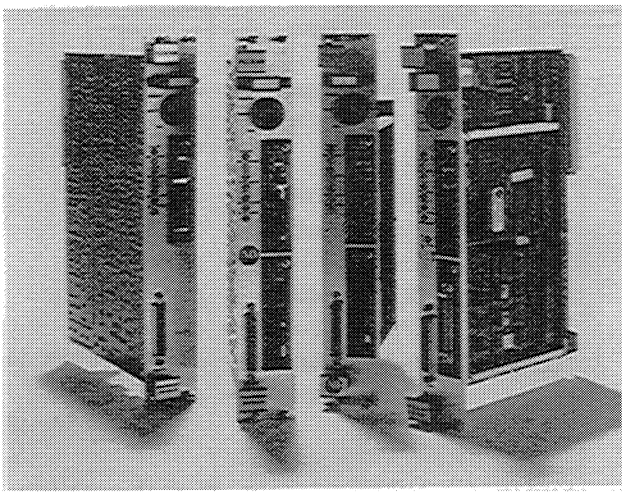
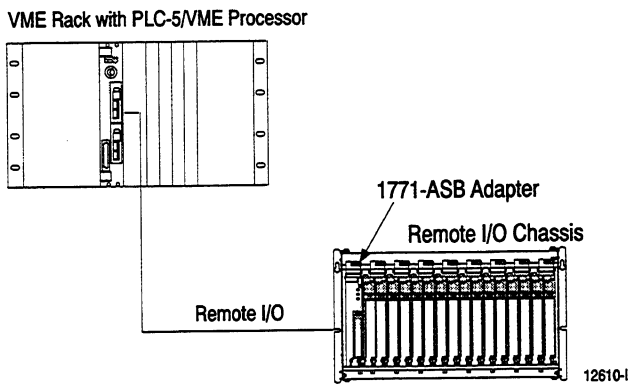
ALLEN-BRADLEY

PLC-5/VME VMEbus Programmable Controllers

Product Data





Take advantage of enhanced PLC-5® processor compatibility.
As a full member of the PLC-5 family of processors, the PLC-5/VME™ processor provides the same capabilities as other enhanced PLC-5 processors. The PLC-5 family of processors offers flexibility and power.

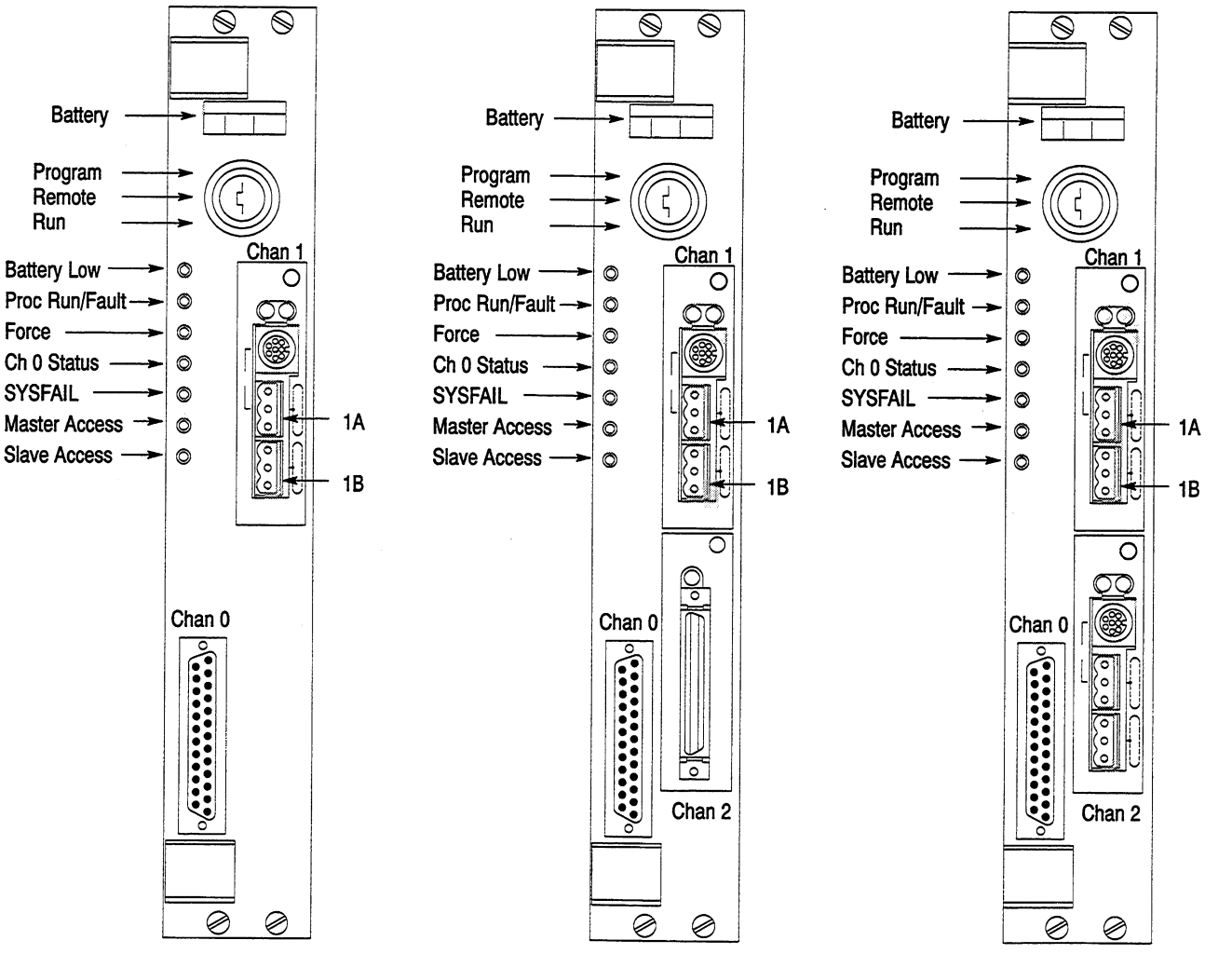
Use the full capabilities of the VMEbus system.
The PLC-5/VME processor is fully compliant with the C.1 VMEbus specification. As many as eight PLC-5/VME processors can coexist with other VMEbus computers and I/O modules in a single VMEbus chassis. The PLC-5/VME processor can act as a master or a slave. As a master, it can access data in other VMEbus modules; as a slave, it can let other VMEbus masters access its VMEbus global memory area. The PLC-5/VME processor is also capable of functioning as the VMEbus system controller.

Introducing the PLC-5/VME Programmable Controller

The Allen-Bradley PLC-5/VME processor is an advanced, multi-processor programmable controller. The PLC-5/V30B™, PLC-5/V40L™, PLC-5/V40B™, and PLC-5/V80B™ processors bring the technology of the enhanced 1785 PLC-5 processors to the VMEbus environment.

Figure 1 shows the available PLC-5/VME processors.

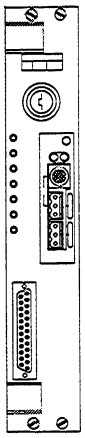
Figure 1
PLC-5/V30B, -5/V40L, -5/V40B, and -5/V80B Processors



PLC-5/V30B Processor

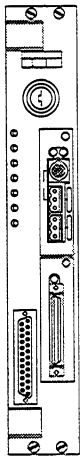
PLC-5/V40L Processor

PLC-5/V40B Processor and PLC-5/V80B Processor



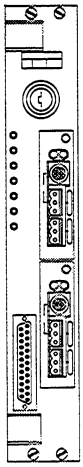
PLC-5/V30B

Channel/ Connector	Physical Description	Functional Description	Default Communication Mode
0	25-pin D-shell	This port is an optically coupled serial port and supports communication protocols defined by EIA RS-232C. Use this port with ASCII or DF1 (point-to-point, slave, or master) protocol.	DF1 point-to-point (2400 bps, no parity, one stop-bit, BCC error check, and no handshaking).
1A 1B	3-pin	These are user configurable ports that support scanner, adapter, and Data Highway Plus (DH+) communication modes.	DH+™ (channel 1A) Scanner (channel 1B)
Programming Terminal	8-pin mini-DIN	This programming terminal connector has parallel connections with the 3-pin connectors of channels 1A. Use this connector only when channel 1A is configured for DH+ communication.	None



PLC-5/V40L

Channel/ Connector	Physical Description	Functional Description	Default Communication Mode
0	25-pin D-shell	This port is an optically coupled serial port and supports communication protocols defined by EIA RS-232C. Use this port with ASCII or DF1 (point-to-point, slave, or master) protocol.	DF1 point-to-point (2400 bps, no parity, one stop-bit, BCC error check, and no handshaking).
1A 1B	3-pin	These are user configurable ports that support scanner, adapter, and Data Highway Plus (DH+) communication modes.	DH+ (channel 1A) Scanner (channel 1B)
2	50-pin	This channel supports extended-local I/O communication, which is a parallel communication link. The communication mode of this channel cannot be changed using 6200 Series software. However, you configure extended-local I/O racks using 6200 Series software.	Extended-local I/O
Programming Terminal	8-pin mini-DIN (2 connectors)	This programming terminal connector has parallel connections with the 3-pin connectors of channel 1A. Use these connectors only when channel 1A and are configured for DH+ communications.	None

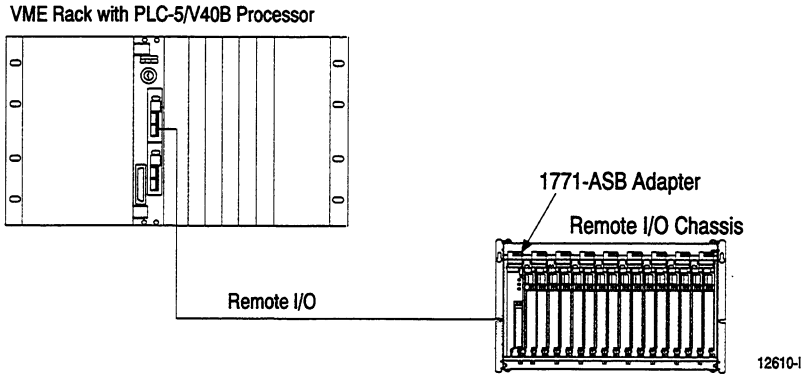


PLC-5/V40B
PLC-5/V80B

Channel/ Connector	Physical Description	Functional Description	Default Communication Mode
0	25-pin D-shell	This port is an optically coupled serial port and supports communication protocols defined by EIA RS-232C. Use this port with ASCII or DF1 (point-to-point, slave, or master) protocol.	DF1 point-to-point (2400 bps, no parity, one stop-bit, BCC error check, and no handshaking).
1A 1B 2A 2B	3-pin	These are user configurable ports that support scanner, adapter, and Data Highway Plus (DH+) communication modes.	DH+ (channel 1A) Scanner (channel 1B) Unused (channel 2A) Unused (channel 2B)
Programming Terminal	8-pin mini-DIN (2 connectors)	This programming terminal connector has parallel connections with the 3-pin connectors of channels 1A and 2A. Use these connectors only when channels 1A and/or 2A are configured for DH+ communication.	None

Figure 2 shows an example of an integrated control system using a PLC-5/VME processor.

Figure 2
Example of PLC-5/VME Integrated Control System



PLC-5/VME Compatibility

The PLC-5/VME processor is part of the PLC-5 family. The PLC-5/VME processor lets you do the following:

Use the full PLC-5 instruction set.
The PLC-5/VME processors have the same instruction set as the enhanced PLC-5 (PLC-5/30, -5/40, and -5/80) processors. It supports:

- complex expressions in compare and compute instructions
- statistical instructions
- floating-point calculations in PID instructions
- ASCII string-handling instructions

Save time with a fast program scan.
The PLC-5/VME processor has a program scan time of:

- 1 ms per Kword (bit logic)
- 2 ms per Kword (typical).

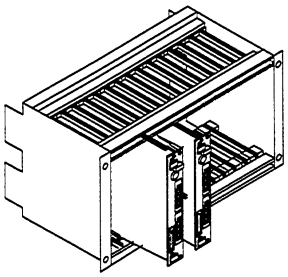
Program with 6200 Series Programming Software.
Allen-Bradley offers the 6200 software package for programming all 1785 PLC-5 processors. This software package lets you create well-documented and re-usable programs that can substantially reduce troubleshooting and start-up time. Using an 8086-based CPU, you can also program across the VMEbus backplane using the 6200 software package; however, only the Radisys EPC family of CPUs are currently supported.

Connect to a broad array of I/O devices.
The PLC-5/VME processor's multiple communication ports let you communicate with all Allen-Bradley PLC® processors as well as bar code readers, computers, programming terminals, operator interfaces, and motor drives. Optimize your I/O system with Allen-Bradley's 1791, SLC 500™, and block I/O modules.

Improve communications.
The PLC-5/VME processor supports Data Highway Plus™ communications. It can communicate in adapter mode with a supervisory processor. Accessing a remote I/O link, it can also operate in remote scanner mode (supervisory). An extended-local I/O port provides high speed scan and update times for Allen-Bradley 1771 I/O systems.

Because the PLC-5/VME processor is a VMEbus module, high-speed data transfers with other modules can be performed across the VMEbus backplane. Commands can also be communicated over the backplane from a VMEbus CPU to the PLC-5/VME processor.

Capabilities in the VMEbus System



VMEbus Chassis 19556

The PLC-5/VME processor:

- occupies two 6U VMEbus slots
- resides in any two adjacent slots
- uses a single VMEbus P1 connector
- contains eight registers that are accessed by a VMEbus CPU to establish certain programmable configuration options of the processor, to control and monitor certain low-level conditions, and to send commands to the processor
- includes an additional 64 Kbytes of global VME RAM memory in the A24 (or "standard") address space that can be configured and shared with other VMEbus masters in the same chassis

A PLC-5/VME in a VMEbus system lets you do the following:

Configure the VME.
One VME CPU can control multiple PLC-5/VME processors. Each PLC-5/VME processor maps into the VMEbus address space, so you can map each PLC-5/VME processor to a different address.

If you do not want to use a VME CPU, a VME CPU is not necessary. The PLC-5/VME processor interacts with I/O modules in one or more remote I/O racks and has the capability, through its ladder program, to generate VMEbus accesses. This means that the PLC-5/VME processor can access VMEbus I/O modules.

Use a PLC-5/VME processor as a master or slave.
The PLC-5/VME processor can serve as a real-time I/O processor, acting as a master or a slave to other modules in the VMEbus. The processor can become a slave to another VME CPU, responding to directions from the VME CPU and passing data back. It can act as a master, gaining access to the VMEbus and retrieving or sending data to another board.

You can configure the PLC-5/VME processor as a VMEbus system controller (arbitrator) by installing it in the leftmost slot in the VME chassis. It generates a 16 MHz bus clock, arbitrates on level 3, and includes a system bus timer.

Send programmable-controller communication commands.
The PLC-5/VME processor has extended programmable-controller communication commands (PCCCs). Some of the PLC-5/VME processor's PCCCs include:

- echo
- identify host/status
- read-modify-write
- typed read
- typed write
- set CPU mode
- upload all requests
- download all requests
- upload complete
- download complete
- physical read/write bytes
- get edit resource
- return edit resource
- apply port configuration
- restore port configuration.

You can send these commands to the PLC-5/VME processor across the VMEbus backplane.

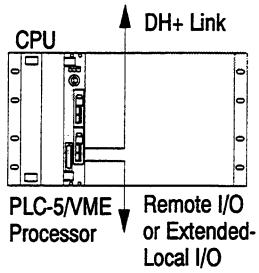
Write ladder programs to access the VMEbus.
A PLC-5/VME processor's ladder program can perform direct VMEbus read and write operations as well as generate VMEbus interrupts. The ladder read and write instructions allow transfers between data-table files and VMEbus memory of up to 1,000 16-bit words. Another available method is the continuous-copy command, which transfers data-table files to/from the VMEbus every program scan. Three message instructions are available:

- copy to VME
- copy from VME
- send VME interrupts

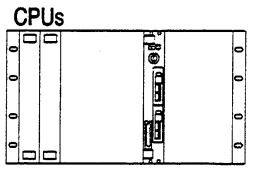
Remain compatible with the 1785-LTV processor.
The PLC-5/VME processor retains compatibility with the 1785-LTV processor. It has an improved continuous copy command that allows an automatic transfer of up to 1,000 words in each direction to the VMEbus during every PLC-5/VME program scan. This eases the task of converting 1785-LTV ladder and CPU driver programs to use with the PLC-5/VME processor.

Possible Configurations

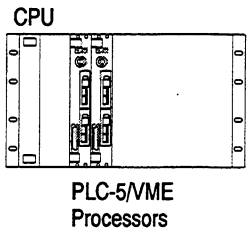
Use the PLC-5/VME processor in a 6U (full-height) VMEbus chassis. You can use the PLC-5/VME processor by itself (i.e., as the system controller and with no other VME modules), but typically the PLC-5/VME processor is used in conjunction with other VMEbus computers (CPUs) and I/O modules. The examples below illustrate possible configurations.



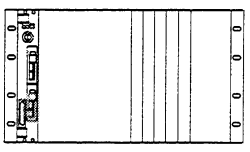
The PLC-5/VME processor is used in conjunction with a VMEbus CPU module. The processor serves as a real-time I/O processor under the direction of the CPU. The processor is a slave of the CPU, where, in addition to its normal ladder logic and I/O processing in each scan loop, the processor responds to directions from the CPU and passes data back to the CPU.



There is no fixed relationship between processor and CPU, so multiple CPUs can communicate with one processor. Multiple CPUs run multiple tasks, all sending and receiving data from the processor at the same time.



One CPU can control multiple PLC-5/VME processors. Each processor maps into the VMEbus address space; so you map each processor to a different address space.



No CPU interacts with the processor. The processor interacts with I/O modules in one or more remote I/O racks and has the capability, from its ladder program, of generating VMEbus accesses. This means that the processor can access VMEbus I/O modules as well.

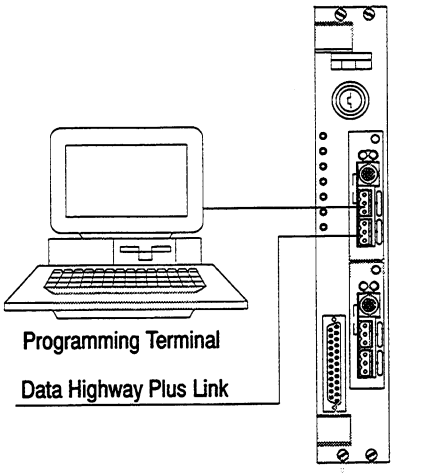
Connecting Programming Terminals

Use the programming terminal to program and monitor your PLC-5/VME processor as well as any processor on any DH+ link in your system.

DH+ Link

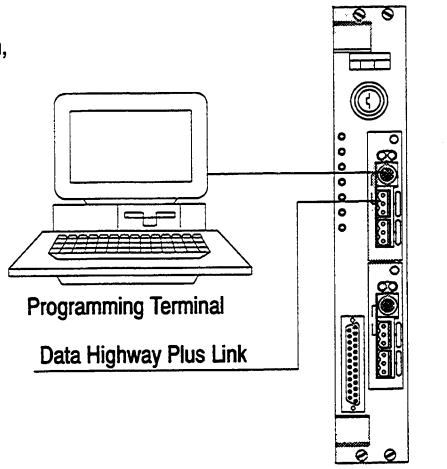
To connect a programming terminal to a PLC-5/VME processor using a DH+ link, use the following:

Communication card to access a DH+ link	Cable
1784-PCMK	1784-PCM5 with a 1784-CP7 adapter
1784-KT, -KT2	▪ 1784-CP6
	▪ 1784-CP with a 1784-CP7 adapter
	▪ 1784-CP8 adapter



To connect a programming terminal to a PLC-5/VME processor using the DH+ programming terminal connection, use the following:

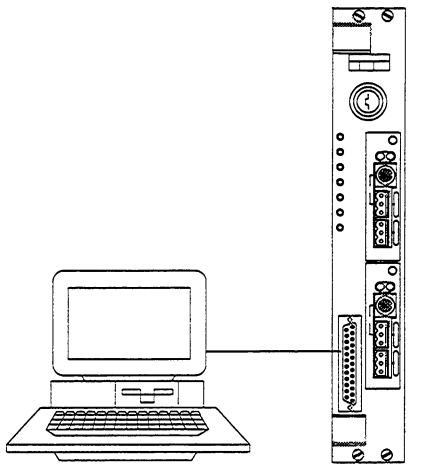
Communication card to access a DH+ link	Cable
1784-PCMK	1784-PCM5 with a 1784-CP7 adapter
1784-KT, -KT2	▪ 1784-CP6
	▪ 1784-CP with a 1784-CP7 adapter
	▪ 1784-CP8 adapter



Serial Connection

To program the processor using channel 0, configure the channel for RS-232C using DF1 point-to-point protocol.

If your programming terminal has:	Use cable:
9-pin serial port	1784-CP10
25-pin serial port	1784-CP11

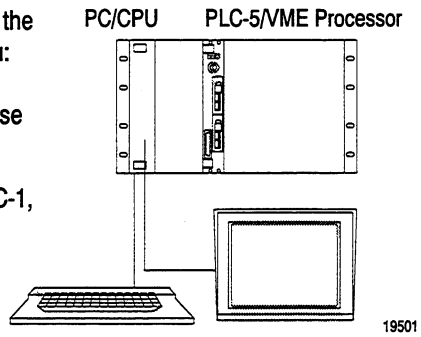


VMEbus Backplane Connection

You can program as well as download files directly over the VMEbus backplane to your PLC-5/VME processor if you:

- run 6200 Series PLC-5 Programming Software release 4.4 or later
- use an 8086-based CPU from RadiSys—i.e., an EPC-1, EPC-4, or EPC-5 VME PC-compatible computer.

Important: In order to use the **save** feature of the 6200 Series PLC-5 Programming Software when you communicate with the processor in this way, you must use release 4.5 or later.



Specifications

This section lists the specifications for the PLC-5/VME processors.

Environmental Specifications

Characteristic		Value
Temperature	Operating	0-65° C at point of entry of forced air with 200 LFM of air flow across the circuit board. Derated 2° C per 1000 ft (300 m) over 6,600 ft (2,000 m). 2° C per min maximum excursion gradient
	Storage	-40 to -85° C 5 C per min maximum excursion gradient
Humidity	Operating	0-90% noncondensing
	Storage	0-95% noncondensing
Altitude	Operating	0-10,000 ft (3,000 m)
	Storage	0-40,000 ft (12,000 m)
Vibration	Operating	0.015 inch (0.38 mm) P-P displacement with 2.5 g peak (maximum) acceleration over 5-2,000 Hz
	Storage	0.030 inch (0.76 mm) P-P displacement with 5.0 g peak (maximum) acceleration over 5-2,000 Hz
Shock	Operating	30 g, 11 ms duration, half-sine shock pulse
	Storage	50 g, 11 ms duration, half-sine shock pulse
Power	Maximum	21 watts
	Typical	16 watts
Current	+ 5V	4.0 A (max), 3.2 A (typical)

VMEbus Specifications (Revision C.1)

Characteristic	Value
Master Address	A16, A24
Master Transfer	D08(EO), D16
Slave Address	A16, A24
Slave Transfer	D08(EO), D16
Interrupter	I(1-7), D08(O)
Interrupt Handler	IH(1-7), D08(O)
Requester	ROR,RWD
System Controller	SYSCLK, IACK daisy chain, bus timer, SGL arbiter
ACFAIL	Input required for PLC-5/VME processor to maintain ladder and data files integrity

Processor Specifications		PLC-5/V30™ (1785-V30B)	PLC-5/V40™ (1785-V40B)	PLC-5/V40L™ (1785-V40L)	PLC-5/V80™ (1785-V80B)
Maximum User Memory Words		32 K	48 K①		100 K①
Maximum Total I/O	Any Mix	896	1920		2944
	Complementary	896 in and 896 out	1920 in and 1920 out		2944 in and 2944 out
Maximum Analog I/O		896	1920		2944
Program Scan Time		0.5 ms per K word (bit logic) 2 ms per K word (typical)			
I/O Scan Time		0.5 ms (extended local) 10 ms per rack @ 57.6 kbps 7 ms per rack @ 115.2 kbps 3 ms per rack @ 230 kbps			
Transmission Rate		57.6 kbps 115.2 kbps 230 kbps			
Maximum Number of MCPs		16			
Number of Data Highway Plus™ (DH+™) or Remote I/O Ports (Adapter or Scanner)		2	4	2	4
Number of Extended-Local I/O Ports		N/A	N/A	1	N/A
Maximum Number of I/O Racks		7	15		23
Maximum Number of I/O Chassis	Extended Local	N/A	N/A	16	N/A
	Remote	28	60		92
Number of RS-232 Ports		1			
Backplane Current Load	Maximum	3.0 A	3.3 A	3.5 A	3.3 A
	Typical	2.4 A	2.7 A	2.9 A	2.7 A
Weight		0.56 kg (1.25 lbs)	0.67 kg (1.5 lbs)		

① The PLC-5/V40, -5/V40L, and -5/V80 processors have a limit of 32K words per data-table file.

PLC-5/VME™ Battery Specifications (1770-WV/A)

Battery used in this processor:	At this temperature:	Worst-case Battery Life Estimates Power off 100%:	Power off 50%:	Battery Duration after the LED lights ①
PLC-5/V30, -5/V40, -5/V80	60°C	180 days	360 days	~6 days @ 80µA
	25°C	290 days	580 days	~9 days @ 50µA

① The battery indicator (BATT) warns you when the battery is low. These durations are based on the battery supplying the only power to the processor (power to the chassis is off) once the LED first lights.

Rockwell *Automation*

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Allen-Bradley, a Rockwell Automation Business, has been helping its customers improve productivity and quality for more than 90 years. We design, manufacture and support a broad range of automation products worldwide. They include logic processors, power and motion control devices, operator interfaces, sensors, and a variety of software. Rockwell is one of the world's leading technology companies.

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