Allen-Bradley

System Overview

MicroLogix™ 1500 Programmable Controller with Compact™ I/O for Expansion

(Bulletins 1764 and 1769)

Rockwell Automation

Bringing Together Leading Brands in Industrial Automation

Take Control

Experience Complete Satisfaction With Allen-Bradley Products

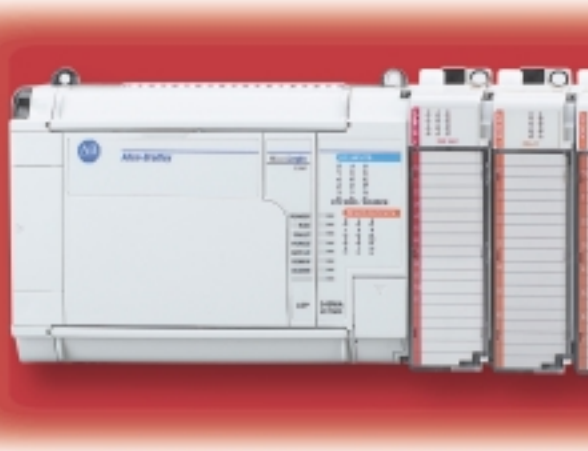
Since 1903, Rockwell Automation's Allen-Bradley has earned a worldwide reputation as the most trusted brand name in industrial automation. It's a reputation built on a very simple strategy: providing customers with products of uncompromising quality and reliability. The MicroLogix 1500 family of controllers demonstrates that commitment to high standards of product dependability, technological innovation, and performance.

More importantly, because your absolute satisfaction is important to us, we back our products with the highest levels of customer service and support in the industry. Your local Rockwell Automation representative is your source for expert sales and order support, as well as:

- Product technical training
- Warranty support
- Service agreements

MicroLogix 1500 Controllers:

Expanding Your Choices for Greater Control

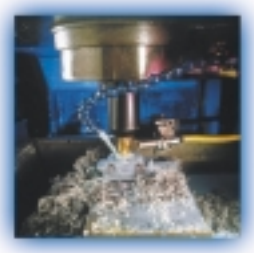


There was a time when a large controller was needed for applications requiring 100 or more points of I/O. Not any more. The MicroLogix 1500 is a more powerful and expandable addition to the MicroLogix family. This dynamic packaged controller can handle many applications that used to require larger, more expensive controllers.

World Class Features for Many Applications

The MicroLogix 1500 has more robust features than you might expect for a controller this size. It supports up to 12K of onboard non-volatile user memory to accommodate complex application programs, with additional memory for applications that require data logging. Additionally, the controller's terminal blocks are removable, "finger safe" NEMA-style blocks. And because it can be either DIN rail or panel mounted, the MicroLogix 1500 takes up a fraction of the space of larger controllers while reducing overall application costs.

Communications are flexible for the MicroLogix 1500, as well. DH-485 and DeviceNet™ compatibility are available via add-on communication modules, and DF1™ Full-Duplex and Half-Duplex Slave is perfect for SCADA applications. Ethernet® and

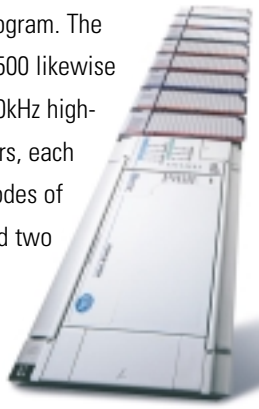


ControlNet™ connectivity is available via a wide range of bridge products. Modbus RTU Slave capability simplifies integration into SCADA/RTU installations that use Modbus.

Finally, as with all MicroLogix controllers, the MicroLogix 1500 is programmed using the RSLogix 500™ programming environment. The instruction set is compatible with all MicroLogix as well as SLC controllers.

High-Speed Performance

Because many large manufacturing applications occur at a fast pace, the MicroLogix 1500 is built for speed. For example, the controller's typical scan time is less than 1 millisecond per 1K of user program. The MicroLogix 1500 likewise boasts two 20kHz high-speed counters, each with eight modes of operation, and two high-speed outputs that can be configured either as 20kHz Pulse Train Outputs (PTO) or as Pulse Width Modulation (PWM) outputs. Finally, you will find one selectable timed interrupt (STI) and four event interrupts, making the MicroLogix 1500 ideal for many high-speed applications.



Application Flexibility through Compact I/O

The magic behind the MicroLogix 1500 is its use of Compact I/O, a new "PLC-style" I/O platform, for I/O expansion. Compact I/O makes use of the latest design technology for superior performance and ease of use while maintaining the MicroLogix 1500's small footprint.

Expandable to over 128 I/O points, Compact I/O features an innovative rackless design, reducing overall system cost. Its modular, high-density configuration reduces panel space requirements. And because modules can be added or replaced from the front of the unit, installation and maintenance time is significantly reduced.

Compact I/O offers broad application coverage via 24VDC sink/source and 120/240VAC I/O, relay, and analog I/O.

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Refer to the MicroLogix Selector Guide on the back cover of this publication for assistance in selecting the correct MicroLogix Programmable Controller for your application.

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MicroLogix 1500 System

The MicroLogix 1500 is a world-class programmable logic control platform with advanced features and performance. Many of these new features allow this controller to be used in applications where much larger controllers were required in the past.

The MicroLogix 1500 controller features an innovative two-piece design with a small footprint. The processor and base units slide together to form the complete controller. The processor and base are independently replaceable, allowing you to maximize your embedded I/O options while minimizing inventory stocking costs.

The MicroLogix 1500 uses Compact™ I/O modules to further expand the embedded I/O offerings, as well as to provide the additional flexibility to cover a wide range of applications. This high-performance modular and rackless I/O platform provides front accessibility for removal and insertion, lowering system cost and reducing maintenance time.

The MicroLogix 1500 system also utilizes Rockwell Software RSLogix™ 500 programming software, and features an instruction set common to the MicroLogix 1000, MicroLogix 1200 and SLC families of controllers. This allows you to choose just the right level of control using the same programming tool.

A field-upgradeable flash operating system ensures you will always be up to date with the latest features. The controller may be easily updated with latest firmware via web site download.

Program portability of user programs (upload, download and transport) is accomplished via Memory Modules. Real-Time Clock (RTC) modules provide scheduling of control capability.

The optional Data Access Tool (DAT) plug-in device offers you the ability to digitally monitor and adjust 48 integer and 48 bit locations for on-the-fly adjustment. Two additional function keys each act as momentary and toggle push buttons. Security features may be used to protect data from operator changes.

Features

- single or dual RS-232 communication ports
- 7K or 12K processors
- 32-bit signed integer math and built-in PID capabilities provide you with process control power.
- Embedded I/O provide enhanced high-speed inputs and outputs.
- Two analog trim potentiometers built into the controller. A 3/4 turn adjusts an integer between 0 and 250, allowing easy adjustments to timer/counter presets, set points, conveyor speed, valve adjustment, etc.
- Two high-speed outputs that can be configured as 20 kHz PTO (Pulse Train Outputs) or as PWM (Pulse Width Modulated) outputs with two acceleration/deceleration profiles. These high-speed outputs allow simple high-speed applications such as packaging or printing to be solved using a low-cost, small controller system as an inexpensive stepper or servo motor controller.
- Data file download protection, saves critical user data from being overwritten during program transfers. Application/user variables can be preserved when a new program is downloaded.
- Programs written for MicroLogix 1000, MicroLogix 1200 or SLC 500 controllers can be easily converted and scaled to work with a MicroLogix 1500. That protects your software investment when you need to scale your control system up or down. And, it saves you time and money during development and testing.
- MicroLogix 1500 provides an enhanced user interface through the use of function files that consolidate parameters within new features. This simplifies the user interface and increases controller performance.
- Connection to DeviceNet (via 1761-NET-DNI) or DH-485 (via 1761-NET-AIC) networks. This enables:
  - use of 1761-NET-DNI for connection to DeviceNet with up to 64 devices with slave I/O peer-to-peer, change of state, and upload and download capability.
  - use of 1761-NET-AIC for connection to DH-485 networks of up to 32 devices with program upload and download capability.

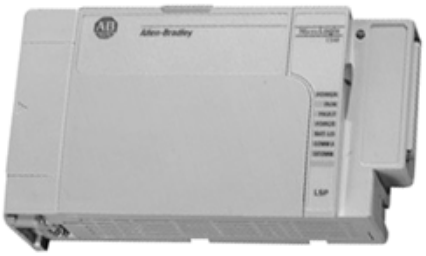
Product Overview

The MicroLogix 1500 controllers are comprised of a base unit, processor unit and optional expansion I/O. (See page page 10 for additional information on expansion I/O.) Each component is optimized for functionality, while maintaining affordability and a small size.

Processor Units

The processor units are the “brains” of the system. They provide the logic processing and the interface to the DAT, real-time clock and memory modules, trim potentiometers, mode switch, and (using the 1764-LRP processor) an electrically isolated RS-232 port (channel 1). The two processor units currently available are described below.

1764-LSP Processor



- The 1764-LSP processor provides you with large memory size (greater than 7K user program capacity) to solve a variety of applications. Configurable user data allows data elements to be selected according to the individual application requirements. 100% retentative data ensures data integrity even during power loss.
- Communications are extremely flexible with support for a variety of protocols including DF1 Full-Duplex and Half-Duplex Slave, DH-485, Modbus RTU Slave and ASCII. The RS-232 port on the base unit allows for direct connection of programming and operator interface devices, remote programming, peer-to-peer communications, and SCADA/RTU networking. Modbus RTU Slave allows for easy integration with existing SCADA/RTU installation utilizing Modbus protocol.
- Static data file protection prevents user data from being altered via communication.
- ASCII read/write capability enables you to initiate modem control and communicate to bar code readers, printers, weigh scales, etc., with string data file support.
- The 1764-LSP processor also provides you with the interface to the following advanced features and functionality:
  - Optional memory and real-time clock modules
  - Optional data access tool (1764-DAT)
  - Built-in analog trim potentiometers
  - Battery (built-in and replacement)
  - 1 ms Selectable Timed Interrupt (STI) (For additional information on high-speed functions, see page 21.)
  - High-resolution timers (For additional information on high-speed functions, see page 21.)
  - Latching (pulse-catch) inputs (For additional information on high-speed functions, see page 21.)
  - Communication toggle push button
  - Mode switch for Run/Remote/Program
  - Field upgradeable flash operating system

1764-LRP Processor

The 1764-LRP processor has all of the advanced features of the 1764-LSP processor with the following additional functionality.

- The 1764-LRP processor provides you with an even larger memory size (12K user program capacity) to solve a variety of applications. Configurable user data allows data elements to be selected according to the individual application requirements. 100% retentative data ensures data integrity even during power loss.
- Communications are extremely flexible with a built-in isolated 9-pin D-shell RS-232C port on the processor unit (in addition to the port on the base unit). Both ports support: DF1 Full-Duplex and Half-Duplex Slave; DH-485; Modbus RTU Slave; and ASCII. The RS-232 port allows for direct connection of programming and operator interface devices, remote programming, peer-to-peer communications, and SCADA/RTU networking. Modbus RTU Slave allows for easy integration with existing SCADA/RTU installation utilizing Modbus protocol. This additional RS-232 communication port provides programming access, direct connection to operator interface and other devices and networking, independent of the base communication port.
- Two additional memory modules are available for larger 1764-LRP programs.
- Data logging instruction stores up to 48K bytes of data records. Allows critical data to be stored for later analysis. The new data logging instruction is also great for SCADA/RTU applications where a stand-alone controller must collect information for later retrieval.
  - The memory used for data logging is independent of processor memory. Within this memory, you can define up to 256 data logging queues. Each queue is configurable by size (maximum number of records stored), and by length (up to 80 characters). The length and the maximum number of records determine how much memory is used by each queue. You can choose to have one large queue or multiple smaller ones.
  - Each record is stored when the DLG instruction is executed and is stored in non-volatile memory (battery-backed) to prevent loss during power-down.
  - The configuration of the DLG instruction allows you to optionally include time stamping, data stamping, and a configurable separator character with the data words that are stored.
  - New records are appended to the end of the file - FIFO (first in, first out) as the DLG instruction is triggered (by an event, timer, counter, real-time clock, etc.)
  - Data logging records may be uploaded using a number of free tools available on the MicroLogix Internet site http://www.ab.com/micrologix. Tools are available for Palm OS, Windows CE, Windows® 95, Windows® 98, and Windows NT™ (v4.0) devices to upload the data directly from the controller through comms. The information may be imported directly into spreadsheet, word processing, or other applications as a .CSV or .TXT file.

Base Units

MicroLogix 1500 base units house embedded inputs, outputs, power supply and the channel 0 port. They also provide the interface to expansion I/O when required by an application. Three base units are available with the following electrical configurations. (For information on base unit specifications, see page 8.)

- 120/240V ac powered base units
  - 1764-24AWA - (12) 120V ac inputs and (12) relay outputs
  - 1764-24BWA - (12) 24V dc inputs and (12) relay outputs
- 24V dc powered base unit
  - 1764-28BXB - (16) 24V dc inputs and (6) 24V dc FET and (6) relay outputs

MicroLogix 1500 Specifications

Available Controllers

Catalog Number	Description
Processor: (**required,** must be interfaced to a base unit, see below)	
1764-LSP	Greater than 7K user memory
1764-LRP	12K user memory/RS-232 isolated Comm port/data logging
Base: (one of the following bases is **required,** for each processor)	
1764-24AWA	AC Powered, 12 AC IN / 12 Relay Out
1764-24BWA	AC Powered, 12 DC IN / 12 Relay Out
1764-28BXB	24V DC Powered, 16 DC IN / 6 Relay and 6 DC FET Out

Base Unit General Specifications

Description	1764-24BWA	1764-24AWA	1764-28BXB
Line Power	85/265V ac		20.4 to 30V dc
Power Supply Max Inrush	120V ac = 25A for 8 ms 240V ac = 40A for 4 ms		24V dc = 4A for 150 ms
User Power Output	24V dc at 400 mA, 400 µf max.	None	
Input Circuit Type	24V dc, sink/source	120V ac	24V dc, sink/source
Output Circuit Type	Relay		6 Relay 6 FET transistor
Operating Temp.	+0°C to +55°C (+32°F to +131°F) ambient		
Operating Humidity	5% to 95% relative humidity (non-condensing)		
Vibration	Operating: 10 to 500 Hz, 5G, 0.030 in. peak-to-peak Relay Operation: 2G		
Shock (without Data Access Tool installed)	Operating: 30G panel mounted (15G DIN Rail mounted) Relay Operation: 7.5G panel mounted (5G DIN Rail mounted) Non-Operating: 40G panel mounted (30G DIN Rail mounted)		
Shock (with Data Access Tool installed)	Operating: 20G panel mounted (15G DIN Rail mounted) Relay Operation: 7.5G panel mounted (5G DIN Rail mounted) Non-Operating: 30G panel mounted (20G DIN Rail mounted)		
Agency Certification	UL 508 C-UL under CSA C22.2 no. 142 Class I, Div. 2, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 no. 213) CE compliant for all applicable directives		
User Manual	MicroLogix 1500 Programmable Controllers User Manual, publication 1764-UM001A-US-P.		

Base Unit Input Specifications

Description	1764-24AWA	1764-24BWA and 1764-28BXB	
		Inputs 0 thru 7	Inputs 8 and Higher
On-State Voltage Range Operating Voltage Range	79 to 132V ac	14 to 30.0 V dc at 30°C (86°F) 14 to 26.4 V dc at 55°C (131°F)	10 to 30.0 V dc at 30°C (86°F) 10 to 26.4 V dc at 55°C (131°F)
Operating Frequency	47 Hz to 63 Hz	0 Hz to 20 KHz	0 Hz to 1 KHz(1)

(1) Scan-time dependent.

Relay Contact Rating Table 1764-24AWA, -24BWA, -28BXB

Maximum Volts	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V ac	7.5A	0.75A	2.5A	1800VA	180VA(2)
120V ac	15A	1.5A			
125V dc	0.22A(1)		1.0A	28VA	
24V dc	1.2A[1]		2.0A	28VA	

(1) For dc voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied dc voltage. For example, 28 VA/48V dc = 0.58A. For dc voltage applications less than 14V, the make/break ratings for relay contacts cannot exceed 2A.
(2) The total load controlled by the 1764-24AWA and 1764-24BWA is limited to 1440VA (break).

Output Specifications - Maximum Continuous Current

Specification		1764-24AWA/-24BWA	1764-28BXB
Current per Common		8A	8A
Current per Controller	at 150V ac Maximum	24A	18A
	at 240V ac Maximum	20A	18A

1764-28BXB FET Output Specifications

Specification		General Operation (Outputs 2 thru 7)	High-Speed Operation(1) (Outputs 2 and 3 Only)
User Supply Voltage	Minimum	20.4V dc	20.4V dc
	Maximum	26.4V dc	26.4V dc
Current Rating per Point	Maximum load	1A at 55°C (131°F) 1.5A at 30°C (86°F)	100 mA
Surge Current per Point	Peak current	4.0A for 10 msec	Not Applicable
Current per Common	Maximum total	6A	6A
Off to On Response	Maximum	0.1 msec	6 µsec
On to Off Response	Maximum	1.0 msec	18 µsec

(1) Outputs 2 and 3 are designed to provide increased functionality over the other FET outputs (4 through 7). They may be used like the other FET transistor outputs, but in addition, within a limited current range, they may be operated at a higher speed. Outputs 2 and 3 also provide a pulse train output (PTO) or pulse width modulation output (PWM) function.

Expansion I/O Modules

High-density Bulletin 1769 Compact I/O rackless expansion modules offer superior functionality and high value at a competitive price. With a variety of modules, they complement and extend the capabilities of the MicroLogix 1500 controller by maximizing flexibility of the I/O count and type. (Up to eight expansion Compact I/O modules can be connected to a MicroLogix 1500 controller dependent on power requirements.) Compact I/O provides an excellent platform for future enhancements, so you can easily choose the level of control as your application needs grow.

Compact I/O's analog modules provide 14-bit plus sign maximum resolution, making them an excellent choice in applications where the need to detect small changes is vital.

Similarly, Compact I/O analog modules can be used in applications where accuracy is crucial. The modules share a high accuracy rating of ±0.35% of full-scale accuracy in the current mode. In the voltage mode, the 1769-IF4 provides ±0.2 and the 1769-OF2 ±0.5% of full-scale accuracy at 25°C.

Features

- Modular system, modules to suit the application
- Feature-rich I/O to address a wide range of applications
- Rackless design, reduces system components
- Small footprint, shrinks panel space requirements
- Front insertion and removal, reducing assembly and replacement time
- Unique tongue-and-groove interlocking case design, ensures a strong, mechanical connection between modules
- Software keying, prevents incorrect module placement within a system
- Discrete, analog and relay output modules

Currently available modules include:

1769-IA16	16-point 120V ac Input Module
1769-IA8I	8-point Individually Isolated 120V ac Input Module
1769-OA8	8-point 120/240V ac Output Module
1769-IM12	12-point 240V ac Input Module
1769-IQ16	16-point 24V dc Sinking/Sourcing Input Module
1769-OB16	16-point 24V dc Sourcing Output Module
1769-OB16P(1)	16-point 24V dc Sourcing Output Module with Electronic Protection
1769-OV16	16-point 24V dc Sinking Output Module
1769-OW8	8-point ac/dc Relay Output Module
1769-OW8I	8-point Individually Isolated ac/dc Relay Output Module
1769-IQ6XOW4	Combination 6-point dc Input and 4-point Relay Output Module
1769-IF4	4-channel analog current/voltage Input Module
1769-OF2	2-channel analog current/voltage Output Module

(1) Planned availability in August 2000.

Expansion I/O Module Specifications

Discrete Input Specifications

Specification	1769-IM12	1769-IA16	1769-IQ16	1769-IA8I
Voltage Category	200/240V ac	100/120V ac	24V dc (sink/source)	100/120V ac
Voltage Range	159 to 265V ac at 47 Hz to 60 Hz	79 to 132V ac at 47 Hz to 63 Hz	10 to 30V dc at 30°C (86°F) 10 to 26.4V dc at 60°C (140°F)	79V ac to 132V ac at 47 Hz to 63 Hz
Number of Inputs	12	16	16	8
Number of Commons per Module	2(1)	2(1)	2	8
Input Compatibility	IEC Type 1+			

(1) This module has two internally connected common terminals.

Discrete Output Specifications

Specification	1769-OA8	1769-OB16	1769-OB16P	1769-OV16	1769-OW8	1769-OW8I
Voltage Category	100 to 240V ac	24V dc		24V dc	AC/DC normally open relay	
Operating Voltage Range	85 to 265V ac at 47 to 63 Hz	20.4 to 26.4V dc (source)		20.4 to 26.4V dc (sink)	5 to 265V ac 5 to 125V dc	
Number of Outputs	8	16			8	
Number of Commons per Module	2	1			2	8
Continuous Current per Point (max.)	0.25A at 60°C (140°F) 0.5A at 30°C (86°F)	0.5A at 60°C (140°F) 1.0A at 30°C (86°F)			2.5A	
Continuous Current per Common (max.)	n/a				8A	2.5A
Continuous Current Per Module (max.)	2.0 A at 60°C (140°F) 4.0 A at 30°C (86°F)	4.0A at 60°C (140°F) 8.0A at 30°C (86°F)			16A	

1769-IQ6XOW4 Input and Output Specifications

Specifications	1769-IQ6XOW4
Voltage Category	24V dc (sink/source) inputs AC/DC normally open relay outputs
Operating Voltage Range	inputs: 10 to 30V dc at 30°C (86°F) inputs: 10 to 26.4V dc at 60°C (140°F) outputs: 5 to 265V ac outputs: 5 to 125V dc
Number of Inputs	6
Number of Outputs	4
Number of Commons per Module	2 (one for inputs, one for outputs)
Input Compatibility	IEC Type 1+
Continuous Current per Point (max.)	2.5A (outputs)
Continuous Current per Common (max.)	8A (outputs)

Analog I/O Modules

Compact I/O offers two analog I/O choices:

- 1769-IF4 - 4-channel current or voltage input
- 1769-OF2 - 2-channel current or voltage output

Each channel on both the 1769-IF4 and 1769-OF2 modules has the ability to be individually configured for either current (4 to 20 mA or 0 to 20 mA) or voltage (±10V dc, 0 to 10V dc, 0 to 5V dc or 1 to 5V dc) input/output. This provides application flexibility, reduces stock inventory and lessens the learning curve.

1769-IF4 Input Specifications

Specification	1769-IF4
Analog Normal Operating Ranges	Voltage: ±10V dc, 0 to 10V dc, 0 to 5V dc, 1 to 5V dc Current: 0 to 20 mA, 4 to 20 mA
Number of Inputs	4 differential or single-ended
Resolution (max.)	14 bits minimum (unipolar) 14 bits plus sign (bipolar), with 50 or 60 Hz filter selected
Normal Mode Rejection Ratio	Voltage: -10 dB at 50 Hz, -12 dB at 60 Hz Current: -15 dB at 50 Hz, -18 dB at 60 Hz
Input Impedance	Voltage Terminal: 200K Ω, Current Terminal: 250 Ω
Overall Accuracy(1)	Voltage Terminal: ±0.2% full scale at 25°C Current Terminal: ±0.35% full scale at 25°C
Module Error over Full Temperature Range (0 to +60°C [+32°F to +140°F])	Voltage: ±0.3% Current: ±0.5%
Field Input Calibration	Not required
Channel Diagnostics	Over- or under-range by bit reporting

(1) Includes offset, gain, non-linearity and repeatability error terms.

1769-OF2 Output Specifications

Specification	1769-OF2
Analog Ranges	Voltage: ±10V dc, 0 to 10V dc, 0 to 5V dc, 1 to 5V dc Current: 0 to 20 mA, 4 to 20 mA
Number of Outputs	2 single-ended
Resolution (max.)	14 bits minimum (unipolar) 14 bits plus sign (bipolar), with 50 or 60 Hz filter selected
Conversion Rate (all channels) max.	2.5 ms
Current Load on Voltage Output	5 mA max.
Resistive Load on Current Output	0 to 500 Ω (includes wire resistance)
Load Range on Voltage Output	> 1k Ω at 5V dc; > 2k Ω at 10V dc
Field Calibration	None required
Overall Accuracy(1)	Voltage Terminal: ±0.5% full scale at 25°C, Current Terminal: ±0.35% full scale at 25°C
Output Error Over Full Temperature Range (0 to 60°C [32 to +140°F])	Voltage: ±0.8% Current: ±0.55%
Open/Short-Circuit Overvoltage Protection	Yes
Output Overvoltage Protection	Yes
Channel Diagnostics	Over-or-under range by bit reporting output wire broken or load resistance high by bit reporting (current mode only)

(1) Includes offset, gain, non-linearity and repeatability error terms.

Expansion Power Supplies and Cables

Using an expansion I/O power supply increases the system's capacity for adding expansion I/O modules, such as the 1769-IF4 and 1769-OF2 analog modules.

You can visit the MicroLogix web site to obtain an electronic worksheet to assist you with system expansion validation using 1769 power supplies and Bus communication cables. On the Internet, go to http://www.ab.com/micrologix. Enter MicroLogix 1500; go to Tools and Tips, Expansion I/O System Qualifier.

MicroLogix 1500 System Expansion

With MicroLogix 1500 Operating System Revision Number (FRN) 3 or later, you can connect an additional bank of I/O to your controller.

In a MicroLogix 1500 system, a maximum of one 1769 Expansion cable can be used, allowing for two banks of I/O modules (one connected directly to the controller and the other connected via the cable). Each I/O bank(1) requires its own power supply (Bank 0 uses the controller's embedded power supply).

Only one power supply (embedded or expansion) may be used on an I/O bank. The expansion power supply cannot be connected directly to a controller that has an embedded power supply, such as the MicroLogix 1500. It must be connected using one of the expansion cables. (See photos on page 14.)

Checking the MicroLogix 1500 Firmware

To use the MicroLogix 1500 controller with a 1769 Expansion I/O power supply, verify that you have the following:

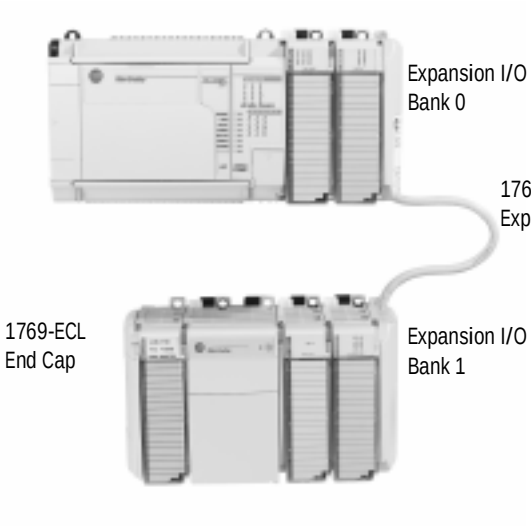
- MicroLogix 1500 Processor (Catalog Number 1764-LSP, Series A, Revision C or higher)
- Operating System Version: Firmware Revision Number (FRN) 3 or higher

You can check the FRN by looking at word S:59 (Operating System FRN) in the status file.

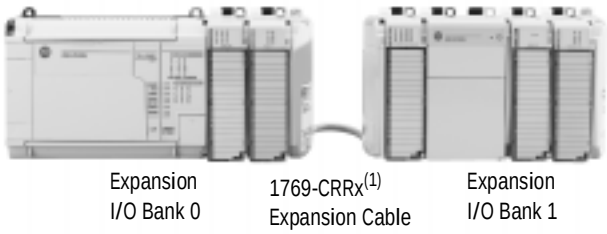
If your processor is at an older revision, you must upgrade the operating system to FRN 3 or higher to use an expansion cable and power supply. On the internet, go to http://www.ab.com/micrologix to download the operating system upgrade. Enter MicroLogix 1500; go to Tools and Tips.

(1) An I/O bank is a group of I/O modules connected directly to one another. Banks are separated by cables.

Vertical Orientation



Horizontal Orientation



(1) The x in this catalog number can be either a 1 or a 3 representing the length of the cable: 1 = 1 foot (305 mm) and 3 = 3.28 feet (1 meter).

Expansion Power Supplies Specifications

Specification	1769-PA2	1769-PB2
Dimensions	118 mm (height) x 87 mm (depth) x 70mm (width); height including mounting tabs is 138 mm. 4.65 in. (height) x 3.43 in (depth) x 2.76 in (width); height including mounting tabs is 5.43 in.	
Operating Temperature	0°C to +60°C (32°F to +140°F)	
Operating Humidity	5% to 95% non-condensing	
Agency Certification	C-UL certified (under CSA C22.2 No. 142) UL 508 listed CE compliant for all applicable directives	
Hazardous Environment Class	Class I, Division 2, Hazardous Location, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 No. 213)	
Voltage Range	85 to 265V ac (no jumper or DIP switch required) 47 to 63 Hz	19.2 to 31.2V dc
Maximum Line Requirement	100 VA at 120V ac 130 VA at 240V ac	50 VA at 24V dc
Short Circuit Protection	Front Access Fuse (Replacement part number: Wickmann 19195-3.15A Wickmann 19343-1.6A, or Wickmann 19181-4A)	Front Access Fuse (Replacement part number: Wickmann 19193-6.3A)
+24V dc User Voltage Range	20.4V dc to 26.4V dc	NA

Expansion Cable Specifications

Specification	
Operating Temperature	0°C to +60°C (32°F to +140°F)
Operating Humidity	5% to 95% non-condensing
Hazardous Environment Class	Class I, Division 2, Hazardous Location, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 No. 213)

Communication Choices

All MicroLogix 1500 programmable controllers provide several communication options to fit into a variety of applications.

The addition of a second full-function RS-232 communications port (catalog number 1764-LRP) enables two communication devices to be connected to the controller simultaneously (e.g. ASCII device, operator interface device, modem or programming device).

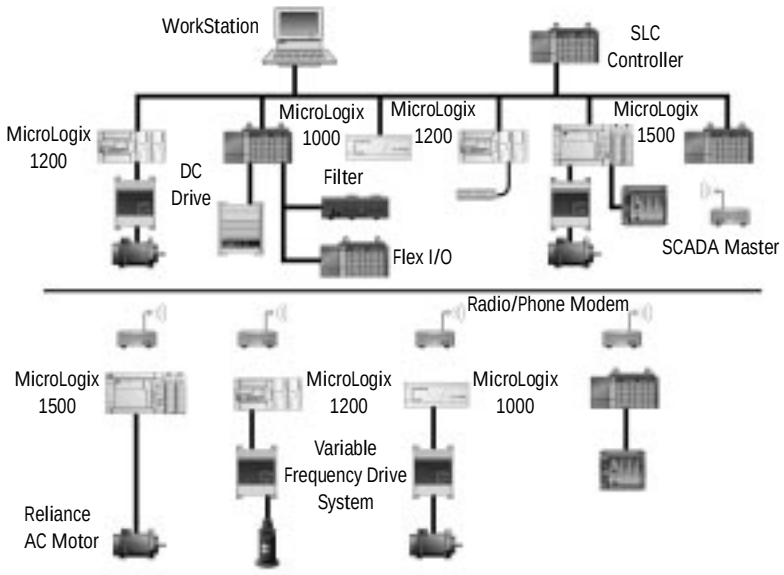
The DF1 Full-Duplex protocol allows a MicroLogix 1500 to communicate directly with another device, such as a personal computer or an operator interface device. The DF1 Full-Duplex protocol (also referred to as DF1 point-to-point protocol) is useful where RS-232 point-to-point communication is required.

The DH-485 multi-drop communication capability allows you to network up to 32 MicroLogix or SLC 500 controllers, Human/Machine Interface (HMI) devices and/or personal computers using peer-to-peer messaging.

And, the MicroLogix 1500 can communicate on a DeviceNet network as well. DeviceNet digitally links push buttons, sensors, actuators, PLCs and other industrial devices on an open network.

MicroLogix 1500 controllers also support DF1 Half-Duplex Slave communications for use in SCADA systems as a Remote Terminal Unit (RTU). This open network protocol enables MicroLogix controllers to communicate as responder (slave) nodes on DF1 master/slave networks. DF1 supports up to 254 responder devices with a single master.

Additionally, the MicroLogix 1500 supports Modbus Slave, a SCADA/RTU protocol.



Features

- One RS-232 port (available on all base units)
- Additional RS-232 port (available when using catalog number 1764-LRP)
- 300, 600, 1200, 4800, 9600, 19,200, and 38,400 baud rates
- RTS/CTS Hardware handshake signals - channel 0
- RTS/CTS/DCD Hardware handshake signals - channel 1
- Connection to DH-485 and DeviceNet networks through 1761-NET-AIC and 1761-NET-DNI, respectively
- Connection to modems for remote communications
- ASCII messaging provides dial-out capability

The MicroLogix 1500 allows you to choose the network that best meets your needs.

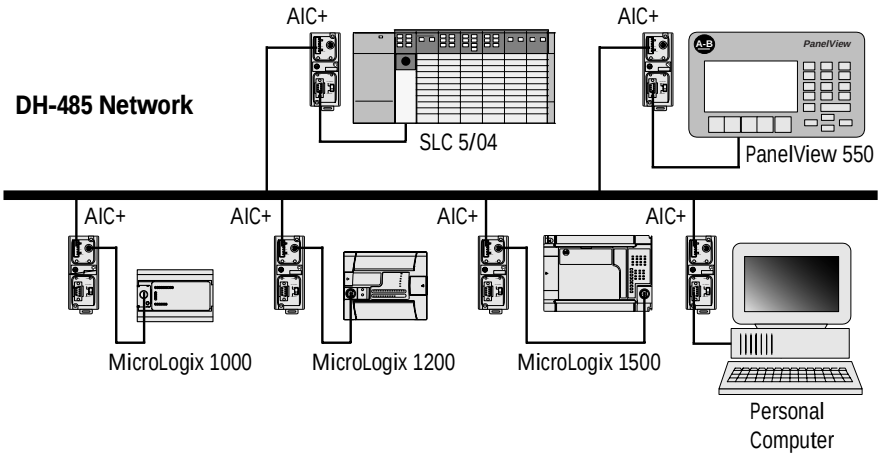
If your application requires:	Use this network
• Connection of low-level multi-vendor devices directly to plant floor controllers • Data sharing between 64 devices • Better diagnostics for improved data collection and fault detection • Less wiring and reduced start-up time than traditional, hard-wired systems	DeviceNet via the 1761-NET-DNI
• Plant-wide and cell-level data sharing with program maintenance • Data sharing between 32 controllers • Program upload, download, and monitoring to all controllers • Compatibility with multiple Allen-Bradley HMI devices	DH-485 via the 1761-NET-AIC
• Connection to dial-up modems for remote program maintenance or data collection • Connection to leased-line or radio modems for use in SCADA systems • Remote Terminal Unit (RTU) functions	DF1 Full-Duplex DF1 Half-Duplex Slave
• Connection to modems for remote data collection in a SCADA system • Remote Terminal Unit (RTU) functions	Modbus RTU Slave

Local Messages

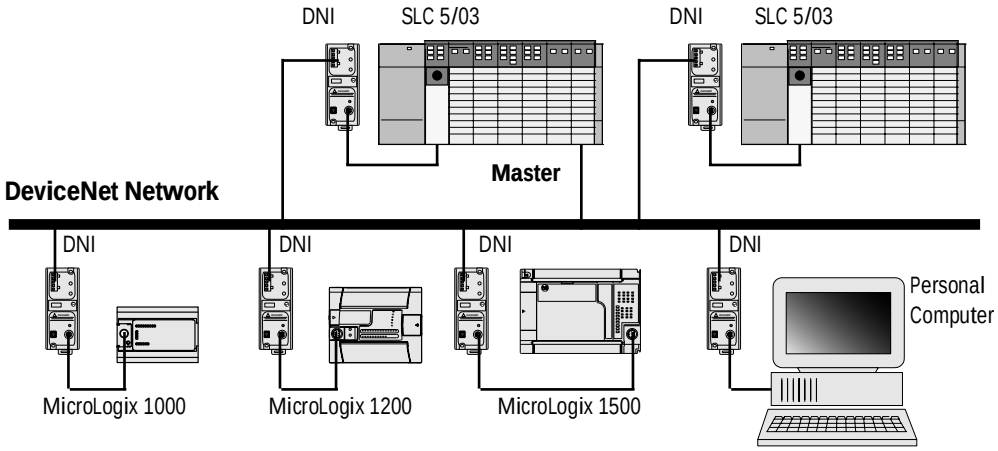
The MicroLogix 1500 is capable of communicating using local or remote messages. With a local message, all network devices are accessible without a separate device acting as a bridge. With remote messages, devices are accessible by passing or routing through a device.

The following four examples represent different types of local and remote networks.

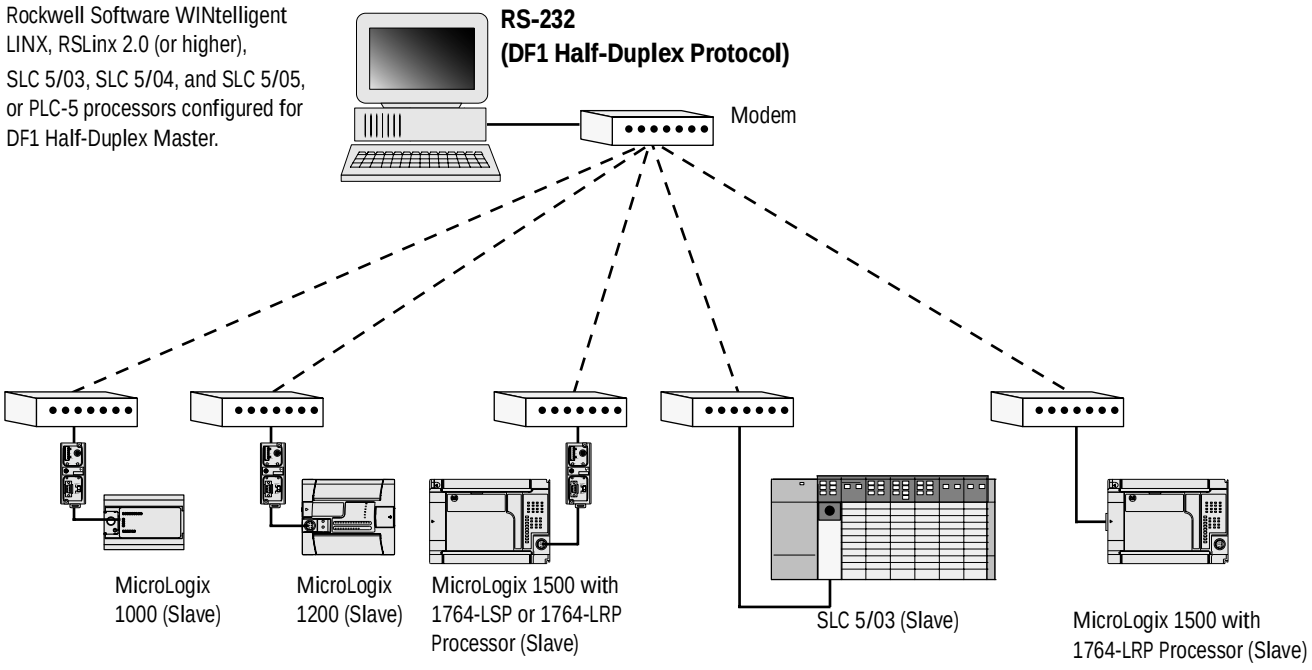
Example 1 - Local DH-485 Network with AIC+ (1761-NET-AIC) Interface



Example 2 - Local DeviceNet Network with DeviceNet Interface (1761-NET-DNI)

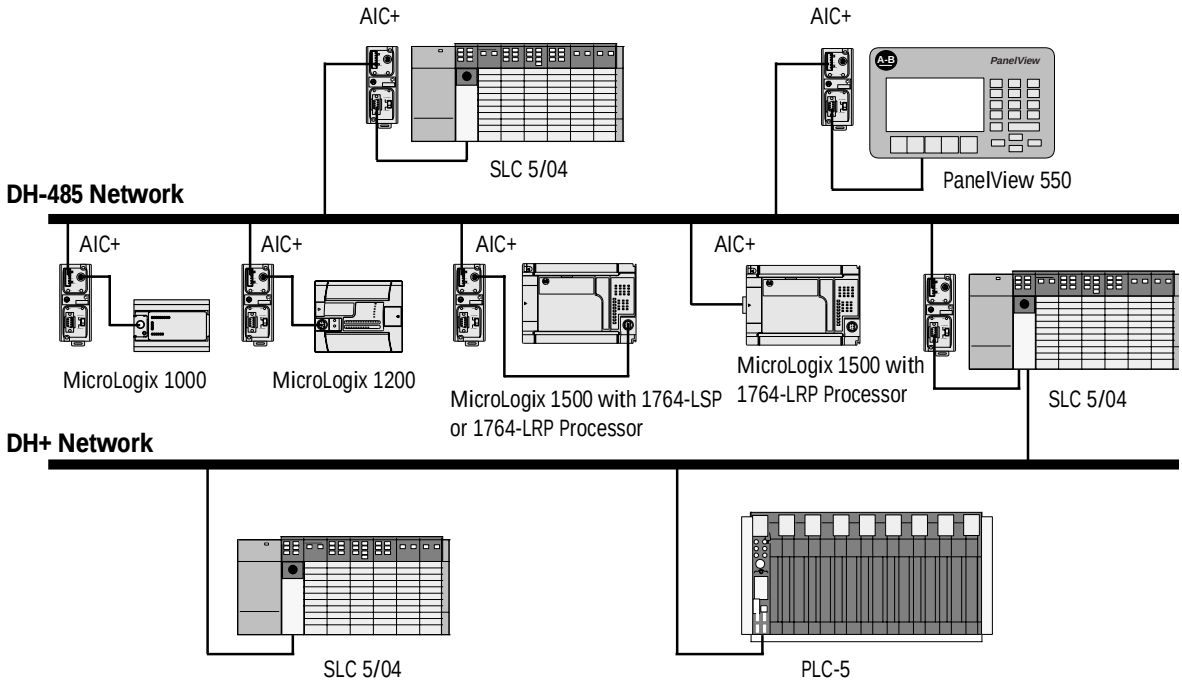


Example 3 - Local DF1 Half-Duplex Network



NOTE It is recommended that isolation (1761-NET-AIC) be provided between the controller and the modem when using a non-isolated port.

Example 4 - Remote Messaging



Network Interface Devices

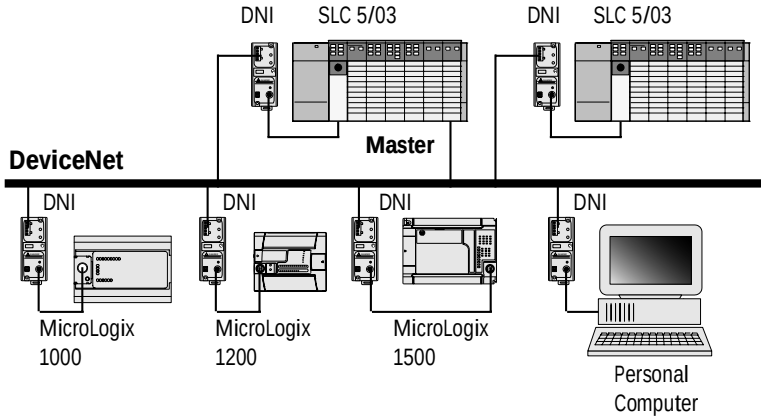
The Micrologix 1500 Programmable Controller's list of impressive hardware, memory, and processing features makes this family of controllers an ideal choice for mid-sized applications. Additionally, with the 1761-NET-DNI DeviceNet Interface and 1761-NET-AIC Advanced Interface Converter (AIC+), you can connect MicroLogix Programmable Controllers to DH-485 and DeviceNet networks.

For detailed information on using these network interface modules, refer to the *DeviceNet™ Interface User Manual*, publication 1761-6.5, or the *AIC+ Advanced Interface Converter User Manual*, publication 1761-6.4. To purchase these manuals or download a free electronic version, visit us at http://www.theautomationbookstore.com. For fast access to related publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

1761-NET-DNI DeviceNet Interface Module

Highlights of the DeviceNet Interface's capabilities are:

- Peer-to-peer messaging between Allen-Bradley controllers and other devices using the DF1 Full-Duplex protocol
- Programming and on-line monitoring over the DeviceNet network
- With a DNI connected to a modem, you can dial in to any other DNI-controller combination on DeviceNet
- Other DeviceNet products can send explicit (Get or Set) messages with the DNI at any time
- The controller can initiate an explicit message to any UCMM (Unconnected Message Manager) compatible device on DeviceNet



MicroLogix micro-PLCs extend the benefits of distributed control to the device level of your process with the addition of DeviceNet functionality.

DeviceNet digitally links push buttons, sensors, actuators, PLCs and other industrial devices. It reduces the installation and maintenance costs of multiple discrete wires with a single cable that handles both communications and power distribution.

The 1761-NET-DNI Series B Interface (DNI) brings the fast response, low cost and reliability of open DeviceNet connectivity to all MicroLogix controllers and most other Allen-Bradley controllers.

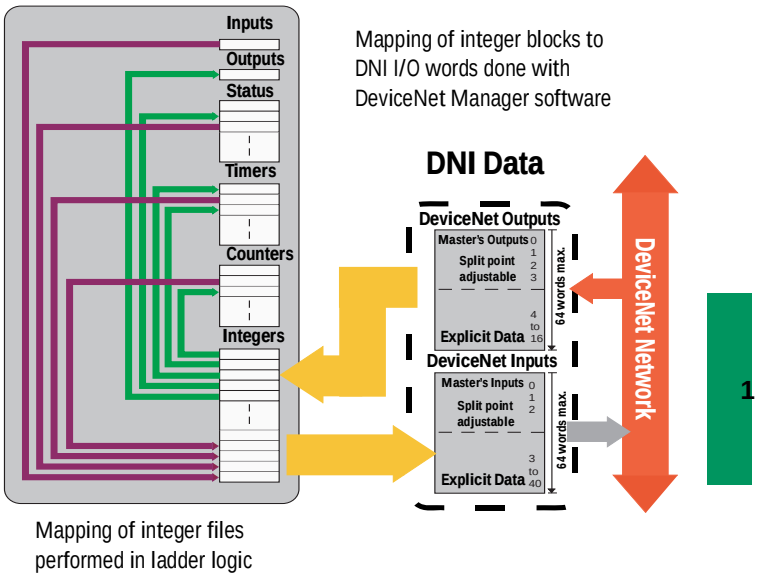
MicroLogix on DeviceNet lets you take advantage of the latest advances in communications. DeviceNet uses producer/consumer technology which significantly reduces the amount of traffic on the network, thus improving efficiency and data throughput. As a result, information gets across the network quicker.

Advanced Slave I/O Functionality

Through the DNI, MicroLogix controllers can function as cost-effective DeviceNet slave nodes. The DNI presents to DeviceNet up to 64 words of data (32 inputs, 32 outputs, configurable). The DNI can either poll or accept data sent from the MicroLogix controller to keep its mapped I/O data up-to-date with the actual data in the controller, while the DNI handles all DeviceNet communications.

All local I/O remains under the MicroLogix controller's direct control, yet can be visible to the DeviceNet master.

Using standard messaging commands, you can easily read or write data to other controllers as shown in the network diagram on page 18.



Simple, Reliable Peer-to-Peer Messaging

The DNI brings brand-new functionality to DeviceNet by enabling peer-to-peer messaging between devices that use the DF1 Full-Duplex protocol.

The DNI takes the DF1 Full-Duplex commands, wraps them in the DeviceNet protocol and sends them to the target DNI. The target DNI removes the DeviceNet information and passes the DF1 command to the end device.

This capability works between controllers, PCs and controllers, and for program up/downloading. I/O and data messages are prioritized, which minimizes I/O determinism problems typically encountered on networks that support I/O and messaging simultaneously.

Enable Your Control Strategy Now

Helpful information and free DNI configuration software are also available at http://www.ab.com/micrologix. For more on the DeviceNet standard, visit http://www.odva.org.

DeviceNet Interface Series B (1761-NET-DNI) Specifications

Description	Specifications
24V dc Power Source Requirements	11 to 25V dc
Current Draw	200 to 250 mA 400 mA maximum inrush current (30 msec, max.)
Operating Ambient Temperature	0 to +60°C (+32 to +140°F)
Agency Certification	UL 1604 C-UL C22.2 No. 213 Class 1, Division 2, Groups A, B, C, D CE compliant for all applicable directives ODVA conformance 2.0-A12
DeviceNet	maximum number of nodes = 64 maximum length = 500m at 125K baud or 100m at 500K baud

AIC+ Advanced Interface Converter

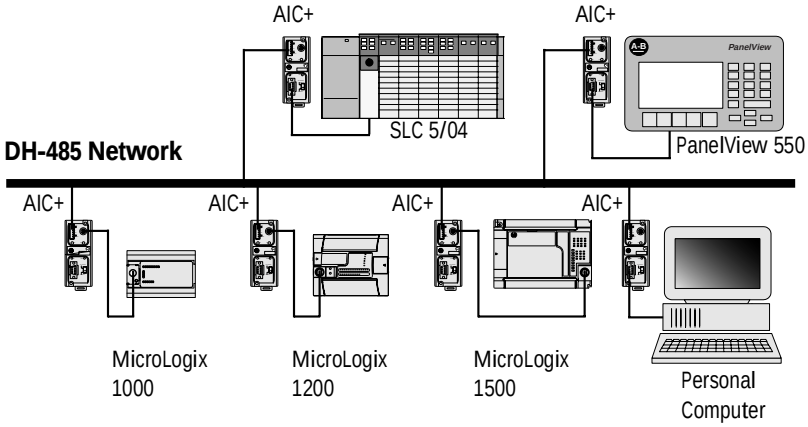
The AIC+ is a networking device from Allen-Bradley that provides DH-485 network access from any DH-485 compatible device that has a RS-232 port, including all MicroLogix controllers, SLC 5/03 and 5/04, and PanelView 550 and 900. In addition, the device provides isolation between all ports for a more stable network and protection for connected devices. The unit is DIN rail or panel mountable and is industrially hardened.

The Advanced Interface Converter provides a simple, cost-effective solution for connecting RS-232 devices to a DH-485 network. The AIC+ also provides:

- Two isolated RS-232 connections - one 9-pin D-shell and one 8-pin mini DIN
- An RS-485 6-pin Phoenix connection
- Accepts power via the 8-pin mini DIN from a MicroLogix controller or an external power connection
- Compatibility with existing SLC DH-485 networks that use 1747-AICs
- Auto baud rate capability for ease of system set-up
- Diagnostic LEDs for network activity

Some typical applications include:

- Connecting a personal computer to a DH-485 network
- Connecting MicroLogix controllers to a DH-485 network
- Linking SLC 5/03 or SLC 5/04 processors using DF1 Half-Duplex “master/slave” protocol. This allows you to connect remote “islands” of automation to a master controller to upload diagnostic and status information.



Advanced Interface Converter (1761-NET-AIC) Specifications

Description	Specifications
24V dc Power Source Requirement	20.4 - 28.8V dc
Current Draw	120 mA 200 mA maximum inrush current
Operating Ambient Temperature	0 to +60°C (+32 to +140°F)
Agency Certification	UL 1604 C-UL C22.2 No. 213 Class 1, Division 2, Groups A, B, C, D CE compliant for all applicable directives
DH-485, DF1, or “user” Network	maximum number of nodes = 32 per multidrop network maximum length = 1,219m (4,000 ft.) per multidrop network maximum number of “ganged” multidrop networks = 2

High-Speed Functions

Features

High-Speed Counters

- Two independent high-speed counters at 20 kHz feature eight modes of operation. Outputs can be directly controlled independent of processor scan.
- Programmable high and low presets, and overflow and underflow setpoints
- Automatic interrupt processing on accumulated count
- 32-bit signed integer data provides extremely wide counting range (+/- 2 billion)

High-Speed Outputs

- Two 20 kHz outputs configurable as:
  - Pulse Train Outputs (PTO) with built-in trapezoid or S-curve profiles allow smooth acceleration and deceleration capability
  - Pulse Width Modulation outputs (PWM) with built-in trapezoid profile allows smooth acceleration and deceleration capability

Latching (Pulse-Catch) Inputs

- Eight latching inputs allow very brief pulses to be captured and held for input scan processing

Selectable Timed Interrupts

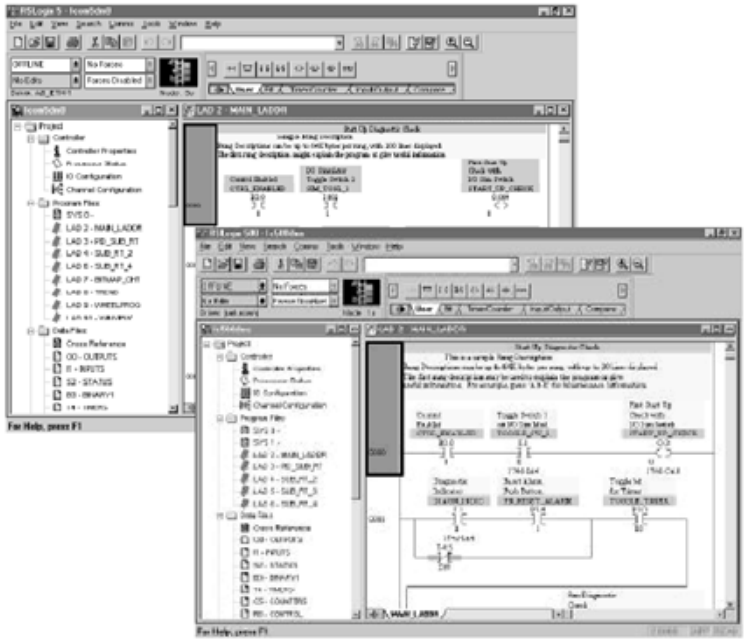
- 1 ms Selectable Timed Interrupt (STI) allows logic to be serviced independent of the program scan

Event Interrupts

- Four event interrupts (EII) allow any of the eight high-speed inputs to be used as input interrupts
- Run-time editable parameters (from the user control program)

Programming Software

The following section describes programming options available for the MicroLogix 1500 controllers. With RSLogix 500 Programming Software, you can create, modify, and monitor application programs used by the MicroLogix 1000, MicroLogix 1200 and SLC Programmable Controller families.



RSLogix 500 Programming Software

The RSLogix 500 ladder logic programming package helps you maximize performance, save project development time, and improve productivity. This product has been developed to operate on Microsoft's 32-bit, Windows® 95, Windows® 98, and Windows NT™ operating systems. Supporting Allen-Bradley's MicroLogix families of processors and SLC 500, RSLogix 500 was the first PLC programming software to offer unbeatable productivity with an industry-leading user interface.

Flexible, Easy-to-Use Editors

Flexible program editors let you create application programs without worrying about getting the syntax correct as you create your program. A *Project Verifier* builds a list of errors that you can navigate to make corrections at your convenience.

Drag-and-drop editing lets you quickly move or copy instructions from rung to rung within a project, rungs from one subroutine or project to another, or data table elements from one data file to another.

Context menus for common software tools are quickly accessible by clicking the right mouse button on addresses, symbols, instructions, rungs, or other application objects. This convenience provides you with all the necessary functionality to accomplish a task within a single menu.

Point-and-Click I/O Configuration

The easy-to-use I/O Configurator lets you click or drag-and-drop a module from an all-inclusive list to assign it a slot in your configuration. Advanced configuration, required for specialty and analog modules, is easily accessible. Convenient forms speed entry of configuration data. An I/O auto configuration feature is also available.

Point-and-Click I/O Configuration

Powerful Database Editor

Use the *Symbol Group Editor* to build and classify groups of symbols so that you can easily select portions of your recorded documentation to be used from project to project.

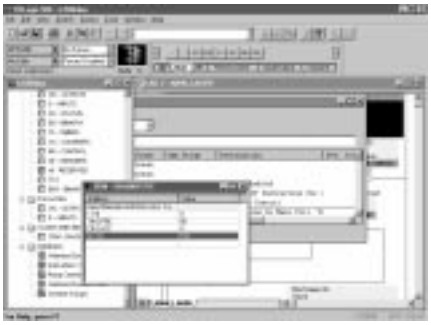
Use the *Symbol Picker* list to easily address instructions in your ladder logic by clicking addresses or symbols to assign them to your ladder instructions.

Powerful Database Editor

Diagnostics and Troubleshooting Tools

Simultaneously examine the status of bits, timers, counters, inputs, and outputs all in one window with the *Custom Data Monitor*. Each application project you create can have its own *Custom Data Monitor* window.

Easily review status bit settings specific to your application programming including *Scan Time* information, *Math Register* information, Interrupt settings and more with the tabbed *Status* displays.



Diagnostics and Troubleshooting Tool

Selection Chart

Catalog Number	Description
9324-RL0300ENE(1) (2)	RSLogix 500 Programming for the MicroLogix families and SLC 500 on CD-ROM. Includes RSLinx Lite.
9324-RL0100ENE(1) (2)	RSLogix 500 Starter Programming for the MicroLogix families and SLC 500 on CD-ROM. This package is a functionally limited version of RSLogix 500.
Programming Cables	See page 27 for information on programming cables.

(1) To use RSLogix 500 programming software, your system must be a Pentium 100 MHz or higher, Windows® 95, Windows® 98, or Windows NT™ (v4.0).
(2) Also available in French, German, Italian, Spanish and Portuguese.

Programming Instructions

The following table shows the MicroLogix 1500 instruction set listed within their functional groups.

The MicroLogix 1500's enhanced programming instructions feature the new data logging instruction which enables you to define controller variables that can be saved as a record. The elements of each record can be any mix of integer or double integer data (catalog number 1764-LRP).

Functional Group	Description
Relay-Type (Bit)	The relay-type (bit) instructions monitor and control the status of bits. XIC, XIO, OTE, OTL, OTU, OSR, ONS, OSF
Timer and Counter	The timer and counter instructions control operations based on time or the number of events. TON, TOF, RTO, CTU, CTD, RES
Compare	The compare instructions compare values by using a specific compare operation. EQU, NEQ, LES, LEQ, GRT, GEQ, MEQ, LIM
Math	The math instructions perform arithmetic operations. ADD, SUB, MUL, DIV, NEG, CLR, SQR, SCL, SCP
Conversion	The conversion instructions multiplex and de-multiplex data and perform conversions between binary and decimal values. DCD, ENC, TOD, FRD
Logical	The logical instructions perform bit-wise logical operations on words. AND, OR, XOR, NOT
Move	The move instructions modify and move data. MOV, MVM
File	The file instructions perform operations on multiple data words. COP, FLL, BSL, BSR, FFL, FFU, LFL, LFU
Sequencer	Sequencer instructions are used to control automatic assembly machines that have consistent and repeatable operations. SQC, SQO, SQL
Program Control	The program flow instructions control the flow of ladder program execution. JMP, LBL, JSR, SBR, RET, SUS, TND, MCR, END
Input and Output	The input and output instructions allow you to selectively update data without waiting for the input and output scans. IIM, IOM, REF
User Interrupt	The user interrupt instructions allow you to interrupt your program based on defined events. STS, INT, UID, UIE, UIF
Process Control	The process control instruction provides closed-loop control. PID (Proportional/Integral/Derivative)
Communications	The communication instructions read or write data to another station. MSG, SVC
High-Speed Counter	The high-speed counter instructions configure, control and monitor the embedded high-speed counters. HSL, RAC
High-Speed Outputs	The high-speed output instructions allow you to control and monitor the PTO and PWM functions which control the physical high-speed outputs. PTO, PWM
ASCII	The ASCII instructions use the communication channel for receiving or transmitting data and manipulate string data. ACB, ACL, AHL, ARD, AEX, ACI, AIC, SWP, AWT, AWA, ASC, ASR
Data Log(1)	The data log instruction allows you to store records into data logging memory. DLG

(1) Available with catalog number 1764-LRP

Operator Interface Devices

Electronic operator interface devices provide you with powerful plant floor control and data monitoring capabilities for improved productivity. They are easy to use, rugged and reliable. Operator interface devices also save valuable panel space and are designed for easy modification as your process expands or changes.

The PanelView™ products listed are only a partial offering of the PanelView Standard (HMI) Human Interface products. For more information, refer to the PanelView™ Standard Operator Interface Terminals System Overview, publication 2711-SO001A-US-P.

MicroView™ Operator Interface

The MicroView Operator Interface is a feature-packed, cost-effective operator interface designed for data monitoring, data display, data entry, and recipe download. This device features a 2-line x 16-character display window.

MicroView Operator Interface

PanelView™ 300, 550 and 600 Operator Interface Terminals

The PanelView 300, 550 and 600 operator terminals offer electronic operator interface capabilities in a space-saving, flat-panel design. The result is a compact package that is loaded with performance functionality. These terminals feature pixel graphics for enhanced operator screens. The PanelView Standard 300 and 550 interfaces have monochrome LCD displays while the PanelView 600 has either an active matrix thin film transistor (TFT) or passive matrix color display.

PanelView 300 (Monochrome)

PanelView 550 Touch Only (Monochrome)

PanelView 600 Keypad (Color)

Accessories

Data Access Tool (1764-DAT)

- Direct access to 48 bit elements
- Direct access to 48 integer elements
- Two function keys
- Display of controller faults
- Removal/Insertion under power

Memory and Real-Time Clock Modules (1764-MM1, -MM2, -MM1RTC, -MM2RTC, 1764-RTC)

- Availability allows for time/date scheduling applications to be easily solved.
- Memory backup and real-time clock/memory module
- User Program and Data Back-up
- Program Compare
- Data File Protection
- Memory Module Write Protection
- Removal/Insertion Under Power

Several modules with different levels of functionality are available for use with the MicroLogix 1500 controller.

Catalog Number	Function	Memory
1764-RTC	Real-Time Clock	Not Applicable
1764-MM1	Memory Module	8K
1764-MM2	Memory Module	16K
1764-MM1RTC	Memory Module and Real-Time Clock	8K
1764-MM2RTC	Memory Module and Real-Time Clock	16K

Cables

Use the communication cables listed below with the MicroLogix 1500 controllers. Cables come in several lengths and connector styles to provide connectivity to the MicroLogix family of products.

Catalog Number	Cable Type	Description
1761-CBL-AC00	9-pin D-shell to 9-pin D-shell	This 45 cm (17.7 in.) cable is used to connect port 1 of the 1761-NET-AIC to the 9-Pin DTE port of a personal computer.
1747-CP3	9-pin D-shell to 9-pin D-shell	This 3m (9.8 ft) cable is used to connect port 1 of the 1761-NET-AIC to the 9-Pin DTE port of a personal computer.
1761-CBL-AM00	8-pin DIN to 8-pin DIN	This 45 cm (17.7 in.) cable is used to connect the MicroLogix controller to port 2 of the 1761-NET-AIC
1761-CBL-HM02	8-pin DIN to 8-pin DIN	This 2m (6.56 ft) cable is used to connect the MicroLogix 1500 Programmable Controller to the HHP or to connect any MicroLogix Programmable Controller to port 2 of the 1761-NET-AIC
1761-CBL-AP00	9-pin D-shell to 8-pin DIN	This 45cm (17.7 in.) cable is used to connect a MicroLogix controller to port 1 of the 1761-NET-AIC.
1761-CBL-PM02	9-pin D-shell to 8-pin DIN	This 2m (6.56 ft) cable is used to connect the MicroLogix Programmable Controller to an IBM compatible PC or to connect an IBM compatible PC to port 2 of the 1761-NET-AIC
Compact I/O Expansion Cables		
1769-CRR1	This 305 mm (1 ft.) right bank-to-right bank cable is used to add a second bank of I/O modules.	
1769-CRR3	This 1 m (3.28 ft.) right bank-to-right bank is used to add a second bank of I/O modules.	
1769-CRL1	This 305 mm (1 ft.) right bank-to-left bank is used to add a second bank of I/O modules.	
1769-CRL3	This 1 m (3.28 ft.) right bank-to-left bank cable is used to add a second bank of I/O modules.	

User Documentation

For an introduction to micro PLC's refer to the MicroMentor™, Publication 1761-MMB. The MicroMentor book includes illustrations, sample applications you can put to immediate use, step-by-step strategies, and worksheets.

Additionally, MicroLogix 1500 user documentation presents information according to the tasks you perform and the programming environment you use. Refer to the table below for information on MicroLogix 1500, 1769 Compact I/O and related publications.

See this Document	Publication Number
MicroLogix™ 1500 Programmable Controllers Installation Instructions	1764-IN001B-ML-P
MicroLogix™ 1500 Programmable Controllers User Manual	1764-UM001A-US-P(1)
MicroLogix™ 1200 and MicroLogix™ 1500 Instruction Set Reference Manual	1762-RM001B-US-P(1)
Bulletin 1769 Compact™ I/O Analog Input/Output Modules	1769-1.2
1769 Compact™ Discrete Input/Output Modules Technical Data	1769-2.1
1769 Compact™ I/O Power Supplies and Communication Bus Expansion Cables Technical Data	1769-TD001A-US-P
Compact™ I/O Analog Modules User Manual	1769-6.0
AIC+ Advanced Interface Converter and DeviceNet Interface Installation instructions	1761-5.11
AIC+ Advanced Interface Converter User Manual	1761-6.4
DeviceNet™ Interface User Manual	1761-6.5
DTAM™ Micro Operator Interface Module User Manual	2707-803
MicroView™ Operator Interface Module User Manual	2707-805
DataDisc™ CD-ROM Information Library	1795-CDRS and 1795-CDRL

(1) Manual includes information on 1764-LRP processor and MicroLogix 1500 enhanced functionality.

For assistance selecting the correct MicroLogix Programmable Controller for your application, see the MicroLogix selector guide on the back of this publication. If you would like a system overview for the MicroLogix 1000 or MicroLogix 1200 controllers, refer to the following table.

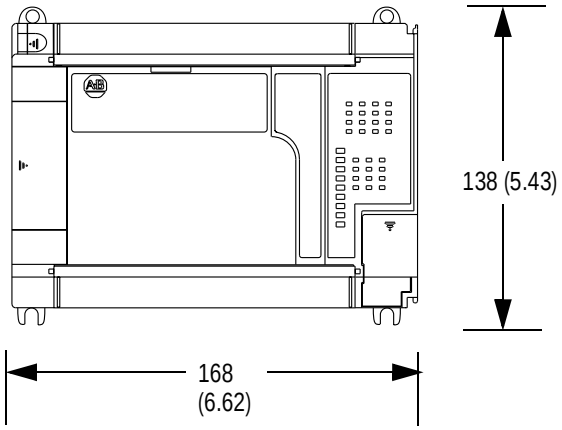
See this Document	Publication Number
MicroLogix™ 1000 System Overview	1761-SO001A-US-P
MicroLogix™ 1200 System Overview	1762-SO001A-US-P

To purchase a manual or download a free electronic version, visit us at http://www.theautomation bookstore.com. Or, for fast access to Bulletin 1761, 1762, and 1764 publications, visit the MicroLogix Internet site http://www.ab.com/micrologix. Electronic versions of our manuals are available for you to search and download.

Dimensions

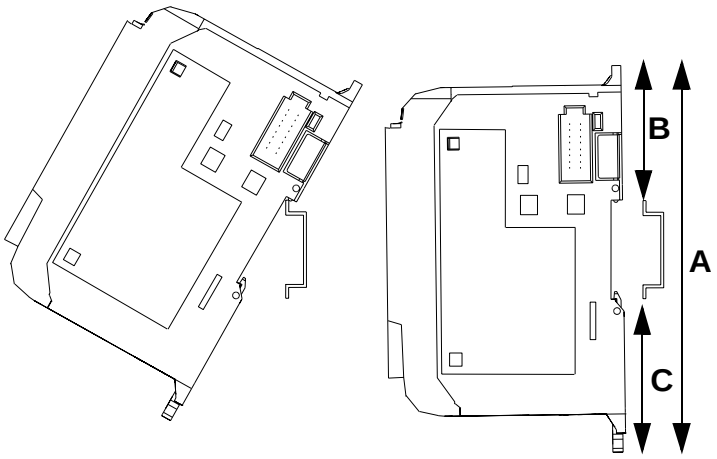
Dimension Drawings

1764-24AWA, -24BWA, -28BXB



Front View

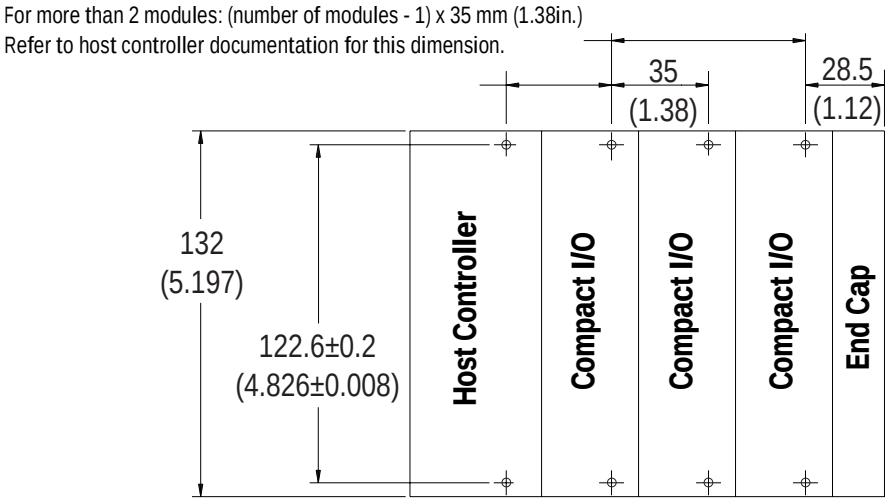
MicroLogix 1500 DIN Rail Dimensions



Side View

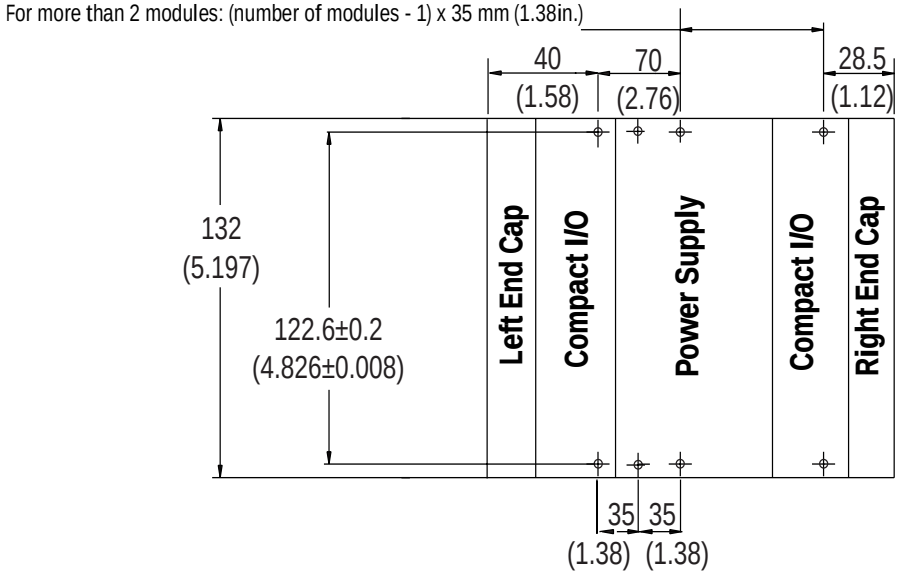
Dimension	Height
A	138 mm (5.43 in.)
B	47.6 mm (1.875 in.)
C	47.6 mm (1.875 in) DIN latch closed 54.7 mm (2.16 in.) DIN latch open

Compact I/O Modular Input/Output System



NOTE: All dimensions are in mm (inches). Hole spacing tolerance: ±0.4 mm (0.016 in.)

Compact I/O Expansion Power Supply and End Caps



NOTE: Compact I/O expansion cables have the same dimensions as the end caps.

NOTE: All dimensions are in mm (inches). Hole spacing tolerance: ±0.4 mm (0.016 in.)

MicroLogix 1500 Master Parts List

Catalog Number	Description
Processor: (**required,** must be interfaced to a base unit, see below)	
1764-LSP	Greater than 7K user memory
1764-LRP	12K user memory/RS-232 isolated Comm port/data logging
Base: (one of the following bases is **required,** for each processor)	
1764-24AWA	AC Powered, 12 AC IN / 12 Relay Out
1764-24BWA	AC Powered, 12 DC IN / 12 Relay Out
1764-28BXB	24V DC Powered, 16 DC IN / 6 Relay and 6 DC FET Out
Accessories:	
1764-DAT	Data Access Tool
1764-RTC	Real-Time Clock
1764-MM1	Memory Module (8K)
1764-MM2	Memory Module (16K)
1764-MM1RTC	Memory Modules with Real-Time Clock (8K)
1764-MM2RTC	Memory Modules with Real-Time Clock (16K)
Expansion I/O Modules: (See page 10 for part numbers and descriptions.)	
Expansion Power Supplies and Cables: (See page 14 for part numbers and descriptions.)	
Training Materials:	
1764-START1500E	MicroLogix 1500 RSLogix Starter Pak includes: 1764-LSP processor; 1764-24BWA base unit; 9323-RL0100ENE (RSLogix Starter Programming Software); 1761-CBL-PM02 PC-to-controller cable; 1764-MM1RTC memory module and real-time clock; user documentation
1796-MICRO151 (Series B)	MicroLogix 1500 Integrated Demonstration Unit includes: 1764-28BXB base unit; 1764-LSP processor unit; 1769-IF4 Analog Input Module; 1769-OF2 Analog Output Module;1761-NET-AIC DH-485 Interface Module; 1761-NET-DNI DeviceNet Interface Module; quadrature encoder; 4 selector switches; 8 illuminated pushbuttons; 1 potentiometer; 1 analog meter; 1 frequency meter
1796-SIM1500	MicroLogix 1500 Input Simulator. For use with 1764-24BWA and 1764-28BXB base units.
MicroLogix 1500 Replacement Parts:	
1764-RPLTRM1	Electrostatic Discharge Sticker
1764-RPLTDR1	Terminal Cover Doors (2 doors per package)
1764-RPLCDR1	Processor Unit Door
1764-RPLDR	Complete Door Kit (includes all doors for 1 controller)
1764-RPLTB1	Replacement Terminal Block — 17-pt for 1764-24AWA and 1764-24BWA inputs

	MicroLogix 1000	MicroLogix 1200	MicroLogix 1500	
	1761	1762	1764-LSP	1764-LRP
Memory				
Up to 1K	•			
Up to 6K		•		
Up to 7K			•	
Up to 12K				•
EEPROM Back-up	•	•		
Battery Back-up			•	•
Back-up Memory Module		•	•	•
I/O				
Up to 32	•			
Up to 88 (using 1762 I/O)		•		
Up to 156 (using 1769 I/O)			•	•
Added Functionality				
Analog (Embedded)	•			
Analog (Expansion)		•	•	•
Trim Potentiometers		2	2	2
PID		•	•	•
High Speed Counters	1	1	2	2
Real Time Clock		•	•	•
Motion Capabilities (Pulse Width Modulated and Pulse Train Outputs)		1 *	2	2
Data Access Tool			•	•
Data Logging (50k bytes)				•
Programming Software				
Windows - RSLogix 500	•	•	•	•
DOS - A.I. 500	•			
Communications				
RS-232 Ports	1	1	1	2
DeviceNet (1761-NET-DNI)	•	•	•	•
DH485 (1761-NET-AIC)	•	•	•	•
SCADA RTU - DF1 Half-Duplex Slave	•	•	•	•
SCADA RTU - Modbus RTU Slave		•	•	•
ASCII - Write only		•		
ASCII - Read/Write			•	•
Operating Power				
120/240V ac	•	•	•	•
24V dc	•	•*	•	•
UL, CSA or C-UL, CE, Class I Div.2	•	•	•	•

* Available in late 2000. Contact your Allen-Bradley sales representative or authorized distributor for availability.

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