-addressable SNAP analog modules are also ideal for inclusion in OEM solutions requiring optically-isolated analog inputs and outputs. With their long life and high current carrying capacity, digital output modules eliminate the need for interposing relays and provide a cost-effective solution for manufacturers. Some examples include machine tools, food processing equipment, distributed control systems, motion control systems, environmental systems, and water and waste/water treatment systems.

Direct I/O



Direct I/O customers include both OEMs and Systems Integrators in virtually every niche and vertical market. These customers purchase both mounting racks and modules from Opto 22 for direct connection to their computer-based control systems. Opto 22's mounting racks are designed to provide pin compatibility to a wide variety of off-the-shelf microprocessor or PC-based control systems. The logic connection to Opto 22's mounting racks has become an industry standard. Opto 22 also offers mounting racks that are designed to provide an optically-isolated front-end for other manufacturers' non-isolated control systems, including many PLC applications.

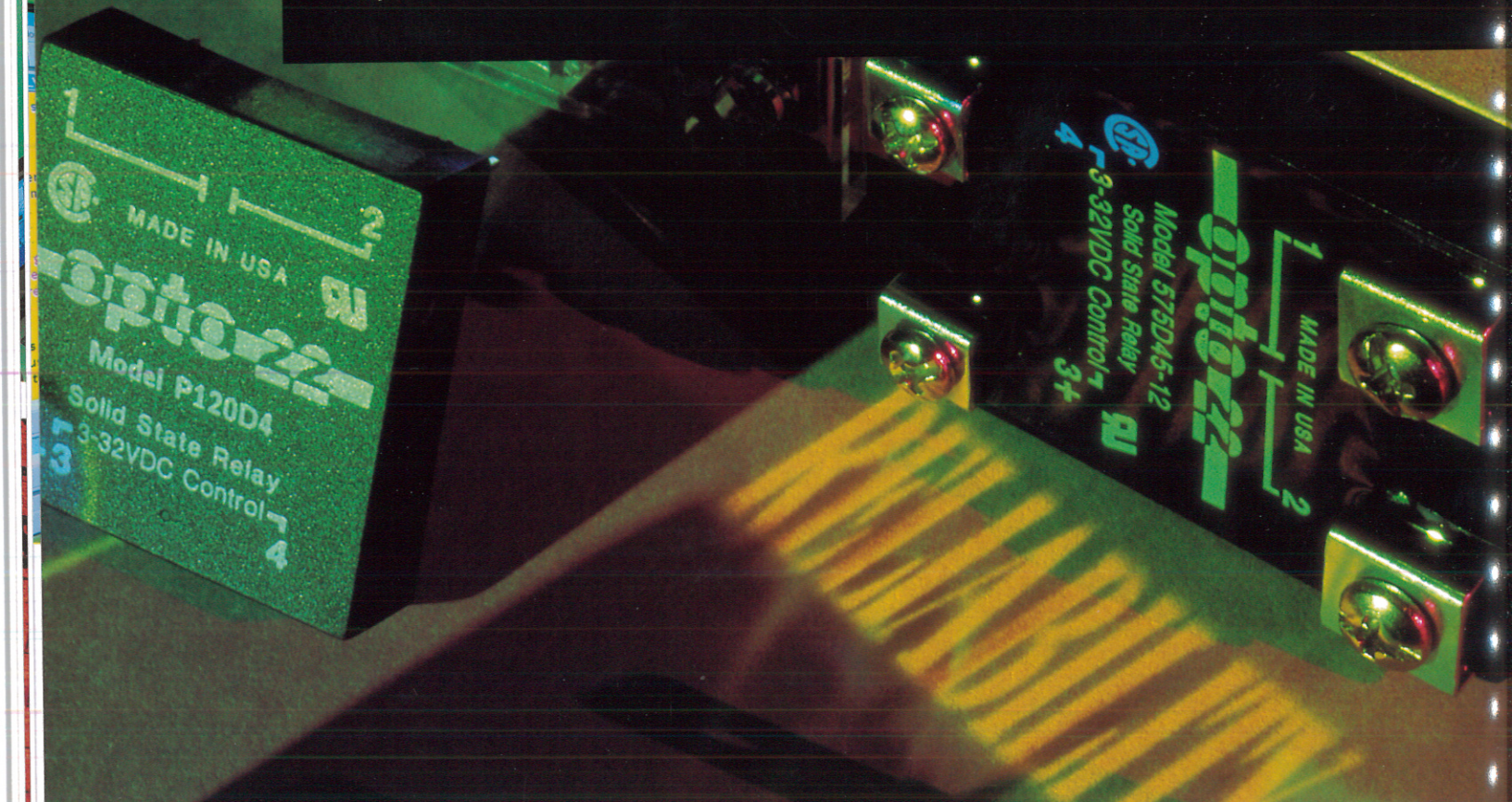
Distributed Intelligent I/O



Distributed Intelligent I/O customers integrate Opto 22's Total Control Hardware products, including adapter cards, brain boards, racks, and I/O into powerful, flexible data acquisition and control solutions. These customers include a diverse group of OEMs, systems integrators, and end-users worldwide who are developing computer-based control systems. Opto 22's OpenIntegration strategy includes open protocols and drivers that are designed to make it easy to take advantage of off-the-shelf software from many third-party companies. The OptoDriver Toolkit is a companion product for Distributed Intelligent I/O systems designed to assist customers in the development of PC-based solutions. The OptoDriver Toolkit contains documentation, tools, and examples for Opto 22 drivers and protocols.



Opto 22 has been the world's largest manufacturer of solid-state relays since it pioneered the concept 22 years ago. Since the beginning, Opto 22 has built a reputation for dependability, reliability, and customer satisfaction, which is unchallenged in the industry. The innovative use of room temperature liquid epoxy encapsulation, coupled with Opto 22's unique Heet-Spreader™ technology, are key to mass producing the world's most reliable solid-state relays. Every Opto 22 solid-state relay is subjected to full load test and six times the rated current surge before and after encapsulation. This double testing of every part before it leaves the factory means you can rely on Opto 22 solid-state relays. Opto 22 offers a complete line of solid-state relays, from the rugged 120/240 volt AC Series to the small footprint MP Series, designed for mounting on printed circuit boards. All Opto 22 relays feature 4,000 volts optical isolation and are UL, CSA, and VDE recognized. Opto 22 keeps a large finished goods inventory at all times so your relay orders can be quickly filled from stock.



SOLID-STATE RELAYS

POWER SERIES • PRINTED CIRCUIT SERIES

POWER SERIES



Opto 22 provides a full range of Power Series relays with a wide variety of voltage (110-575 volts) and current options (3-45 amps). All Power Series relays feature 4,000 volts of optical isolation, and have a high PRV rating.

DC SERIES

The DC Series delivers isolated DC control to large OEM customers worldwide.

AC SERIES

The AC Series offers the ultimate in solid-state reliability. All AC Power Series relays feature a built-in snubber and zero voltage turn-on. Transient proof models offer self protection for noisy electrical environments.

Z SERIES

The Z Series employs a unique heat transfer system that makes it possible for Opto 22 to deliver a low cost, 10 amp, solid-state relay in an all plastic case. The push-on tool-free quick-connect terminals make the Z Series ideal for high volume OEM applications.

PRINTED CIRCUIT SERIES



Opto 22's Printed Circuit Series allows OEMs to easily deploy solid-state relays on printed circuit boards with switch loads up to 4 amps.

MP SERIES

The MP Series packaging is designed with a minimum footprint to allow maximum relay density on the printed circuit board.

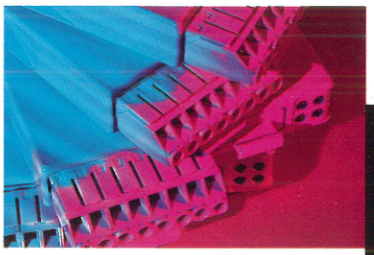


Today, more than 45 million Opto 22 I/O modules are operating in the comfort of computer rooms throughout the world, in the freezing cold of traffic control cabinets in an Alaskan winter, and in the searing heat of a pipeline control center in the Arabian desert. Every Opto 22 I/O module incorporates the finest components, modern automated manufacturing techniques, and is subjected to Opto 22's stringent quality control testing at every step of the manufacturing process. Opto 22 offers a wide variety of analog and digital I/O modules that provide 4,000 volts of optically-isolated power I/O and analog input and output functionality for computer-based control. The modules are color-coded according to function. Opto 22's color-coding scheme has become the worldwide standard. AC output modules include a built-in RC snubber to allow switching of heavy inductive loads. The input modules are designed with filtering on the input and hysteresis for high noise rejection, and transient-free, "clean" switching. Input modules are designed so that high voltage transients on the input will not cause damage to the module. Analog modules offer both optical and transformer isolation for protection from ground loop problems and are factory-calibrated to reduce installation and maintenance costs by eliminating costly field adjustments. Opto 22 I/O modules are available in four distinct package styles, SNAP, G4, Quads, and Standard I/O. Opto 22 manufactures a complete selection of versatile mounting racks to support the various I/O module styles.

I/O MODULES

SNAP • G4 • QUADS • STANDARD

SNAP



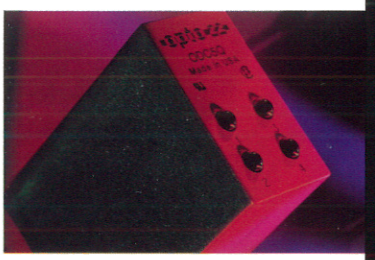
SNAP I/O is Opto 22's newest and highest density I/O packaging. SNAP I/O includes 4-channel AC and DC digital modules and intelligent analog modules. SNAP's compact design delivers an overall space savings of 60 percent over traditional I/O, while innovative new packaging allows modules to simply snap in place. All SNAP modules have removable top-mounted connectors to provide easy access for field wiring. Digital modules include a built-in LED status indicator for each channel. Digital output modules use a standard fuse with a convenient handle for easy replacement. DC output modules are available in either current sinking or current sourcing versions. SNAP analog modules are software-configurable and offer both optical and transformer isolation. Each analog input module offers 15-bit resolution for high accuracy. All analog modules include a serial interface for easy programmability and integration into OEM applications.

G4



G4 I/O includes both digital and analog modules. Each G4 module offers high-density single-channel packaging. Each digital module includes an LED status indicator and is also available with manual switching capability for field wiring and control logic testing. Digital modules support 5, 15, or 24-volt logic. G4 digital output modules feature a top-mounted replaceable fuse. G4 analog modules are factory-calibrated, offer 12-bit resolution, and require a single 24-volt power supply. All current loop modules include an isolated loop power supply for added flexibility and reduced instrumentation costs. Input types include voltage, current, thermocouple, RTD, ICTD, frequency, and velocity. Outputs include voltage, current, and time-proportional output.

QUADS



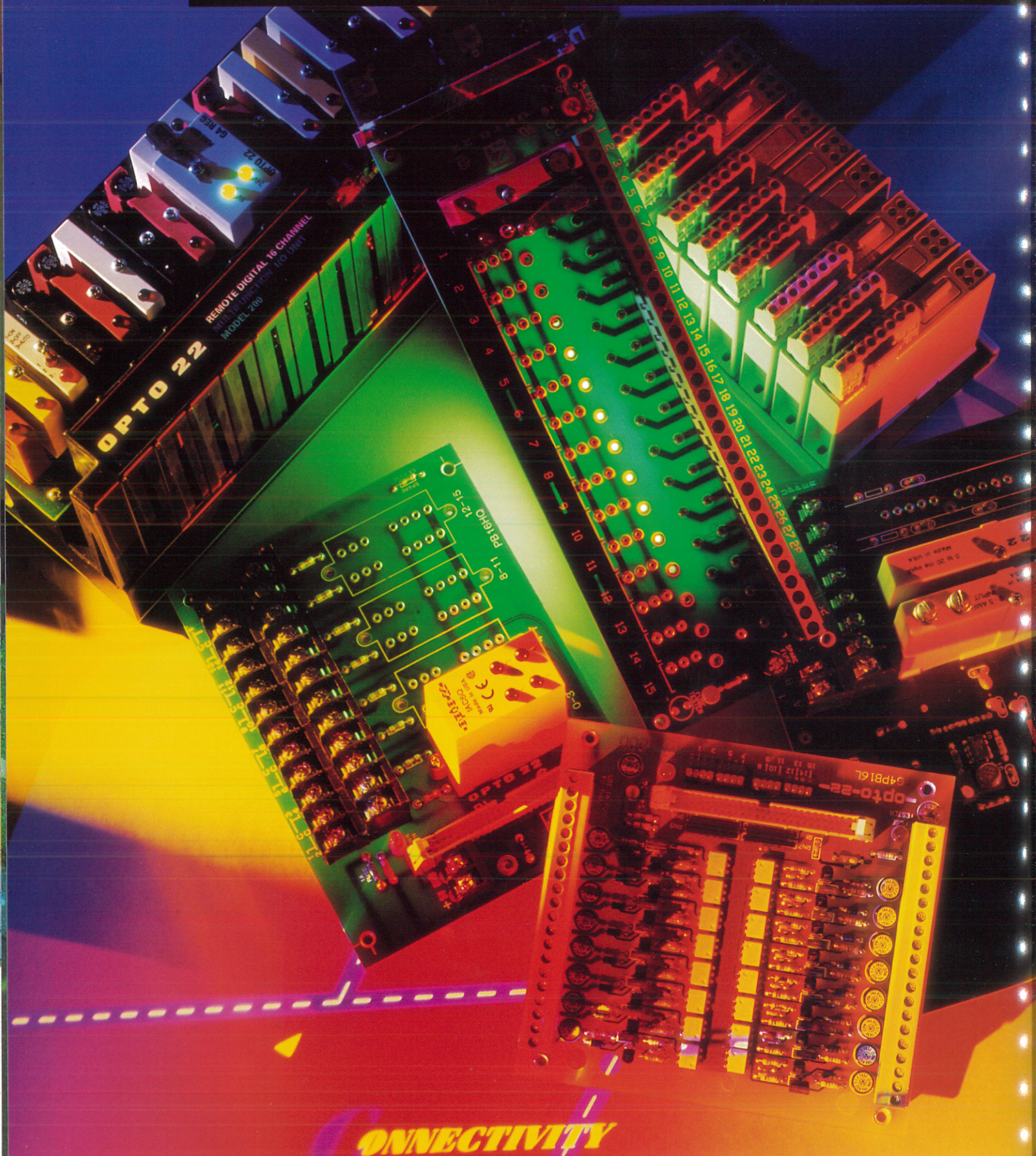
Quad Pak modules each contain four single channels of digital I/O in one high-density package. Each Quad Pak module includes an integral LED for each channel on the module.

STANDARD



Both analog and digital modules are available in Opto 22's standard packaging. Standard digital modules offer a wide range of voltage and speed combinations and are available for 5, 15, or 24-volt logic. Analog modules offer 12-bit resolution. Analog input modules include voltage, current, thermocouple, RTD, ICTD, and frequency. Both voltage and current analog outputs are available.

Opto 22 mounting racks were manufactured as companion products for the first digital I/O modules. Opto 22 racks allowed a direct 50-pin ribbon cable connection from the parallel port of a computer to the mounting rack. Opto 22 modules were then plugged into the mounting rack and the field wiring connections made to industrial screw-terminal barrier strips located on the mounting rack. Over time, Opto 22 has developed a wide variety of racks, tailored to support its expanding I/O product line and designed to accommodate both direct connections and Opto 22's brain boards (I/O processors). Today, mounting racks fall into three main categories: SNAP, Brick, and Classic.



RACKS

SNAP • BRICK • CLASSIC

SNAP



SNAP racks come in two model types: D Series (digital only) and B Series. All SNAP racks use a single 5-volt power source, are configured for standard panel mounting, and offer a DIN rail mounting option. B Series racks are designed for integration with SNAP I/O processors (brain boards) and allow a combination of analog and digital modules on the same rack. D Series racks use the same 50-pin connector as Opto 22 Classic racks and are therefore compatible with Opto 22 Classic brain boards. D Series racks also provide an ideal direct connect solution for OEM applications.

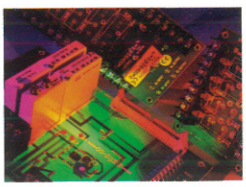
BRICK



Opto 22 Brick packaging integrates an Opto 22 brain board with an I/O mounting rack. Details are available in the brain board section.

CLASSIC

G4



G4 mounting racks accept G4 digital I/O modules only and are available in 4, 8, 16, 24, and 32-channel models. G4 digital input and output modules can be combined in any combination on any G4 mounting rack. A model with screw terminals for both field and logic connections is available for custom application development, targeted at isolating non-isolated devices such as PLCs. G4 models are available for both direct connection and connection to Opto 22 Classic brain boards.

QUADS



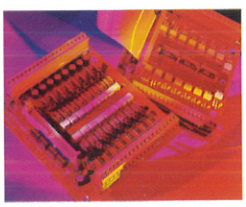
Quad racks provide a high-density digital I/O solution and accept Opto 22 Quad Pak modules. Both 50-pin header and card edge connectors are available.

STANDARD

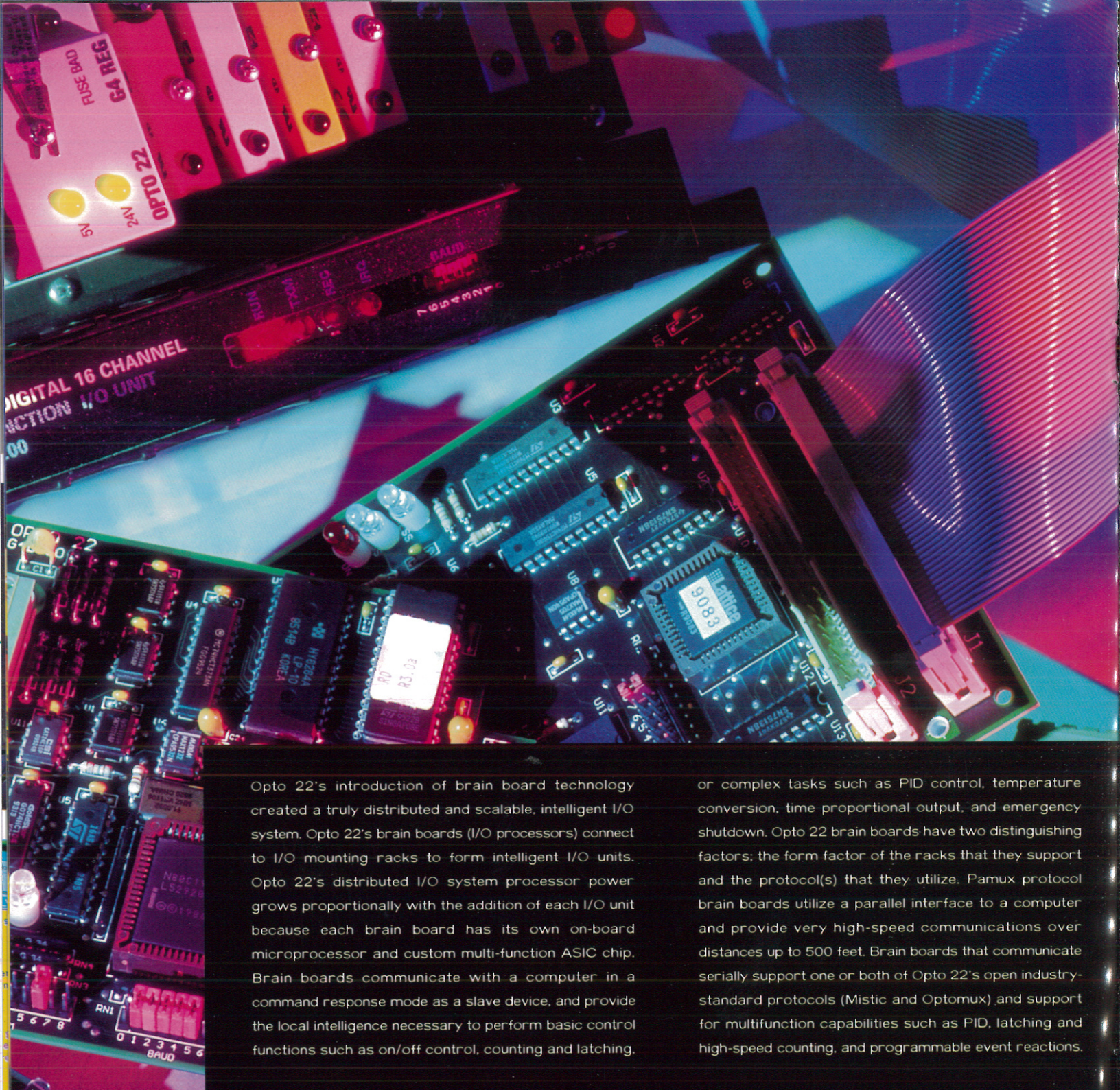


Standard mounting racks include both Standard digital racks and Standard analog racks. Standard digital racks are available in 4, 8, 16, and 24-channel models and feature LED status indicators and plug-in replaceable fuses for each channel. Standard digital input and output modules can be combined in any combination on any Standard mounting rack. A Standard digital rack, with screw terminals for both field and logic connections, is available for custom application development targeted at isolating non-isolated devices such as PLCs. Standard digital racks are available for both direct connection and connection to Opto 22 Classic brain boards. Standard analog racks in 4, 8, or 16-channel models accept Opto 22 Standard analog I/O modules. Standard analog racks are compatible with all Classic analog brain boards.

INTEGRAL



Integral mounting racks provide 16 channels of low cost, high-density I/O on the rack. Integral racks are compatible with all Classic digital brain boards and 5-volt TTL direct connect applications. Integral mounting racks have pluggable field wiring connections for increased serviceability and are available in either 16-channel DC input or 16-channel DC output models.



Opto 22's introduction of brain board technology created a truly distributed and scalable, intelligent I/O system. Opto 22's brain boards (I/O processors) connect to I/O mounting racks to form intelligent I/O units. Opto 22's distributed I/O system processor power grows proportionally with the addition of each I/O unit because each brain board has its own on-board microprocessor and custom multi-function ASIC chip. Brain boards communicate with a computer in a command response mode as a slave device, and provide the local intelligence necessary to perform basic control functions such as on/off control, counting and latching, or complex tasks such as PID control, temperature conversion, time proportional output, and emergency shutdown. Opto 22 brain boards have two distinguishing factors; the form factor of the racks that they support and the protocol(s) that they utilize. Pamux protocol brain boards utilize a parallel interface to a computer and provide very high-speed communications over distances up to 500 feet. Brain boards that communicate serially support one or both of Opto 22's open industry-standard protocols (Mistic and Optomux) and support for multifunction capabilities such as PID, latching and high-speed counting, and programmable event reactions.

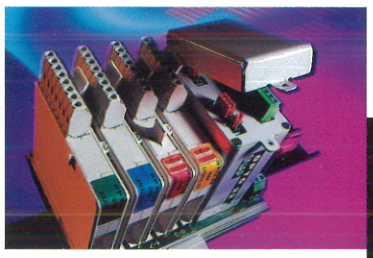


BRAIN BOARDS

SNAP • BRICK • CLASSIC • DEVICENET

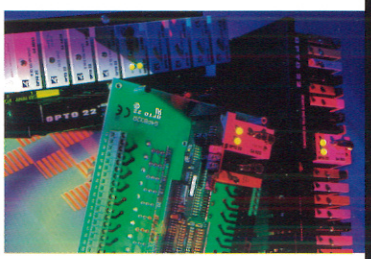
SNAP

With SNAP I/O, a single processor does it all. SNAP controls analog, digital, or mixed I/O modules on the same compact SNAP B series mounting rack. Both Optomux and Mistic protocols are supported for easy integration into existing Optomux or Mistic installations. SNAP I/O processors offer a variety of high-speed serial communications options and can be daisy-chained on a simple serial link over very long distances. SNAP I/O processors feature flash-based firmware for easy upgrades and maintenance. The Mistic protocol provides seamless integration with Opto 22's FactoryFloor software.



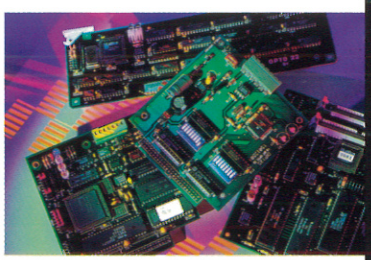
BRICK

Bricks offer a unique packaging scheme for G4 digital or G4 analog I/O and support either Mistic or Optomux protocols. Bricks combine I/O with a mounting rack and a brain board to form an I/O unit in a dead-front package with an enclosed wire way. The Mistic protocol provides seamless integration with Opto 22's FactoryFloor software. Bricks operate from a single 24-volt DC power supply and provide on-board voltage regulation.



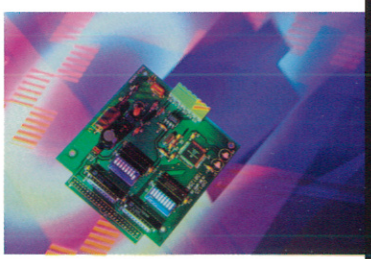
CLASSIC

Classic brain boards are distinguished by the protocol that they support. Mistic protocol brain boards include the B100 (digital) and B200 (analog). The Optomux protocol is supported by the B1 and B100 (digital) and B2 and B200 (analog) brain boards. Pamux brain boards include B4 (32-channel digital), B5 (16-channel digital), and B6 (16-channel analog). The Mistic protocol provides seamless integration with Opto 22's FactoryFloor software.

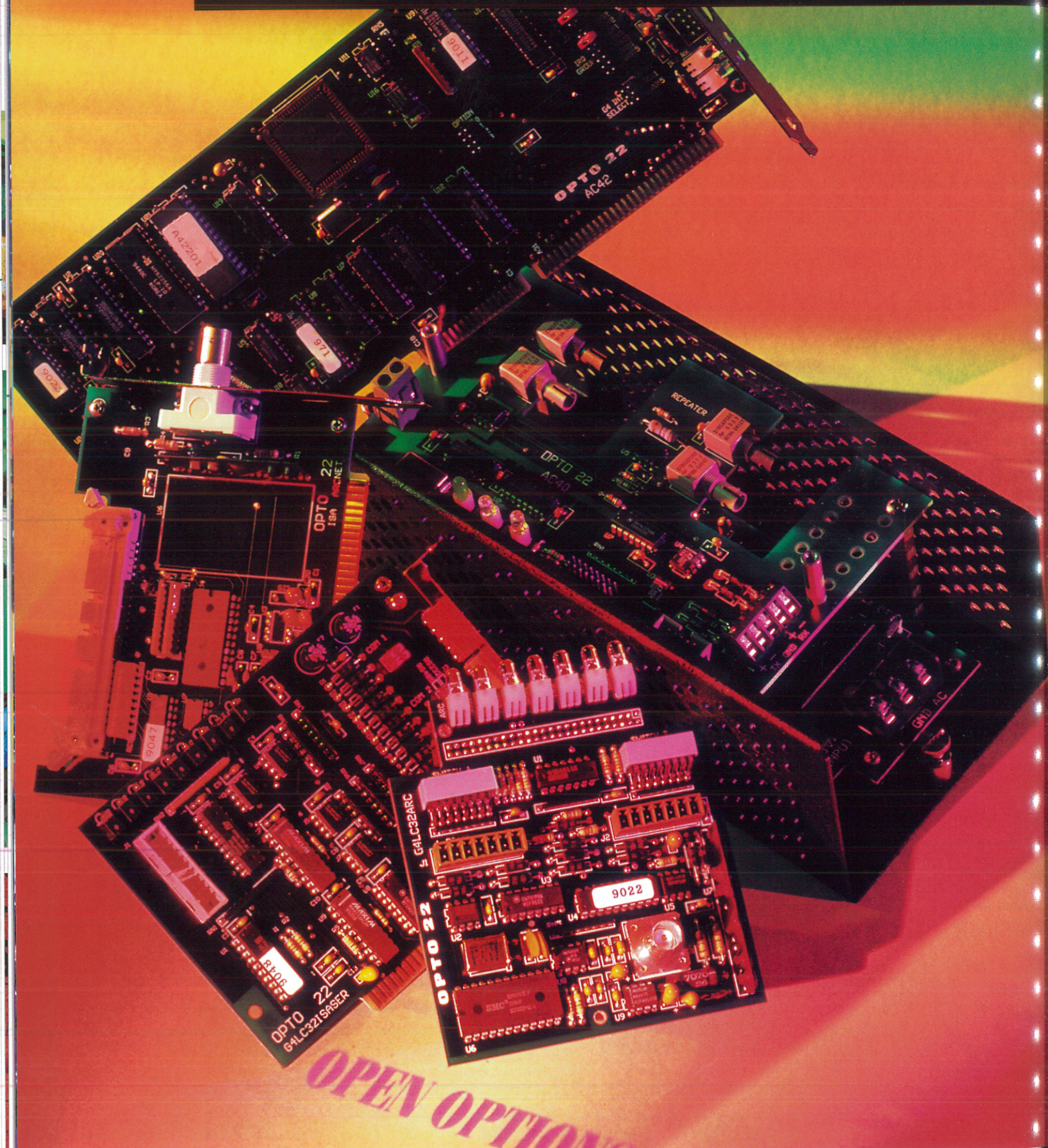


DEVICENET

The Opto 22 DeviceNet brain board allows DeviceNet customers to take advantage of Opto 22 I/O. The DeviceNet brain board, operating as a Group 2 slave, can be integrated with Opto 22 Classic and SNAP digital mounting racks.



Opto 22's extensive line of flexible communications interfaces and their tight integration with Opto 22 software products has enabled Opto 22 to lead the industry in intelligent distributed systems. Opto 22's interface layer is divided into two segments: Interface Cards for Opto 22 controllers and Traditional adapter cards that support a myriad of communications options. Traditional adapter cards include PC adapter cards and standalone adapter cards. Opto 22 standalone adapter cards facilitate communication between Opto 22's control system and a wide range of third-party computers, devices, and protocols. Opto 22 offers a variety of bus-based adapters to fully harness the power of the PC in industrial control.



INTERFACES

TRADITIONAL ADAPTER CARDS • CONTROLLER INTERFACES

TRADITIONAL ADAPTER CARDS

PC ADAPTER CARDS

PC adapter cards provide a direct connection from the PC to Opto 22 serial addressable intelligent I/O and parallel addressable I/O as well as direct connection to I/O mounting racks. PC adapter cards are designed to provide high-speed, noise-immune communications to many third-party devices.



STANDALONE ADAPTER CARDS

Standalone adapter cards include the latest in fiber optics repeaters, and provide RS232 to RS485 conversion, modem support, and addressability for RS232 devices.

CONTROLLER INTERFACES

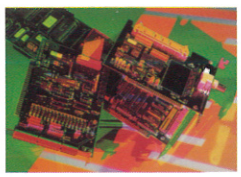
MODULAR CONTROLLER INTERFACES

Opto 22's interface products for Modular controllers are plug-in cards that provide Ethernet, ARCnet, RS485, and Fiber Optic communications. The Ethernet interface provides TCP/IP support, allowing the Opto 22 Modular controller network to be integrated into existing enterprise networks.



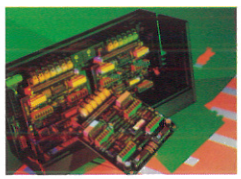
ISA CONTROLLER INTERFACES

ISA controller interface cards come in two types, one with an ARCnet port and the other with three serial ports. ISA interface cards and the ISA controllers plug into a PC backplane.



CLASSIC CONTROLLER INTERFACES

Opto 22's SX line of Classic controllers offers two types of interface cards. One contains two RS232/485 serial ports, the other offers two RS485 ports and an ARCnet port.





Opto 22 offers a family of controllers. All Opto 22 controllers take full advantage of Opto 22's FactoryFloor software. Extensive communications capabilities and networking are standard features of Opto 22 controllers. The Modular line of controllers has the added flexibility of the M4 expansion bus, resulting in added connectivity options, including Ethernet with TCP/IP and fiber optic communications. Optional features include extended non-volatile memory and various expansion cards. Key features that make Opto 22 controllers both flexible and scalable include high performance 32-bit processors, factory floor compatibility using the Mistic protocol, and flash-based firmware for easy upgrades and maintenance. All Opto 22 controllers are seamlessly integrated with Opto 22 software and are programmed with the same control language. This single programming solution offers consistency and dramatically simplifies development and maintenance requirements.

CONTROLLERS

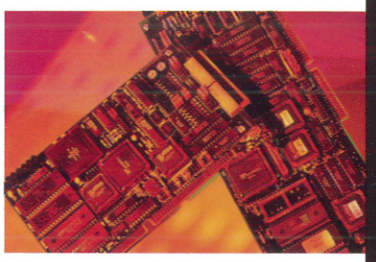
MODULAR • ISA • CLASSIC

MODULAR



Modular controllers deliver flexibility, power, and communications, by design. Modular controllers are designed to take advantage of the Opto 22 distributed, intelligent I/O architecture and provide a solid hardware foundation for Opto 22's new Windows 32-bit FactoryFloor software suite. The M4 bus supports a variety of communications interfaces with Ethernet, ARCnet, RS485, RS232, and fiber optic cards. The Modular Controller line includes a general purpose controller, an I/O controller for data acquisition and control, and a powerful remote telemetry unit/distributed automation system. All Modular controllers provide rugged industrial packaging and include an M4 processor, Opto 22's M4 Expansion Bus, and accommodate one of the various plug-in power supply options.

ISA

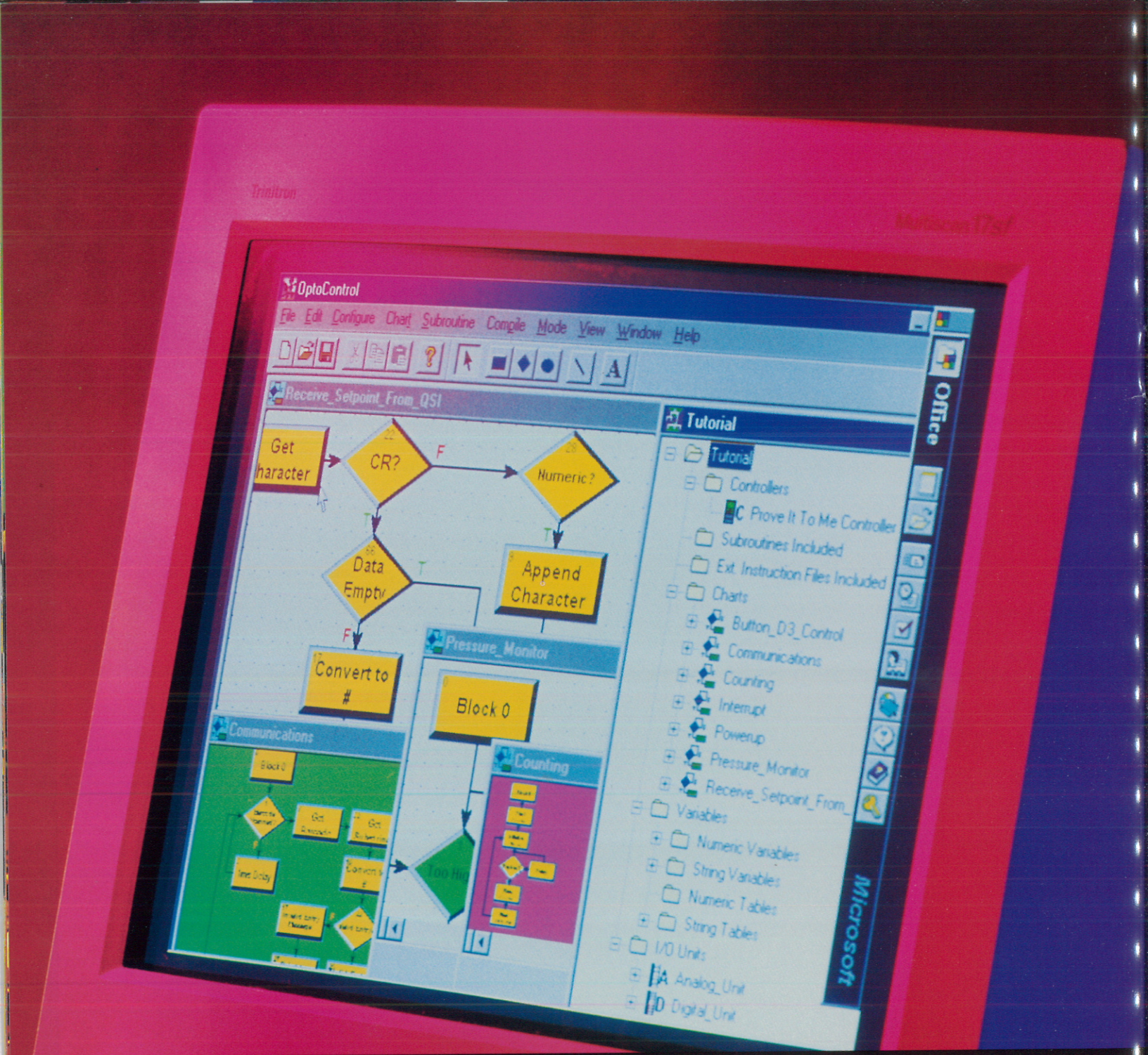


ISA controllers utilize the PC to deliver full FactoryFloor software compatibility at an even lower price. Acting as a slave or bus master, the ISA controller can be used with either active or passive backplanes. Battery-backed RAM starts at 256K and is expandable to 2MB. A hardware math co-processor is available as an option.

CLASSIC



Classic controllers include all the options required to meet the most sophisticated control challenges. Classic controller performance is based on state-of-the-art 32-bit technology. The G4LC32 controller includes four high-speed serial ports, an ARCnet port, a 4-line backlit LCD display, 25-key membrane key pad, LED status indicators for diagnostics, and 512K battery-backed RAM for program and data storage. The Classic G4LC32SX controller is a low-cost alternative to the Classic G4LC32 for applications that do not require a key pad, display, or a floating point math co-processor. The SX controller is equipped with 256K of battery-backed RAM that is expandable to 1 MB. The SX is supplied with two RS232/485 serial ports. Additional ports can be added using either of the two available interface adapters.



After earning a reputation for consistent innovation and leadership in automation hardware, Opto 22 realized it was time to take a new approach to control software. In 1988, Opto 22 introduced the first flowchart-based control programming language, Cyrano. Today, Opto 22's history of innovation in control hardware and software, combined with Microsoft's 32-bit operating systems, tools, and applications form the foundation for the world's most powerful graphical development environment for control solutions - FactoryFloor. From programming and debugging your control system to designing a graphical man-machine interface, on through managing your controller and PC-based network, FactoryFloor brings unprecedented value, performance, and ease of use to your control solution. OptoConnect, Opto 22's newest software innovation, brings a whole new dimension of openness to industrial automation by making manufacturing information available across the entire enterprise. All Opto 22 software is designed with the OptoOpen Integration philosophy in mind because Opto 22 understands that customers need the flexibility to build solutions unique to their business.

SOFTWARE

FACTORYFLOOR • OPTOCONTROL • OPTODISPLAY • OPTOSERVER

FactoryFloor

Opto 22's FactoryFloor is a tightly-integrated suite of Windows 32-bit software that delivers a Total Control Solution for industrial automation. FactoryFloor is made up of OptoControl, OptoDisplay, and OptoServer. OptoKernel and OptoUtilities are included with FactoryFloor and each of the FactoryFloor components.

OptoControl

OptoControl, the cornerstone of Opto 22's total control software for Windows '95 and Windows NT®, takes advantage of Microsoft's 32-bit Windows graphical interface. OptoControl makes it easy to understand, configure, design, and troubleshoot your control environment. Some of OptoControl's key features include the following: • OptoControl's "Strategy Tree," which provides a graphical tree-like view of your control system configuration • OptoControl's flowchart programming environment, which provides a precise, graphical view of your control process • OptoControl's animated debugger which makes it easy to step through your process and see what's happening at every point in your control program • OptoControl's subroutine builder provides extensive code reusability by packaging flowcharts for re-use • OptoControl's built in integration allows connectivity to third-party software and custom applications.

OptoDisplay

OptoDisplay is a Windows 32-bit graphical multimedia operator interface package that is tightly integrated with OptoControl. OptoDisplay gives operators, technicians, and engineers the information they need at a glance. Displays can mix pictures, symbols, bitmaps, and 3-D graphics from OptoDisplay's extensive library. OptoDisplay allows you to construct your operator interface by designing graphical objects. Display functions include controller-driven animation and operator-driven commands. Operators can also utilize real-time data for trend plotting. Advanced features enable you to animate any graphical control object and to associate it with real-world events by choosing a tagname from the shared OptoControl database. OptoDisplay is easy to program - just point, click, and associate.

OptoServer

OptoServer is the 32-bit Windows-based client-server application that gathers and serves requested data from the Opto 22 controller network and the PC-based FactoryFloor network. Combined with Microsoft's communication-enabling technologies, OptoServer becomes the universal I/O server for Opto 22 I/O systems. OptoServer is fully integrated with OptoControl and OptoDisplay, either as stand-alone applications or within a complex client/server architecture. OptoServer can also be integrated with Microsoft products, third-party packages, and/or user-developed custom applications created with tools such as Microsoft Visual Basic®.


PUMP 1
ON OFF
PUMP 2
ON OFF
PUMPING
WELL #1
WATER LEVEL
90.00
PUMPING
WELL #2
WATER LEVEL
125.45
PUMP #1
LOW LIMIT
5.00
PUMP #2
LOW LIMIT
7.50
Office
Microsoft
SONY
COLOR
GEOM
SIZE
CENTER

SOFTWARE

OPTOCONNECT • OPTODRIVER TOOLKIT
OPTOINTEGRATION KITS • CLASSIC SOFTWARE

OptoConnect

OptoConnect introduces a new dimension of data management to manufacturing and makes FactoryFloor information available to the entire enterprise. OptoConnect allows the bi-directional flow of information between manufacturing and your Microsoft SQL server or JET database. Access to this information in an understandable format makes it possible to manage your manufacturing and business environments as never before. With OptoConnect, timely access to accurate manufacturing information is as easy as point-and-click — literally. Just use your mouse to select the items you want from the OptoControl strategy tree and associate them with your OptoConnect database. From there, data transfer is automatic. You can choose historical or snapshot data with data snapshots taken at user-defined intervals. OptoConnect utilizes standard infrastructure and communications technologies and is available with or without Microsoft SQL Server.

OptoDriver TOOLKIT

OptoDriver Toolkit helps you build custom solutions for Opto 22 I/O systems. Programmers using high-level languages, such as Microsoft C++ or Microsoft Visual Basic, can use the OptoDriver Toolkit to write Microsoft WIndows and DOS software applications that can access the brain board, rack, and I/O combination that best fits their application. The OptoDriver Toolkit includes new 32-bit Windows-compatible drivers, Windows 16-bit drivers, and Opto 22's classic DOS drivers.

OptoIntegration KITS

OptoIntegration Kits support the integration of Opto 22 hardware with standard protocols such as MODBUS, as well as selected proprietary protocols from vendors such as Allen-Bradley.

OptoClassic SOFTWARE

Classic Software - Cyrano - MMI - MDS - Opto 22 Classic software was the first visual flowchart-based programming and graphic MMI environment for industrial automation. Opto 22's classic software products run as 16-bit applications and have a large installed base. Opto 22 is committed to supporting this installed base and to making these products available for those customers who have not moved to the Windows 32-bit platform. Opto 22 has also provided utilities to assist customers in migrating to FactoryFloor.

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