

ControlLogix AutoMax DCSNet and AutoMax Remote I/O Communication Interface Module

(Catalog Number 56AMXN/B)

Use this document as a guide to install the ControlLogix AutoMax DCS and AutoMax Remote I/O communication interface module. The following table lists what this manual contains and where to find specific information.

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Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment 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.

The illustrations, charts, sample programs and layout examples shown in this guide 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. Reproduction of the contents of this copyrighted publication, in whole or part, without written permission of Rockwell Automation, is prohibited.

Throughout this manual we use the following notes to make you aware of safety considerations:

WARNING

Identifies information about practices or circumstances that have the potential to create an explosion hazard.



ATTENTION

Identifies information about other practices or circumstances that can lead to personal injury or death, property damage or economic loss.



Warning and Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

We use the following note to call attention to critical information:

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

Understand Compliance to European Union Directive

If this product bears the CE marking, it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC - Generic Emission Standard, Part 2 - Industrial Environment
- EN 50082-2 EMC - Generic Immunity Standard, Part 2 - Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests.

For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the following Allen-Bradley publications:

- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1
- Automation Systems Catalog, publication B113

Open style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards publication 250 and IEC publication 529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

Enclosure and Environmental Requirements Specific To This Product

The 56AMXN/B is NOT suitable for use in hazardous locations.

This product must be mounted within a suitable system enclosure to prevent personal injury resulting from accessibility to live parts. The interior of this enclosure must be accessible only by the use of a tool. This industrial control equipment is intended to operate in a Pollution Degree 2 environment, in overvoltage category II applications, (as defined in IEC publication 664A) at altitudes up to 2000 meters without derating.

Preventing Electrostatic Discharge

The 56AMXN/B module is sensitive to electrostatic discharge.

ATTENTION

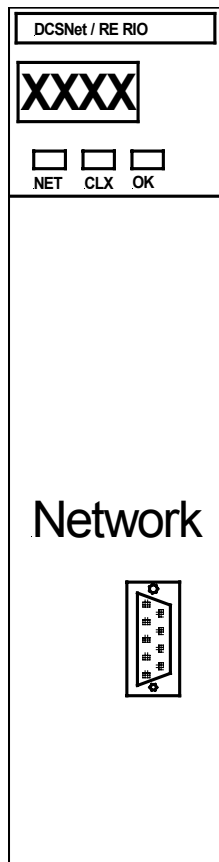
Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential
- Wear an approved wrist-strap grounding device
- Do not touch the backplane connector or connector pins
- Do not touch circuit components inside the module
- If available, use a static-safe work station
- When not in use, keep the module in its static-shield packaging

For additional information refer to publication 1770-4.1, *Industrial Automation Wiring and Grounding Guidelines*.

Identify Module Features

Refer to the following figure to identify the hardware components of the 56AMXN/B module.



The module has:

- A label to indicate that it is a scanner for AutoMax DCSNet and remote I/O
- A 4-character scrolling display (XXXX)
- 3 LEDs, labelled NET, CLX, and OK, to indicate the status of the network, the connection to the ControlLogix processor, and its own internal state
- a 9-pin D-shell connector to connect to the DCS or remote I/O network
- switches at the top of the module to set the mode of operation and the drop number and drop depth

Set the Network Type and Node Address Switches

Before you install the module, you must set the network type, drop number and drop depth using the switches at the top of the module.

The two switches at the left set the drop depth, the two at the right set the drop number.

The following table shows how to set the switches for each mode of operation.

	Depth 10	Depth 1	Drop 10	Drop 1
DCS Master	0	0	0	0
DCS slave	Drop depth 10's digit	Drop depth 1's digit	Drop Number 10's digit	Drop number 1's digit
Remote I/O Master	0	1	0	0

For example, to configure the 56AMXN/B as a DCS slave with drop number 17, drop depth 5, set the switches to 0, 5, 1, and 7 from left to right.

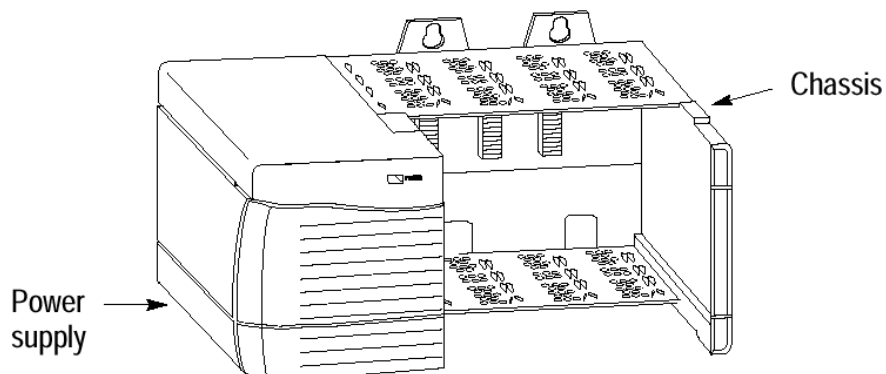
Any other settings are invalid and result in the module going into “Thumbwheel test” mode. In thumbwheel test mode, the display shows the current switch settings. It doesn’t go out of thumbwheel test mode until you cycle power.

In thumbwheel test mode, the 56AMXN/B initially displays “Thumb Test Mode” on the 4-character display, displays the switch settings for 5 seconds, then resumes displaying “Thumb Test Mode”

For DCS slave operation, if the drop number and drop depth are individually valid but the combination results in invalid drop numbers (for example, drop number 55, drop depth 2), the module displays an error message on the 4-character display but does not enter Thumbwheel test mode.

Prepare the Chassis for Module Installation

Before you install the 56AMXN/B module, you must install and connect a ControlLogix chassis and power supply.

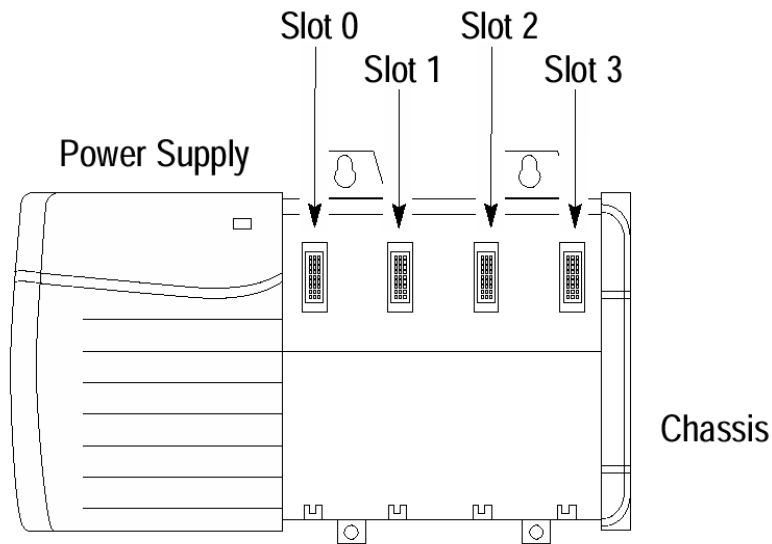


For information on installing these products, refer to the publications listed in the following table.

Chassis Type	Chassis Installation	Power Supply	Power Supply Installation
Series B: 1756-A4, -A7, -A10, -A13	Pub. No. 1756-IN080	1756-PA72/B	Pub. No. 1756-5.67
		1756-PB72/B	
		1756-PA75/A	Pub. No. 1756-5.78
		1756-PB75/A	

Determine Module Slot Location

The figure below shows chassis slot numbering in a 4-slot chassis. Slot 0 is the first slot and is always the leftmost slot in the rack (the first slot to the right of the power supply). You can use any size ControlLogix chassis and install the module in any slot. You can also install multiple 56AMXN/B modules in the same chassis. You can install as many modules as your power supply can accommodate (i.e., number for which the power supply is rated).



Installing or Removing the Module While Power Is Applied

Versions of the 56AMXN hardware prior to O-57677-1 do NOT support removal and insertion under power.

The hardware version can be identified by looking for a sticker with the part number O-57677-1 or above on the module's printed circuit (near the serial number – you do not need to disassemble the 56AMXN to find the sticker). Modules with no stickers are hardware version O-57677 and do NOT support removal and insertion under power

For hardware versions O-57677-1 and above, you can install or remove the module while chassis power is applied if you observe the following precautions.

WARNING

When you insert or remove a module while backplane power is on, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's actuators causing unintended machine motion or loss of process control.
- causing an explosion in a hazardous environment.

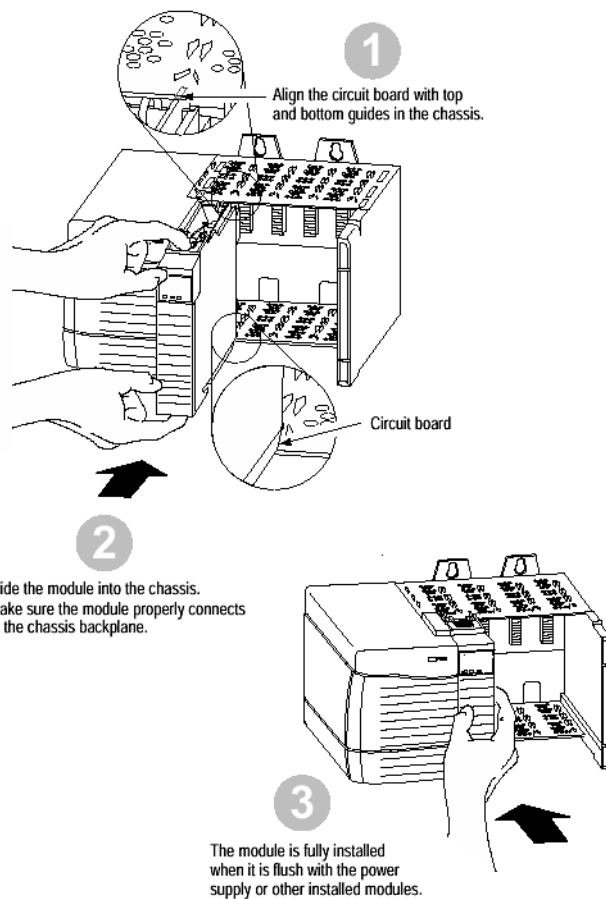
Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

Install the Module

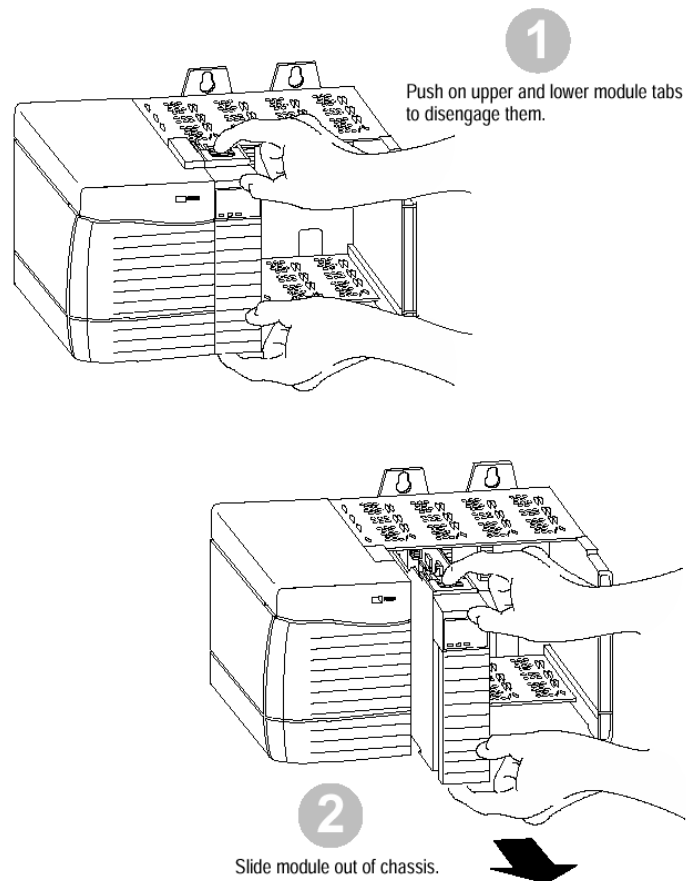
ATTENTION



Do not force the module into the backplane connector. If you cannot seat the module with firm pressure, check the alignment. Forcing the module into the chassis can damage the backplane connector or the module.



Removing or Replacing the Module (When Applicable)



If you are replacing an existing module with an identical one, and you want to resume identical system operation, you must install the new module in the same slot.

You must also set the switches to the same settings and run the configuration program and download the appropriate configuration to the module.

Wire the Connector for the AutoMax Network

Use a drop cable, 612574-36R, available through Rockwell Automation Systems Business, and passive tap M/N 57C380 to connect the module to the coaxial network cable. This cable turns down and has a ferrite to reduce EMI. This cable must be used in CE applications. You can also use drop cable 612403-036R but it points up.

The drop cable is a 3-foot long multi-conductor cable with 9-pin D-shell connectors at each end. Connect one end to the connector on the module and the other end to the passive tap.

The passive tap has two BNC connectors for connection to the coaxial cables and terminating loads.

The network coaxial cable must be terminated with 75 ohm terminating loads attached to the taps at the physical ends of the network. There should be two and only two terminators on the network.

For DCS, the network cable can be RG-59/U or RG-11/U. For remote I/O, the cable must be RG-59/U.

Apply Chassis Power

Turn the rack power supply on.

Check Power Supply and Module Status

The rack power supply indicator should be green.

The module OK LED should be solid red, then solid green.

The alphanumeric display shows the following messages at powerup.

Alphanumeric Status Display Powerup Messages

B#nn	Stages in the startup processes
Boot	
56AMXN Ver 1.xx.xx	Module firmware version

Troubleshooting the Power Supply

If the alphanumeric indicator on the 56AMXN/B module does not cycle through these messages on powerup, refer to the following table and to the Troubleshooting section that follows.

Power Supply Indicator

If the POWER indicator is:	Power Supply Status is	Recommended Action:
Off	Not operating	Turn power switch ON. Check power wiring connections. Check fuse.
On	Operating	None, normal operation.

Interpreting the Alphanumeric Display

The 56AMXN/B module displays alphanumeric messages that provide diagnostic information about your module. The alphanumeric display displays warning messages twice, then resumes the normal display. The following table summarizes the messages.

Message	Description
56AMXN Ver x.xx.xx	The module's firmware version, displayed at powerup.
Error: Heard Another DCS Master	The module is configured as a DCS master and has heard another DCS master on the network.
DCS Master	The module is a DCS master. Displayed during normal operation.
Drop xx OffLine	DCS drop xx has gone offline.
DCS Slave Invalid Depth 0	The drop number switches are set for a drop number from 1 to 55 but the drop depth switches are set to 0.
DCS Slave Drop+Depth 'xx' Too High	The combination of drop number and drop depth results in invalid drop numbers (>55). Check the switch settings.
DCS Slave Drop=xx Depth=xx Waiting...	The module is configured as a DCS slave with the drop number and depth displayed, but is not currently being scanned by a DCS master.
Error: Heard Duplicate DCS Slave Drop xx	The module is configured as a DCS slave and has heard a drop on the network with a drop number that overlaps one of its active drops.
DCS Slave Drop=xx Depth=xx	The module is configured as a DCS slave, with the drop number and drop depth shown. Displayed during normal operation.
Drop xx Timeout	DCS drop xx has timed out.
Mon Drop xx Timeout	Monitored DCS drop xx has timed out.
Firmware Update...	The firmware on the module is being updated.

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Message	Description
Error: Heard Another RIO Master	The module is configured as a Remote I/O master and has heard another Remote I/O master active on the network.
RIO Master	The module is configured as a Remote I/O master. Displayed during normal operation.
Drop x Config Mismatch	The configuration for remote I/O drop x in Flash memory on the module doesn't match the drop on the network.
Drop x OffLine	Remote I/O drop x is offline.
RIO FLASH Config Invalid	The module is configured as a Remote I/O master and the configuration in FLASH memory is invalid. Run 56AmxnRioCfg and configure the module.
Flash config drop mismatch	Configuration in FLASH is incompatible with current switch settings
Thumb Test Mode	The module is in thumbwheel test mode.

Interpreting the LED Status Indicators

The three LED status indicators on the module provide information about your module and the status of each channel. The following tables outline the indicator condition and the corresponding status, and explain what each condition means.

NET LED – DCS/RIO Network Status

The NET LED indicates the status of the network connection. It is green if the network status is good. If it is red, the following table shows possible causes.

Operating Mode	Meaning
DCS Slave	Red if no master is heard or Active
DCS Master	Red if no Drops are found or if a Drop goes offline (1 sec)
RIO Master	Red if not all drops in configuration are active, or if extra drops are found or any other configuration mismatch exists

CLX LED – ControlBus Status

The CLX LED indicates the status of communication with the ControlLogix processor.

Color	Meaning
Red	The module has returned an error, received an error or refused a connection from the backplane. Look at the debug log in 56AmxnMon for further information.
Yellow	No errors, but no activity
Green	An active connection is open or Bridging is active or DCS registers are being accessed

OK LED – Module Health

A bicolor OK LED indicates module health. A red LED indicates that module startup diagnostics have failed or a major module fault such as watchdog bite or jabber inhibit has occurred. Green indicates that the card has passed all power-up diagnostics and is functioning normally. This LED is red during powerup.

If all three LEDs are solid red and the 4-character display shows something like M#66, this indicates that a fatal error has occurred. Refer to the User Guide for information on clearing fatal errors.

Where to Find Information on Configuring Your 56AMXN/B Module

Now that you have installed your AutoMax DCS/RIO module, you must configure it. For this information, refer to the configuration chapters of your *56AMXN User's Guide*, publication 56AMXN-UM002A-EN-P.

This manual is supplied on the 56AMXN/B distribution CD. The CD also contains the Adobe PDF reader.

Hazardous Location information

The following information applies when operating this equipment in hazardous locations:

The 56AMXN is NOT suitable for use in hazardous locations.

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.

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.
-

Specifications

Parameter	Specification	
Module Location	ControlLogix chassis	
Maximum Backplane Current Load	650mA @ +5.1V dc and 75mA @ 24 V dc from I/O chassis backplane	
Power dissipation	5W maximum	
Environmental Conditions:		
Operational Temperature	0-60°C (32-140°F)	
Storage Temperature	-40 to 85°C (-40 to 185°F)	
Relative Humidity	5-95% without condensation	
Shock Unpackaged	30g operational 50g non-operational	
Vibration Unpackaged	2g from 10-150Hz	
Agency Certification (when product or packaging is marked)		Listed Industrial Control Equipment
		Marked for all applicable directives
User Manual	Publication 56AMXN-UM002A-EN-P	

Local Drive Solutions

Contact Directory

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West Coast Ph. 626.969.7647 Fax 626.334.8320 Los Angeles CA	Eastern Ph. 732.225.1360 ext. 110 Fax 732.225.7833 Edison NJ	Carolinas Ph. 704.525.1455 Fax 704.525.9025 Charlotte NC
Midwest Ph. 630.860.1090 Fax 630.787.0309 Chicago IL	St. Louis Ph. 314.770.0168 Fax 314.770.0268 St. Louis MO	Ohio Valley Ph: 513.943.1145 Fax 513.943.7438 Cincinnati OH
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