Installation Instructions

Direct Communication Module

(Catalog Number 1747-DCM)

Publication 1747-IN005B-EN-P - March 2003

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

For More Information

For detailed information on planning and installing your system, see the following publications:

Publication	Number
Direct Communication User Manual	1747-6.8
SLC 500 Modular Hardware Style User Manual	1747-UM011
SLC 500 Fixed Hardware Style User Manual	1747-6.21
RIO Scanner User Manual	1747-6.6
SLC 500 Instruction Set Reference Manual	1747-RM001
Industrial Automation Wiring and Grounding Guidelines	1770-4.1

If you would like a manual, you can:

- download a free electronic version from the internet at **www.theautomationbookstore.com**
- purchase a printed manual by:
  - contacting your local distributor or Rockwell Automation representative
  - visiting **www.theautomationbookstore.com**
  - calling 1.800.963.9548 (USA/Canada) or 001.330.725.1574 (Outside USA/Canada)

Hazardous Location Considerations

This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only. The following WARNING applies to use in hazardous locations.

WARNING

EXPLOSION HAZARD

- Substitution of components may impair suitability for Class I, Division 2.
- Do not replace components or disconnect equipment unless power has been switched off.
- Do not connect or disconnect components unless power has been switched off.
- All wiring must comply with N.E.C. article 501-4(b).

Environments dangereux

Cet équipement est conçu pour être utilisé dans des environnements de Classe 1, Division 2, Groupes A, B, C, D ou non dangereux. La mise en garde suivante s'applique à une utilisation dans des environnements dangereux.

AVERTISSEMENT

DANGER D'EXPLOSION

- La substitution de composants peut rendre cet équipement impropre à une utilisation en environnement de Classe 1, Division 2.
- Ne pas remplacer de composants ou déconnecter l'équipement sans s'être assuré que l'alimentation est coupée.
- Ne pas connecter ou déconnecter des composants sans s'être assuré que l'alimentation est coupée.

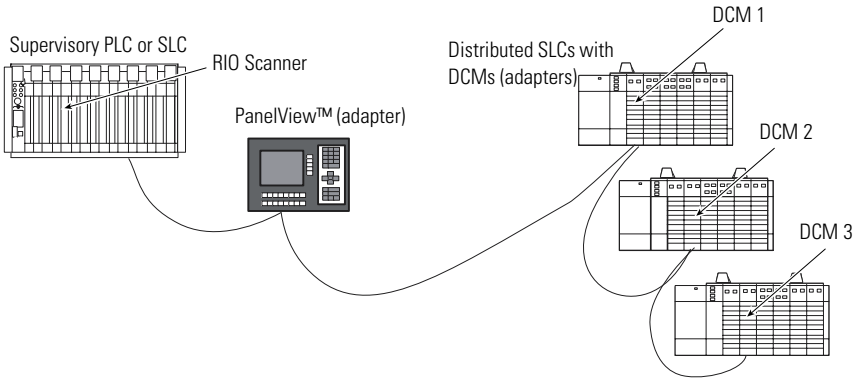
System Overview

The Direct Communication Module, catalog number 1747-DCM, connects any SLC 500 ® programmable controller with expansion chassis or SLC 500 Modular Programmable Controller to a supervisory Allen-Bradley programmable controller via the RIO Link, providing a distributed processing system. The 1747-DCM allows these supervisory processors to transfer data between one another. The 1747-DCM appears as an RIO adapter to:

- a PLC® processor with integral RIO scanner on the RIO Communication Link
- an RIO scanner, catalog number 1771-SN or 1747-SN, on the RIO Communication Link

The 1747-DCM can physically reside on the RIO Link with any other adapter. It is compatible with all RIO scanners.

1747-DCM Modules are connected in a daisy-chain configuration using Belden™ 9463 cable. See the example below.

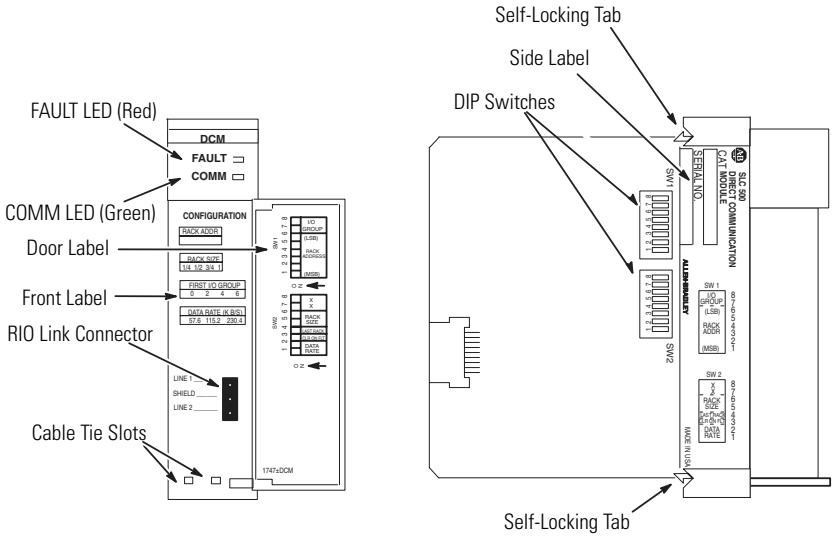


Extended Node Capability

The 1747-DCM features extended node capability. Extended node capability allows you to have up to 32 adapters on the RIO link using an 82Ω termination resistor at both ends of the RIO link for all baud rates.

IMPORTANT Extended node capability can only be used if the scanner and all adapters on the RIO link have extended node capability.

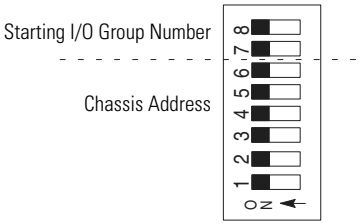
Hardware Features



Module Configuration

DIP Switches

DIP switches enable the 1747-DCM to properly interpret the RIO system addressing. The 1747-DCM has two banks of DIP switches mounted on its circuit board. Each bank contains eight switches. The default settings are shown below.



DIP Switch 1 Settings

Chassis Address (SW1-1 through SW1-6)

The chassis address refers to the logical chassis number from the scanner image that contains a particular 1747-DCM's image.

The table on the following page shows the settings that define possible chassis address choices for all scanners. To use this table, first determine which of the following categories applies to your scanner.

- PLC-2, mini-PLCs, PLC-2/30 with 1770-SD, SD2 remote scanner
- PLC-3 and PLC-5/250 processors (This category includes those with built-in scanners, as well as the following, without built-in scanners: 1775-54A, -54B, -S5, SR, -SR5, and 5250-RS.)
- SLC-5/02 (or above) with 1747-SN scanner

After determining which category applies to your 1747-DCM application:

1. Find the column for the scanner used in your application.
2. Go down the column to the chassis address that you assigned to the 1747-DCM.
3. Use the switch settings in the right-most columns of the table that correspond to your chassis address.

Settings for SW1-1 through SW1-6

Logical Chassis Number (Octal)								Switch Number (SW1)					
1747-SN	**PLC-2**	**PLC-3**	**PLC-5/15**	**PLC-5/25**	**PLC-5/40**	**PLC-5/60**	**PLC-5/250**	**1**	**2**	**3**	**4**	**5**	**6**
0	1	0	-	-	-	-	0	ON	ON	ON	ON	ON	ON
1	2	1	1	1	1	1	1	ON	ON	ON	ON	ON	OFF
2	3	2	2	2	2	2	2	ON	ON	ON	ON	OFF	ON
3	4	3	3	3	3	3	3	ON	ON	ON	ON	OFF	OFF
	5	4		4	4	4	4	ON	ON	ON	OFF	ON	ON
	6	5		5	5	5	5	ON	ON	ON	OFF	ON	OFF
	7	6		6	6	6	6	ON	ON	ON	OFF	OFF	ON
		7		7	7	7	7	ON	ON	ON	OFF	OFF	OFF
		10			10	10	10	ON	ON	OFF	ON	ON	ON
		11			11	11	11	ON	ON	OFF	ON	ON	OFF
		12			12	12	12	ON	ON	OFF	ON	OFF	ON
		13			13	13	13	ON	ON	OFF	ON	OFF	OFF
		14			14	14	14	ON	ON	OFF	OFF	ON	ON
		15			15	15	15	ON	ON	OFF	OFF	ON	OFF
		16			16	16	16	ON	ON	OFF	OFF	OFF	ON
		17			17	17	17	ON	ON	OFF	OFF	OFF	OFF
		20				20	20	ON	OFF	ON	ON	ON	ON
		21				21	21	ON	OFF	ON	ON	ON	OFF
		22				22	22	ON	OFF	ON	ON	OFF	ON
		23				23	23	ON	OFF	ON	ON	OFF	OFF
		24				24	24	ON	OFF	ON	OFF	ON	ON
		25				25	25	ON	OFF	ON	OFF	ON	OFF
		26				26	26	ON	OFF	ON	OFF	OFF	ON
		27				27	27	ON	OFF	ON	OFF	OFF	OFF
		30					30	ON	OFF	OFF	ON	ON	ON
		31					31	ON	OFF	OFF	ON	ON	OFF
		32					32	ON	OFF	OFF	ON	OFF	ON
		33					33	ON	OFF	OFF	ON	OFF	OFF
		34					34	ON	OFF	OFF	OFF	ON	ON
		35					35	ON	OFF	OFF	OFF	ON	OFF
		36					36	ON	OFF	OFF	OFF	OFF	ON
		37					37	ON	OFF	OFF	OFF	OFF	OFF
		40						OFF	ON	ON	ON	ON	ON
		41						OFF	ON	ON	ON	ON	OFF
		42						OFF	ON	ON	ON	OFF	ON
		43						OFF	ON	ON	ON	OFF	OFF

Settings for SW1-1 through SW1-6

Logical Chassis Number (Octal)								Switch Number (SW1)					
1747-SN	PLC-2	PLC-3	PLC-5/15	PLC-5/25	PLC-5/40	PLC-5/60	PLC-5/250	1	2	3	4	5	6
		44						OFF	OFF	ON	OFF	ON	ON
		45						OFF	ON	ON	OFF	ON	OFF
		46						OFF	ON	ON	OFF	OFF	ON
		47						OFF	ON	ON	OFF	OFF	OFF
		50						OFF	ON	OFF	ON	ON	ON
		51						OFF	ON	OFF	ON	ON	OFF
		52						OFF	ON	OFF	ON	OFF	ON
		53						OFF	ON	OFF	ON	OFF	OFF
		54						OFF	ON	OFF	OFF	ON	ON
		55						OFF	ON	OFF	OFF	ON	OFF
		56						OFF	ON	OFF	OFF	OFF	ON
		57						OFF	ON	OFF	OFF	OFF	OFF
		60						OFF	OFF	ON	ON	ON	ON
		61						OFF	OFF	ON	ON	ON	OFF
		62						OFF	OFF	ON	ON	OFF	ON
		63						OFF	OFF	ON	ON	OFF	OFF
		64						OFF	OFF	ON	OFF	ON	ON
		65						OFF	OFF	ON	OFF	ON	OFF
		66						OFF	OFF	ON	OFF	OFF	ON
		67						OFF	OFF	ON	OFF	OFF	OFF
		70						OFF	OFF	OFF	ON	ON	ON
		71						OFF	OFF	OFF	ON	ON	OFF
		72						OFF	OFF	OFF	ON	OFF	ON
		73						OFF	OFF	OFF	ON	OFF	OFF
		74						OFF	OFF	OFF	OFF	ON	ON
		75						OFF	OFF	OFF	OFF	ON	OFF
		76						OFF	OFF	OFF	OFF	OFF	ON
77	77	77	77	77	77	77	77	Reserved					

Starting I/O Group Number (SW1-7 and SW1-8)

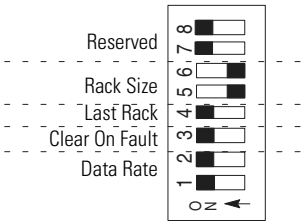
The starting I/O group number must be an even number from 0 to 6 (e.g. 0, 2, 4, or 6) and is dependent upon whether the 1747-DCM has been configured as a full, ¾, ½, or ¼ chassis. The first word transferred is always the status word for the 1747-DCM.

The table below shows the switch settings for the starting I/O group numbers.

Starting I/O Group Number	SW1-7	SW1-8	Valid Chassis Configuration
0	ON	ON	All
2	ON	OFF	¾, ½, ¼
4	OFF	ON	½, ¼
6	OFF	OFF	¼

DIP Switch 2 Settings

The default settings are shown below.



Data Rate (SW2-1 and SW2-2)

Data Rate	SW2-1	SW2-2	Cable Length (Belden 9463)
57.6K baud	ON	ON	3048 meters (10,000 feet)
115.2K baud	ON	OFF	1542 meters (5,000 feet)
230.4K baud	OFF	ON	762 meters (2,500 feet)
	OFF	OFF	

Clear on Fault (SW2-3)

Clear On Fault	SW2-3
Yes	OFF
No	ON

Turn the switch to the OFF position if you want the 1747-DCM to clear and hold clear all data bits in its input image table in the event of an RIO communication failure or when the supervisory processor enters the Program/Test/Fault mode. *Status bits will not be cleared.*

Turn the switch to the ON position if you want the 1747-DCM to hold all input data bits in their last state if an RIO communication failure occurs or when the supervisory processor enters the Program/Test/Fault mode.

ATTENTION

Before setting SW2-3 to ON, make sure that holding all 1747-DCM input bits in their last state, in the event of an RIO communication failure, does not create an unsafe condition in the distributed SLC processor.

Last Chassis (SW2-4)

Switch SW2-4 must be set to the OFF position if the 1747-DCM shares its logical chassis with at least one other adapter and has been assigned the highest I/O group number in that logical chassis.

Last Chassis	SW2-4
Yes	OFF
No	ON

Chassis Size (SW2-5 and SW2-6)

The logical chassis size allocates image space in the scanner for each 1747-DCMs I/O data. The 1747-DCM allows ¼, ½, ¾, and full chassis addressing. SW2 switches 5 and 6 define the chassis size, as shown below.

Chassis Size	SW2-5	SW2-6	Number of RIO Words Transferred	Total Words
¼ Logical Chassis	ON	ON	1 Status and 1 Data	2
½ Logical Chassis	ON	OFF	1 Status and 3 Data	4
¾ Logical Chassis	OFF	ON	1 Status and 5 Data	6
Full Logical Chassis	OFF	OFF	1 Status and 7 Data	8

IMPORTANT The 1747-DCM image cannot cross logical chassis boundaries. For example, configuring the module for ½ logical chassis with starting group 6 will cause a configuration error.

Installation and Removal

ATTENTION Disconnect power before attempting to install, remove, or wire the 1747-DCM.

IMPORTANT Make sure you have set the DIP switches properly before installing the 1747-DCM. See Module Configuration on page 7.

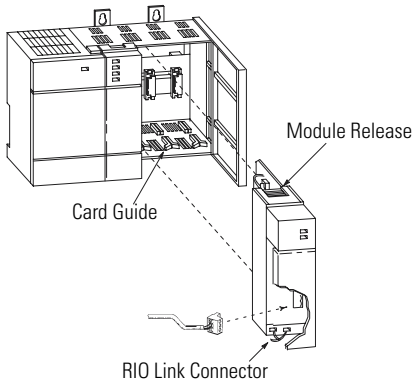
Power Requirements

Before installation, make sure your modular SLC power supply has adequate reserve current capacity. The 1747-DCM requires 360 mA at 5V dc.

Each fixed SLC 500 controller can support one 1747-DCM in a 2-slot expansion chassis, depending on which I/O module is in the second slot. See *Discrete Input and Output Modules Technical Data*, publication number 1746-2.35 for details.

Installation

1. Disconnect power.
2. Align the full-sized circuit board with the chassis card guides. The 1747-DCM must not be installed in slot 0. The first slot (slot 0) of the first chassis is reserved for the CPU.
3. Slide the module into the chassis until the top and bottom latches are latched.
4. Attach the RIO link cable to the connector on the front of the module.
5. Insert the cable tie in the slots.
6. Route the cable down and away from the module, securing it with a cable tie.
7. Cover all unused slots with the Card Slot Filler, catalog number 1746-N2.



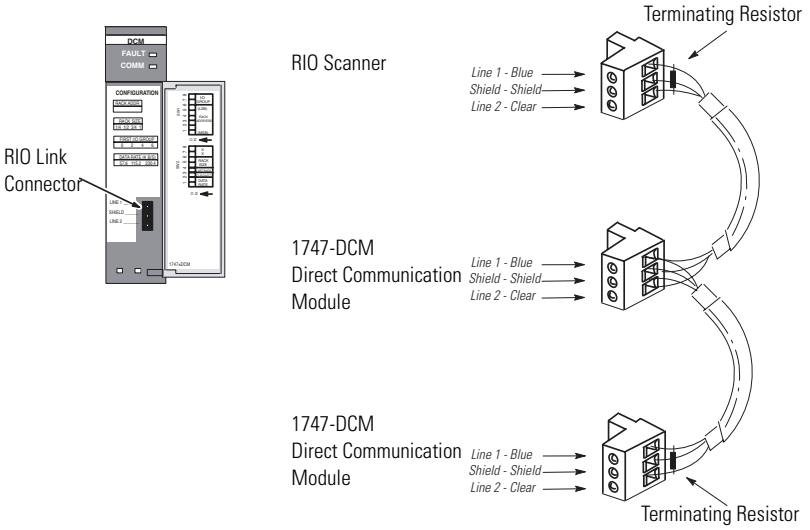
Removal

1. Disconnect power.
2. Press the releases at the top and bottom of the module and slide the module out of the chassis slot.
3. Cover all unused slots with the Card Slot Filler, catalog number 1746-N2.

Network Wiring

A ½ Watt terminating resistor must be attached across line 1 and line 2 of the connectors at each end (scanner and last physical device) of the network. The size of the resistor depends upon the baud rate and extended node capability, as shown in the table below.

Baud Rate		Terminating Resistor Size	Maximum Cable Distance (Belden 9463)
Using Extended Node Capability	57.6K baud	82Ω½ Watt Grey-Red-Black-Gold	3048 m (10,000 ft.)
	115.2K baud	82Ω½ Watt Grey-Red-Black-Gold	1524 m (5,000 ft.)
	230.4K baud	82Ω½ Watt Grey-Red-Black-Gold	762 m (2,500 ft.)
Without Extended Node Capability	57.6K baud	150Ω½ Watt	3048 m (10,000 ft.)
	115.2K baud	150Ω½ Watt Brown-Green-Brown-Gold	1524 m (5,000 ft.)
	230.4K baud	82Ω½ Watt Grey-Red-Black-Gold	762 m (2,500 ft.)



Troubleshooting

Using the FAULT LED (Red)

If LED is:	Cause:	Corrective Action:
On	Internal Fault	Cycle power to the I/O chassis containing the 1747-DCM. Replace the 1747-DCM if red LED remains lit after power-up.
Flashing	Configuration Error	Check that the DIP switch settings are correct. Make sure that I/O group and chassis size settings are compatible.(1) Also see that the setting for chassis address is correct.
Off	Normal State	No action required.

(1) The 1747-DCM cannot cross logical chassis boundaries. For example, configuring the module for ½ logical chassis with starting group 6 causes a configuration error.

Using the COMM LED (Green)

If LED is:	Cause:	Corrective Action:
On	Normal State	No action required.
Flashing	RIO scanner's processor in Program/Test/Fault mode	Check for RIO scanner's processor error, correct condition, and cycle power to the 1747-DCM.
Off	RIO scanner's processor not connected to scanner	Check that the scanner is properly installed in the chassis.
	RIO scanner's processor chassis inhibited	Check RIO scanner's processor chassis integrity, correct any problem, and cycle power to the 1747-DCM.
	No communication between RIO scanner's processor and 1747-DCM	Check that the baud rate of the 1747-DCM matches the baud rate of the scanner.
		Check cable connections from the RIO scanner or its processor to the 1747-DCM.
		Check that the 1747-DCM connector is properly installed.

Specifications

Backplane Current Consumption	360 mA at 5V dc
Operating Temperature	0°C to +60°C (+32°F to +140°F)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity Rating	5% to 95% non-condensing
Agency Certification (when product or packaging is marked)	UL listed CSA certified Class 1, Division 2, Groups A, B, C, D certified CE compliant for all applicable directives. C-Tick marked for all applicable acts.

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