Automated Logic M0320

Multi-Equipment Application Controller

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M0320 Controller

Technical Instructions

Rev. 9/8/2011

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Contents

What is the M0320 controller?

The M0320 is a general-purpose controller that you can use for a variety of applications. The M0320 is part of the M line that lets you build a complete HVAC control system a piece at a time.

Using expanders

To add inputs or outputs to the M0320, you can attach up to 5 MX or X expanders to the M0320. See an expander's *Technical Instructions* for more information.

Driver and control programs

Driver	DRV_MXM
Maximum number of control programs*	100
Maximum number of BACnet objects*	2000

* Depends on available memory.

Specifications

Power	24 Vac ±10%, 50–60 Hz, 35 VA power consumption, single Class 2 source only, 100 VA or less
CMnet port	For communication with the controller network using ARC156 or MS/TP (9600 bps–76.8 kbps)
Access port	For local access to start up and troubleshoot system
Auxiliary device port	For communication with a BACview or BACview2
Inputs	32 universal inputs, configurable for 0–5 Vdc, 0–20 mA, thermistor, dry contact, or pulse counter
Input resolution	12 bit A/D
Input pulse frequency	10 pulses per second. Minimum pulse width (on or off time) required for each pulse is 50 msec.
Expansion	Up to 5 expanders with a maximum of 192 points
Microprocessor	32-bit Motorola MC68-series microprocessor
Memory	2 MB of non-volatile, battery-backed RAM and 1 MB of Flash memory
Real-time clock	Battery-backed real-time clock keeps track of time in event of power failure
Battery	7-year Lithium BR2330 battery provides a minimum of 10,000 hours of data retention during power outages
Protection	Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, and input connections are also protected against transient excess voltage/surge events lasting no more than 10 msec.

Status indicators	LED's indicate status of communications, running, errors, and power
Environmental operating range	0 to 130°F (-17.8 to 54.4°C), 10–90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable, screw-type terminal blocks
Overall dimensions	Width: 11 5/16 in. (28.7 cm) Height: 11 5/16 in. (28.7 cm)
Mounting dimensions	Width: 10 13/16 in. (27.5 cm) Height: 9 13/16 in. (24.9 cm)
Recommended panel depth	2 3/4 in. (7 cm)
Weight	3 lbs (1.36 kg)
BIBB support	Supports BACnet Interoperability Building Blocks (BIBB's) from the following groups: Data Sharing, Alarm and Event Management, Scheduling, Trending, and Device and Network Management. See *PICS* for details.
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B-Class A, CE EN50082-1997

Inputs

The M0320 has 32 universal inputs that accept the following signal types.

Signal Type	Description
Thermistor	Precon type 2 (10 kOhm at 77°F). Input voltages should be from 0.489 Vdc to 3.825 Vdc for thermistors.
Dry contact	A 5 Vdc wetting voltage detects contact position, resulting in a 0.5 mA maximum sense current when the contacts are closed.
0–5 Vdc	The output impedance of a 0–5 Vdc source must not exceed 10 kOhms. The input impedance of the M0320 is approximately 1 MOhm.
0–20 mA	The input resistance on each A terminal is 250 Ohms. The B terminal supplies a voltage source to power the 4–20 mA transducer. Each B terminal is capable of supplying 18–24 Vdc, but the total current drawn by all B terminals must not exceed 200 mA. If the voltage measured from any B terminal to **Gnd** is less than 18 Vdc, you need to use an additional external power supply.
Pulse counter*	Pulse counting up to 10 pulses per second. Minimum pulse width (on or off time) required for each pulse is 50 msec.

* The M0320 can perform pulse counting for dry contact or voltage inputs if you assign the input to a Pulse to Analog Input microblock. See *To assign inputs to points* (page 8).

To mount the M0320 expanders

Screw the M0320 into an enclosed panel using the mounting holes provided on the cover plate. Leave about 2 in. (5 cm) on each side of the controller for wiring.

If using expanders, see the following section(s) before mounting the controller.

To attach expanders

1. Arrange the M0320 and expanders in one or two columns, placing the M0320 anywhere in the columns.
2. Connect the devices' **Expansion** connectors.

   NOTE If you use 2 columns, use an MX expander cable to connect an **Expansion** connector in the first column to an **Expansion** connector in the second column. See the expander's *Technical Instructions* for more information.

Wiring for power

CAUTIONS

- The M0320 is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- ALC controllers can share a power supply as long as you:
  - Maintain the same polarity.
  - Use the power supply only for ALC controllers.

NOTE For the controller to recognize an attached expander, you must turn on the expander before you turn on the controller.

To wire for power

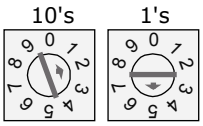
1. Turn off the M0320's power to prevent it from powering up before you can verify the correct voltage.
2. Remove power from the 24 Vac transformer.
3. Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.
4. Connect the transformer wires to the screw terminal connector.
5. Apply power to the transformer.
6. Measure the voltage at the M0320's power input terminals to verify that the voltage is within the operating range of 21.6–26.4 Vac.
7. Insert the screw terminal connector into the M0320's power terminals.
8. Turn **on** the M0320's power.
9. Verify that the **Power** LED is on and the **Run** LED is blinking.

To address the M0320

You must give the M0320 an address that is unique on the network. You can address the M0320 before or after you wire it for power.

1. If wired for power, turn off the controller's power. The controller reads the address each time you turn it on.
2. Using the rotary switches, set the controller's address to match the **Address** in the controller's **Device Properties** dialog box in SiteBuilder. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

   EXAMPLE If the controller's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.



Wiring for communications

The M0320 communicates using BACnet on the following types of network segments:

- ARC156 communicating at 156 kbps
- MS/TP communicating at 9600 bps, 19.2 kbps, 38.4 kbps, or 76.8 kbps

NOTE ARC156 is a unique implementation of the industry standard ARCNET. For a summary of differences between ARCNET and ARC156, see the *ARC156 Wiring Technical Instructions* (http://accounts.automatedlogic.com/download).

Wiring specifications

For...	Use...	Maximum Length
ARC156 [1] and MS/TP [2]	22 AWG, low-capacitance, twisted, stranded, shielded copper wire	2000 feet (610 meters)

[1] See the *ARC156 Wiring Technical Instructions* (http://accounts.automatedlogic.com/download).

[2] See the *MS/TP Networking and Wiring Technical Instructions* (http://accounts.automatedlogic.com/download).

To wire the M0320 for communications

1. Turn **off** the M0320's power.
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the controller's screw terminals labeled **Net +**, **Net -**, and **Shield**.

   NOTE Use the same polarity throughout the network segment.
4. Set the communication type and baud rate.

For...	Set CMnet Mode jumper to...	Set DIP switches 1 and 2 to...
ARC156	**ARC156**	N/A. Baud rate will be 156 kbps regardless of the DIP switch settings.
MS/TP	**MSTP**	The appropriate baud rate. See the **MSTP Baud** diagram on the controller.

   NOTE Use the same baud rate for all controllers on the network segment.
5. Turn **on** the M0320's power.
6. Verify communication with the network by viewing a Module Status report in WebCTRL.

Wiring inputs

Wiring specifications

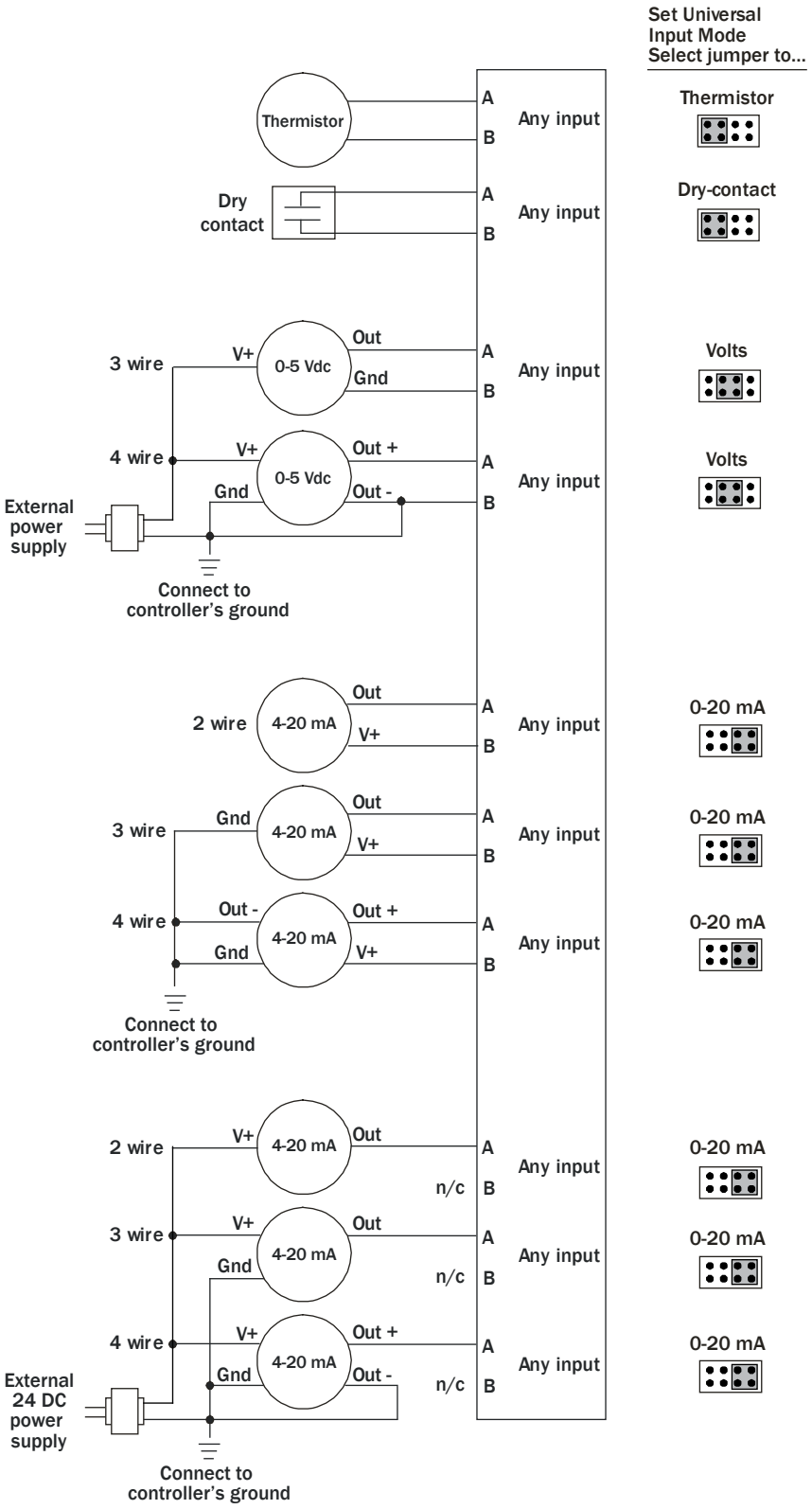
Input	Maximum length	Minimum gauge	Shielding
Thermistor Dry contact	1000 feet (305 meters)	22 AWG	Shielded
0–5 Vdc	1000 feet (305 meters)	26 AWG	Shielded
0–20 mA	3000 feet (914 meters)	26 AWG	Shielded or unshielded

To wire inputs

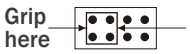
1. Verify that the M0320's power and communications connections work properly.
2. Turn **off** the M0320's power.
3. Connect the input wiring to the screw terminals on the M0320.

   NOTES

   - If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.
   - If a 4–20 mA sensor uses an external 24 Vac power supply, connect one leg of the 24 Vac supply to the M0320's ground.



4 Set each input's **Universal Input Mode Select** jumper to indicate the type of input. Grip the jumper by the sides only.



5 Turn **on** the M0320's power.

Downloading the M0320

Download the following items to the M0320's battery-backed memory:

Item	Notes
Up to 100 control programs, depending on available memory	Must be in **WebCTRLx.x\webroot**<system_name>**\programs**.
DRV_MXM driver	Must be in **WebCTRLx.x\webroot**<system_name>**\drivers**. **NOTE** To verify that you have the driver's latest version, go to http://accounts.automatedlogic.com/download, then select **Drivers** > **ExecB**. Compare the latest version to the M0320's driver in SiteBuilder.
Editable properties	
Schedules	

If you change any of these items or the M0320's address after the initial download, you must download again. The first download takes longer than subsequent downloads.

CAUTIONS

- The M0320 will lose stored data when you download.
- Equipment controlled by the M0320 will shut down and restart when you download.

To download in WebCTRL

You download the controller from WebCTRL. If your network is complete, you can download from any network browser. If not complete, connect a laptop with a local copy of the system database to the M0320's local access port. See *To communicate through the local access port* (page 15).

1 On WebCTRL's **NET** tree, select the controller.

2 Click **Downloads**.

3 Do one of the following:

- If the controller is in the Downloads list, go to step 4.
- If the controller is not in the list:
  a. Click **Add**.
  b. In the pop-up, select the controller.
  c. Select **All Content**.
  d. Click **Add**.
  e. Click **Close**.

4 Select the controller in the Downloads list.

5 Click **Start**.

NOTES

- If the download fails, locate and resolve the problem, then retry the download.
- You can also download a controller from the **Devices** page.

To assign inputs to points

To use an input, you must assign it to its corresponding point in the control program.

1 In WebCTRL's **GEO** tree, select the equipment controlled by the M0320.

2 On the **Properties** page, select the **I/O Points** tab.

3 In each point's **Num** field, type the number of the controller's corresponding input or output. For example, if you use IN-1 on the M0320 for the point **Fan Status**, type `1` in the **Num** field for **Fan Status**.

NOTE **Exp** (expander number) is 00 for the M0320.

4 Enter the appropriate values for your input in the remaining columns. See *Input values*, *Resolution values* and *Offset/Polarity values* below.

NOTE You can also enter these values in EIKON LogicBuilder.

5 If you have not performed the initial download to the M0320, you must download now so you can verify inputs.

6 To verify each input's operation, force each sensor to a known value, then compare it to the **Value** shown on the **Properties** page on the **I/O Points** tab.

Input values

Input	I/O Type	Sensor/Actuator Type	Min/Max
Analog (BAI)			
0-5 Vdc	**0–5 Volt**	**Linear Full Range**	Engineering values associated with 0 Vdc (Min) and 5 Vdc (Max)[1]
0-20 mA	**0–20 mA**	**Linear Full Range**	Engineering values associated with 0 mA (Min) and 20 mA (Max)[1]
4-20 mA	**0–20 mA**	**Linear w/Offset, 4–20 mA**	Engineering values associated with 4 mA (Min) and 20 mA (Max)[1]
Thermistor	**Thermistor**	Select your Thermistor type or set up and select a **Non-Linear, Custom Table**[2]	N/A
Pulse to Analog (BPTA)[3]			
Pulse Counter	**Counter Input**	N/A	N/A
Digital (Binary) (BBI)			
Dry Contact	**Dry Contact**	N/A	N/A

[1] The sensor reads a value and sends a corresponding signal (Volt, mA, or psi) to the M0320's physical input. The Analog Input microblock uses the **Min** and **Max** values to linearly translate the signal into the engineering value used in subsequent control logic. For example, set **Min** to 0 and **Max** to 10 for a 4–20 mA sensor that measures velocity from 0.0 to 10.0 inches/second so that when the input reads 4 mA, the microblock outputs a value of 0. Similarly, when the input reads 8 mA, the microblock outputs a value of 2.5.

[2] You can set up a *custom translation table* (page 13) on the driver's **Custom Translation Tables** pages in WebCTRL.

[3] The control program must have one Pulse to Analog Input microblock for each pulse counting input.

Resolution values

Resolution is not particular to a type of input, but the driver handles analog and digital (binary) inputs differently. To set these values appropriately, you should understand how the driver uses them.

Resolution	Notes
Analog Input (BAI)	The driver truncates the microblock's present value according to the resolution. **EXAMPLE** If the calculated present value is 13.789 and you set the **Resolution** to 0.1, the control program uses 13.7 for any calculations downstream from the microblock.
Digital Inputs	N/A

Offset/Polarity values

Offset/Polarity is not particular to a type of input, but the driver handles analog and digital (binary) inputs differently. To set these values appropriately, you should understand how the driver uses them.

Offset/Polarity	Notes
Analog Input (BAI)	**Offset** value (positive or negative) adds a fine adjustment to a sensor reading after all scaling for calibration. **EXAMPLE** If a sensor reads 74.9°F when the actual measured value is 73.6°F, enter an **Offset** of `-1.3` to calibrate the sensor to the measured value.
Digital (Binary) Input (BBI)	**Polarity** determines the microblock's present value when no signal is received from the equipment. When no signal is received from the equipment, if **Polarity** is set to: **normal**—present value is **off** **reversed**—present value is **on**

To set up the driver

After you download the driver and control program(s) to the M0320, you may want to change the driver's properties to suit your application.

1. On WebCTRL's **NET** tree, click ⊞ to the left of your M0320.
2. Click ⊞ to the left of **Driver** to see its children.
3. Make changes as needed on the **Properties** page for **Driver** and any of its children.

Driver

On the **Driver** page, you can change the following properties:

- BACview inactivity timeout and user password. See table below.
- Module clock synchronization and failure. See table below.
- Network Input microblock communication properties.

BACview Control	
Overwrite Daylight Saving parameters set in BACview?	**Yes**—Every download includes Daylight Saving Time properties from System Settings page and overwrites changes to these properties made from BACview. **No**—Download System Settings page Daylight Saving Time properties during first download. You must make subsequent changes from BACview. (Primarily for OEM use.)
Keypad inactivity timeout (minutes)	End the user session, turn off the backlight, and display the standby screen after this period of inactivity.
Keypad user-level password	Numeric password user must enter to access system through BACview.

Module Clock	
Clock Fail Date and Time	Date and time control program uses when controller's real-time clock is invalid. **TIP** Use an occupied date and time (such as a Tuesday at 10 a.m.) so the equipment does not operate in unoccupied mode if the controller loses power during occupancy.
Time Synch Sensitivity (seconds)	When the controller receives a time synch, if the difference between the controller's time and the time synch's time is greater than this field's value, the controller's time is immediately changed. If the difference is less than this field's value, the controller's time is slowly adjusted until the time is correct.
BACnet COV Throttling	
Enable COV Throttling	Under normal circumstances, COV Throttling should be enabled to prevent excessive network traffic if an object's COV Increment is set too low. See EXCEPTION below. When enabled, if an object generates excessive COV broadcasts (5 updates in 3 seconds), the driver automatically throttles the broadcasts to 1 per second. Also, if the object's value updates excessively for 30 seconds, an alarm is sent to WebCTRL listing all objects that are updating excessively. A Return-to-normal alarm is sent only after all objects have stopped updating excessively. EXCEPTION: In rare circumstances, such as process control, a subscribing object may require COV updates more frequently than once per second. For these situations, clear this checkbox, but make sure that your network can support the increased traffic. You will also need to disable the **Excessive COV** alarms under the driver's **Common Alarms**.

Device

On the **Device** page, you can change the following properties:

- BACnet device object properties for the M0320
- M0320 network communication

Configuration	**NOTE** The three APDU fields refer to all networks over which the M0320 communicates.
Max Masters and Max Info Frames	Apply only if the M0320 is on an MS/TP network.

Notification Classes

WebCTRL alarms use Notification Class #1. A BACnet alarm's Notification Class defines:

- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgement
- Where alarms should be sent (recipients)

NOTE You may need to set up additional Notification Classes if your system will handle Life Safety alarms or if you need to send certain types of alarms only to an alarm manager other than WebCTRL.

Priorities	**NOTE** BACnet defines the following Network message priorities for Alarms and Events.

Priority range	**Network message priority**
00–63	Life Safety
64–127	Critical Equipment
128–191	Urgent
192–255	Normal

Priority of Off-Normal	BACnet priority for Alarms.
Priority of Fault	BACnet priority for Fault messages.
Priority of Normal	BACnet priority for Return-to-normal messages.
Ack Required for Off-Normal, Fault, and Normal	Requires a controller acknowledgement for each message type. Normally not required. **TIP** To require operator acknowledgement for an Alarm or Return-to-normal message (stored in the WebCTRL database) change the acknowledgement settings on WebCTRL's **Alarm > Enable/Disable** tab for an alarm source or an alarm category.
Recipient List	
Recipients	The first row in this list is the WebCTRL Server. Do not delete this row. Click **Add** if you want other BACnet devices to receive alarms.
Recipient Description	Name that appears in the **Recipients** table.
Recipient Type	Use **Address** (static binding) only for third-party BACnet device recipients that do not support dynamic binding.
Recipient Device Object Identifier	Type the **Device Instance** from SiteBuilder (or from the network administrator for third-party devices) in the **#** field.
Process Identifier	Change for third-party devices that use a BACnet Process Identifier other than 1. WebCTRL processes alarms for any 32-bit Process Identifier.
Issue Confirmed Notifications	Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient.

Calendars

Calendars are provided in the driver for BACnet compatibility only. Use WebCTRL's **Schedules** feature instead.

Common and Specific Alarms

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Common alarms:

- Module Halted
- All Programs Stopped
- Duplicate Address
- Locked I/O
- Control Program
- Program Stopped
- Excessive COV

Specific alarm:

- Pneumatic Unstable Alarm
- Pneumatic Leak Alarm
- Low Main Air Alarm

NOTE To set up alarm actions for controller generated alarms, see *Setting up alarm actions* in WebCTRL Help.

Module Generated Alarm	
Description	Short message shown on WebCTRL's Alarm page or in an alarm action when this type of alarm is generated.
Events	
Alarm Category and Alarm Template	See *Customizing alarms* in WebCTRL Help.
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

Custom Translation Tables

You can set up a translation table that an analog input will use to translate the raw data from a non-linear sensor to the engineering units you want it to output on the wire. In the **NET** tree, select **Custom Translation Table #1**, **#2**, or **#3**. The **Properties** page has instructions. For the input to use the translation table, navigate to the input in WebCTRL's **GEO** tree, select the **Details** tab, then set **Sensor Type (Scaling Method)** to **Non-Linear, Custom Table #__**.

I/O Tuning

Applies if an expander with pneumatic analog outputs is attached to the M0320.

On the **I/O Tuning** page, you can change communication and control settings for pneumatic inputs and outputs.

Pneumatic control power up delay (seconds)	Delay after controller is reset before pneumatic control is available.
Refresh all channels every ___ seconds	Each pneumatic output is refreshed at this interval and whenever its setpoint changes.
Maximum service time per channel (seconds)	Time allowed for each output to reach setpoint.
Use coarse control when more than ___ PSI beyond setpoint	Coarse control allows faster but less accurate pressure changes. Use fine control when pressure is closer than this value to setpoint.
Fine control supply gain	Proportional gain used when setpoint is greater than current pressure. Larger actuators require higher gains.
Fine control bleed gain	Proportional gain used when setpoint is less than current pressure.
Fine control minimum valve pulse length (msec)	The shortest duration that a pneumatic valve is pulsed open when making fine adjustments to the line pressure. **NOTE** Enter an even multiple of 10msec between 20 and 4000.
"on" pressure for pneumatic digital outputs (psi)	Pressure maintained by digital outputs that are ON.
"off" pressure for pneumatic digital outputs (psi)	Pressure maintained by digital outputs that are OFF.
Main air low pressure limit (psi)	Trigger Low Main Air Alarm when main air pressure drops below this value.

Pneumatic Lines

Applies if an expander with pneumatic analog outputs is attached to the M0320.

This page shows pneumatic line status information.

Expanders

If the M0320 has expanders attached, the **Expanders** page displays expander status information.

To communicate through the local access port

If the M0320 is connected to an ARC156 network, you can use a USB Link Kit to connect a computer to the M0320's **Access Port** for downloading or troubleshooting.

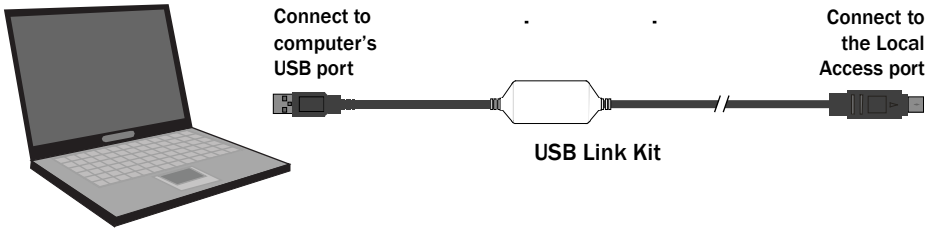
If the M0320 is connected to an MS/TP network, the **Access Port** is disabled. To enable the **Access Port**, unplug the MS/TP connector from the **CMnet** port, then cycle the **Power** switch. Or, you can use the M0320's **Access Port** before connecting it to the MS/TP network.

PREREQUISITES

- A computer with a USB port
- A USB Link Kit. See the *USB Link Kit Technical Instructions* (http://accounts.automatedlogic.com/download).
  NOTE The USB Link Kit driver is installed with WebCTRL v5. But if needed, you can get the latest driver from http://accounts.automatedlogic.com/download. Install the driver before you connect the USB Link Kit to your computer.
- v2.00 or later controller driver

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link Kit and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link Kit. Purchase a USB isolator online from a third-party manufacturer.

1 Connect the USB Link Kit to the computer and to the controller's Local Access port.



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link Kit cable into the isolator.

2 Turn **off** the M0320's power.

3 Using the baud rate diagram on the controller, set DIP switches 1 and 2 to 38.4 kbps.

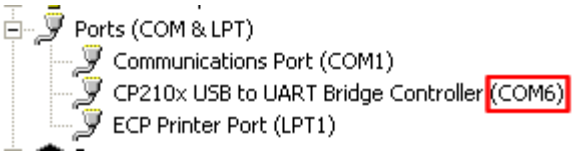
4 Turn **on** the M0320's power.

To set up a Local Access connection in WebCTRL

To communicate in WebCTRL, do the following:

1. On WebCTRL's **CFG** tree, select **Connections**.
2. On the **Configure** tab, click **Add**.
3. From the **Type** drop-down list, select **BACnet Local Access**.
4. Optional: Edit the **Description**.
5. Type the computer's **Port** number that the USB cable is connected to.

   NOTE To find the port number, plug the USB cable into the computer's USB port, then select **Start** > **Control Panel** > **System** > **Hardware** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **CP210x USB to UART Bridge Controller**.



6. Set the **Baud** rate 38400.
7. Click **OK**.
8. On the **View** tab, click the drop-down arrow next to your device's network **Connection**, then select **BACnet Local Access**.
9. Click **OK**.
10. On the **Configure** tab, select **BACnet Local Access**, then click **Start**.

    NOTE If WebCTRL displays an error, make sure the COM port you selected is not in use. For example, PuTTY may be open and is holding the port open.

Troubleshooting

If you have problems mounting, wiring, or addressing the M0320, contact ALC Technical Support.

Formatting the controller

If you cannot communicate with a controller after downloading it, as a last resort, you can manually format the controller to erase its memory.

1. Turn **off** the M0320's power. Make sure the address switches are not set to 0, 0.
2. Hold down the controller's **Format** button while you turn its power on.
3. Continue to hold down the **Format** button until the **Error** LED stops flashing and turns on, then release the button.
4. Download the M0320.

LED's

The LED's on the M0320 show the status of certain functions.

If this LED is on...	Status is...
Power	The M0320 has power
Rx	The M0320 is receiving data from the network segment
Tx	The M0320 is transmitting data over the network segment

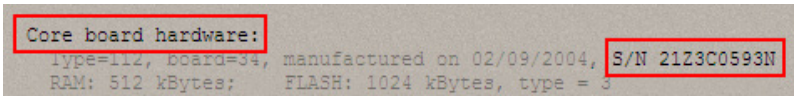
The **Run** and **Error** LED's indicate controller and network status.

If Run LED shows...	And Error LED shows...	Status is...
2 flashes per second	Off	Normal
2 flashes per second	2 flashes, alternating with **Run** LED	Five minute auto-restart delay after system error
2 flashes per second	3 flashes, then off	The controller has just been formatted
2 flashes per second	4 flashes, then pause	Two or more devices on this network have the same ARC156 network address
2 flashes per second	1 flash per second	The controller is alone on the network
2 flashes per second	On	Exec halted after frequent system errors or control programs halted
5 flashes per second	On	Exec start-up aborted, Boot is running
5 flashes per second	Off	Firmware transfer in progress, Boot is running
7 flashes per second	7 flashes per second, alternating with **Run** LED	Ten second recovery period after brownout
14 flashes per second	14 flashes per second, alternating with **Run** LED	Brownout
On	On	Failure. Try the following solutions: • Turn the M0320 off, then on. • Format the M0320. • Download the M0320. • Replace the M0320.

Serial number

If you need the M0320's serial number when troubleshooting, the number is on:

- a sticker on the back of the main controller board
- a Module Status report (Modstat) under **Core** (or **Main**) **board hardware**



To obtain a modstat in WebCTRL:

1. Select the M0320 in the **NET** tree.
2. On the **Properties** page, click **Module Status**.

Replacing the M0320's battery

The M0320's 7-year Lithium BR2330 battery provides a minimum of 10,000 hours of data retention during power outages.

If the M0320 experiences a power outage and the control programs stop functioning, obtain a modstat. If one of the entries under **Information message history** is **Possible battery failure**, replace the battery.

1. Remove the M0320's coverplate.
2. Gently pull the core board from the main circuit board.
3. Remove the battery from the controller, making note of the battery's polarity.
4. Insert the new battery into the controller, matching the polarity of the battery you removed.
5. Reattach the core board to the main circuit board.
6. Replace the M0320's coverplate.
7. Download the M0320.

NOTE The battery in an older M line controller (1 MB memory) is permanently attached to the controller and cannot be replaced. If the battery needs to be replaced, you must replace the board that it is mounted on with a CORE2M board.

To take the M0320 out of service

If needed for troubleshooting or start-up, you can prevent WebCTRL Server from communicating with the M0320.

1. Select the M0320 in WebCTRL's **NET** tree.
2. On the **Properties** page, select the **Out of Service** checkbox.
3. Click **OK**.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Appendix - M0320 coverplate