Allen-Bradley 1756-RM

ControlLogix Redundancy Module

The 1756-RM is a redundancy module that links a supported pair of ControlLogix controller chassis. It provides the redundancy interface for ControlLogix 5560 and 5570 systems; separate controllers execute the application logic.



Technical Specifications

Product Identity	
Manufacturer	Allen-Bradley
Complete part number	1756-RM
Product type	ControlLogix redundancy module
Module width	1 chassis slot
Module location	Chassis-based, any slot; partner configuration must be matched
Approximate weight	0.29 kg
Functional Configuration	
Supported controller families	ControlLogix 5560 and 5570
Interconnection cable options	1756-RMC1 / 1756-RMC3 / 1756-RMC10
Cable lengths	1 m / 3 m / 10 m
Performance & Power	
Backplane current at 5.1V DC	1.2 A
Backplane current at 1.2V DC	4 mA
Backplane current at 24V DC	120 mA
Power dissipation	9.0 W maximum
Thermal dissipation	31 BTU/hr
Environment	
Operating temperature	0…60 °C
Nonoperating temperature	-40…+85 °C
Relative humidity	5…95%, noncondensing

Selected original manufacturer pages follow on pages 3–7.

Compatibility & Selection Guide

System and software compatibility. Partner modules must have the same catalog number and corresponding chassis slots, with all chassis modules using compatible firmware from the same redundancy bundle. Series B supports DDR backplane operation in the applicable ControlLogix 5570 configuration.

Wiring & Installation Reference

Interfaces and connections

Use one matching module in the corresponding slot of each chassis.

Use a direct end-to-end link between partner fiber ports; do not connect this link through a network switch.

Mounting and connection

Prepare the matching chassis pair. Use matching partner modules in corresponding slots, install compatible engineering software, and verify the hardware and redundancy firmware bundle before assembly.

Install and connect the modules. Install the power supplies, redundancy modules, communication modules and controllers in the required chassis sequence. Connect the partner fiber ports directly and keep both chassis off until all modules are installed.

Update and qualify the system. Update each chassis using the same compatible redundancy firmware bundle. With both chassis initially off, power the intended primary first, confirm PRIM, then power the secondary and verify the chassis designations and synchronization.

Installation precautions. Review the safety and environmental requirements for every chassis component before setup. Do not apply power to either chassis until all modules in both chassis are installed; during firmware updates, power only the chassis being updated. Use the same compatible redundancy firmware bundle across both chassis, and follow the required primary-then-secondary startup order. Connect matching redundancy modules directly; do not route the partner fiber link through a network switch.

View redundancy requirements (PDF) · PDF page 4 | View chassis installation · PDF page 6

Manufacturer sources: ControlLogix and GuardLogix Controller Specifications — redundancy / 1756 ControlLogix Controllers — redundant system requirements / ControlLogix 5570 and 5560 Controllers User Manual — DDR backplane / Redundancy Systems User Manual.

1756-RM Redundancy Modules

Technical Specifications - 1756-RM Redundancy Modules

Attribute	1756-RM	1756-RMXT
Current draw @ 1.2V DC	4 mA	
Current draw @ 5.1V DC	1.2 A	
Current draw @ 24V DC	120 mA	
Power dissipation	9.0 W, max	
Thermal dissipation	31 BTU/hr	
Connector cables	1756-RMC1, 1 m (3.28 ft) 1756-RMC3, 3 m (9.84 ft) 1756-RMC10, 10 m (32.81 ft)	
Slot width	1 slot	
Module location	Chassis-based, any slot	
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	1756-A7XT, 1756-A4LXT, 1756-A5LXT, 1756-A7LXT
Controller families, supported	ControlLogix 5560, ControlLogix 5570	
Power supply, standard	1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75	1756-PAXT, 1756-PBXT
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2	None
North American temperature code	T4	
IEC temperature code	T4	
Enclosure type	None (open-style)	
Weight, approx	0.29 kg (0.64 lb)	
Mounting	ControlLogix-XT chassis, single-slot module	

Environmental Specifications - 1756-RM Redundancy Modules

Attribute	1756-RM	1756-RMXT
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)	-25...+70 °C (-13...+158 °F) When using a 1756-A7LXT chassis, surrounding air temperature range is -25...+60 °C (-13...+140 °F) even when using an 'XT' redundancy module.
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	70 °C (158 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration	IEC 60068-2-6 (Test Fc, Operating)	
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock)	
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock)	
Emissions	CISPR 11	
ESD immunity	IEC 61000-4-2	
Radiated RF immunity	IEC 61000-4-3	

Redundancy Module Requirements

A pair of redundancy modules is required to link the redundancy chassis pair. Place one redundancy module in the same slot of each redundant chassis. The partner redundancy modules monitor events in each chassis and initiate system responses as required.

IMPORTANT Use only direct, end-to-end connections between the fiber ports of partner redundancy modules. For example, do not use the fiber ports on a redundancy module to connect to a Stratix® switch or other device.

Partner redundancy modules must have the same catalog number.

Table 5 - Supported Redundancy Modules

Redundancy System	Cat. No.
Logix SIS	1756-RM3, 1756-RM3XT, 1756-RM2, 1756-RM2XT
ControlLogix 5580	1756-RM3, 1756-RM3XT, 1756-RM2, 1756-RM2XT
ControlLogix 5570	1756-RM3, 1756-RM3XT, 1756-RM2, 1756-RM2XT, 1756-RM

The 1756-RM3-2SFP module is functionality equivalent to a 1756-RM3 module but comes with two small form-factor pluggable (SFP) fiber-optic transceivers. The 1756-RM3-2SFP module is intended to be one catalog number for a functional replacement of a 1756-RM2 module in an existing redundancy system.

For redundancy module and accessory specifications, see the ControlLogix and GuardLogix Controllers Technical Data, publication 1756-TD001.

EtherNet/IP Features

Redundancy modules support the following EtherNet/IP features. For information about these EtherNet/IP features, see Configure Redundancy Modules.

Table 6 - Redundancy Module EtherNet/IP Features

Cat. No.	Features			
	Communication Rate, Max	Protected Mode	Fiber Security	CIP Sync™
1756-RM3, 1756-RM3XT	1000 Mbps	Yes	Yes	Yes
1756-RM2, 1756-RM2XT	1000 Mbps	No	No	No
1756-RM	100 Mbps	No	No	No

Set Up a Redundancy System

The setup process of a redundancy system consists of the following:

- Firmware bundle installation
- Redundancy Module Configuration Tool (RMCT) installation
- Redundant chassis component installation and firmware updates
- Identification of the primary and secondary chassis
- Qualification and synchronization verification

After setup, you can reset, remove, and replace redundancy modules as needed.

Before You Begin

Before you set up a redundancy system, do the following:

- Make sure that the redundant chassis pair has the required matching components. See Chapter 2. For best performance, place the redundancy module in the chassis as close as possible to the controller.
- Read and understand the safety and environmental considerations explained in the installation instructions for each component.
- Download and install the compatible versions of the Studio 5000 Logix Designer® application, communication software, and ControlFLASH Plus® software.

  For information on how to download and install ControlFLASH Plus software, see the ControlFLASH Plus Quick Start Guide, publication CFP-QS001.

  IMPORTANT If communication software is already on your system, be sure to shut it down before you install or update software.

- Review the release notes for the firmware bundle that you are installing. Make sure that you have compatible hardware and the correct firmware revisions.
- Determine the IP address for each of your Ethernet/IP™ communication modules. Both communication modules in the redundant chassis pair usually have the same IP address. See IP Address Swapping.

Install Redundant Chassis Components

When you install redundant chassis components, be sure to match the slot locations of partner modules in each redundant chassis.

IMPORTANT	Do not power on either chassis until you have installed all modules in both chassis.

For installation instructions, see the Additional Resources.

1. Install the power supply or redundant power supplies for the first chassis.
2. Install and connect the redundancy modules in both chassis.
3. Install EtherNet/IP communication modules in the first chassis.
4. Install one controller in the first chassis.
5. Install the power supply or redundant power supplies in the second chassis.
6. Install the second chassis Ethernet/IP communication modules.
7. Install one controller in the second chassis of the redundant pair.

Convert a Standalone Chassis to a Redundant Chassis Pair

To convert a standalone chassis to a redundant chassis pair, follow these steps.

1. Insert a redundancy module in a spare slot in the standalone chassis.
2. Configure an identical chassis with compatible modules in the same slot as the standalone chassis.

For details about how to convert from a non-redundant system, see Appendix H.

Update Firmware

Use ControlFLASH Plus software to update the firmware of each module in each chassis. For information on how to download, install, and use ControlFLASH Plus software, see the ControlFLASH Plus Quick Start Guide, publication CFP-QS001.

IMPORTANT	• Apply power only to the chassis in which you are updating firmware. • Redundancy module firmware that is contained in the redundancy firmware bundle is designed for use with redundancy modules. • All modules in both chassis must use firmware from the same redundancy firmware bundle.

To update the firmware in each chassis, following these steps.

1. Apply power to the chassis.
2. Set the keyswitch on the controller to PROG.
3. Wait for the modules to complete their start-up scrolling status messages, and then check the status indicators.

   During this time, the redundancy module conducts internal operations to prepare for an update.
4. Launch ControlFLASH Plus software and update the communication module that is the gateway to the other modules.
5. Update the redundancy module.
6. Once the firmware update is complete, verify that the redundancy module status displays PRIM, which indicates a successful update.
7. Use ControlFLASH Plus software to update the rest of the modules in the chassis.
8. Verify a successful update of each module with firmware revisions that match the revision in the firmware bundle.
9. Power off the chassis.

Identify the Primary and Secondary Chassis

IMPORTANT

- Do not apply power to the chassis until you have read the instructions for identifying the primary chassis. Applying power to the chassis in the correct order is crucial to identifying the primary and secondary chassis.
- Make sure that both communication modules are set appropriately.
- As a best practice, do not load an application until the primary and secondary racks are synchronized.
- Before you identify the primary chassis and qualify the system, install the latest firmware. See Update Firmware.
- A secondary chassis stops functioning if it contains modules or firmware that are not compatible with redundancy systems.

To identify the initial primary and secondary chassis of a redundant chassis pair, complete these steps.

1. Verify that power is removed from both chassis.
2. Apply power to the chassis that you want to identify as the primary chassis and wait for the PRIM status message to appear on the front panel of the module.
3. Verify that all module pairs are at compatible firmware revision levels.
4. Apply power to the chassis that you want to identify as the secondary chassis.
5. Verify primary and secondary chassis designations by viewing the redundancy module status message display.

   For information about status messages on the display, see Appendix A.