Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

ControlLogix ControlNet Scanner Module

Catalog Numbers 1756-CNB, 1756-CNBK, 1756-CNBR, 1756-CNBRK

This publication describes how to install the ControlLogix® ControlNet® scanner for standard and redundant media.

The ControlNet network combines the functionality of an I/O network and a peer-to-peer network, providing high-speed performance. The ControlNet network provides deterministic, repeatable transfers of critical control data.

The catalog numbers of the conformal coated products include the designation 'K' in the last position before the series identifier.

Summary of Changes

This publication contains new and updated information as indicated in the following table.

Topic	Page
Updated UK and European Hazardous Location Approval	3
Updated IEC Hazardous Location Approval	3
Updated Special Conditions for Safe Use	3
Added information regarding how to Remove the Module	6
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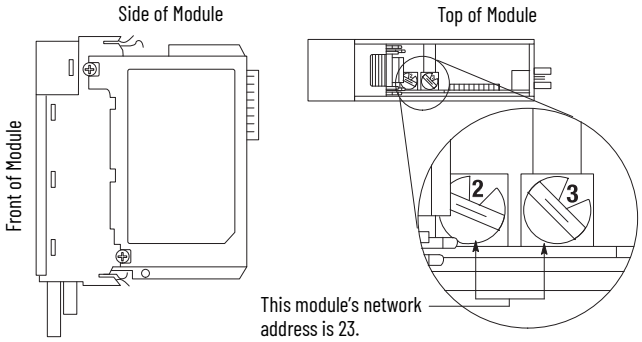
Added information regarding how to Troubleshoot the Module	8
Updated Operating Temperature and Isolation Voltage Specifications	10

Rockwell Automation

Set the Module Network Address

Use your fingers or a small screwdriver to set the network address switches for the module. For modules in a standalone chassis, you must specify a unique ControlNet network address; for modules in a redundant chassis, you must specify the same address for the secondary module that you specified for the corresponding primary module.

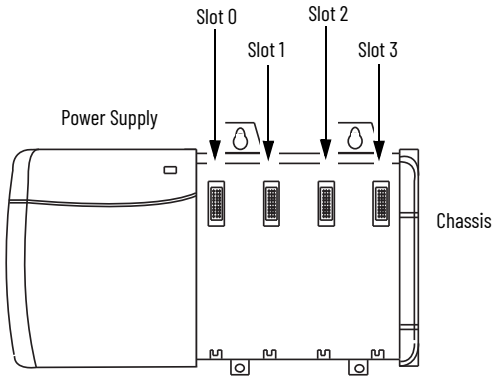


You can select an address of 01 to 99 for modules in a standalone chassis or 01...98 for modules in redundant chassis. 00 is an invalid ControlNet network address.

Determine Module Slot Location

This figure 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 ControlNet modules in the same chassis. You can install as many modules as your power supply can accommodate (such as the number for which the power supply is rated).

Chassis Slot Numbering



IMPORTANT If you plan to install a redundant system, you must place the primary and redundant modules in the same corresponding slot in their respective chassis. For example, if you place a 1756-CNBR module in slot 3 (from the left) in the primary chassis, you must also place a 1756-CNBR module in slot 3 in the redundant chassis.

Install the Module

You can install or remove a module while chassis power is applied.

WARNING: When you insert or remove the module while backplane power is on, an electric 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 electric 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.

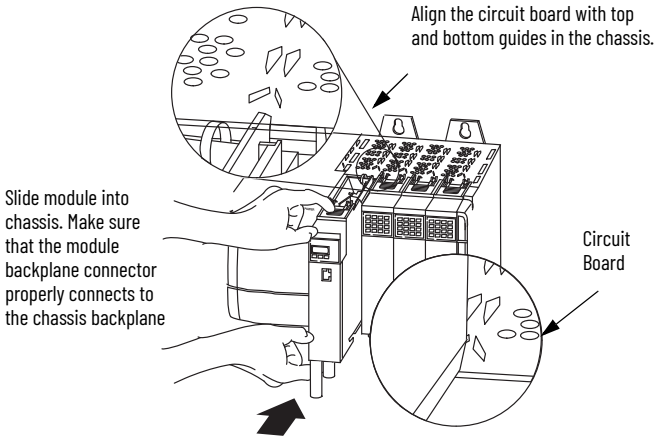
WARNING: If you connect or disconnect the communication cable with power that is applied to this module or any device on the network, an electric arc can occur. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is nonhazardous before proceeding.

WARNING: The NAP port is intended for temporary local programming purposes only and not intended for permanent connection. If you connect or disconnect the NAP cable with power that is applied to this module or any device on the network, an electric 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.

Follow these steps to install the module.

1. Align the circuit board with top and bottom guides in the chassis.
2. Slide the module into the chassis.

   Make sure that the module backplane connector properly connects to the chassis backplane as shown.

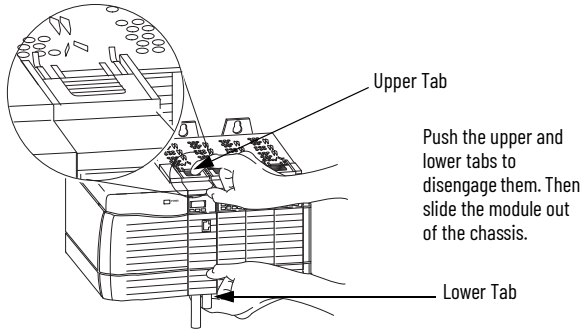


The module is properly installed when it is flush with the power supply or other installed modules.

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.

Remove the Module

If necessary, you can remove the module from the chassis as shown in this illustration.



IMPORTANT Removing power from the chassis before removing the module is only necessary if the module is in a Class I, Division 2 hazardous location.

Connect to the ControlNet Network

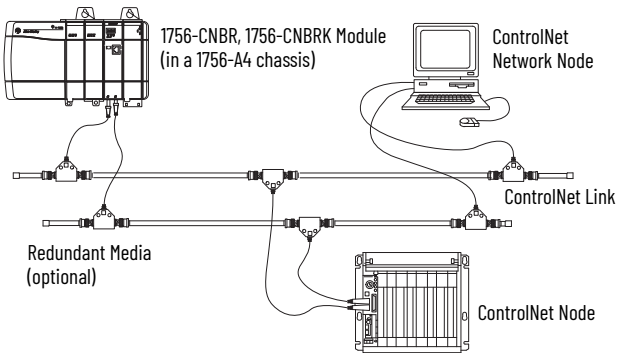
Connect the module to the ControlNet network using a tap (1786-TPR, 1786-TPS, 1786-TPYR, 1786-TPYS, or 1786-TCT2BD1) or a network access cable (1786-CP).

WARNING: If you connect or disconnect the communications cable with power that is applied to this module or any device on the network, an electric arc can occur. This could cause an explosion in hazardous location installations.

Use the 1786-CP cable for temporary connections, such as programming software. For permanent connections, use a tap.

ATTENTION: The modules that are listed on page 1 of this document that end with a 'K' are shipped with port protection plugs installed to provide a layer of protection from corrosive atmospheres. Port plugs must remain installed in unused ports at all times during storage and operation for the product to meet its corrosive atmosphere rating. If temporary access is required, plugs can be removed, and should be reinserted after temporary access is complete.

This figure shows an example ControlNet network using redundant media.



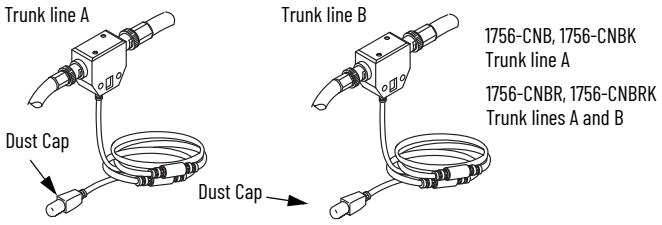
When connecting the module to a ControlNet network, also refer to the following documentation:

- *ControlNet Coax Tap Installation Instructions*, publication 1786-IN007
- *ControlNet Cable System Planning and Installation Manual*, publication CNET-IN002.

Taps with a straight connector (1786-TPS or 1786-TPYS) are recommended because of the location of the BNC connectors on the bottom of the module.

Follow these steps to connect the module to the network by using a tap.

1. Remove and save the dust caps from the ControlNet network taps.

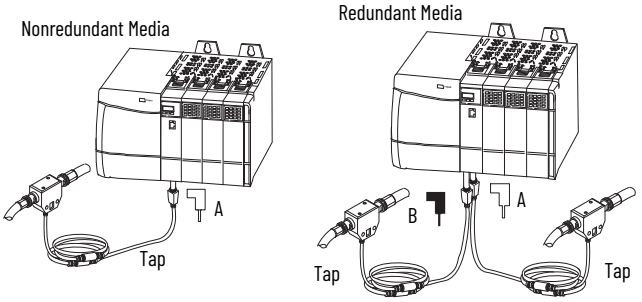


ATTENTION: Do not allow any metal portions of the tap to contact any conductive material. If you disconnect the tap from the module, place the dust cap back on the straight or right-angle connector to help prevent the connector from accidentally contacting a metallic grounded surface.

2. Connect the straight or right-angle connector on the tap to the module BNC connector.

If Your Node Supports	Connect The Connector on the Tap
Non-redundant media 1756-CNB, 1756-CNBK	to the channel A connector on the module (channel B on the 1756-CNBR, 1756-CNBRK is not used)(1)
Redundant media	• from trunk line A to channel A on the 1756-CNBR, 1756-CNBRK • from trunk line B to channel B on the 1756-CNBR, 1756-CNBRK

(1) While both channels are active, we recommend using channel A for non-redundant media.



IMPORTANT To prevent inadvertent tap connection reversal (causing incorrect status displays and requiring troubleshooting), check the tap drop cable for the label indicating the attached segment before making the connection.

The primary and redundant partner modules in a redundant control chassis pair must be connected to the same network segment. Connect the channel of each partner to the same network segment.

3. Apply power to the module and Check Module Status.

Troubleshoot the Module

Reference these tables to troubleshoot your module using the OK status indicator and display messages or the network channel status indicators.

OK Status Indicator and Display

OK Status Indicator and Display

Status	Display	Description
Off	None	The module is not communicating due to a power supply fault or internal fault. Do any of the following: • Check the power supply. • Check the cable connectors. • Make sure that the module is firmly seated in the chassis. • If the status indicator remains off, replace the module.
Steady Red	Msg scrolls(1)	The module's network address is set to 00, an invalid ControlNet address, or 99, an invalid ControlNet address if you are using enhanced redundancy control. See the footnote at the end of the table. Remove the module from the chassis, and set the network address to a valid value.
	BPA# ERR	The module has detected a different slot address from that latched in when the module was started. Excessive noise on the backplane causes this error. Replace the chassis or module.
	BPRX ERR	Too many CRC errors are being generated by the multicast backplane receiver, so the backplane multicast receivers have been shut off. Replace the module.
	BPIC ERR	Hardware within the module has faulted. Replace the module.
	CNIC ERR	
	DUPL NODE	For enhanced redundancy systems, this may be a temporary condition during chassis switchover. Otherwise, the module's network address is the same as another module's on the link. For enhanced redundancy systems only, wait 10 seconds. If the condition persists, remove the module from the chassis, and set the switches to a unique address.
	RACK ERR	The module cannot read the backplane EEPROM, or the rack/slot address is incorrect. Replace the chassis.
	STOP	The 1756-CNB module was commanded to stop functioning by the redundancy module. This occurs when a non-redundancy-compliant 1756-CNB module is placed into a redundant secondary chassis. Remove the nonredundancy-compliant 1756-CNB module from the redundant secondary chassis and replace it with a redundant 1756-CNBR module.
	WAIT RM(2) or WAIT SRM(2)	The 1756-CNB/E module is waiting for the redundancy module to be started.
Flashing Red	BOOT	The module has invalid firmware. Update the module's firmware with ControlFLASH™ software.
	ROM UPDT	A firmware update is in progress.
	SNGL KPR!	The module has detected that it has been connected to a ControlNet single-keeper network, version 1.0 or 1.25. Update the firmware of module at node address 01 and reschedule the network.
Steady Green	OK	Normal operation is occurring. At least one connection has been made to or through the module.
	INIT	The module is initializing.
	BW >MAX	The module is receiving too much network traffic and connections are timing out. The network bandwidth has been exceeded. No action is required because this is a temporary condition. If this happens frequently, add another module and split the traffic between them.
	CMPT(2)	The secondary 1756-CNB/E module is compatible with its partner.
	DSNP(2)	The 1756-CNB/E module is disqualified without a partner. Check corresponding slot of primary chassis for type and revision of module.
	PwDS(2)	The 1756-CNB/E module is primary with a disqualified secondary partner. Check the type and revision of the module.
	PwQg(2)	The 1756-CNB/E module is primary with a qualifying secondary partner.
	PwQS(2)	The 1756-CNB/E module is primary with a qualified secondary partner.
	PwNS(2)	The 1756-CNB/E module is primary with no secondary partner. Check the corresponding slot of the secondary chassis for the correct module.
	Qfng(2)	The secondary 1756-CNB/E module is qualifying.
	QS(2)	The secondary 1756-CNB/E module is qualified.
	SW ERR	The node address switch changed after the module was started. We recommend that you either return the switches to their original settings or replace the module, since this condition could indicate a latent hardware anomaly.
Flashing Green	CNFG ERR	The ControlNet network was configured incorrectly. Recheck the ControlNet network configuration.
	NET ERR	A network cabling error exists, or no other active nodes exist on the network. Recheck your network cabling and make sure that another node on the network is active (online).
	OK	Normal operation is occurring. No connections have been made to or through the module.

OK Status Indicator and Display (Continued)

Status	Display	Description
Steady Green or Off	SO_1[2]	Old primary switchover phase 1 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	SO_2[2]	Old primary switchover phase 2 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	SO_3[2]	Old primary switchover phase 3 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	SN_1[2]	New primary switchover phase 1 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	SN_2[2]	New primary switchover phase 2 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	SN_3[2]	New primary switchover phase 3 is in progress. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	?Cpt[2]	The 1756-CNB/E module has not determined if it is compatible. If the display shows this message for more than 3 seconds, then the 1756-CNB/E module failed during the transition from one redundancy phase to another. Replace one or both redundancy modules.
	!Cpt[2]	The 1756-CNB/E module has determined that it is not compatible. Replace the 1756-CNB/E module with one of the correct type and revision.

(1) If switches are set to 00, the display scrolls 'FAULT: ADDRESS SWITCHES = 00, ILLEGAL'.
If switches are set to 99 in a redundant chassis pair, the display scrolls 'FAULT: ADDRESS SWITCHES = 99, ILLEGAL IN REDUNDANT SYSTEM'.
(2) ControlLogix redundancy systems only.

Network Channel Status Indicators

Network Channel Status Indicators A and B

Status	Description
Off	There is no power.
Steady red	The module has faulted. Cycle power to the module. If the fault persists, contact your Rockwell Automation representative or distributor.
Alternating red/green	The module is undergoing a self-test.
Alternating red/off	A node was configured incorrectly, or a duplicate ControlNet node address exists. Check the node address and other ControlNet module configuration parameters.

Network Channel Status Indicators A or B

Status	Description
Off	A channel has been disabled. Program the network for redundant media, if necessary.
Steady green	Normal operation is occurring.
Flashing green/off	Temporary network errors exist. Check media for broken cables, loose connectors, and missing terminators. If the condition persists, see the *ControlNet Coax Media Planning and Installation Guide*, publication CNET-IN002.
	The node is not configured to go online. Make sure that the network keeper is present and working, and that the selected address is less than or equal to the UMAX[1].
Flashing red/off	Media has faulted. Check media for broken cables, loose connectors, and missing terminators. If the condition persists, see the *ControlNet Coax Media Planning and Installation Guide*, publication CNET-IN002.
	No other nodes are present on the network. Add other nodes to the network.
Flashing red/green	An incorrect node address exists. Change the node address so that it is less than or equal to the UMAX[1]. Then, stop and restart the 1784-PCIC and 1784-PCICS cards in RSLinx® software.
	The ControlNet network was configured incorrectly. Reconfigure the ControlNet network so that the UMAX[1] is greater than or equal to the node address.

(1) UMAX is the highest node address on a ControlNet network that can transmit data.

Reset the Module

To reset a module to its factory settings, complete these steps.

1. Remove power from the chassis.
2. Remove the module from the chassis.
3. Reset the switches to 00.

IMPORTANT	Do not use the 00 switch setting during normal module operation.

4. Replace the module in the chassis.
5. Apply power to the chassis.
6. After the module status display reads 'Reset Complete—Change Switch Settings', remove power from the chassis.
7. Remove the module from the chassis.
8. Set the switches to their final value.
9. Replace the module in the chassis.
10. Apply power to the chassis.

Specifications

Attribute	1756-CNB, 1756-CNBK	1756-CNBR, 1756-CNBRK
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 °C≤Ta≤+60 °C (+32 °F≤Ta≤+140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Corrosive Atmosphere[1] ASTM B845-97 Method H Accelerated Test (20-Day Exposure)	Severity Level G3[2] per ANSI/ISA 71.04–2013, Airborne Contaminants—Gases Severity Level CX[2][3] per IEC 60721-3-3:2019, Chemically Active Substances	
Voltage and current ratings	Backplane: 5.1V DC, 970 mA 24V DC, 1.7 mA	
Isolation voltage	30V (continuous), Basic Insulation Type, ControlNet Channel to Backplane Tested according to UL/IEC 61010-1 and 61010-2-201	30V (continuous), Basic Insulation Type, ControlNet A/B to Backplane, and ControlNet A to ControlNet B Tested according to UL/IEC 61010-1 and 61010-2-201
Temperature code	T4	

(1) Only applicable to modules that end with a 'K'.
(2) Port Plugs must remain installed in unused ports at all times during storage and operation for the product to meet its corrosive atmosphere rating.
(3) Up to 9.6 microns per year, corrosion rate of copper.