BASIC Language Modules Catalog Numbers and Specifications

Attribute		1746-BAS	1746-BAS-T
Maximum communication distance	RS-232 (300…19200 bps)	15 m (50 ft)	
	RS-423 (300 bps)	1230 m (4000 ft)	
	RS-423 (600 bps)	920 m (3000 ft)	
	RS-423 (1200 bps)	770 m (2500 ft)	
	RS-423 (4800 bps)	245 m (800 ft)	
	RS-423 (9600 bps)	120 m (400 ft)	
	RS-423 (19200 bps)	60 m (200 ft)	
	RS-422 (300…19200 bps)	1230 m (4000 ft)	
	RS-485 (300…19200 bps)	1230 m (4000 ft)	
Data Transfer	SLC 5/01	8 input words (SLC input image table) 8 output words (SLC output image table)	
	SLC 5/02 and higher	8 input words (SLC input image table) 8 output words (SLC output image table) 64 input and 64 output words (SLC M0/M1 file)	
Data Rates		300…19,200 baud	
Modem support		DF1 half-duplex slave or full duplex	
Clock/calendar accuracy		±1 minute/month @ 25 °C (77 °F) 0, -6 minutes/month @ 60 °C (140 °F)	

(1) If the BASIC Module DH-485 channel is connected to a 1747-AIC Link Coupler, add 0.085 A to the BASIC module's power supply loading value @ 24V DC.

(2) If the BASIC Module is connected to any device (for example, DTAM) either directly or through a 1747-AIC Link Coupler, add the appropriate current loading for the device to the BASIC module's power supply loading value @ 24V DC.

Windows-compatible BASIC Module Interface Software (1747-WINBAS)

BASIC Software is a terminal emulation program specifically written for you to interface to a Rockwell Automation 1746-BAS, 1746-BAS-T, or 1771-DB BASIC module. BASIC software simplifies the uploading and downloading of BASIC module programs, as well as backing up and restoring complete module images. BASIC software also provides debugging tools to aid in troubleshooting BASIC programs while online.

As a terminal emulation program, BASIC software requires either one RS-232 serial COM port or a DH-485 interface (1784-PCMK, 1784-PKTX, 1784-PKTXD, or 1747-UIC converter) be available on the personal computers. Bridging to the DH-485 network from other networks is not supported.

BASIC software works on personal computers with Windows 98, 2000, NT, and XP operating systems. RSLinx Classic OEM software must be installed on the personal computer to communicate to the 1746-BAS module via the DH-485 interface.

Selecting a Network

You can configure your system for information exchange between a range of devices and computing platforms, and operation systems. Use the table below to help you select a network.

Network Selection Criteria

If your application requires	Choose this network	Select this communication / device
• High-speed data transfer between information systems and/or a large quantity of controllers • Internet/Intranet connection • Program maintenance	EtherNet/IP	• SLC 5/05 Processor, or • 1761-NET-ENI EtherNet Interface • 1761-NET-ENIW Web-Enabled EtherNet Interface
• High-speed transfer of time-critical data between controllers and I/O devices • Deterministic and repeatable data delivery • Program maintenance • Media redundancy or intrinsic safety options	ControlNet	• 1747-KFC15 ControlNet Messaging Module • 1747-SCNR ControlNet Scanner Module • 1747-ACN15 and -ACNR15 ControlNet Adapter Modules
• Connections of low-level devices directly to plant floor controllers, without the need to interface through I/O devices • More diagnostics for improved data collection and fault detection • Less wiring and reduced startup time than traditional, hard-wired systems	DeviceNet	• 1747-SDN DeviceNet Scanner Module • 1761-NET-DNI DeviceNet Interface Module
• Plant-wide and cell-level data sharing with program maintenance	Data Highway Plus (DH+)	• SLC 5/04 Processor
	DH-485	• 1747-KE DH-485/RS-232C Interface • SLC 5/01, 5/02 or 5/03 Processor with a 1747-AIC Isolated Link Coupler • SLC 5/01, 5/02 or 5/03 Processor with a 1761-NET-AIC Advanced Interface Converter • 1747-UIC USB to DH-485 Interface Converter
• Connections between controllers and I/O adapters • Distributed controllers so that each has its own I/O communications with a supervisory controller	Universal Remote I/O	• 1747-SN Remote I/O Scanner • 1747-BSN Backup Remote I/O Scanner • 1747-ASB Remote I/O Adapter • 1747-DCM Direct Communication Module
• Modems • Messages that send and receive ASCII characters to/from devices such as ASCII terminals, bar code readers, message displays, weight scales, or printers	Serial	• SLC 5/03 Processor • SLC 5/04 Processor • SLC 5/05 Processor • SLC 5/01, 5/02, or 5/03 Processor with a 1747-KE DH-485/RS-232C Interface

Ethernet Network

The TCP/IP Ethernet network is a local-area network designed for the high-speed exchange of information between computers and related devices. With its high bandwidth (10 Mbps to 100 Mbps), an Ethernet network allows many computers, controllers, and other devices to communicate over vast distances. An Ethernet network

Data Highway Plus (DH+) Network

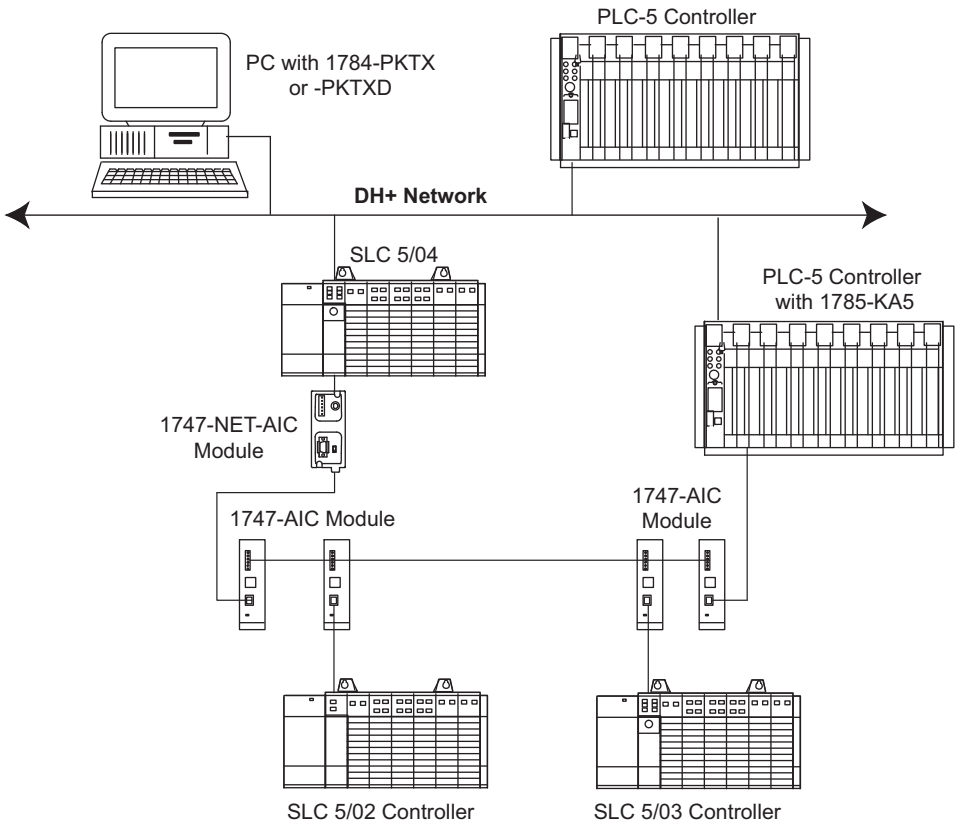
The DH+ network is a local area network designed to support remote programming and data acquisition for factory-floor applications. You can also use DH+ communication modules to implement a peer-to-peer network.

The DH+ network supports daisy-chain and trunkline-dropline configurations. The number of supported devices on a DH+ link and the maximum length of the cable depends on the communication rate.

The table below shows the maximum cable lengths, communication rates and associated termination resistor sizes for the DH+ network.

DH+ Network Specifications

Baud Rate	Maximum Cable Distance	Terminating Resistor Size
57.6 K baud	3048 m (10,000 ft)	150 Ω
115 K baud	1542 m (5000 ft)	150 Ω
230.4 K baud	762 m (2500 ft)	82 Ω



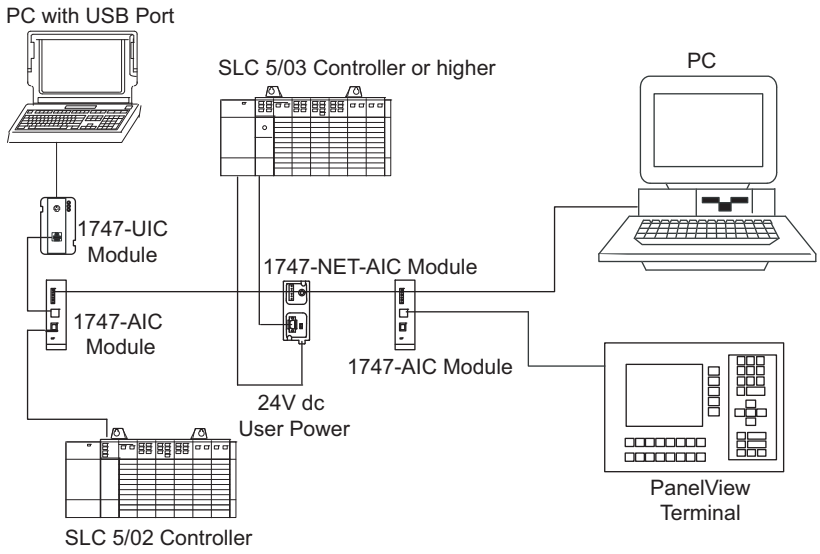
Data Highway Plus connectivity for the SLC 500 is provided by the SLC 5/04 processor. See page 63 for more information on the SLC 5/04.

DH-485 Network

The DH-485 communication network allows devices on the plant floor to share information. Via the network, application programs can:

- monitor process and device parameters and status, including fault and alarm detection.
- perform data acquisition.
- perform supervisory control functions.
- upload/download PLC programs over the network.

The network offers connection to up to 32 nodes, token passing access control, and the ability to add or remove nodes without disrupting the network. DH-485 supports slave devices and features multiple-master capability.



The SLC 500 family includes the following DH-485 devices:

- 1747-KE DH-485/RS-232C Interface Module
- 1761-NET-AIC Advanced Interface Converter
- 1747-AIC Isolated Link Coupler
- 1747-UIC USB to DH-485 Converter

DH-485/RS-232C Interface Module

The 1747-KE module is a communication interface that acts as a bridge between DH-485 networks and RS-232C devices using DF1 protocol. It allows you to access your SLC 500 processor through an RS-232C link. When used in an SLC 500 chassis with a modem, the 1747-KE module enables remote programming and troubleshooting of any single SLC 500 processor, remote communication to a DH-485 network of SLC 500 processors, and remote data collection from the data table of any SLC 500 processor. The interface module allows you to use the SLC 500 as a remote terminal unit.

DH-485/RS-232C Interface Module

Attribute	1747-KE
Backplane current (mA) @ 5V(1)	150 mA
Backplane current (mA) @ 24V(1) (2)	40 mA
Real time clock/accuracy	±1 minute/month at 25 ° C (77 °F) +0, -6 minute/month at 60 ° C (140 °F)
Isolation voltage(1) (2)	Tested @ 500V DC

(1) The 1747-KE module requires both 5V Dc and 24V DC power from the SLC backplane. The power consumption of the module must be taken into consideration when planning your SLC 500 system.

(2) If the 1747-AIC Link Coupler is connected to the 1747-KE module with a 1747-C10 cable, then the link coupler draws its power (85 mA @ 24V DC) through the module. Be sure to add this value to the current requirements for the 1747-KE when estimating the total requirements for your system. If the 1747-AIC Link Coupler is connected to the 1747-KE module with a 1747-C13 cable, the power for the link coupler comes from either an SLC 500 processor or an external power supply. Therefore, current requirements remain as listed.

1761-NET-AIC Advanced Interface Converter (AIC+)

This device is an isolated RS-232 to RS-485 converter. It allows two RS-232 devices (SLC 5/03, SLC 5/04, SLC 5/05; MicroLogix 1000, 1200, and 1500; DTAM Micro; PanelView) to connect to the DH-485 network.

To protect connected devices, the coupler provides 1500V dc isolation between the communications cable and the attached SLC 500 controller and peripheral devices.

Advanced Interface Converter (AIC+) Specifications

Attribute	1761-NET-AIC
24V DC current draw	120 mA
Inrush current, max.	200 mA @ 24V
24V DC power source requirement	20.4…28.8V DC
Isolation voltage	Tested @ 500V DC for 60 s

1747-AIC Isolated Link Coupler

The panel-mountable isolated link coupler is used to connect SLC 5/01, SLC 5/02, and SLC 5/03 processors to a DH-485 network. Where there are two or more SLC 500 processors on the link, one isolated link coupler is required for each processor.

When another device (DTAM or personal computer) is connected to an SLC 500 processor at a distance greater than 6.09 m (20 ft), an isolated link coupler must be connected at each end of the link. A 1747-C11 cable is included with the coupler for connection to the processor.

1747-UIC Universal Serial Bus to DH-485 Interface Converter

This device allows a computer with a USB port to interface to DH-485 ports on an SLC 500, MicroLogix, or other Rockwell Automation controllers and on PanelView terminals. The 1747-UIC features a USB connector as well as both an RS-232 and an RS-485 port. Use the RS-232 port to connect to SLC 5/03, 5/04, 5/05 (Channel 0), MicroLogix, CompactLogix, FlexLogix, ControlLogix, PanelView 300 or higher, or AIC+. Use the RS-485 Port to connect to SLC 5/01, 5/02, 5/03 (Channel 1), PanelView 300 or higher, or 1747-AIC.

USB to DH-485 Interface Converter Specifications

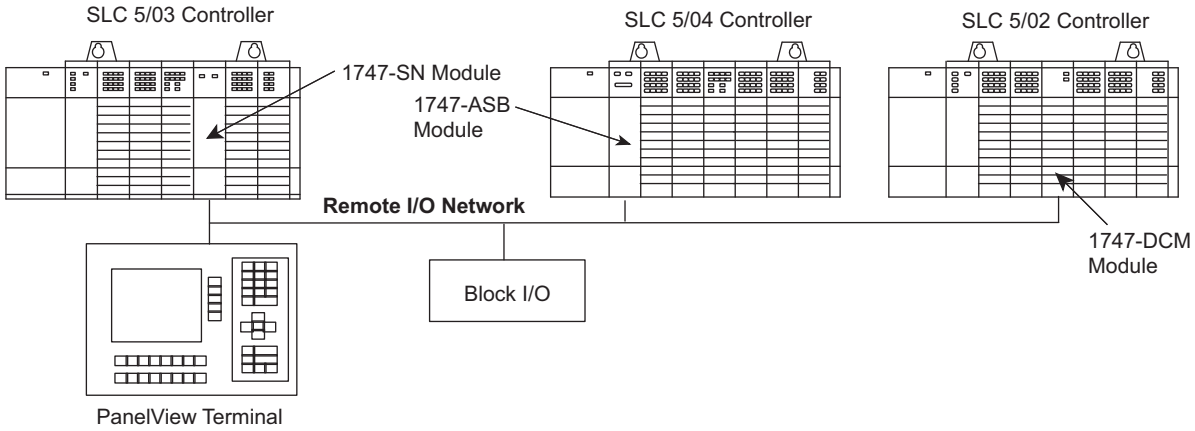
Attribute	1747-UIC
USB power consumption	<100 mA (low power)
USB speed	USB 1.1 (12 Mbps)
DH-485 Baud Rate	19.2 Kbps

Universal Remote I/O (RIO) Network

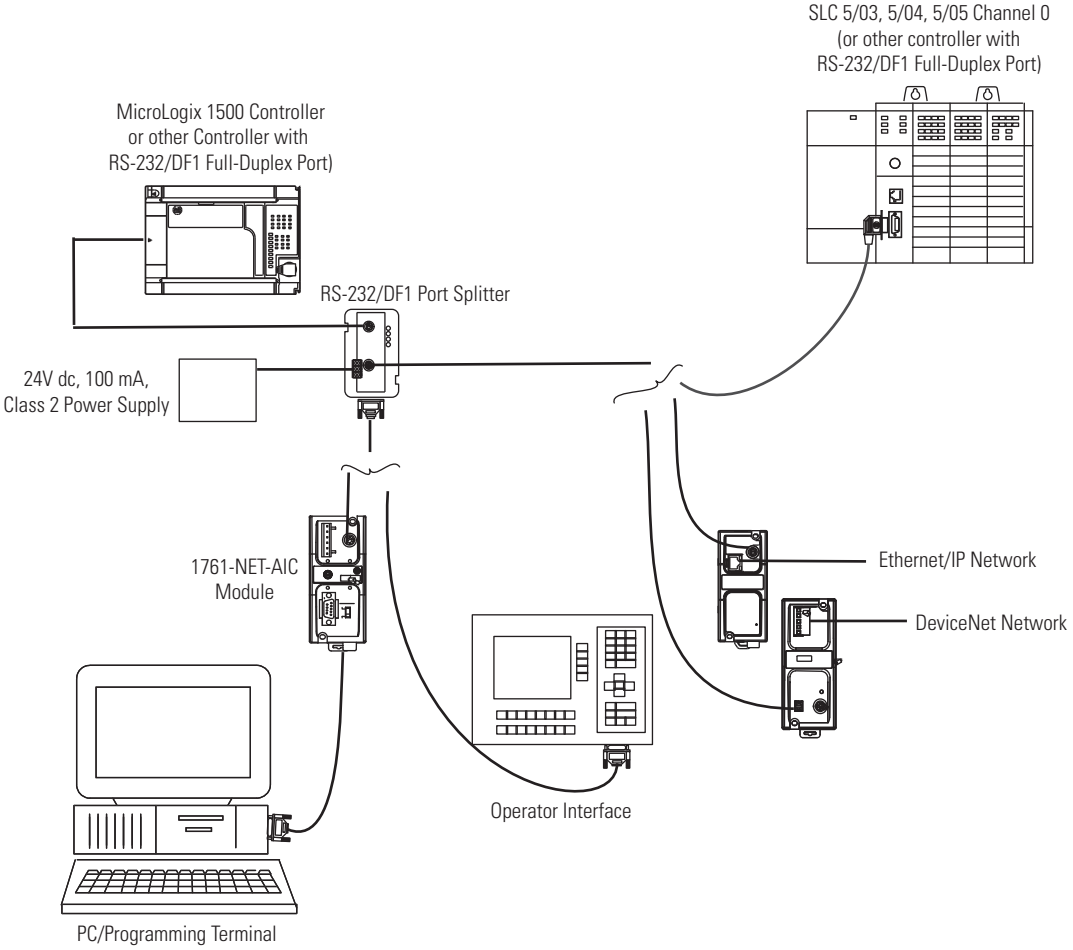
The strength and versatility of the Universal Remote I/O network comes from the breadth of products it supports. In addition to 1746 I/O, the Universal Remote I/O network supports many Allen-Bradley and third-party devices.

Typical applications range from simple I/O links with controllers and I/O, to links with a wide variety of other types of devices. You connect devices through remote I/O adapter modules or built-in remote I/O adapters. Using the Universal RIO Network instead of direct-wiring a device over a long distance to a local I/O chassis reduces installation, start-up, and maintenance costs by placing the I/O closer to the sensors and actuators.

SLC 5/03, 5/04, and 5/05 processors support pass-thru which lets you configure RIO devices remotely from an Ethernet, DH+, or DH-485/DF1 network, as well as block transfer instructions for faster reading and writing of I/O data.



Universal Remote I/O Connectivity for SLC 500 is provided by the following interfaces:



Communication Cables

The following tables provide a description of available communication cables and a summary of cable connectivity.

Communication Cables

Catalog Number	Description
1761-CBL-AC00	SLC 5/03, 5/04, and 5/05 Communication Cable - This 45 cm (17.7 in) cable has two 9-pin DTE connectors and is used to connect the SLC 5/03, 5/04, or 5/05 processor RS-232 channel (channel 0) to port 1 of the 1761-NET-AIC.
1761-CBL-AP00	SLC 5/03, 5/04, and 5/05 Communication Cable - This 45 cm (17.7 in) cable has a 9-pin DTE and an 8-pin mini DIN connector and is used to connect the SLC 5/03, 5/04, or 5/05 processor RS-232 channel (channel 0) to port 2 of the 1761-NET-AIC.
1761-CBL-PM02	SLC 5/03, 5/04, and 5/05 Communication Cable - This 2 m (6.5 ft) cable has a 9-pin DTE and an 8-pin mini DIN connector and is used to connect the SLC 5/03, 5/04, or SLC 5/05 processor RS-232 channel (channel 0) to port 2 of the 1761-NET-AIC.
1761-CBL-AS03	RJ45 to 6-Pin Phoenix Connector Communication Cable - This 3 m (9.8 ft) cable is used to connect the SLC 5/01, SLC 5/02, and SLC 5/03 processor RJ45 port to port 3 of the 1761-NET-AIC.

Communication Cables

Catalog Number	Description
1761-CBLAS09	RJ45 to 6-Pin Phoenix Connector Communication Cable - This 9.5 m (31.2 ft) cable is used to connect the SLC 5/01, SLC 5/02, and SLC 5/03 processor RJ45 port to port 3 of the 1761-NET-AIC.
1747-CP3	SLC 5/03, 5/04, and 5/05 RS-232 Programmer Cable - This 3 m (10 ft) cable has two 9-pin DTE connectors and is used to connect the SLC processor RS-232 channel (channel 0) to a personal computer serial port.
1747-C11	Processor to Isolated Link Coupler Replacement Cable – This 304.8 mm (12 in) cable is used to connect the SLC 500 processor to the Isolated Link Coupler (1747-AIC).
1747-C13	Specialty Module to Isolated Link Coupler Cable - Use a 1747-C13 cable to connect a BASIC or KE module to an Isolated Link Coupler (1747-AIC). Also connects 1747-UIC RS-485 port to AIC or SLC RJ45 port.

Cable Connectivity Summary

For Connectivity Between These Devices		Preferred Cable Catalog Number	These Cables May Be Used
1746-A4, -A7, -A10, or -A13 Chassis	1746-A4, -A7, -A10, or -A13 Chassis	1746-C7 1746-C9 1746-C16	–
1747-DTAM-E Data Table Access Module	SLC 500 Processors (DH-485 Channel)	1747-C10	1747-C11 1747-C20
1746-AIC Isolated Link Coupler	SLC 500 Processors (DH-485 Channel)	1747-C11	1747-C10 1747-C13 1747-C20
1747-UIC USB to DH-485 Interface Converter 1747-KE DH-485/RS-232C Interface Module 1746-BAS BASIC Module	1747-AIC Isolated Link Coupler (J2 Port) SLC 500 Processors (DH-485 Channel)	1747-C13	1747-C10 1747-C11
1746-xx32 32-channel I/O Modules	1492-IFM40x	1492-CABLExH	–
SLC 5/03 Processor (RS-232 Channel 0) SLC 5/04 Processor (RS-232 Channel 0) SLC 5/05 Processor (RS-232 Channel 0)	Personal Computer Serial Port (9-Pin DTE)	1747-CP3	–
1746-I/O	1492-IFMxx Interface Modules	1492-CABLExx	–
1747-SN Remote I/O Scanner 1747-DCM Direct Communication Module 1747-ASB SLC Remote I/O Adapter Module	Remote I/O Network	Belden 9463	–
SLC 5/04 Processors (1747-L541, -542, -543)	Data Highway Plus	Belden 9463	–
1747-AIC Isolated Link Coupler 1761-NET-AIC Communication Interface 1784-PKTX(D) Communication Interface Card	1747-AIC Isolated Link Coupler	Belden 9842 Belden 3106A	–
1747-DPS1 and 1747-DPS2 Port Splitter	Rockwell Automation controllers, PanelView, PanelView Plus, VersaView, InView and Personal Computers	Uses available 1747, 1756, 1761, 2706 and 2711 cables.	Refer to Installation Instructions for the port splitter (1747-IN516).

Power Supply Worksheet Example

Procedure

1. For each slot of the chassis that contains a module, list the slot number, catalog number of module, and its 5 V and 24 V maximum currents. Also include the power consumption of any peripheral devices that may be connected to the processor other than a DTAM, HHT, or PIC - the power consumption of these devices is accounted for in the power consumption of the processor.

Chassis Number 1		**Maximum Currents**		**Chassis Number 2**		**Maximum Currents**	
Slot Number	**Cat. No.**	**5V dc**	**24V dc**	**Slot Number**	**Cat. No.**	**5V dc**	**24V dc**
0	1747-L511	0.350 A	0.105 A	0	1747-L514	0.350 A	0.105 A
1	1746-IV8	0.050 A	—	1	1746-OW16	0.170 A	0.180 A
2	1746-OB8	0.135 A	—	2	1746-NO41	0.055 A	0.195 A
3	1746-OA16	0.370 A	—	3	1746-NO41	0.055 A	0.195 A
				4	1746-NO41	0.055 A	0.195 A
				5	1746-NO41	0.055 A	0.195 A
				6	1746-IO12	0.090 A	0.070 A
Peripheral Device	1747-AIC		0.085 A	Peripheral Device	1747-AIC		0.085 A
Peripheral Device				Peripheral Device			
2. Add loading currents of all system devices at 5 and 24V dc to determine **Total Current**.		**0.905 A**	**0.190 A**	2. Add loading currents of all system devices at 5 and 24V dc to determine **Total Current**.		**0.830 A**	**1.220 A**

3. For 1746-P4 power supplies, calculate total power consumption of all system devices. If not using a 1746-P4, go to step 4.

Current		**Multiply By**	**=Watts**	**Current**		**Multiply by**	**= Watts**
Total Current at 5V dc	0.905 A	5V	4.525 W	Total Current at 5V dc	0.830 A	5V	4.15 W
Total Current at 24V dc	0.190 A	24V	4.56 W	Total Current at 24V dc	1.220 A	24V	29.28 W
User Current at 24V dc	0.500 A	24V	12.00 W	User Current at 24V dc	0.500 A	24V	12.00 W
Add the Watts values to determine Total Power (cannot exceed 70 W)			**21.085 W**	**Add the Watts values to determine Total Power (cannot exceed 70 W)**			**45.43 W**

4. Choose the power supply from the list of catalog numbers below. Compare the Total Current required for the chassis with the Internal Current capacity of the power supplies. Be sure the Total Current consumption for the chassis is less than the Internal Current Capacity for the power supply, for both 5 V and 24 V loads.

		Internal Current Capacity				**Internal Current Capacity**	
Catalog Number		**5V dc**	**24V dc**	**Catalog Number**		**5V dc**	**24V dc**
1746-P1		2.0 A	0.46 A	**1746-P1**		2.0 A	0.46 A
1746-P2		5.0 A	0.96 A	**1746-P2**		5.0 A	0.96 A
1746-P3		3.6 A	0.87 A	**1746-P3**		3.6 A	0.87 A
1746-P4 (See step 3)		10.0 A	2.88 A	**1746-P4 (see step 3)**		10.0 A	2.88 A
1746-P5		5.0 A	0.96 A	**1746-P5**		5.0 A	0.96 A
1746-P6		5.0 A	0.96 A	**1746-P6**		5.0 A	0.96 A
1747-P7✶	12V input	2.0 A	0.46 A	**1747-P7✶**	12V Input	2.0 A	0.46 A
	24V input	3.6 A	0.87 A		24V Input	3.6 A	0.87 A
Required Power Supply		**1746-P1**		**Required Power Supply**		**1746-P4**	

✶See P7 current capacity chart on page 69.

Specialty Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1746-BAS-T	150 mA	40 mA(1)	N/A	3.75 W	3.80 W
1746-BLM	110 mA	85 mA	N/A	5.00 W	5.00 W
1746-BTM	110 mA	85 mA	N/A	2.59 W	2.59 W
1746-HSCE	320 mA	0 mA	N/A	1.60 W	1.60 W
1746-HSCE2	250 mA	0 mA	N/A	1.25 W	1.25 W
1746-HSRV	300 mA	0 mA	N/A	1.50 W	1.50 W
1746-HSTP1	200 mA	90 mA	N/A	1.50 W	1.50 W
1746-INT4	110 mA	85 mA	N/A	1.26 W	1.26 W
1746-NR4	50 mA	50 mA	N/A	1.50 W	1.50 W
1746-NR8	100 mA	55 mA	N/A	1.82 W	1.82 W
1746-NT4	60 mA	40 mA	N/A	0.80 W	0.80 W
1746-NT8	120 mA	70 mA	N/A	2.28 W	2.28 W
1746-QS	1000 mA	200 mA	N/A	9.80 W	9.80 W
1746-QV	250 mA	0 mA	N/A	1.075 W	1.075 W

(1) When using the 1747-BAS or 1747-KE modules to supply power to an AIC, add 0.085 A (the current loading for the AIC) to the 1747-BAS or 1747-KE module's power supply loading value at 24V DC.

Communication Modules

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1747-ACN15	900 mA	0 mA	N/A	4.50 W	4.50 W
1747-ACNR15	900 mA	0 mA	N/A	4.50 W	4.50 W
1747-ASB	375 mA	0 mA	N/A	1.875 W	1.875 W
1747-BSN	800 mA	0 mA	N/A	4.00 W	4.00 W
1747-DCM	360 mA	0 mA	N/A	1.80 W	1.80 W
1747-KE	150 mA	40 mA(1)	N/A	3.75 W	3.80 W
1747-KFC15	640 mA	0 mA	N/A	3.20 W	3.20 W
1747-SCNR	900 mA	0 mA	N/A	4.50 W	4.50 W
1747-SDN	500 mA	-- mA	N/A	2.50 W	2.50 W
1747-SN	600 mA	0 mA	N/A	4.50 W	4.50 W

(1) When using the 1747-BAS or 1747-KE modules to supply power to an AIC, add 0.085 A (the current loading for the AIC) to the 1747-BAS or 1747-KE module's power supply loading value @ 24V DC.

Peripheral Devices

Catalog Number	Backplane Current (mA) @ 5V	Backplane Current (mA) @ 24V	Watts per point	Thermal dissipation, min.	Thermal dissipation, max.
1747-AIC	0 mA	85 mA	N/A	2.00 W	2.00 W
1747-UIC(1)	N/A	N/A	N/A	N/A	N/A
1747-PSD	N/A	N/A	N/A	N/A	N/A
1761-NET-AIC(2)	0 mA	0 mA	N/A	2.50 W	2.50 W
1761-NET-DNI	0 mA	0 mA	N/A	2.50 W	2.50 W
1761-NET-ENIW	0 mA	0 mA	N/A	2.50 W	2.00 W

(1) 1747-UIC power consumption is less than 100 mA.

(2) Current for the 1761-NET-AIC and 1761-NET-ENI(W) must be supplied from an external 24V DC source.