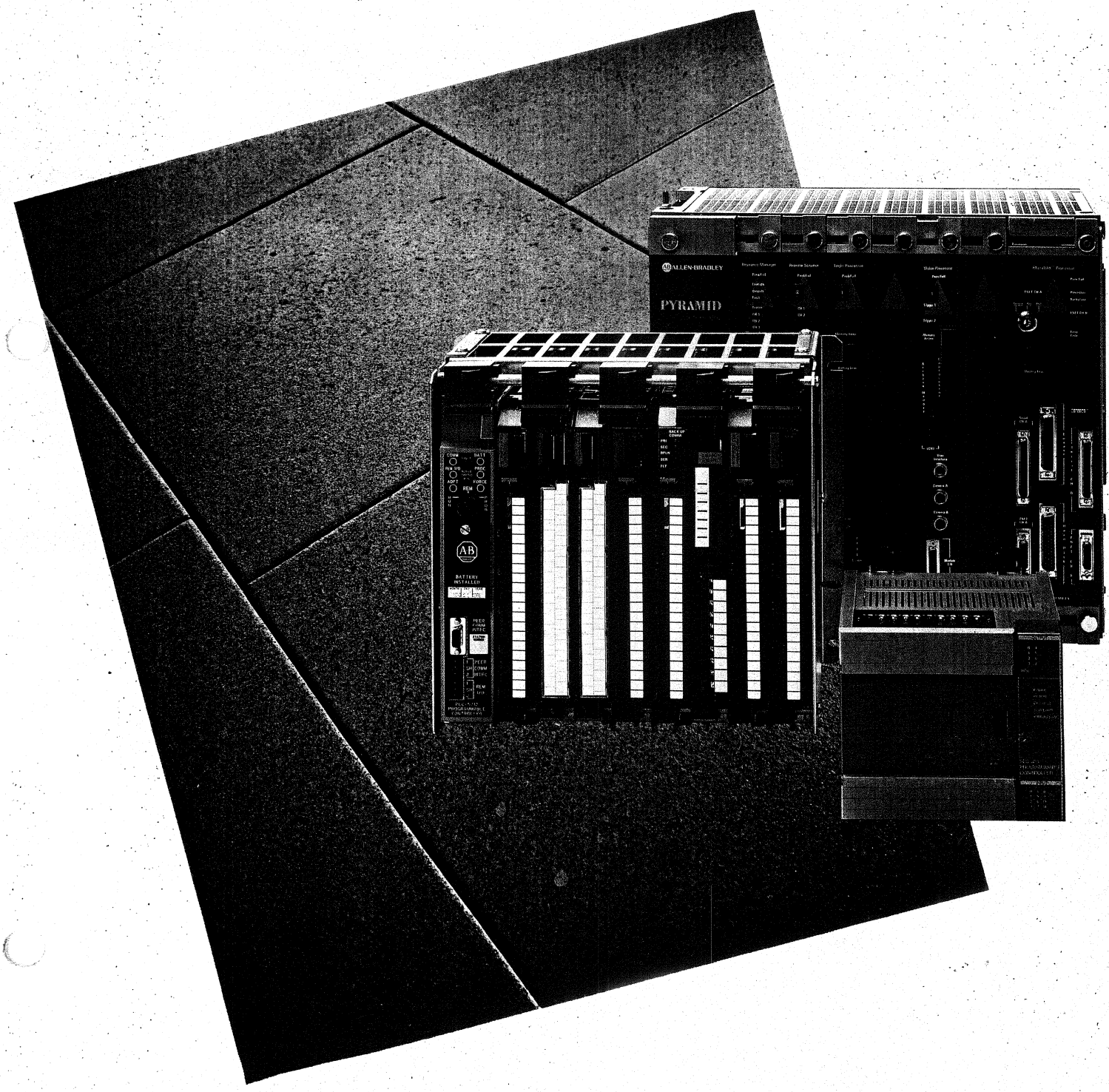
ALLEN-BRADLEY

FOCUSED SOLUTIONS FOR TODAY WITH FLEXIBILITY AND INNOVATION FOR TOMORROW

THE PLC-5 FAMILY OF PROGRAMMABLE CONTROLLERS



FOCUSED SOLUTIONS WITH UNMATCHED FLEXIBILITY FOR DEDICATED, DISTRIBUTED AND INTEGRATED CONTROL

The control investment you make today must grow to meet your automation needs tomorrow!

While the objective is clear, the solution is not as obvious. That's because every production system is different and, to optimize the process, each requires a ***focused*** control solution.

Yet, to meet changing needs and to take advantage of new technology, you also need a ***flexible*** control system. One with a broad range of compatible components to protect your original investment. And continued innovation to enhance its value.

Focus and flexibility. That's what the PLC®-5 Family is all about.

Focused Solutions For Optimum Performance

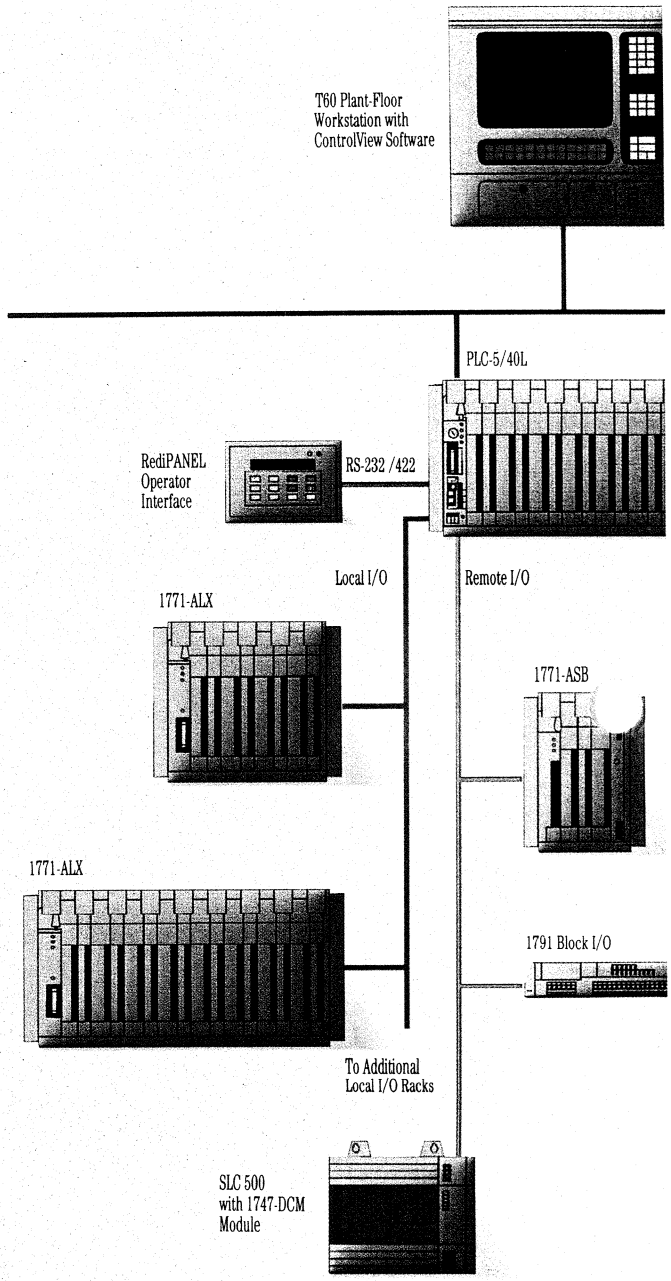
The PLC-5 Family is focused on solving the three basic approaches to control problems:

- ***Dedicated Control*** for stand-alone applications is provided by SLC 500 controllers.
- ***Distributed Control*** for applications with multiple, inter-dependent operations is provided by PLC-5 midsize controllers.
- ***Integrated Control*** to coordinate and supervise dedicated and distributed operations is provided by the PLC-5/250 controller.

Flexibility For Innovation And Change

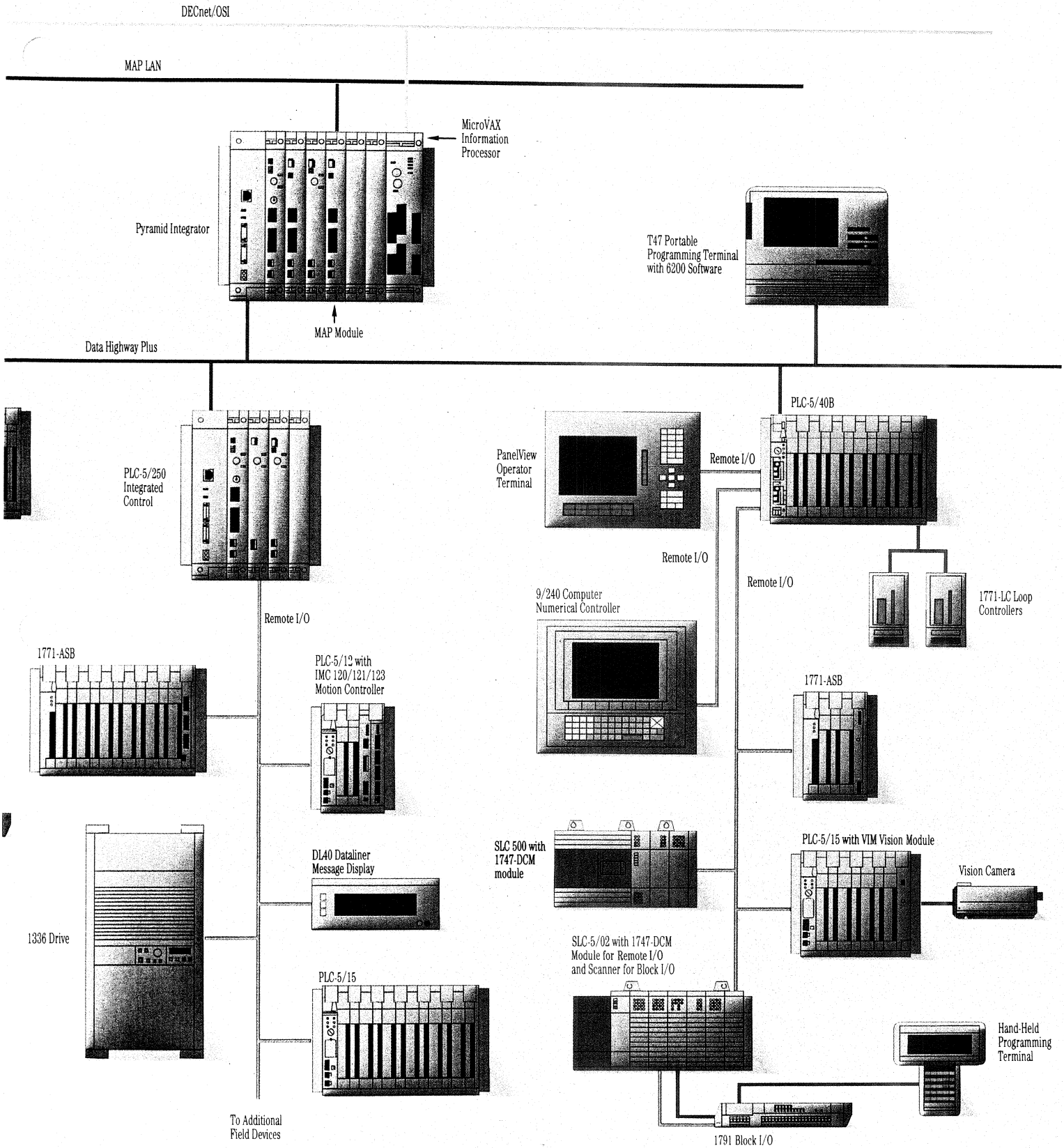
PLC-5 Family flexibility lowers your cost of ownership and lets you expand, change and innovate at your own pace through:

- Industry's broadest I/O structure
- Standard, compatible components
- Modular, expandable architecture
- Full, complimentary Allen-Bradley product line
- Continued innovation



THE END OF DEAD-END TECHNOLOGY

The PLC-5 Family lets you build on, network more and take advantage of the latest technology anytime. And all PLC-5 Family enhancements are made with migration in mind. So, as control technology moves forward, you can move with it — without walking away from your control investment.

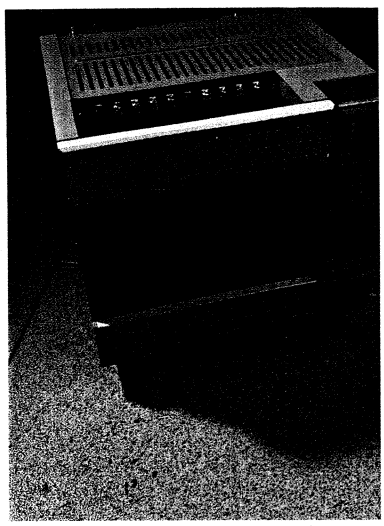

DECnet/OSI
MAP LAN
MicroVAX
Information
Processor
Pyramid Integrator
MAP Module
T47 Portable
Programming Terminal
with 6200 Software
Data Highway Plus
PLC-5/250
Integrated
Control
PanelView
Operator
Terminal
Remote I/O
PLC-5/40B
Remote I/O
Remote I/O
1771-LC Loop
Controllers
9/240 Computer
Numerical Controller
Remote I/O
1771-ASB
PLC-5/12 with
IMC 120/121/123
Motion Controller
1771-ASB
SLC 500 with
1747-DCM
module
PLC-5/15 with VIM Vision Module
Vision Camera
DL40 Dataliner
Message Display
1336 Drive
SLC-5/02 with 1747-DCM
Module for Remote I/O
and Scanner for Block I/O
PLC-5/15
Hand-Held
Programming
Terminal
To Additional
Field Devices
1791 Block I/O

DEDICATED CONTROL WITH FLEXIBILITY THAT LETS YOU KEEP ON GROWING

The SLC™ 500 line is ideal for dedicated control applications. Yet these small, affordable controllers have broad flexibility to address future growth, including the ability to communicate with our larger programmable controllers.

Discrete, analog and specialty I/O modules offer broad application flexibility, including a new IMC110 module for single-axis motion control. All supported by an instruction set derived from the PLC-5 line of controllers, including:

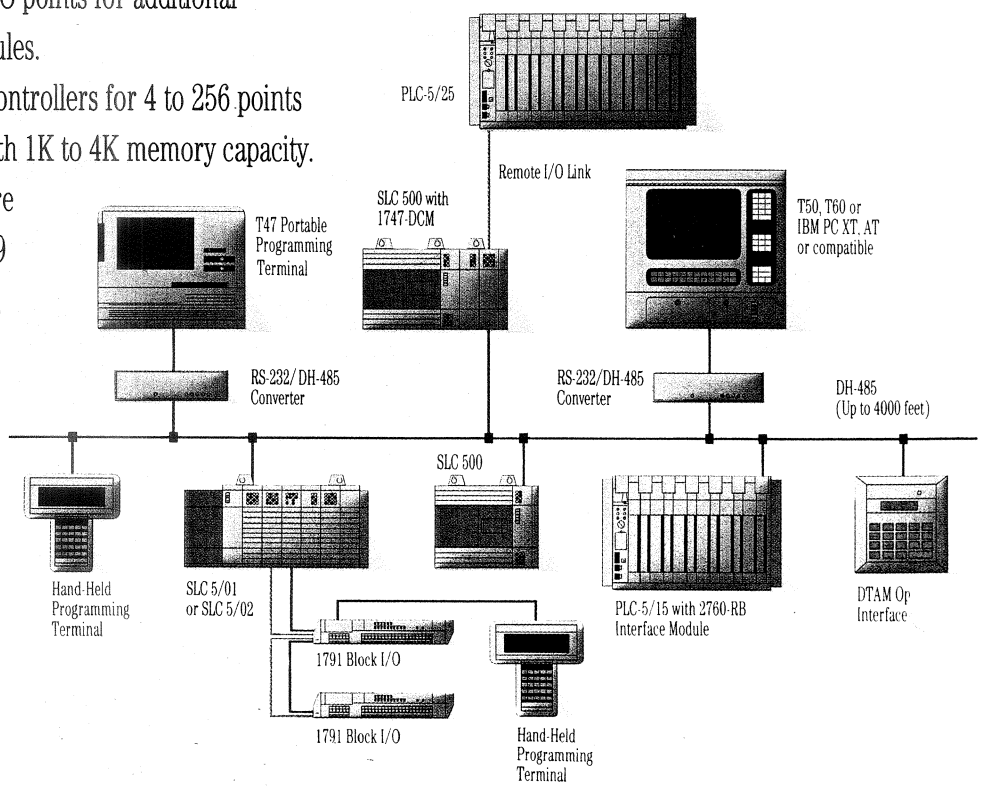
- Four-function math and BCD-binary conversion
- File moves and logic functions
- Data comparison
- Immediate I/O update
- Jump and subroutine

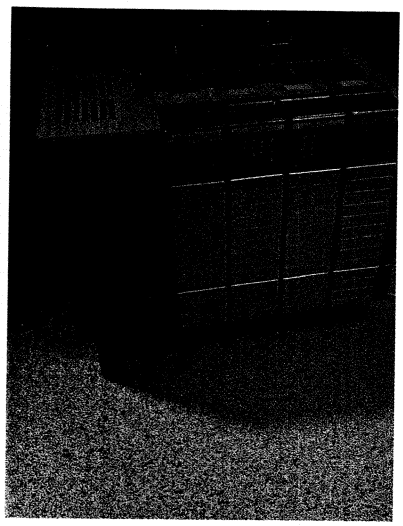


SLC 500 FIXED CONTROLLER

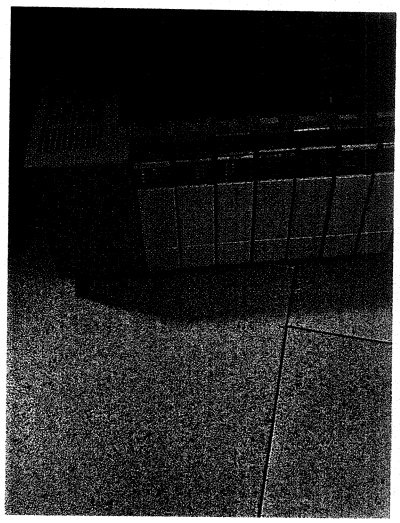
The SLC 500 line is built around two hardware options for focused control solutions:

- ***SLC 500 controllers*** offer 20, 30 or 40 fixed discrete I/O points in 24 different versions to support 24Vdc or 120/240Vac inputs and relay, triac or transistor outputs. You can also add up to 32 modular I/O points for additional discrete, analog or specialty I/O modules.
- ***SLC 5/01 processors*** are modular controllers for 4 to 256 points of discrete, analog or specialty I/O with 1K to 4K memory capacity.
- ***SLC 5/02 processors*** offer even more flexibility in a modular system with 19 additional instructions, including PID, messaging and selectable timed interrupts to support up to 480 I/O. A new distributed I/O scanner module and Block I/O permit small I/O clusters remote from the SLC 5/01 or 5/02 rack.

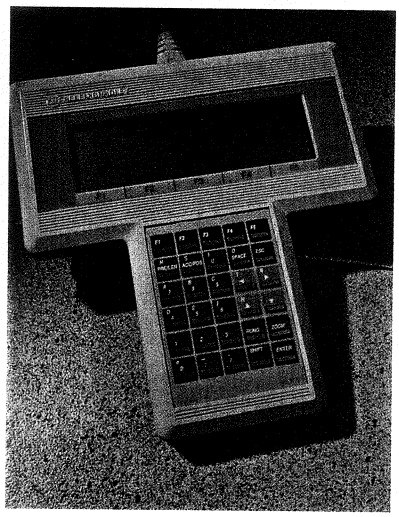




SLC 5/01 MODULAR PROCESSOR



SLC 5/02 MODULAR PROCESSOR

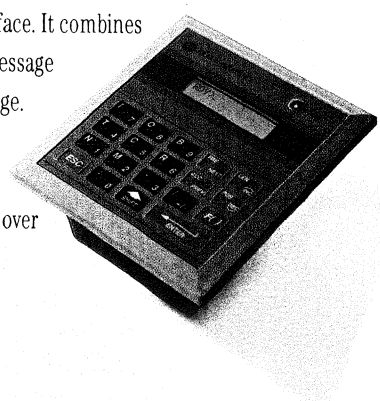


For Programming, Monitoring And Troubleshooting

The Hand-Held terminal (HHT) shows menu selection and up to 5 rungs of ladder logic for programming off-line at your desk, connected to the processor or over the DH-485 network.

Data Table Access Module (DTAM)

The DTAM is an easy-to-use, low-cost operator interface. It combines a tuner/tweaker and message display in a small package. DTAM interfaces with any SLC 500 processor, either point-to-point or over the DH-485 network.



PROGRAMMING AND COMMUNICATIONS FLEXIBILITY

The SLC 500 line features Advanced Programming Software (APS), a menu-driven off-line software package that runs on a T47, T50 or T60 terminal or an IBM PC or compatible computer. You can program, monitor and troubleshoot processors over the DH-485 network. Through the 1747-DCM module, processors can communicate a supervisory PLC over the 1771 Remote I/O network.

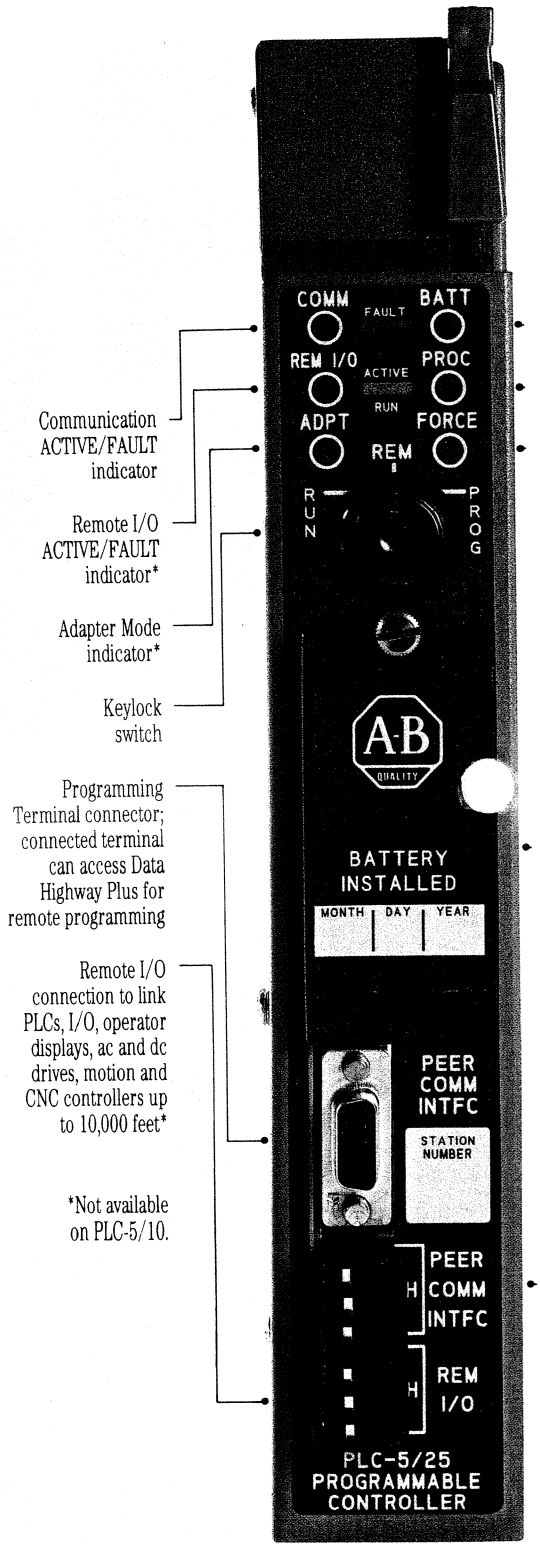
DISTRIBUTED CONTROL THAT LETS YOU INCREASE CAPACITY, ADD FUNCTIONS, AND EXPAND NETWORKS... WHENEVER YOU'RE READY.

The PLC-5 Family includes a broad line of midsize controllers with the processing power, application and communications flexibility you need for focused distributed control applications.

Flexible Processing Power

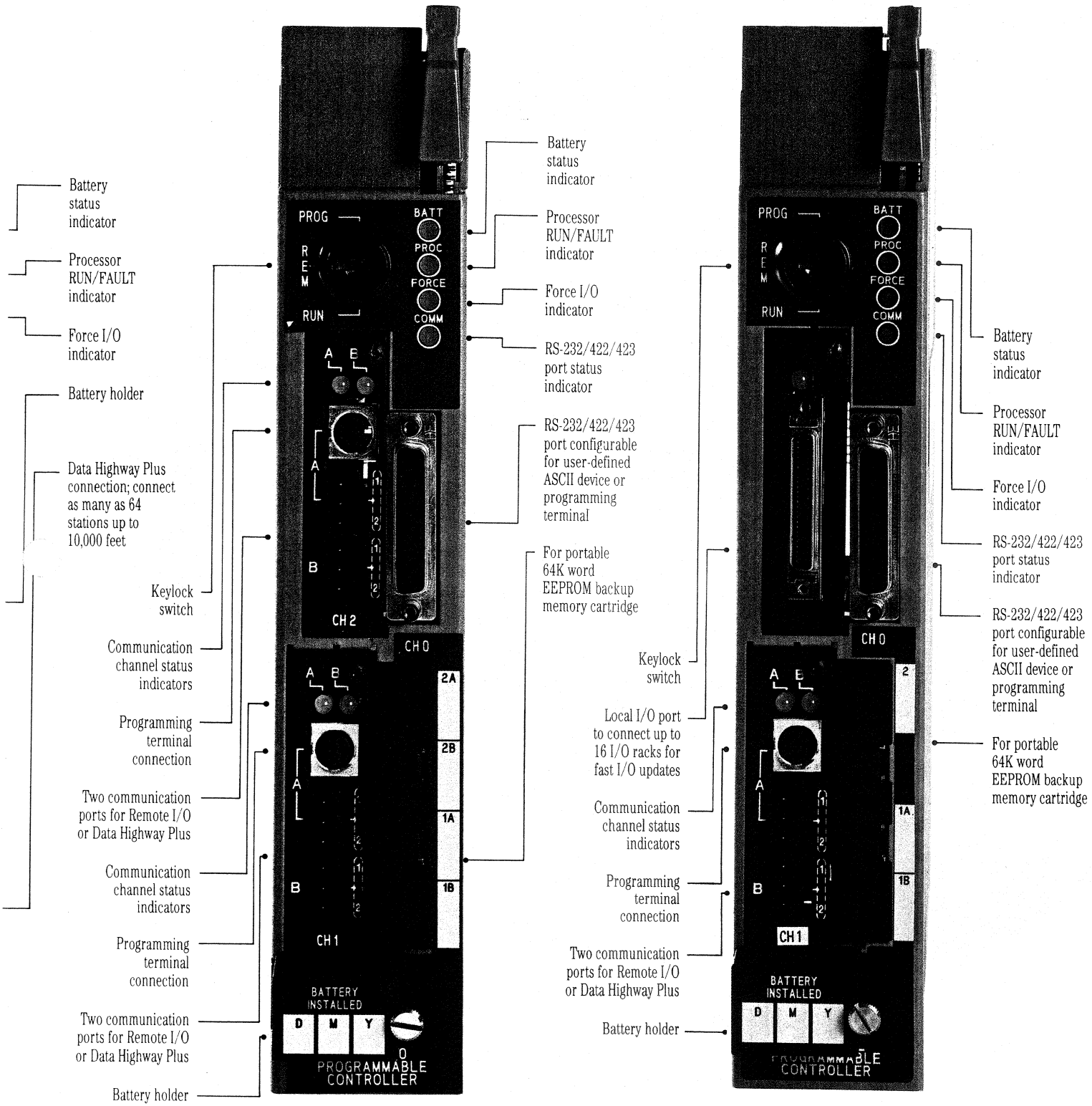
PLC-5/10, -5/12, -5/15 and -5/25 processors provide 6K to 12K words of memory for 256 to 1,024 I/O points. A CMOS module lets you add 4K or 8K words of additional memory to the PLC-5/15 or -5/25 processor. An EEPROM memory module offers nonvolatile backup for 6K or 13K words (-5/10 through -5/25).

New PLC-5/40, -5/40L, -5/60 and -5/60L processors provide 48K to 64K words of memory for up to 3,072 I/O points. A plug-in EEPROM cartridge offers 64K words of nonvolatile backup for program protection or transport to another PLC-5/40 or PLC-5/60 processor.



PLC-5/10 THRU PLC-5/25

Processors include n communication and programming ports and a high-level instruction set with over 80 instructions.



PLC-5/40 AND PLC-5/60

Processors have fast scan times, multiple scanner channels and expanded communication options for flexible distributed control applications.

PLC-5/40L AND PLC-5/60L

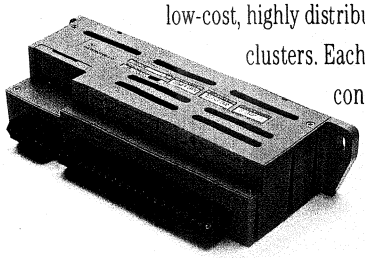
Processors include a local I/O port for demanding high-speed processing application, such as packaging, web and cut-to-length.

APPLICATION FLEXIBILITY

The 1771 I/O System includes industry's largest selection of modules, over 90 in all, to address broad manufacturing and process control applications.

With over 6 million installations, 1771 I/O is the premier standard for industrial control. And to satisfy today's high-speed, high-performance applications, the innovations continue:

- Four new high-density, discrete I/O modules for increased throughput.
- Three new analog I/O modules for thermocouples and RTDs provide high resolution and increased system throughput.
- New adapter capabilities include a 1771-ASB/C for enhanced system throughput on the Remote I/O link and a 1771-ALX for high-speed local I/O processing.
- New 1771-VHSC counter module combines four modes of operation in a single unit for high-speed industrial encoder and counter applications.
- New Block I/O* lets you extend your 1771 I/O System through low-cost, highly distributed I/O clusters. Each block consists of 16 points in a small package.



COMMUNICATIONS FLEXIBILITY

Local I/O Link

The new PLC-5/40L and -5/60L processors and new 1771-ALX adapters are designed as a local I/O system for high-speed processing applications.

The processor is resident in a 1771 I/O rack and is connected over a local I/O link to 1771-ALX adapters in up to 16 separate 1771 I/O racks.

This provides a parallel I/O system for fast I/O updates and system throughput, the practical equivalent of resident-rack performance for I/O modules not placed within the processor chassis.

Remote I/O Network

PLC-5 processors** have built-in access to the Remote I/O link, a cost-effective, real-time control network with connectivity up to 10,000 feet.

Remote I/O Network throughput has been enhanced substantially through our latest innovations in PLC-5 functionality, 1771 I/O modules and adapters. Innovations that are compatible with your existing Remote I/O installations and its broad connectivity for:

- Programmable controllers
- 1771 I/O
- Operator interface devices
- AC and DC drive systems
- Motion controllers
- Computer numerical controllers
- Sensors
- Multivendor products

Data Highway Plus

All PLC-5 midsize processors have built-in access to the Data Highway Plus automation network for peer-to-peer communications. With multiple processors, programming terminals and computers on the link, you can program; edit, monitor and transfer data among control devices.

Information Networks

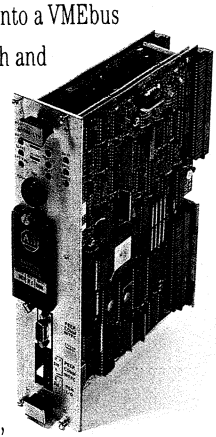
You can link the Data Highway Plus network to A-B carrierband and broadband LANs and to Ethernet™/MAP/OSI information networks for plant-wide connectivity.

Communication Backup

To protect critical processes, PLC-5/15 through PLC-5/60 processors can be configured for processor backup when used with the 1785-BCM Backup Communication Module.

Focus On PLC-5 Flexibility For VMEbus Systems

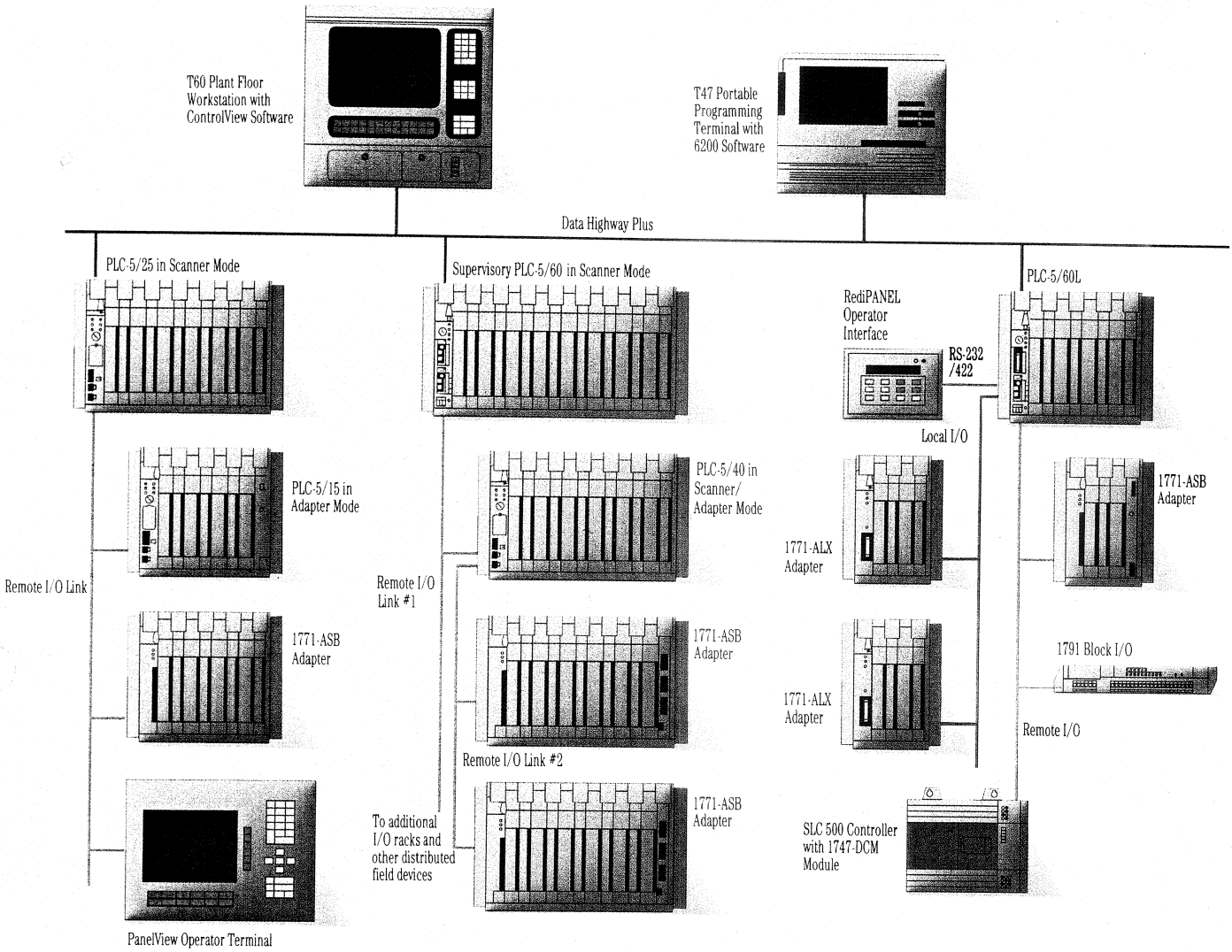
The PLC-5/VME fits into a VMEbus rack and communicates with and responds to commands from the VMEbus arbiter. The PLC-5/VME has 5Kbytes of VME global memory on board and can access other global memory in the system.



With the PLC-5/VME,

- You can access the full-line of 1771 I/O and the Remote I/O network.
- Communicate with other devices through built-in access to Data Highway Plus
- Free your VME system from time-critical control tasks.

*Available August 1991.
**Except PLC-5/10 which is designed for single-rack applications



SCANNER/ADAPTER MODE

In adapter mode, all midsize processors can monitor and control I/O in their resident chassis while communicating with a supervisory controller over the remote I/O link.*

In scanner mode, PLC-5/15 through PLC-5/60 processors can monitor and control I/O in remote racks as well as their own resident chassis.

SIMULTANEOUS SCANNER/ ADAPTER MODE

PLC-5/40 and -5/60 processors can communicate with a supervisory controller (adapter mode) and scan remote I/O (scanner mode) simultaneously over separate Remote I/O links for expanded distributed control capability.

HIGH-SPEED LOCAL I/O

In addition to Remote I/O communications capability, new PLC-5/40L and -5/60L processors include a local I/O port to connect up to 16 independent I/O racks through a new 1771-ALX adapter. This parallel I/O system increases throughout, improves system performance and provides fast I/O updates for high-speed processing.

* *Except PLC-5/10*

INTEGRATED CONTROL WITH FLEXIBILITY FOR PLANT-WIDE CONNECTIVITY AND INFORMATION PROCESSING

The PLC-5/250 controller lets you integrate and supervise your dedicated and distributed control while controlling information flow for high-performance process optimization.

The PLC-5/250 controller mounts in a Pyramid Integrator™ chassis and is the most powerful and flexible processor in the PLC-5 Family.

Processing Power

Each PLC-5/250 processor offers 384K words of memory and up to 4,096 I/O points. With up to four logic processors per chassis, capacity can be increased to 1.5M words of memory for greater processing power.

The PLC-5/250 controller supports a superset of the PLC-5 Family instructions, including complex math, data manipulation and smart directed sequencer (SDS) instructions for diagnostics and state control.

Multiprocessing Control

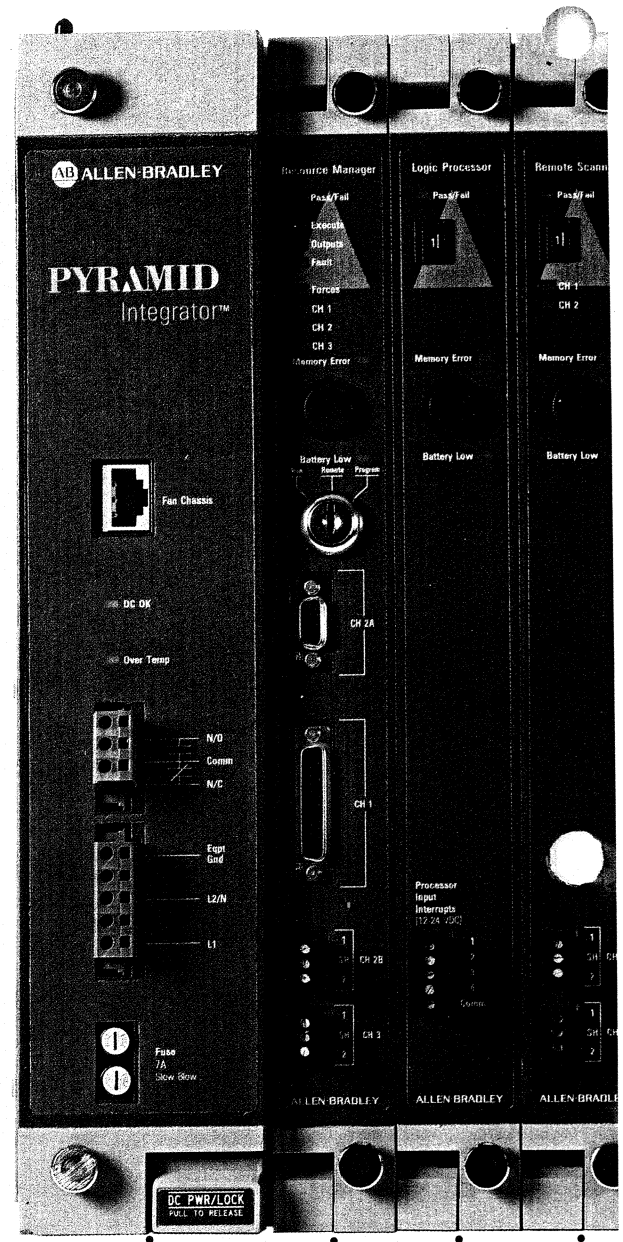
Up to four PLC-5/250 processors can be mounted in a single chassis organized to:

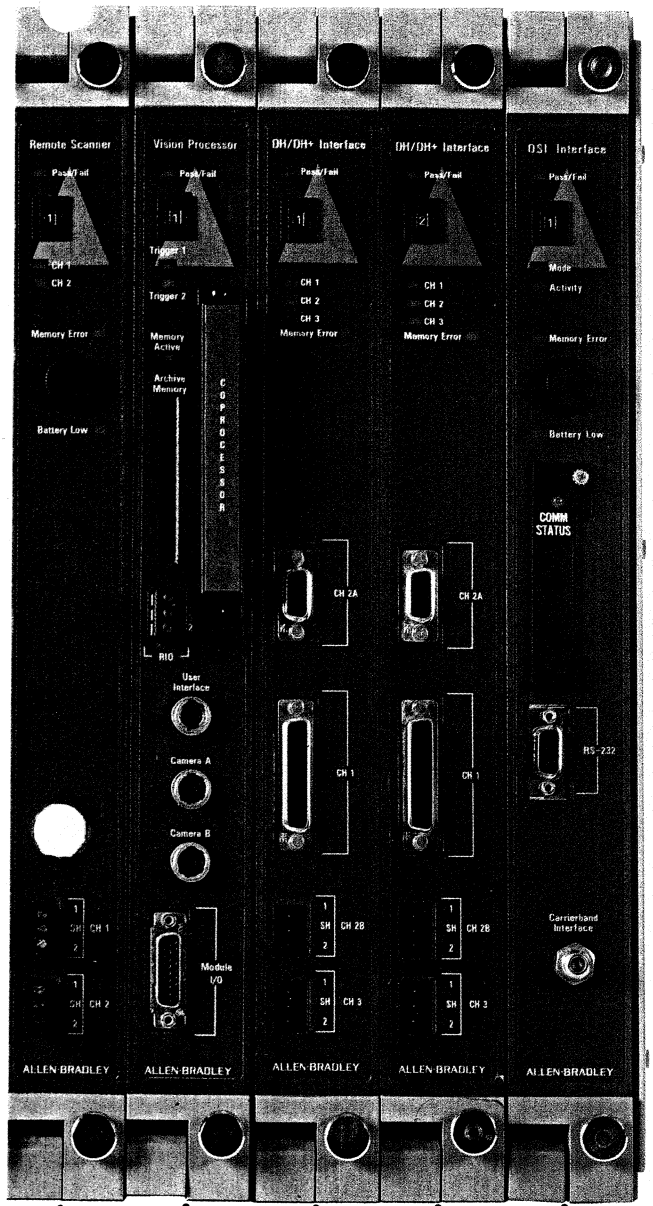
- Run a single program where a complex task requires fast, parallel processing to optimize performance, or
- Run individual programs, logically partitoned for optimum performance, easier development and maintenance, while communicating with each other for close-coupled multiprocess coordination.

Multitasking Control

Each PLC-5/250 processor can support:

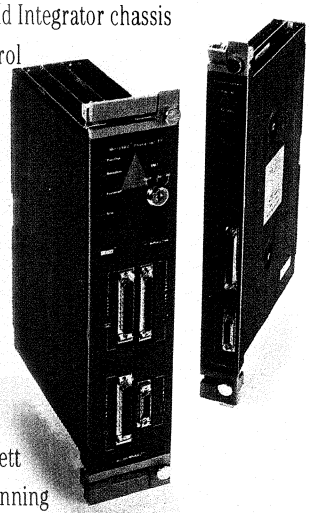
- A main application program while performing up to 64 background tasks for non-time-critical functions, saving processor scan time for critical control tasks.
- Four hard-wired processor input interrupts to actuate subroutines based on user-determined process events.
- Eight selectable timed interrupts.

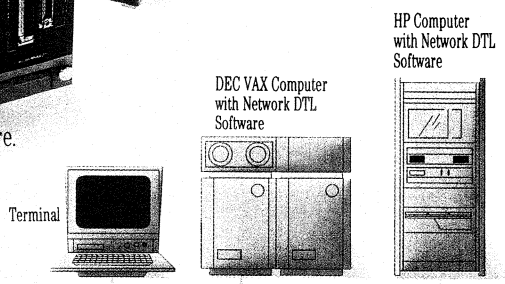




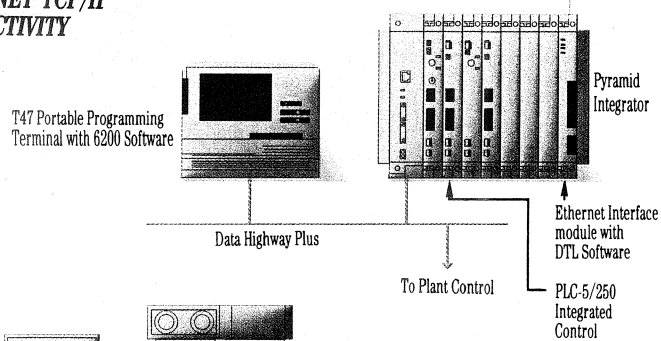
Resident Or Remote Information And Control Integration

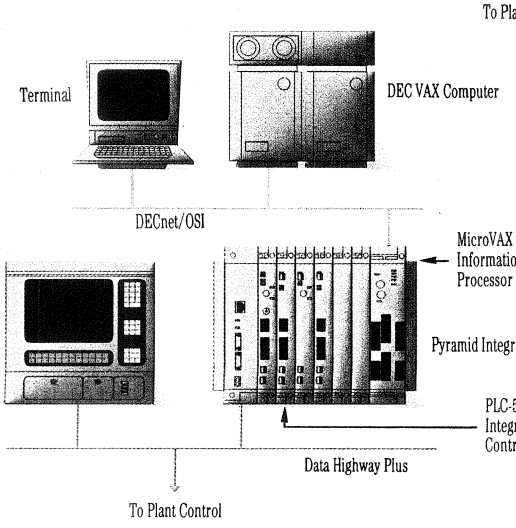
You can integrate information and control in the Pyramid Integrator chassis with PLC-5/250 control and a MicroVAX™ Information Processor (left). A new Ethernet Interface Module (right) lets you integrate control information over an Ethernet TCP//IP network with your existing DEC or Hewlett Packard computer running A-B's new Network DTL™ software.





ETHERNET TCP/IP CONNECTIVITY





DECnet/OSI CONNECTIVITY

MAP/OSI module for multivendor connectivity.

5130-KA module for connectivity to one or two Data Highway/ Data Highway Plus networks.

CVIM module for integrated vision/ inspection applications.

Each Remote Scanner provides connectivity for two Remote I/O networks.

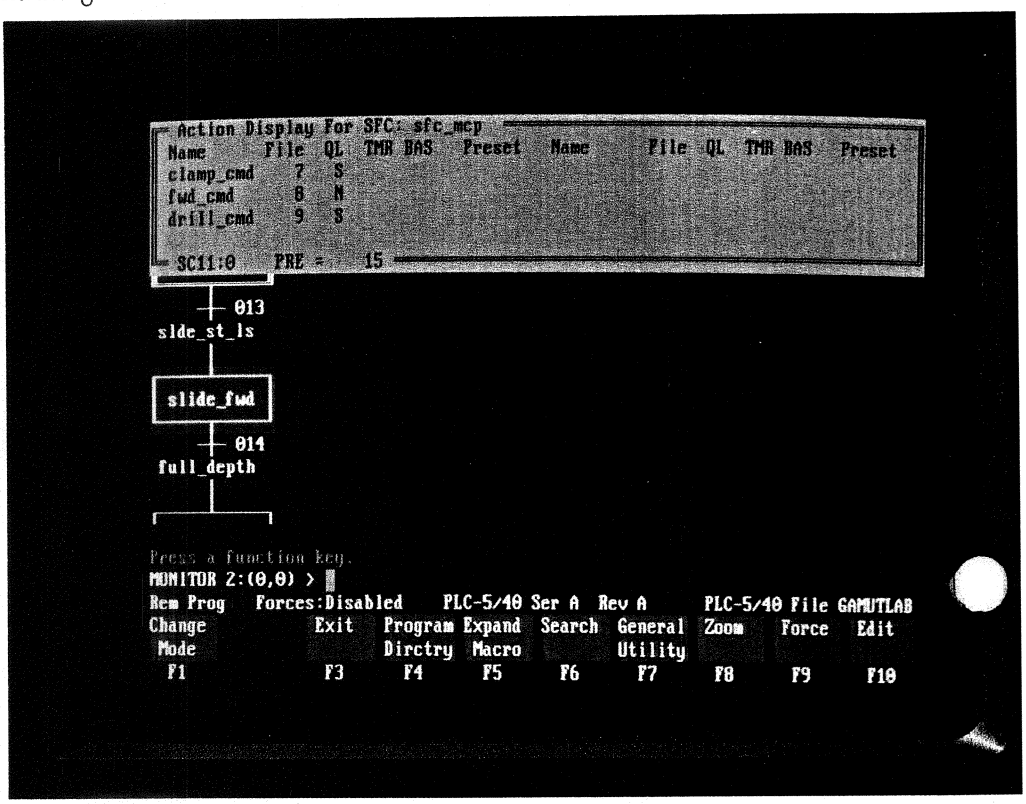
POWERFUL INSTRUCTION SET FOR FLEXIBLE CONTROL CAPABILITY

For manufacturing and process control flexibility, each PLC-5 midsize processor includes a powerful instruction set of over 80 standard instructions, including:

- Floating point and integer math
- Compute/compare
- PID control
- Sequential Function Charts
- Message instructions to write data between two processors peer-to-peer over Data Highway Plus

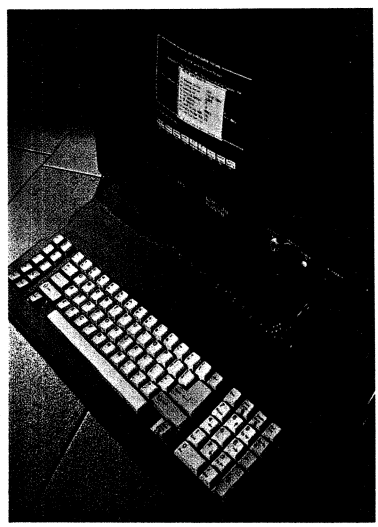
In addition to the standard instruction set, PLC-5/40, -5/40L, -5/60 and -5/60L processors provide advanced instructions, including:

- ***ASCII/string handling instructions*** and a built-in RS-232/422 port to improve the efficiency of integrating ASCII devices into your control system.
- ***Floating point PID***
- ***Statistical analysis***
- ***One shot***
- ***File load/unload***



T60 Plant-Floor Workstation

A high-performance industrial workstation that can be used as an operator station, programming terminal and a plant-floor computer.



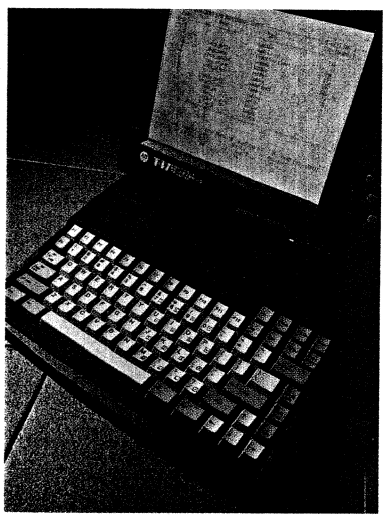
T50 Industrial Terminal

A transportable industrially hardened IBM PC/AT compatible for on-line or off-line programming.

FLEXIBLE PROGRAMMING PLATFORMS

To program PLC-5 Family processors, Allen-Bradley offers a broad selection of hardware and software. Hardware options include:

- *T60, T50, T47 terminals*
- *IBM or compatible personal computers*
- *Pyramid Integrator MicroVAX Processor*
- *VAX-based computers*



T47 Portable Programming Terminal

A laptop computer for program development and troubleshooting with an MS-DOS operating system, 2 Mbytes of memory and a 40 mbyte hard disk for additional storage.

PROGRAMMING TOOLS FOR ENGINEERING AND MAINTENANCE PRODUCTIVITY

Allen-Bradley Series 6200 programming software is compatible with all PLC-5/10 through PLC-5/250 processors and includes tools to enhance programming and maintenance efficiency. Users can:

- Develop and document programs off-line.
- Generate and print reports, such as ladder listing, cross-reference information, memory map, data table usage and I/O force table.
- Monitor and troubleshoot programs on-line to force I/O, determine processor status/mode.

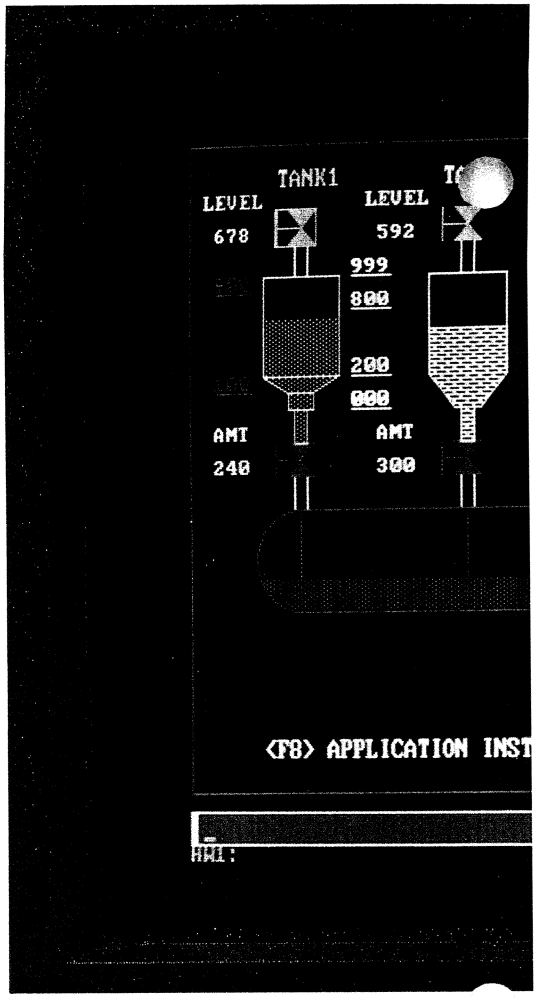
PLC-5/40, -5/40L, -5/60 and 5/60L processors also include advanced programming tools that significantly improve programming, control and troubleshooting productivity:

- ***Main Control Programs (MCPs)*** to segment up to 16 control programs by function or location using Sequential Function Charts and ladder logic together.
- ***Processor Input Interrupts (PII)*** are user-configurable to interrupt active programs and run a specified, event-driven program file.
- ***Global Status Flags*** are files which are updated automatically in each processor on the Data Highway Plus network for information and control coordination. Each file can include up to 16 bits of user-selected data.

FLEXIBLE APPLICATION SOFTWARE IMPROVES SYSTEM DESIGN, CONTROL AND INTEGRATION PRODUCTIVITY

In addition to programming software, Allen-Bradley is a leader in developing custom and configurable software solutions. Software that integrates easily with PLC-5 Family processors to save valuable engineering, programming and maintenance time. And lets you address broad application requirements, including:

- Programmable controller support
- Process monitoring and control
- Cell monitoring and control
- Factory data collection and SQC/SPC
- Production scheduling
- Operator interface



System Design Software

ABECOS™, Allen-Bradley Expert Control System, is a software productivity tool for customers to design and develop quotations for programmable controller-based systems. It runs on IBM and compatible personal computers. Features include:

- Automatically configure hardware based on creating an I/O database.
- Interface to AutoCAD® and A-B ABECOS Panel Designer software for integrated system design tools.

ControlView™ Operator Interface Software

ControlView is an advanced set of color-graphic software modules for data acquisition, supervisory control and information management.

ControlView is user-configurable through fill-in-the blank screens. A C-Toolkit option allows users to develop software for custom applications.

The main element of the ControlView core is the database. It provides communication and concurrent data acquisition in real-time for up to 10,000 analog or digital points. Data acquisition tasks can be defined based on time or event.

Batch Process Control Software

Our BatchMaster™ System for batch applications is based on ControlView software, PLC-5/25 processors and Allen-Bradley's exclusive BatchWare software, an integrated package of three software tools:

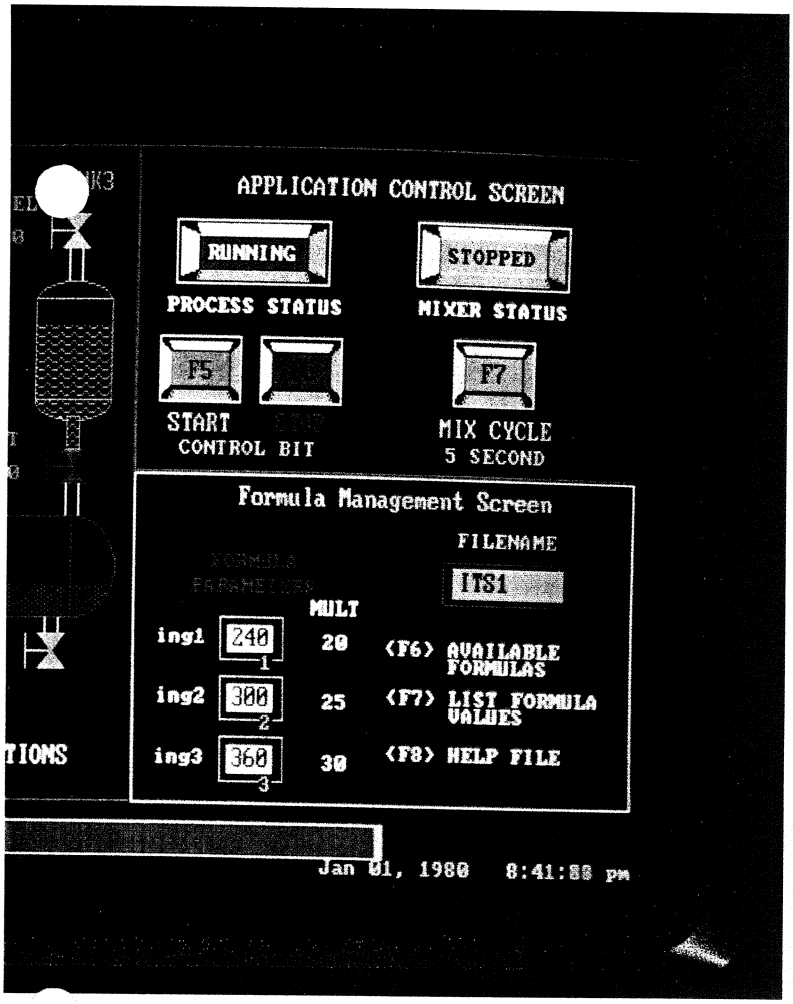
- ***Batch Manager*** executes procedure control for each batch and provides preconfigured logic for data interface.
- ***Recipe Builder*** is a software module used off-line to develop recipes for use by the Batch Manager tool.
- ***Batch Control*** is provided by the PLC-5/25 controller which comes with the database already structured for the BatchWare configuration.

Software For Discrete Manufacturing Control

Our Distributed Discrete Manufacturing Control (DDMC) is a flexible system for controlling discrete manufacturing applications.

The heart of DDMC is PLC-5 Family control with powerful new Smart Directed Sequencer (SDS) instructions that automatically generate messages that describe machine faults.

SDS is a state-based instruct which is easily configured using fill-in-the-blank ControlView displays. SDS is entered with standard 6200 series software using ladder logic programming.



CONTROLVIEW APPLICATIONS

The applications run concurrently in a prioritized, multitasking, DOS-compatible operating system on:

- *T60 Plant-Floor Workstation*
- *IBM PC XT/AT/PS2 or compatible*

Software For Plastics Machinery Control

Allen-Bradley offers control system solutions for injection molding, extrusion, rotary molding, reaction injection molding and vacuum forming/ thermo-forming automation.

Each system is based on our PLC-5 Family of programmable controllers and standard or configurable application-specific software.

For example, Pro-Set™ software is an application software package that lets you configure a PLC-5 family controller for injection molding control. It includes operator interface screens to configure, monitor and control all phases of the injection molding process.

Software For Integrated Information Processing

Network DTL is an Allen-Bradley standard Application Programming Interface that provides transparent communication between multivendor computer systems and Allen-Bradley control systems.

Network DTL features a comprehensive, easy-to-use library of calls that simplify a programmer's access to control information. Network DTL is supported on Hewlett-Packard HP 9000 and DEC VAX computers.

Connectivity is accomplished using the industry standard Ethernet TCP/IP network protocol.

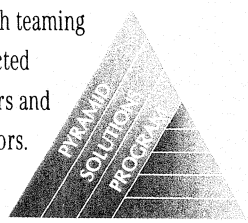
With Network DTL, you can integrate your A-B control system with your manufacturing computer systems for efficient, integrated operations.

Solutions Through Teaming

To provide customers with the best possible system solution, Allen-Bradley has strategic alliances and working relationships with other leading control and computer companies.

Our alliances with Digital Equipment Corporation and Hewlett Packard simplify control and information integration. An alliance with Fisher Controls has resulted in a PLC/DCS interface software package.

Our Pyramid Solutions Program (PSP) offers application-specific solutions through teaming efforts with selected software suppliers and systems integrators.



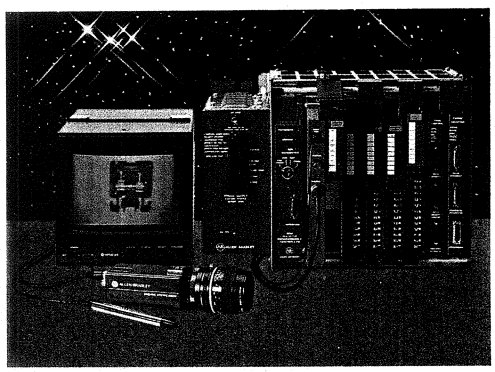
COMPATIBLE WORLD-CLASS AUTOMATION PRODUCTS...

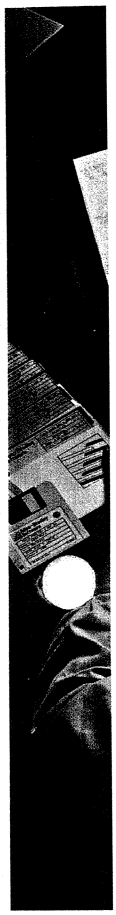
Allen-Bradley has been solving control problems successfully for over 85 years. In virtually every industry—including our own manufacturing operations.

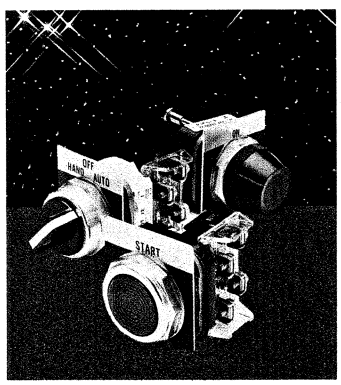
This practical, real-world experience has led us to develop the industry's broadest line of automation products, from sensors to systems.

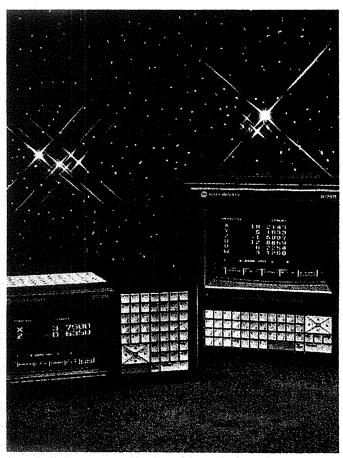
Allen-Bradley Automation Products

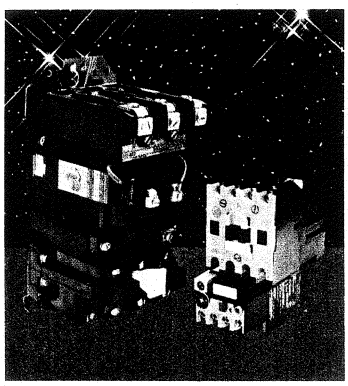
- Limit switches, proximity and photoelectric sensors
- Vision, bar code, RFI sensors
- Motor starters, contactors, controllers
- General-purpose and industrial relays
- Programmable controllers
- Application-specific I/O
- AC and DC drives, motors, drive systems
- General-purpose motion controllers
- Computer numerical controls
- PLC, motion and CNC programming software
- Application-specific software
- Operator panels, terminals, workstations
- Information processing
- Control and information networks
- Ethernet, DECnet, MAP/OSI connectivity
- Batch, plastics, SCADA control systems
- Discrete manufacturing control systems
- Burner management systems
- Engineered systems

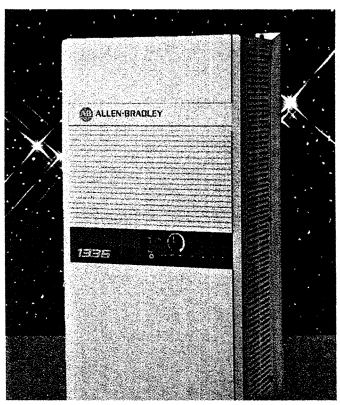


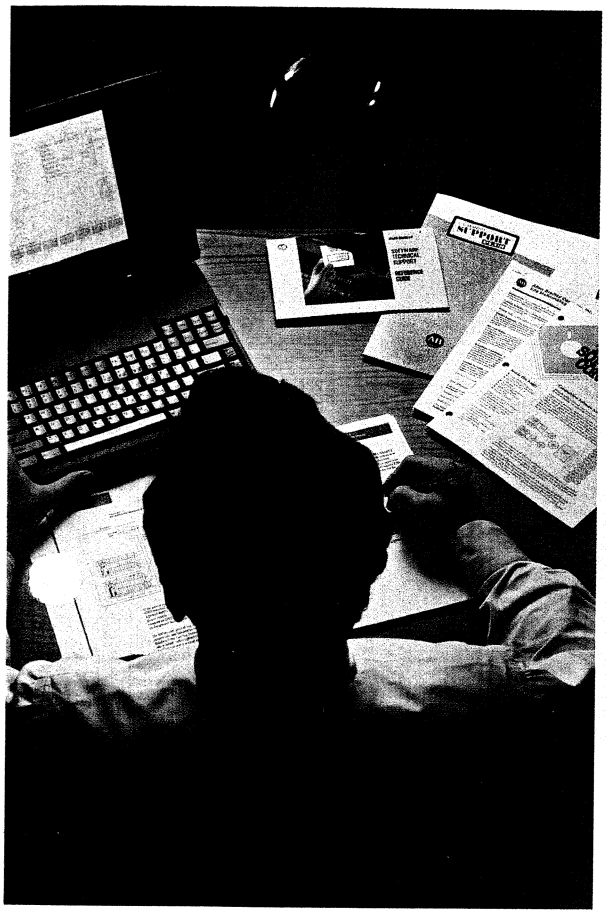












...WITH COMPREHENSIVE WORLDWIDE SUPPORT

Manufacturing technology keeps evolving. To continue moving ahead, you need to respond to change and get complex systems working together.

Yet integration isn't easy. That's why you need an automation partner with solid team support—like Allen-Bradley.

We have the people, resources and technology to help you build the system you need. So you can use it today and expand it tomorrow.

With Allen-Bradley as your automation partner, you get a company and products that work together to help you increase output, improve quality, cut costs and speed products to market. Benefits that can put you ahead of the competition—and keep you there!

Customer Support Services

The Allen-Bradley Support Division maintains customer support centers in principal cities throughout the world, staffed by experienced professionals dedicated to customer support services:

- Application engineering
- Field service
- Training
- Support agreements
- Repair
- Telephone support

Distributor Network

Our worldwide network of appointed Allen-Bradley distributors stock A-B products for fast delivery and provide local sales and product support services.

Allen-Bradley distributors are factory-trained professionals, carefully selected for their product knowledge and commitment to customer satisfaction.

Systems Integration Services

Our network of authorized integrators provide system solutions based on Allen-Bradley automation products.

These independent companies are integration experts in specialized technologies, including process and discrete manufacturing control, motion control, information processing, communications, vision and automatic identification systems.

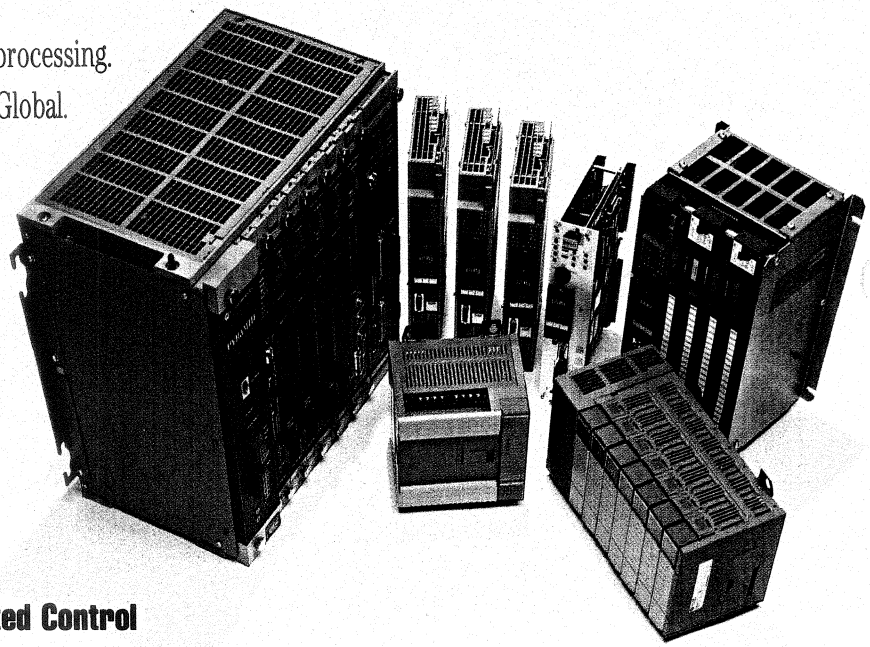
PLC-5 FAMILY FEATURES

SLC 500 Processors For Dedicated Control

- Expandable fixed or modular hardware.
- Comprehensive processor functionality.
- Discrete, analog and specialty I/O.
- Flexible programming options.
- Powerful instruction set derived from the PLC-5 line.
- DH-485 network communications.
- 1771 Remote I/O communications.

PLC-5 Midsize Processors For Distributed Control

- 1771 slot-based processors.
- Local I/O for fast scan times, high-speed processing.
- Sequential Function Chart, MCP, PII and Global. Status Flag programming tools.
- Application software for Batch, Plastics, SCADA, discrete manufacturing.
- Advanced instruction set with over 80 instructions.
- Built-in 1771 Remote I/O and Data Highway Plus communications.
- Back-up communications capability.



PLC-5/250 Processors For Integrated Control

- High-performance controller for large, integrated PLC and supervisory control applications.
- Flexible multiprocessing, multitasking architecture.
- Integrate control, vision and information processing.
- Advanced instructions, a superset of the PLC-5 midsize line.
- Connect multiple 1771 Remote I/O and Data Highway/ Data Highway Plus networks.
- MAP 802.4 connectivity.
- Network Hewlett-Packard or DEC VAX computers over an Ethernet TCP/IP network.

PLC-5 FAMILY SELECTION CHART

Product	Memory Capacity	Backup Memory with EEPROM Module	I/O (any mix)	Maximum Number of 1771 I/O Racks	I/O Chassis Configurations	1771 Remote I/O Communications Mode	Communications
SLC 500	1K	1K	72	—	All Resident	1747-DCM	DH-485
SLC 5/01	1K or 4K	1K or 4K	256	—	All Resident	1747-DCM	DH-485
SLC 5/02	4K	4K	480	—	All Resident	1747-DCM	DH-485
PLC-5/10	6K	6K	256[1]	1	1 Resident	None	1 Data Highway Plus
PLC-5/12	6K	6K	256[1]	1	1 Resident	Adapter	1 Data Highway Plus
PLC-5/15	Up to 14K[3]	6K	512	4	1 Resident 3 Remote	Scanner or adapter	1 Data Highway Plus
PLC-5/VME[2]	14K	—	512	4	All Remote	Scanner	1 Data Highway Plus
PLC-5/25	Up to 21K[3]	13K	1024	8	1 Resident 7 Remote	Scanner or adapter	1 Data Highway Plus
PLC-5/40	48K	48K	2048	16	1 Resident 15 Remote	Simultaneous Scanner/Adapter	4 configurable channels for Data Highway Plus or Remote I/O 1 RS-232/422/423 Port
PLC-5/40L	48K	48K	2048	16	1 Resident 15 Local 15 Remote	Simultaneous Scanner/Adapter	2 configurable channels for Data Highway Plus or Remote I/O 1 RS-232/422/423 Port 1 Local I/O port
PLC-5/60	64K	64K	3072	24	1 Resident 23 Remote	Simultaneous Scanner/Adapter	4 configurable channels for Data Highway Plus or Remote I/O 1 RS-232/422/423 Port
PLC-5/60L	64K	64K	3072	24	1 Resident 16 Local 23 Remote	Simultaneous Scanner/Adapter	2 configurable channels for Data Highway Plus or Remote I/O 1 RS-232/422/423 Port 1 Local I/O port
PLC-5/250	384K per processor	—	4096	8/Remote Scanner up to 4 Scanners maximum	All Remote	Scanner and/or adapter	2 Data Highway/Data Highway Plus[4] 1 RS-232/422/423 port

[1] 512 I/O using 32-point I/O modules in the local chassis. [2] Provides PLC-5 functionality for VME-based systems. [3] With memory card option. [4] Supports up to 10 Data Highway Plus ports by adding additional 5130-KA modules.

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ALLEN-BRADLEY
A ROCKWELL INTERNATIONAL COMPANY

As a subsidiary of Rockwell International, one of the world's largest technology companies — Allen-Bradley meets today's challenges of industrial automation with over 85 years of practical plant-floor experience. More than 13,000 employees throughout the world design, manufacture and apply a wide range of control and automation products and supporting services to help our customers continuously improve quality, productivity and time to market. These products and services not only control individual machines but integrate the manufacturing process, while providing access to vital plant floor data that can be used to support decision-making throughout the enterprise.

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