ProcessLogix/ControlLogix System Redundancy Module

Catalog numbers 1757-SRM/A, 1757-SRM/B

This document tells you how to install the ProcessLogix™/ControlLogix™System Redundancy Module (1757-SRM) into the ProcessLogix or ControlLogix Redundant Chassis pair. Read these installation instructions completely before you install the 1757-SRM. The 1757-SRM Series B has a user relay, Series A does not.

Firmware Revision Compatibilities

Check the catalog revision field of the product ID label on your 1757-SRM/B module. If your module is at Cat. Rev. B01 or later, the module has firmware revision D, (Rev. 2.20), pre-loaded for you. The 2.20 firmware limits the functionality to:

- allow the module to power up
- run hardware diagnostics
- support downloading 1.12, 2.15, or 3.xx operational firmware

To flash the 1757-SRM with the appropriate operational firmware from the ProcessLogix or ControlLogix system release CD, refer to either the ControlLogix Redundancy Release Notes or the ProcessLogix Installation and Upgrade Guide to determine which version of operational firmware to load.

For the ControlLogix 5000 V11.00 release, new SRM 3.xx firmware is available. This firmware is compatible with both 1757-SRM/A and 1757-SRM/B hardware.

When upgrading to 3.xx firmware from 1.12 or 2.15 firmware, you will notice the following auto-sequence:

1. 2 downloads (ERAS/PROG on display twice).

2. A reset to Rev. 2.20.

3. 2 additional downloads (ERAS/PROG on display twice).

4. A second reset to REV. 3.xx, before the upgrade to 3.xx firmware is complete.

   This sequence will take several minutes to complete.

ATTENTION

You must not interrupt this process. Wait until the display scrolls the final REV. 3.xx firmware designation. Failure to wait may result in an inoperable 1757-SRM module.

If necessary, the 3.xx firmware allows you to downgrade the 1757-SRM to firmware revision 1.12 or 2.15 using the firmware kit supplied with your system software release. Please refer to either the *ControlLogix Redundancy Release Notes* or the *ProcessLogix Installation and Upgrade Guide* to determine which version of firmware to load.

Installation Requirements

Before you begin assembling the components of your redundant systems, make sure that all aspects of your redundant system components are identical. This means:

- Chassis and system setup of the primary and secondary (redundant) control chassis must be identical, with all modules in the exact same order (slot for slot), in identical-sized chassis.
- The firmware revision levels of all module partners must be compatible.

ATTENTION

If the primary and secondary (redundant) system are **not** assembled in identically the same configuration, **and** are **not** comprised of components with compatible firmware revision levels, the 1757-SRM will be unable to qualify the secondary to the primary.

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.

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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.

ATTENTION	**Environment and Enclosure**

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

ATTENTION	**Preventing Electrostatic Discharge**
⚠	This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Rockwell Automation Support

Before you contact Rockwell Automation for technical assistance, we suggest you please review the troubleshooting information contained in this publication first.

If the problem persists, call your local Rockwell Automation representative or contact Rockwell Automation in one of the following ways:

Phone	United States/ Canada	1.440.646.5800
	Outside United States/Canada	You can access the phone number for your country via the Internet: 1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com) 3. Under *Support Centers,* click on *Contact Information*
Internet	$\Longrightarrow$	1. Go to http://www.ab.com 2. Click on *Product Support* (http://support.automation.rockwell.com)

Redundancy System Assembly Preview

Assembling the primary and secondary chassis for redundancy is the same as assembling any ProcessLogix or ControlLogix chassis, except in this instance you will be assembling two identical chassis.

| **ATTENTION**	If you are adding redundancy to an already operational ProcessLogix or ControlLogix system, power down your process to install the 1757-SRM and to designate the primary system.
	You may also have to use RSNetworx or Ntools to configure keeper information in the secondary CNB if the master keeper for ControlNet is in the primary chassis.

	Tasks:
❏	• Place the primary and redundant module(s) in the same corresponding slot in their respective chassis. See page 6. For example, if you place a 1757-SRM in slot 3 (from the left) in the primary chassis, you must also place a 1757- SRM in slot 3 in the redundant chassis. • Refer to the ProcessLogix or ControlLogix Controller Module Installation Instructions (supplied with the 1757 or 1756 modules) and ControlLogix ControlNet Bridge Installation Instructions, Publication 1756-5.32.
❏	• Install the cable between the primary and secondary modules according to the System Redundancy Module Cable Installation Instructions, Publication 1757-5.14. See Figure 1 on page 7.
❏	• If you are using the 1757-SRM/B with the user relay, wire to the separable block connector supplied and plug it into the relay's terminal. See Figure 2 on page 8.
❏	• Make sure that all firmware revision levels are compatible between primary and secondary module pairs. See page 9.
❏	• Power-up one of the chassis to designate the primary chassis, then power-up the secondary chassis and allow it to qualify and become synchronized with the primary chassis. See page 9.

Installing the 1757-SRM

The 1757-SRM can be installed in any slot of the chassis. However, the primary and secondary system must have the 1757-SRMs installed in the same chassis slot position.

1. Prior to installing the 1757-SRM into the rack, locate the module's fiber optic port and connect one end of the Redundancy Module cable to it. See Figure 1.

Figure 1 Front View of SRM (door open) With Fiber Optic Cable and Port

Fiber
Optic
Port

Fiber Optic Cable

42792
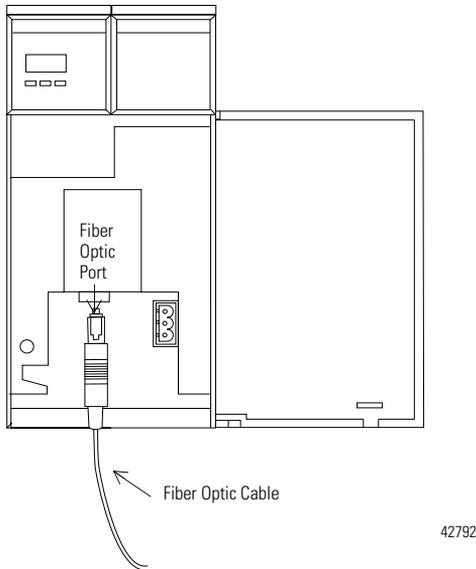
2. Align the left module circuit board with the top and bottom guides in the chassis.

3. Slide the module into the chassis. Make sure the module properly connects to the chassis backplane.g.

TIP

When the module is flush with the other modules and the locking clips click into place, the module is installed.

To remove the module, push down on the locking clips at the top right and bottom left of each module. Slide the module out of the chassis.
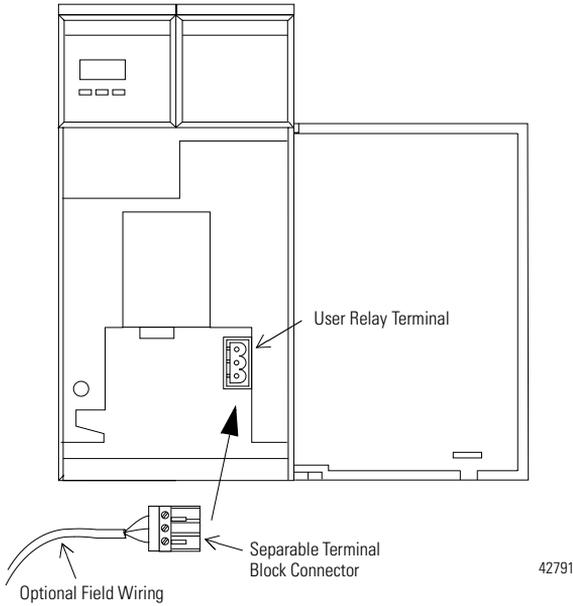
WARNING

When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

4. Connect the optional field wiring to the separable terminal block connector and plug it into the user relay terminal. See Figure 2.

Figure 2 Front View of SRM (door open) With Wiring, Connector, and Terminal.

WARNING

If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This can cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Designate the Primary Chassis and Qualify the System

Once you assemble the chassis, you must designate the primary chassis and then qualify the system to assure that all module pairs are at compatible firmware revision levels.

ATTENTION	Initial power-up of the chassis is crucial to designating the primary and secondary chassis. Do not power up the chassis until you have read the instructions for designating the primary chassis.

Designate the Primary Chassis

The chassis that is first powered up is automatically designated as the primary chassis. The 1757-SRM will display PRIM on the module's 4-character display to acknowledge that this chassis is the primary control chassis.

If both modules are powered up simultaneously, the module with the lowest serial number will be designated as the primary chassis and will display PRIM on the module's 4-character display. In addition, the PRI status light on the primary 1757-SRM will be ON. On the 1757-SRM/B, the normally open (NO) contacts of the user relay will be closed.

The secondary chassis is acknowledged by either DISQ or SYNC, depending on the state of the secondary chassis. In addition, the PRI status light on the secondary 1757-SRM will be OFF. On 1757-SRM/B, the NO contacts of the user relay will be open.
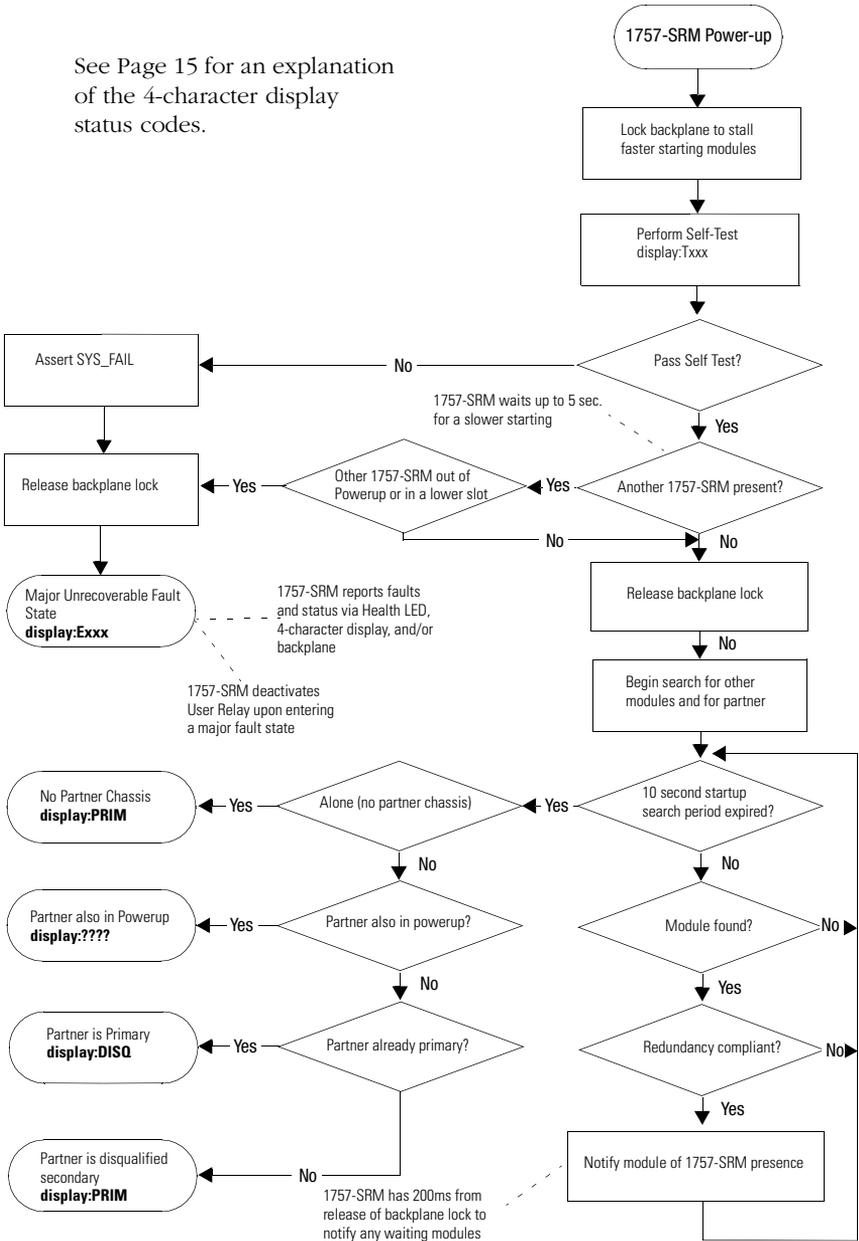
Qualify the System

On initial start-up of the complete primary and secondary chassis, the redundant system will begin a qualification process. During qualification, the primary modules are compared with the secondary module partners to ensure that hardware and firmware are compatible.

If the 1757-SRM module displays:	Then:
SYNC after the chassis completes the power-up cycle and qualification	the chassis configuration and the firmware revision levels are compatible
DISQ **Important:** The secondary 1757-SRM will initially display DISQ until it completes the qualification process. This may take anywhere from 1 to 3 minutes.	a problem exists: • with the chassis configuration *or* • with incompatible firmware revision levels between primary and secondary module *or* • if the CNB module partners' Keeper parameters are not the same

Flow Chart of Power-up of a Chassis with a Healthy 1757-SRM

See Page 15 for an explanation of the 4-character display status codes.

1757-SRM Power-up

Lock backplane to stall faster starting modules

Perform Self-Test
display:Txxx

Pass Self Test?

No → Assert SYS_FAIL

Yes

1757-SRM waits up to 5 sec. for a slower starting

Another 1757-SRM present?

Yes → Other 1757-SRM out of Powerup or in a lower slot

Yes → Release backplane lock

No

No

Release backplane lock

Major Unrecoverable Fault State
display:Exxx

1757-SRM reports faults and status via Health LED, 4-character display, and/or backplane

1757-SRM deactivates User Relay upon entering a major fault state

Begin search for other modules and for partner

10 second startup search period expired?

Yes → Alone (no partner chassis)

Yes → No Partner Chassis
display:PRIM

No

No

Partner also in powerup?

Yes → Partner also in Powerup
display:????

Module found? No ►

No

Yes

Partner already primary?

Yes → Partner is Primary
display:DISQ

Redundancy compliant? No ►

No

Yes

Partner is disqualified secondary
display:PRIM

No

Notify module of 1757-SRM presence

1757-SRM has 200ms from release of backplane lock to notify any waiting modules

User Relay Terminals for the 1757-SRM/B

The user relay is only available on the 1757-SRM/B module. The Relay will energize when the module determines that it is in a primary control chassis. The relay has three terminals. The terminal plug is located on the right side of the 1757-SRM/B fiber optic cable. The functions of the terminals are:

Normally Open

(NO)   The Normally Open contact is located on terminals 1 and 2. The contact is closed when the relay is energized.

The user relay contacts are rated as follows:

Maximum Switching Voltage = 30VAC, 30VDC
Maximum Switching Current = 100MA

For an example of the user relay for Logix Controller serial port redirection, See Figure 3 on page 13.

GND

Terminal 3 is connected to chassis ground. It is intended for use with a shielded 2 connector cable for field wiring of the Normally Open connection. Attach the shield to terminal 3. Leave the opposite end of the shield unconnected. Refer to Specifications on page 22 for cable listing.
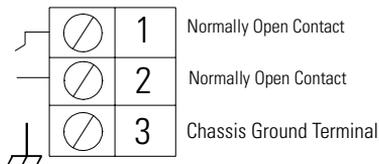
User Relay Example Application

Connecting to an External Switchbox

You can use an external switchbox connected to user relay on the 1757-SRM/B to determine which Logix controller you will attach to the other RS232 devices on the serial link. You must assemble an external switchbox to direct serial port devices to only one pair of redundant Logix controllers. Allen-Bradley does not supply the external switchbox with the modules.

Figure 3 illustrates an example connection scheme, with one single pole double throw switch for each RS232 signal. The external power supply output should not exceed the ratings of the external switchbox coil.

TIP

The same line voltage that provides power to Chassis A (to which user relay connections are made) should be used to provide input power to the external power supply.

Using the same line voltage insures that a line failure to both Chassis A and the external power supply will cause the external switchbox to switch to Chassis B when it de-energizes.

WARNING

Failure to use an appropriately rated switchbox may result in an explosion hazard. When installing this equipment in a Class I, Division 2 hazardous location, select an external switchbox that is appropriately certified for use in this environment.

Figure 3 External Switchbox Connections to Logix Controller Serial Port
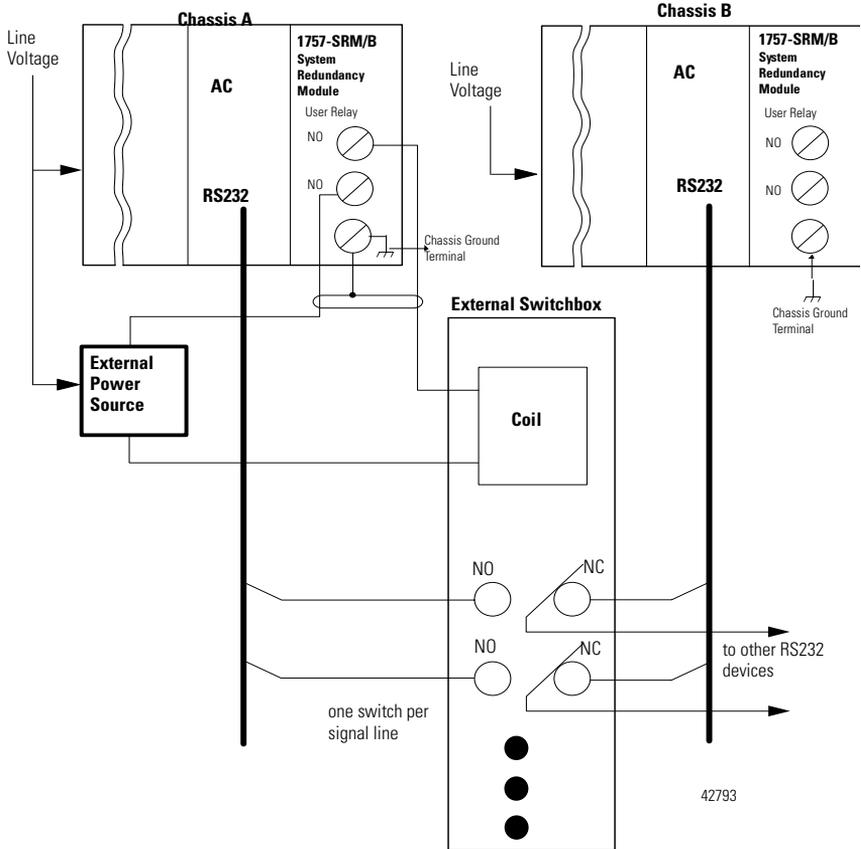
ATTENTION

Use the same line voltage input for the external power source as is used to supply power to Chassis A.

1757-SRM Module LEDs and Display Codes

Health LED

The right-most LED on the 1757-SRM face is the Health LED. Bi-color (red/green), the Health LED is labeled "OK" and indicates whether or not the module has power and operates correctly. The following table describes the Health LED status:

Table 1 Health LED

LED Status	Condition
off	• No power to 1757-SRM
solid red	• Powerup self test
	• 1757-SRM critical failure
flashing red	• 1757-SRM NVS update
	• 1757-SRM non-critical failure
	• 1757-SRM configured improperly
solid green	• 1757-SRM O.K.
flashing green	• 1757-SRM O.K. but not communicating with other modules

Inter-1757-SRM Communication LED

The center LED on the 1757-SRM face state is the Inter-1757-SRM Comm LED. Bi-color (red/green), the Inter-1757-SRM COM LED is labeled "COM" and indicates activity on the inter-1757-SRM communications link. The following table describes the Inter-1757-SRM COM LED status.

Table 2 Inter-1757-SRM COM LED

LED Status	Condition
off	• No power
	• No Inter-1757-SRM Comm activity
red < 1 second	• Powerup with 1757-SRM establishing partner communication
solid red	• Critical communication failure
green flash	• Communication activity present (sampled every 250 ms)

Chassis State LED

The left-most LED on the 1757-SRM face is the Chassis State. Bi-color (red/green), the Chassis State LED indicates when the chassis is primary.

Table 3 Chassis State LED

LED Status	Condition
off	• No power • 1757-SRM chassis state is in secondary or failed state
green < 1 second	• Powerup with partner 1757-SRM determining primary state
solid green	• 1757-SRM chassis state is in primary state

Character Display Codes

The table below outlines the codes displayed by the 4-character status display on the face of the 1757-SRM.

Table 4 Character Display Codes

Display	1757-SRM State
▮▮▮▮ (1)	Testing 4-character display at startup
Txxx[2]	1757-SRM self test at startup
????	Resolving transition state
DISQ	Disqualified secondary chassis
SYNC	Qualified secondary chassis
PRIM	Primary chassis
BOOT	Boot mode - awaiting further instructions
ERAS	Boot mode - erasing firmware
PROG	Boot mode - loading new firmware
Exxx[3]	Major fault situation
message[4]	The shifted message string will alternate with the error ID code

[1] all pixels on
[2] xxx represents a hexadecimal test identification number
[3] xxx represents an error or fault code, with the 2 least significant characters in decimal
[4] a shifted message string

1757-SRM Module Fault Codes and Display Messages

The 1757-SRM classifies Fault into four categories:

Table 5 Categories of 1757-SRM Fault Codes

Fault Type:	Description:
Minor Recoverable	• The fault does not stop redundancy operations and provides you with a recovery mechanism. • The 1757-SRM may clear some minor recoverable faults on its own.
Minor Non-Recoverable	• The fault does not stop redundancy operations. • No recovery mechanism is available.
Major Recoverable	• The fault will impact redundancy operations, although the effect may not be immediate. For example, if the fault occurred in the Secondary 1757-SRM, it may not affect control until the Primary 1757-SRM fails.
Major Non-Recoverable	• The fault is a critical fault. Redundancy operations will cease. • A switchover may occur. • No recover mechanism is available. • The module may need to be replaced.

All fault types are logged in the 1757-SRM's Event Log, which is stored in non-volatile memory. See the ControlLogix System Users Manual, publication 1756-UM001, for a description of how to access the 1757-SRM event log.

In addition to the Event Log, the 1757-SRM displays major faults on the module's 4 character status display in one of two ways; 2 to 4 character word abbreviations and alpha numeric codes. Table 6 describes the error messages, and tables 7 and 8 describe the alpha numeric codes.

Table 6 2 to 4 Character Word Abbreviations

If you see:				it means:	do this:
1st Word	**2nd Word**	**3rd Word**	**4th Word**	**Error Description**	**Action**
FLSH	UPDT	REQD		Flash Update Required	Flash update the SRM with appropriate firmware revision[1]
OS	ERR			Operating system error	Replace SRM Module
COMM	RSRC	ERR		Communication resource error	Reset SRM Module
COMM	RSRC	ERR	PRT1	Port1 Communication resource error on Backplane	Reset SRM Module and check rack
COMM	RSRC	ERR	PRT2	Port2 Communication resource error on Inter-SRM link	Reset SRM Module and check cable
WDOG	ERR			Watchdog time-out	Reset SRM Module
HDW	ERR			Hardware failure	Replace SRM Module
FMWR	ERR			Firmware error	Re-Flash firmware
CFG	LOG	ERR		Configuration log error	No Action
DUPL	RM			Duplicate SRM. This SRM is not in control.	Remove this SRM
RM	PWR	DOWN		SRM Power Down, Module detected a DC_Fail condition.	Check other modules in rack
COMM	ERR	PRT1		Port1 Communication error, Backplane communication	Check/Replace Rack
COMM	ERR	PRT2		Port2 Communication error, Inter-SRM communication link	Check/Replace SRM Cable
COMM	ERR			General Communication Error	No Action
EVNT	LOG	ERR		Event Log Error	No Action
WDOG	FAIL			Watchdog task failed its status check	Replace SRM

[1] Please refer to either the *ControlLogix Redundancy Release Notes* or the *ProcessLogix Installation and Upgrade Guide* to determine which version of firmware to load.

Alpha Numeric Error Codes

The fault code is a 4 character alpha-numeric string. Valid characters are [0-9, A-Z], except [S,O]. The first character is always 'E'. Each firmware subsystem within the 1757-SRM is assigned a range of fault codes. Each subsystem assigns fault codes within its range. The format of the error code is as follows:

Table 7 Alpha Numeric Error Codes $Ex^1x^2x^3$

Valid Character String	Indicates
E	error
x^1	the subsystem in which the error was detected
x^2	the subsystem function or group of functions in which the error was detected
x^3	enumerates the specific error

Table 8 Fault Code Subsystem Assignment

Range	Subsystem	Range	Subsystem
E 0 _ _	Backup Control Object	E A _ _	RM State Machine
E 1 _ _	OS Board Support Package	E B _ _	Event Log Device Driver
E 2 _ _	Chassis Profile Object	E C _ _	Object Communications
E 3 _ _	Coordinated System Time Object	E D _ _	Wall Clock Time Object
E 4 _ _	Device Object	E E _ _	Non-Maskable Interrupt Service Routine
E 5 _ _	Extended Log Object	E F _ _	Non-Volatile Storage Object
E 6 _ _	Event Log Object	E G _ _	RM Fault Handler
E 7 _ _	Backup Communications Object	E H _ _	Self Test Object
E 8 _ _	ICP Toolkit	E I _ _	Workstation Display Object
E 9 _ _	Indicator Device Driver	E J _ _	Industrial Control Platform Object
		E K _ _	RM Watchdog Manager

If you encounter one of these error codes, write the Exxx code down and contact Rockwell Automation Product Support using one of the methods described on page 5.

Recovery Messages

For certain fault situations, specific recovery instructions will shift across the 4-character status display. The table below lists all recovery messages which originate within the SRM.

SRM Display is the string displayed on the SRM four character display. Up to four 4-character words will be shifted on the display.

Table 9 Recovery Messages Logged by the 1757-SRM Module

SRM Display	Description
RPLC MOD	Replace the module
RSET MOD	Reset the module
REMV MOD	Remove the module
SEAT MOD	Reinsert the module into the chassis

The following information applies when operating this equipment in hazardous locations:	Informations sur l'utilisation de cet équipement en environnements dangereux:
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

WARNING

EXPLOSION HAZARD

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

AVERTISSEMENT

RISQUE D'EXPLOSION

- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Specifications

Electrical	backplane current	0.75 amp@3.3VDC 1.0 amp@5.1 VDC 0.090 amp@24 VDC
	power dissipation	9.6 watts
	thermal dissipation	9.6 watts
Physical	module type	redundancy
	module size	(ICP std. 2 slots wide)
	chassis location (recommended default)	slots 5-6 in 10-slot and 17-slot slots 4-5 in 7-slot and 13-slot
	weight	0.452 kg
	mounting	35 mm DIN rail
	Enclosure Type Rating	None (open-style)
Environmental		
Operating Temperature	0 to 60°C (32 to 140°F) 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)	
Storage Temperature	–40 to 85°C (–40 to 185°F) IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock)	
Relative Humidity	5 to 95% non-condensing IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat)	
Vibration	IEC60068-2-6 (Test Fc, Operating): 2g @ 10-500Hz	

Shock	IEC60068-2-27 (Test Ea Unpackaged shock):
	    Operating 30g
	    Non-operating 50g	

Emissions	CISPR 11: Group 1, Class A	

ESD Immunity	IEC 61000-4-2:
	    4kV contact discharges
	    8kV air discharges	

Radiated RF Immunity	IEC 61000-4-3:
	    10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz
	    10V/m with 200Hz 50% Pulse 100%AM at 900Mhz	

EFT/B Immunity	IEC 61000-4-4: ±2kV at 5kHz on signal ports	
Surge Transient Immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports	
Conducted RF Immunity	IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 80MHz	
Magnetic Field Immunity	IEC 61000-4-8: 30A/m at 50Hz	

Power Requirements	11-30V dc; 270 mA @ 24V dc (typical)	
Redundancy Cable Interfaces	connector	ST-type (fiber-optic)
	cable type	62.5/125 micron multi-mode fiber-optic cable
	channels	one (transmit and receive fiber)
	ground isolation	N/A (fiber-optic interface)
Status Contact Cable Interface 1757-SRM/B only	connectors	3-terminal Weidmuller #150191 mating connector supplied with redundancy module for use on user cable.
	cable type	shielded pair; conductor size range = AWG #14-22
	voltage/current ratings	30 v ac/dc maximum / 100 milliamps maximum
	channels	one
	ground isolation	1500 vac
Certifications (when product is marked)	UL UL Listed Industrial Control Equipment CSA CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations FM FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations CE[1] European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 50082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity C-Tick[1] Australian Radiocommunications Act, compliant with: AS/NZS 2064; Industrial Emissions		

[1] See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

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Notes:

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