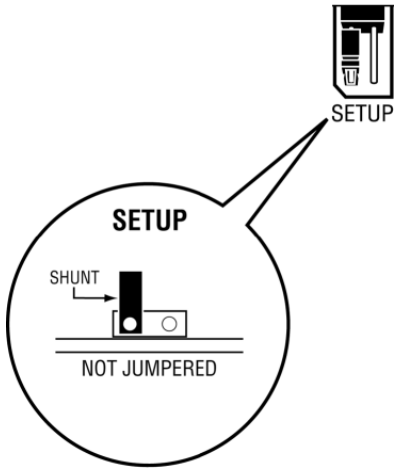
1.5 Setting Jumpers

The Setup Jumper acts as "write protection" for the module's firmware. In "write protected" mode, the Setup pins are not connected, and the module's firmware cannot be overwritten. The module is shipped with the Setup jumper OFF. Do not jumper the Setup pins together unless you are directed to do so by ProSoft Technical Support (or you want to update the module firmware).

The following illustration shows the jumper configuration with the Setup Jumper OFF.



Note: If you are installing the module in a remote rack, you may prefer to leave the Setup pins jumpered. That way, you can update the module's firmware without requiring physical access to the module.

Security considerations:

Leaving the Setup pin jumpered leaves the module open to unexpected firmware updates.

You should consider segmenting the data flow for security reasons. Per IEC 62443-1-1, you should align with IEC 62443 and implement segmentation of the control system. Relevant capabilities are firewalls, unidirectional communication, DMZ. Oil and Gas customers should also see DNVGL-RP-G108 for guidance on partitioning.

You should practice security by design, per IEC 62443-4-1, including layers of security and detection. The module relies on overall network security design, as it is only one component of what should be a defined zone or subnet.

1.6 Installing the Module in the Rack

Make sure your ControlLogix processor and power supply are installed and configured, before installing the MVI56E-GSC module. Refer to your Rockwell Automation product documentation for installation instructions.

Warning: You must follow all safety instructions when installing this or any other electronic devices. Failure to follow safety procedures could result in damage to hardware or data, or even serious injury or death to personnel. Refer to the documentation for each device you plan to connect to verify that suitable safety procedures are in place before installing or servicing the device.

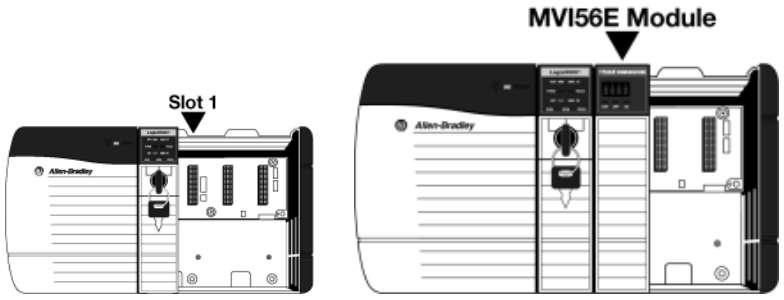
After you have checked the placement of the jumpers, insert the MVI56E-GSC into the ControlLogix chassis. Use the same technique recommended by Rockwell Automation to remove and install ControlLogix modules.

You can install or remove ControlLogix system components while chassis power is applied and the system is operating. However, please note the following warning.

Warning: When you insert or remove the module while backplane power is on, an electrical arc can occur. An electrical arc can cause personal injury or property damage by sending an erroneous signal to the system's actuators. This can cause unintended machine motion or loss of process control. Electrical arcs may also cause an explosion when they happen in a hazardous environment. Verify that power is removed or the area is non-hazardous 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.

1 Align the module with the top and bottom guides, and then slide it into the rack until the module is firmly against the backplane connector.



2 With a firm, steady push, snap the module into place.
3 Check that the holding clips on the top and bottom of the module are securely in the locking holes of the rack.
4 Make a note of the slot location. You must identify the slot in which the module is installed in order for the sample program to work correctly. Slot numbers are identified on the green circuit board (backplane) of the ControlLogix rack.
5 Turn power ON.

2 The **GSC.CONFIG.PORT1** and **GSC.CONFIG.PORT2** controller tag arrays contain tags to configure the application serial ports. These sets of controller tags allow you to configure typical serial port parameters, such as baud rate, data bits, and stop bits.

GSC	{...}		GSCMODULEDEF
GSC.CONFIG	{...}		GSCPORTCONFIG
GSC.CONFIG.Port1	{...}		GSCPORTCONFIGPARA
GSC.CONFIG.Port1.Enabled	1	Decimal	INT
GSC.CONFIG.Port1.Type	1	Decimal	INT
GSC.CONFIG.Port1.Baudrate	9600	Decimal	INT
GSC.CONFIG.Port1.Parity	0	Decimal	INT
GSC.CONFIG.Port1.DataBits	8	Decimal	INT
GSC.CONFIG.Port1.StopBits	1	Decimal	INT
GSC.CONFIG.Port1.RTSOn	0	Decimal	INT
GSC.CONFIG.Port1.RTSOff	0	Decimal	INT
GSC.CONFIG.Port1.Handshaking	0	Decimal	INT
GSC.CONFIG.Port1.RTermCnt	2	Decimal	INT
GSC.CONFIG.Port1.RTermChar	{...}	Hex	SINT[12]
GSC.CONFIG.Port1.RPacketLen	240	Decimal	INT
GSC.CONFIG.Port1.RTimeout	2000	Decimal	INT
GSC.CONFIG.Port1.RDelay	0	Decimal	INT
GSC.CONFIG.Port1.WTermCnt	0	Decimal	INT
GSC.CONFIG.Port1.WTermChar	{...}	Hex	SINT[12]
GSC.CONFIG.Port1.WPacketLen	0	Decimal	INT
GSC.CONFIG.Port1.WTimeout	500	Decimal	INT
GSC.CONFIG.Port1.WDelay	0	Decimal	INT
GSC.CONFIG.Port1.WMinDelay	0	Decimal	INT

2.1 GSC.UTIL.BackplaneFail

GSC.UTIL.BackplaneFail	10	Decimal	INT

A "backplane communication failure" is any failed attempt by the module to communicate with the ControlLogix processor. For local rack applications, where the module is installed in the same chassis as the processor, backplane failures can occur due to a hardware problem or Input/Output (I/O) configuration problem. For remote rack applications, where the module is installed in a different chassis from the processor and linked by communication adapters, such as ControlNet or EtherNet/IP, in addition to hardware and I/O configuration problems, any failure to communicate with the ControlLogix processor across a process network will be considered a backplane communication failure.

The **GSC.UTIL.BACKPLANEFAIL** parameter specifies the number of successive ControlLogix backplane transfer failures that must occur before the ASCII serial communication ports are shut down. If the parameter is set to zero, the communication ports will continue to operate under even if the module has no communication with the processor. If the value is set greater than 0 (1 to 65535), serial port communication will cease if the specified number of successive communication failures occur.

The only ways to restart serial port communication after a *Backplane Fail* shutdown are by Cold Boot from ladder logic, by removing and then reinserting the module in the chassis, or by turning power to the module or chassis off and then back on (Cold Start).

2.2.2 Port[x].Type

0 through 15

You can use any combination of one or more termination types. When multiple termination types are selected, the module will determine the end of the string to be as soon as any of the selected terminating conditions becomes true. After that, any new characters received will be considered part of a new string until the next time a terminating condition is true.

Decimal Value of Bits Selected	0 = No Bits Set **(S)** Streaming Mode Selected	1 = Bit 0 Set **(T)** Terminating Characters Selected	2 = Bit 1 Set **(M)** Message Timeout Selected	4 = Bit 2 Set **(D)** Intercharacter Delay Selected	8 = Bit 3 Set **(P)** Packet Length Selected	Port Types Selected by Bitmap
0	**0**					**S**
1		**1**				**T**
2			**2**			**M**
3		**1**	**2**			**M, T**
4				**4**		**D**
5		**1**		**4**		**D, T**
6			**2**	**4**		**D, M**
7		**1**	**2**	**4**		**D, M, T**
8					**8**	**P**
9		**1**			**8**	**P, T**
10			**2**		**8**	**P, M**
11		**1**	**2**		**8**	**P, M, T**
12				**4**	**8**	**P, D**
13		**1**		**4**	**8**	**P, D, T**
14			**2**	**4**	**8**	**P ,D, M**
15		**1**	**2**	**4**	**8**	**P, D, M, T**

For each termination type, you must also enter values in the following parameter configuration tags. Streaming mode is not recommended for general use, as it creates heavy demands on the ControlLogix processor and requires time-critical programming logic to properly process.

For Termination Type	Receive Parameters to Set
Terminating Characters	GSC.PortX.RTermCnt GSC.PortX.RTermChar
Message Timeout	GSC.PortX.RTimeout
Intercharacter Delay	GSC.PortX.RDelay
Packet (String) Length	GSC.PortX.RPacketLen

2.2.3 Port[x].Baudrate

This is the baud rate to use on the port. Enter the baud rate (bits per second) as a value. All devices on this port must communicate at the same baud rate. For example, to select 19K baud, enter 19200.

The following table describes the valid parameters for this configuration entry.

Value	Baud Rate (bits per second)
110	110 Baud
150	150 Baud
300	300 Baud
600	600 Baud
1200	1200 Baud
2400	2400 Baud
4800	4800 Baud
9600	9600 Baud
19200	19200 Baud
384	38400 Baud
576	57600 Baud
115	115200 Baud

2.2.4 Port[x].Parity

Parity is a simple error checking algorithm used in serial communication. This parameter specifies the type of parity checking to use. All devices connected to the port must use the same parity.

Value	Description
0	None
1	Odd
2	Even
3	Mark
4	Space

2.2.5 Port[x].DataBits

5, 6, 7 or 8

This parameter sets the number of data bits for each word used by the protocol. All devices communicating through this port must use the same number of data bits.

2.2.6 Port[x].StopBits

1 or **2**

Stop bits signal the end of a character in the data stream. For most applications, use one stop bit. For slower devices that require more time to re-synchronize, use two stop bits.

All devices communicating through this port must use the same number of stop bits.

2.2.7 Port[x].RTSOn

0 to **65535** milliseconds

This parameter sets the number of milliseconds to delay after *Ready To Send* (RTS) is asserted before data will be transmitted.

2.2.8 Port[x].RTSOff

0 to **65535** milliseconds

This parameter sets the number of milliseconds to delay after the last byte of data is sent before the RTS modem signal will be set low.

2.2.9 Port[x].Handshaking

Handshaking is a negotiation process between devices that establishes a data connection. Select the handshaking type that best matches the needs of the devices connected to the port.

Value	Description
0	No hardware or software handshaking
1	RTS/CTS hardware handshaking
2	DTR/DSR hardware handshaking
3	XON/XOFF software handshaking

2.2.10 Port[x].RTermCnt

0 to 12 characters

This parameter specifies the number of termination characters that define the end of a received message. Use this parameter if you set the **PORT[X].TYPE** Port[x].Type (page 48) value to 1, 3, 5, 7, 9, 11, 13 or 15.

2.2.11 Port[x].RTermChar

This array of up to 12 characters specifies the termination characters that define the end of a received message. Each character occupies one position in the array. The number of termination characters you enter here must match the value in the **PORT[X].RTERMCNT** tag.

2.2.12 Port[x].RPacketLen

This parameter specifies the number of bytes of data to receive on the port before considering an incoming message complete and transferring the data to the processor. Use this parameter if you set the **PORT[X].TYPE**Port[x].Type (page 48) value to 8, 9, 10, 11, 12, 13, 14, or 15.

2.2.13 Port[x].RTimeout

This parameter specifies the number milliseconds to wait after receiving the first character on the port before considering an incoming message complete and automatically sending the data to the processor. Use this parameter if you set the **PORT[X].TYPE** Port[x].Type (page 48) value to 2, 3, 6, 7, 10, 11, 14, or 15.

2.2.14 Port[x].RDelay

This parameter specifies the maximum number milliseconds to wait between each character received on the port to see if more characters are coming before considering an incoming message complete and automatically sending the data to the processor. In practice, this can be thought of as a period of time in which no characters are received after receiving a string of characters. Use this parameter if you set the **PORT[X].TYPE** Port[x].Type (page 48) value to 4, 5, 6, 7, 10, 11, 14, or 15.

2.2.15 Port[x].WTermCnt

Not used in current release of product.

2.2.16 Port[x].WTermChar

Not used in current release of product.

2.2.17 Port[x].WPacketLen

Not used in current release of product.

2.2.18 Port[x].WTimeout

This parameter specifies the timeout period to transmit a message out the port. A message must be transmitted out the port within the specified timeout period. Message transmission will be aborted if the timeout is exceeded. Use this parameter if you set the **PORT[X].TYPE** Port[x].Type (page 48) to 2, 3, 6, 7, 10, 11, 14, or 15.

4 Reference

4.1 Product Specifications

The Enhanced Generic ASCII Serial Communication Modules allow Rockwell Automation® ControlLogix® Programmable Automation Controllers (PACs) to easily interface with serial devices using non-specific ASCII character text string or byte value serial communication protocols.

MVI56E-GSC enhancements include local and remote diagnostics through the module's Ethernet port, and CIPconnect® technology for bridging though Rockwell Automation ControlNet™and EtherNet/IP™ networks.

The MVI56E-GSC module is a fast and easy way to add two fully configurable serial communication ports to the ControlLogix platform, eliminating the need to use the front port of the processor, or consume valuable processor time sending and receiving serial messages.

The module is a single-slot, backplane-compatible solution. Each port is capable of sending and receiving large ASCII character strings or byte streams of up to 4096 characters or bytes. Many different serial communication devices can be integrated into the ControlLogix platform by building upon the sample ladder logic provided for this module.

4.1.1 General Specifications

- Backward-compatible with previous MVI56-GSC version
- Single Slot - 1756 ControlLogix® backplane compatible
- 10/100 MB Ethernet port for network configuration and diagnostics with Auto Cable Crossover Detection
- User-definable module data memory mapping of up to 10,000 16-bit registers
- CIPconnect®-enabled network diagnostics and monitoring using ControlLogix 1756-ENxT modules and EtherNet/IP® pass-thru communications
- Sample Ladder Logic or Add-On Instruction (AOI) used for data transfers between module and processor and for module configuration
- 4-character, scrolling, alphanumeric LED display of status and diagnostic data in plain English
- ProSoft Discovery Service (PDS) software finds the module on the network and assigns a temporary IP address to facilitate module access

4.1.2 Functional Specifications

- The MVI56E-GSC and MVI56E-GSCXT are functionally identical. The MVI56E-GSC is for normal process and control environments. The MVI56E-GSCXT is conformal coated for extra protection in harsh or caustic environments and operates in extreme high or low temperature environments.
- Both modules transfer data in the largest possible I/O image block sizes, which optimizes data through-put and update time.
- Both modules appear to the ControlLogix processor as input/output (I/O) modules, rather than communication modules.
- Two ASCII serial communication ports:
  - Can independently transmit and/or receive ASCII character strings and serial byte streams
  - Each port is individually configurable
- Receive ASCII strings or byte streams up to 4096 characters in length
- Received packet termination types:
  - Stream mode (no packet termination)
  - Receipt of specified character or characters
  - Message length timeout
  - Intercharacter spacing timeout
  - Packet size limit (number of received characters/bytes)
- Module configuration and communication configuration data is transferred to the module via predefined sample ladder logic
- Module error and status conditions returned to processor for diagnostics
  - Module status
  - Port error status word (bit mapped)
  - Port receive state
  - Port receive character count
  - Port receive block count
  - Port transmit state
  - Port transmit character count
  - Port transmit block count

4.1.3 Hardware Specifications

Specification	Description
Backplane Current Load	800 mA @ 5 VDC 3 mA @ 24 VDC
Operating Temperature	0°C to 60°C (32°F to 140°F) - MVI56E-GSC -25°C to 70°C (-13°F to 158°F) - MVI56E-GSCXT
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Shock	30 g operational 50 g non-operational Vibration: 5 g from 10 to 150 Hz
Relative Humidity	5% to 95% (without condensation)
LED Indicators	Application Status (APP) Module Status (OK)
4-Character, Scrolling, Alpha-Numeric LED Display	Shows Module, Version, IP, Port Status, P1 and P2 Settings, and Error Information
Debug/Configuration Ethernet port (E1 - Config)	
Ethernet Port	10/100 Base-T, RJ45 Connector, for CAT5 cable Link and Activity LED indicators Auto-crossover cable detection
Serial Application ports (P1 & P2)	
Software configurable communication parameters	Baud rate: 110 baud to 115.2 kbps RS-232, RS-485, and RS-422 Parity: none, odd or even Data bits: 5, 6, 7, or 8 Stop bits: 1 or 2 RTS on/off delay: 0 to 65535 milliseconds Full hardware handshaking control (optional) Radio and modem support
App Ports (P1, P2)	RJ45 (DB-9M with supplied adapter cable) Configurable RS-232 hardware handshaking 500V Optical isolation from backplane RS-232, RS-422, RS-485 jumper-select, per port RX (Receive) and TX (Transmit) LEDs, each port
Shipped with Unit	RJ45 to DB-9M cables for each serial port