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KMC KMD-5290E LAN Controller

KMC KMD-5290E LAN Controller Instruction Manual

Contents

KMC KMD-5290E LAN Controller

Product Information

Specifications:

- Model: KMD-5290E LAN Controller
- Network Support: Tier 1 and Tier 2
- Communication: Ethernet, RS-485, RS-232, CAN
- Programming Language: Control Basic
- Maximum Controllers in Network: 32
- Maximum Nodes per Controller: 124

Product Usage Instructions

Mounting the Controller:

To ensure proper functioning and protection, follow these steps to mount the controller:

On a Flat Surface:

1. Position the controller on a flat surface with color-coded terminal blocks accessible.
2. Screw a #6 sheet metal screw through each corner of the controller to secure it.

On a DIN Rail:

1. Position the DIN rail for easy access to terminal blocks.

2. Pull out the DIN latch until it clicks once.

3. Place the controller on the DIN rail ensuring the top four tabs rest on it.

4. Lower the controller against the rail and push in the DIN latch to secure it.

Terminology and Wiring:

Terminals, Indicators, and Switches:

The controller features various terminals, indicators, and switches for different functions including power, communication, and network status.

Wiring Notes:

Use the specified color codes for terminals and reliable operation. For RS-485 network wiring, use Belden cable model #82760 or equivalent. Refer to technical bulletin TB190529B for detailed information.

For more detailed information, refer to the Expansion Modules data sheet.

Frequently Asked Questions

Q: Can the KMD-5290E LAN Controller be used in a Tier 1 network?

A: Yes, the KMD-5290E LAN Controller can be used in a Tier 1 network with Ethernet hardware for communication.

Q: How many controllers can be integrated into a single peer-to-peer network?

A: Up to 32 KMD-5290E controllers can be integrated into a single peer-to-peer network, with each supporting up to 124 nodes on each Tier 2 network.

Q: What programming language does the firmware in the controller use?

A: The firmware in the controller uses Control Basic, a high-level, easy-to-learn programming language available within KMC Connect and TotalControlTM software.

INTRODUCTION
These are instructions for installing and operating a KMD-5290E LAN Controller. Review this material in its entirety before installing or operating the controller.

OVERVIEW

The LAN Controller may be operated in a stand alone configuration or as part of a fully networked digital system. The KMD-5290E uses Tier 1 networks with Ethernet hardware to communicate with other LAN Controllers. The controller also supports remote access to a Tier 1 network through a dedicated serial port for direct connection to a PC. Unlike legacy KMD LAN controllers, the KMD-5290E does not support Tier 1 networking using EIA-485 connections. The LAN Controller supports Tier 2 networks with two dedicated RS-485 ports. Up to 32 KMD-5290E controllers can be integrated into a single peer-to-peer network, each supporting up to 124 nodes on each Tier 2 network. The firmware in the controller uses Control Basic, a high-level, easy-to-learn programming language. This programming functionality is available from within KMC Connect and TotalControl™ software.

MOUNT CONTROLLER

Mount the controller inside a metal enclosure for RF shielding and physical protection.
To mount the controller with screws on a flat surface, complete the steps in On a Flat Surface on page 2. To mount the controller on a 35 mm DIN rail (such as integrated in an HCO-1103 enclosure), complete the steps in On a DIN Rail on page 2.

On a Flat Surface

1. Position the controller on a flat surface so that the color-coded terminal blocks 1 are easy to access for wiring after the controller is mounted.
   NOTE: The black terminals are for power. The green terminals are for inputs and outputs. The gray terminals are for communication.
2. Screw a #6 sheet metal screw through each corner 2 of the controller.

On a DIN Rail

1. Position the DIN rail 1 so that the color-coded terminal blocks are easy to access for wiring after the controller is mounted.
2. Pull out the DIN latch 2 until it clicks once.
3. Position the controller so that the top four tabs 3 of the back channel rest on the DIN rail.
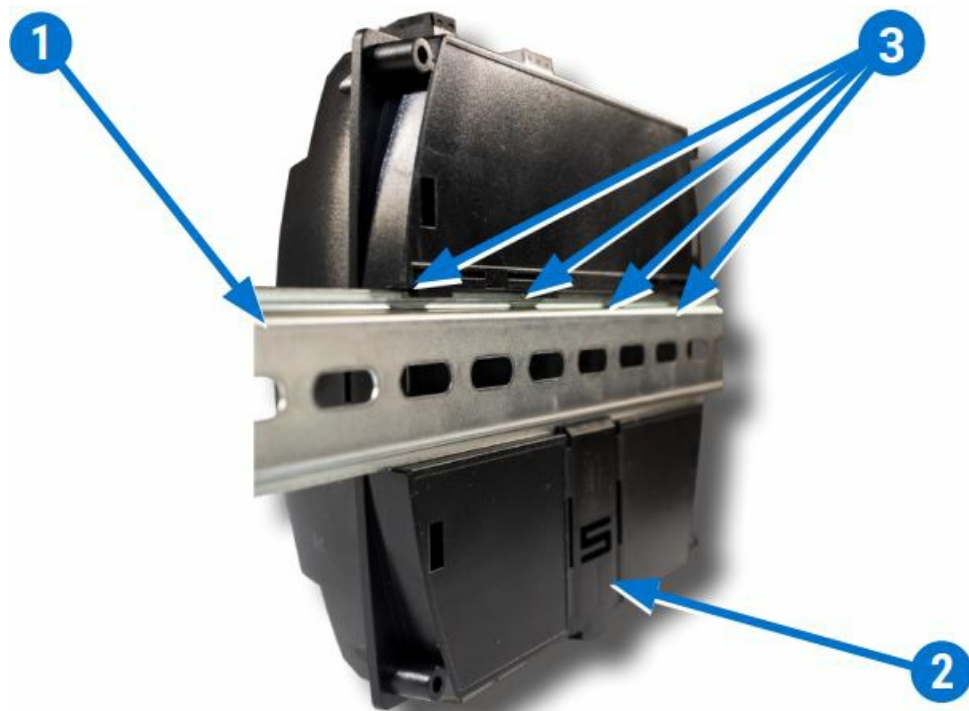
4. Lower the controller against the DIN rail.

5. Push in the DIN latch 4 to engage the rail.

   NOTE: To remove the controller, pull the DIN latch until it clicks once and then lift the controller off the DIN rail.
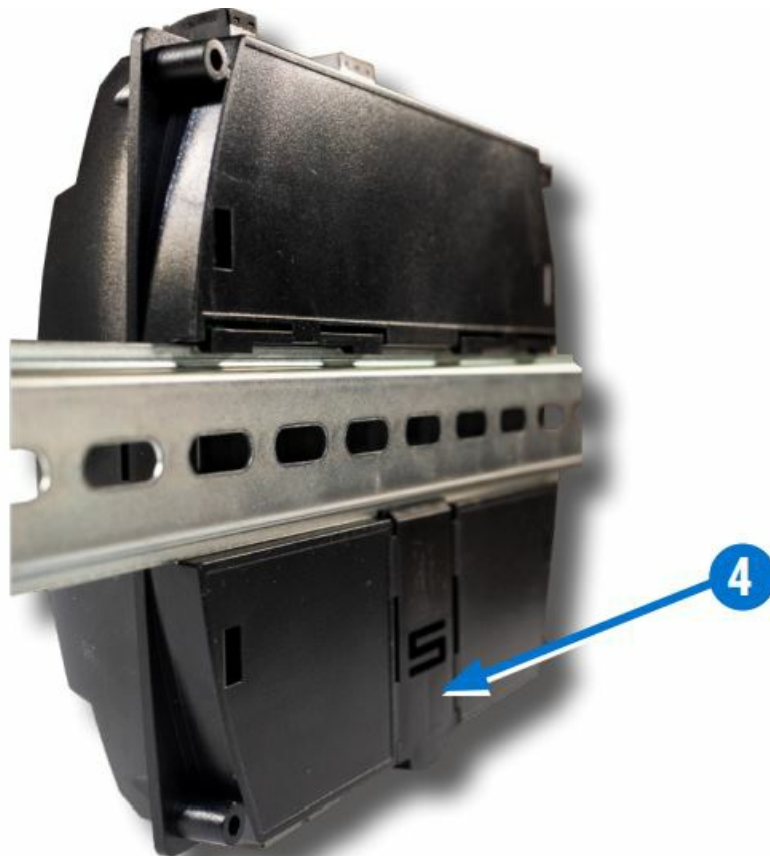
CONNECTIONS

The KMD-5290E LAN Controller may operate in either a stand-alone mode or connected by network to other controllers. Prior to making network connections, determine which connections will be used and how the network will be configured. The LAN Controller may be connected to other controllers using one or more of the following network technologies.

- KMDigital Tier 1 LAN connection using the dual 10/100 Ethernet ports and standard 10/100 CAT 5 Ethernet

cabling

- KMDigital Tier 2 networks using RS-485 wiring and hardware
- BACnet 8802.3 networks using the dual 10/100 Ethernet ports and standard 10/100 CAT 5 (or better) Ethernet cabling
- BACnet MS/TP using RS-485 wiring and hardware
- CAN-590x Expansion Module EIO. For more information on the CAN-590X series, see the CAN-5900 Series I/O Expansion Modules data sheet.

For more information on ports and physical connections, see Terminals, Indicators and Switches on page 4, Wiring Notes on page 4 and Sample Wiring on page 5.

TERMINALS, INDICATORS AND SWITCHES

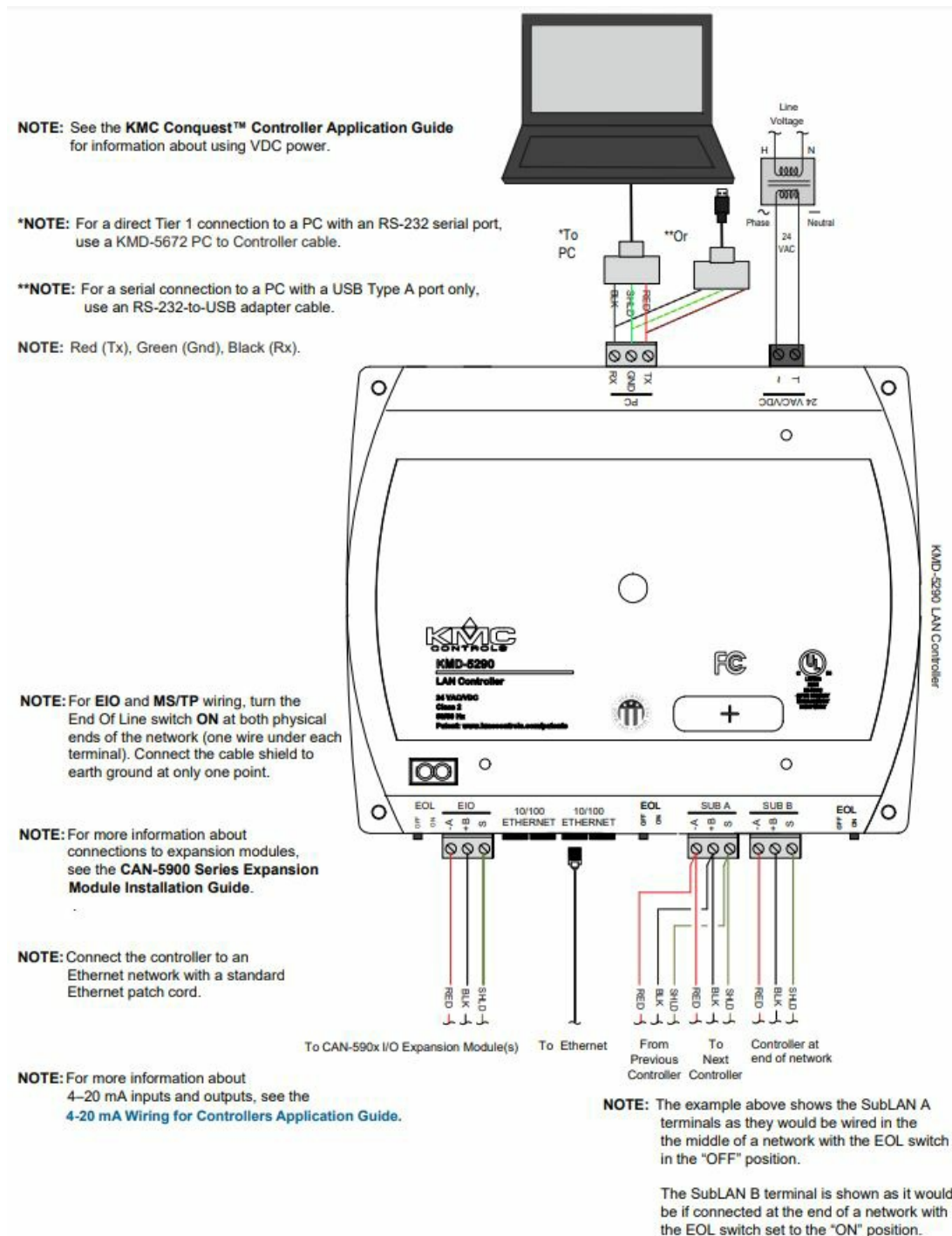| TERMINAL COLOR CODE	
Black	24 VAC/VDC Power
Gray	RS-485, RS-232, and CAN Communications

WIRING NOTES

The same wiring principles apply to all RS–485 network segments (KMDigital protocol or BACnet).

- Use approved shielded cable and the following principles when connecting a controller to a Tier 2 (subLAN) network: Note: For reliable operation, use Belden cable model #82760 or equivalent (18 gauge, twisted, shielded, 50 picofarads or less) for all RS-485 network wiring. Refer to the technical bulletin EIA-485 Network Wire Recommendations (TB190529B) for more information.
- Connect no more than 31 KMC addressable controllers or devices on the same Tier 1 Ethernet network.
- Connect no more than 124 KMC programmable controllers to the Tier 2 A or Tier 2 B connectors.
- Connect the A terminal in parallel with all other A terminals.
- Connect the B terminal in parallel with all other B terminals.
- Connect the shields of the cable together at each controller.

- Connect the shields to an earth ground (if available) or chassis ground only at one end of the segment; tape back the shield ground at the other end.
- Use a KMD–5575 repeater between every 32 Tier 2 controllers or if the cable length of a Tier 2 network exceeds 4,000 feet (≈ 1,220 meters).
- Use no more than seven repeaters per network.
- Place a KMD–5567 surge suppressor in the cable path where it exits a building.

SAMPLE WIRING

(General Purpose Applications)

NOTE: See the **KMC Conquest™ Controller Application Guide** for information about using VDC power.

*NOTE: For a direct Tier 1 connection to a PC with an RS-232 serial port, use a KMD-5672 PC to Controller cable.

**NOTE: For a serial connection to a PC with a USB Type A port only, use an RS-232-to-USB adapter cable.

NOTE: Red (Tx), Green (Gnd), Black (Rx).

NOTE: For EIO and MS/TP wiring, turn the End Of Line switch **ON** at both physical ends of the network (one wire under each terminal). Connect the cable shield to earth ground at only one point.

NOTE: For more information about connections to expansion modules, see the **CAN-5900 Series Expansion Module Installation Guide**.

NOTE: Connect the controller to an Ethernet network with a standard Ethernet patch cord.

NOTE: For more information about 4–20 mA inputs and outputs, see the **4-20 mA Wiring for Controllers Application Guide**.

NOTE: The example above shows the SubLAN A terminals as they would be wired in the the middle of a network with the EOL switch in the "OFF" position.

The SubLAN B terminal is shown as it would be if connected at the end of a network with the EOL switch set to the "ON" position.

CONNECT (OPTIONAL) EXPANSION MODULES

NOTE: Up to four CAN-5900 series expansion modules can be connected in series (daisy-chained) to a KMD-5290E LAN Controller for additional inputs and outputs.

Wire the gray EIO (Expansion Input Output) terminal block A of the KMD-5290E series controller to the gray EIO terminal block of the CAN-5900 series expansion module.
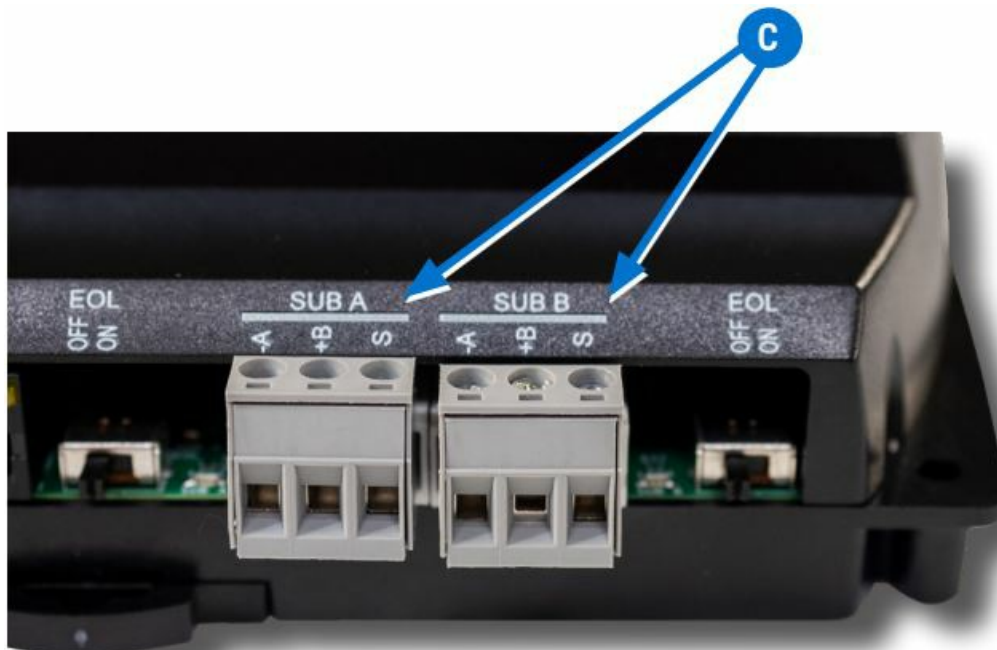
NOTE: See the CAN-5901 I/O Expansion Module Installation Guide for details.

CONNECT (OPTIONAL) ETHERNET NETWORK

1. To connect to a Main (KMDigital Tier 1) or BACnet network, attach an Ethernet patch cable to a 10/100 ETHERNET port B .
   NOTE: The Ethernet patch cable should be T568B Category 5 or better and a maximum of 328 feet (100 meters) between devices.

CONNECT (OPTIONAL) TIER 2 NETWORK(S)
Up to two (2) Tier 2 KMD networks can be connected to a KMD-5290E series controller using the SubLAN A and SubLAN B terminals.

Do the following to wire the gray SUB A or SUB B terminal block C of the KMD-5290E series controller to a Tier 2 network.

1. Connect the —A terminal to the negative wire of the cable.
2. Connect the +B terminal to the positive wire of the cable.
3. Connect the S (shield) terminal to the ground wire of the cable. Connect the shields of the cable together at each device using a wire nut or the S terminal on KMD controllers.

   NOTE: Connect no more than 124 KMD programmable controllers to each of the SubLAN ports.
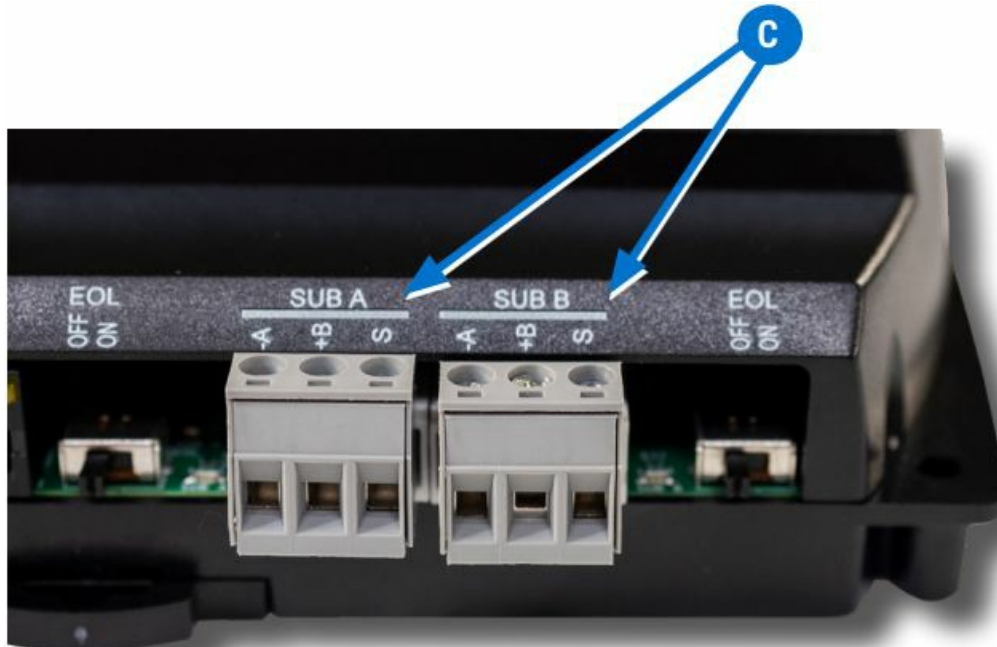
   NOTE: Refer to the technical bulletin EIA-485 Network Wire Recommendations (TB190529B) for more information.

CONNECT (OPTIONAL) BACNET MS/TP NETWORK
The KMD-5290E can connect to a BACnet MS/TP network using the SubLAN B terminals.
To wire the gray SUB B terminal block D of the KMD-5290E series controller to an MS/TP network:

1. Connect the —A terminal to the negative wire of the cable.
2. Connect the positive +B terminal to the positive wire of the cable.
3. Connect the S (shield) terminal to the ground wire of the cable. Connect the shields of the cable together at each device using a wire nut or the S terminal on KMD controllers.

CONNECT DIRECTLY TO PC (OPTIONAL)

For a direct Tier 1 connection to a PC, attach a KMD-5672 cable between a USB port on the PC to the RS-232 serial port terminal block E .

4. Connect the TX terminal to the red wire of the cable.

5. Connect the GND terminal to the green wire of the cable.

6. Connect the RX terminal to the black wire of the cable.
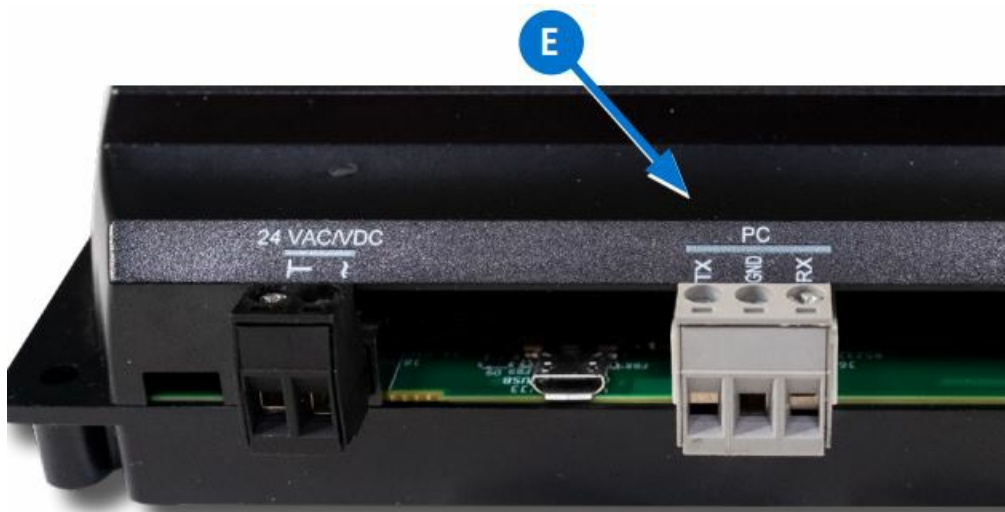
NOTE: If there is no RS-232 port on the PC, use an RS-232-to-USB Type A adapter cable (available in stores that carry network products).

SELECT END OF LINES (EOL)

EOL switches are shipped in the OFF position. Do the following to activate switches as necessary.

- If the controller is at either end of an EIO (Expansion Input Output) network (only one wire under each terminal), turn that EOL switch F to ON.
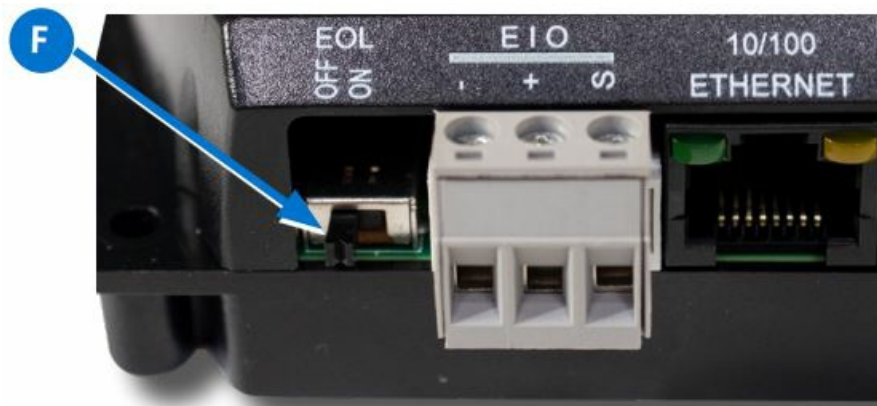
- If the controller is at either end of the SubLAN A network (only one wire under each terminal), turn that EOL switch G to ON.

- If the controller is at either end of the SubLAN B network (only one wire under each terminal), turn that EOL switch H to ON.
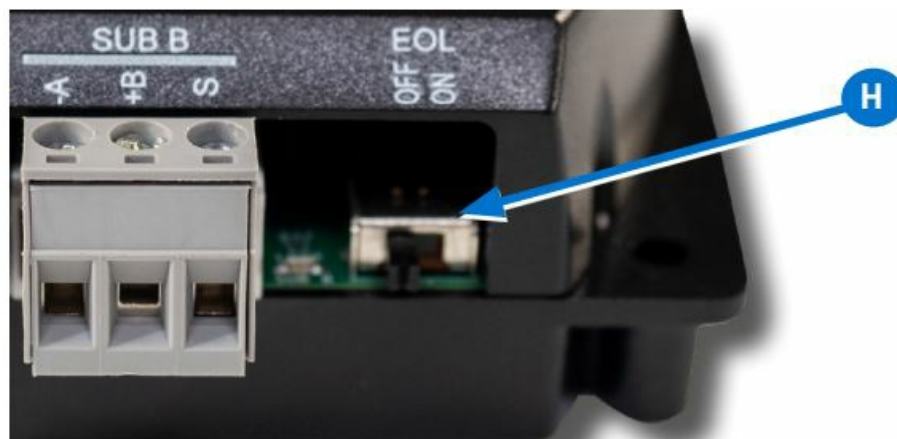
CONNECT POWER

NOTE: Follow all local regulations and wiring codes.
Connect a 24 VAC, Class-2 transformer to the black power terminal block I of the controller by doing the following.

1. Connect the neutral side of the transformer to the controller's common terminal ⊥ 1 .
2. Connect the AC phase side of the transformer to the controller's phase terminal ∼ 2 .

NOTE: Connect only one controller to each 24 VAC, Class-2 transformer with 12–24 AWG copper wire.

NOTE: Use either shielded connecting cables or enclose all cables in conduit to maintain RF emissions specifications.

NOTE: To use DC power supply instead of AC, see the Power (Controller) Connections section of the KMC Conquest Controller Application Guide.

POWER AND COMMUNICATION STATUS
The status LEDs indicate power connection and network communication. The descriptions below describe their activity during normal operation (at least 5 to 20 seconds after power-up/initialization or restart).
NOTE: If both the green READY LED and the amber COMM LED remain OFF, check the power and cable connections to the controller.

Green READY LED J
After controller power-up or restart is complete, the READY LED flashes steadily about once per second, indicating normal operation.

EIO COMM LED K

The Expansion Input Output (EIO) status LED indicates EIO network communication with one or more CAN-590X series expansion modules.

The EIO LED flashes when the controller is communicating with the EIO network

• The EIO LED remains OFF when the (powered) controller is not communicating with the EIO network. Check the power and EIO network connections.

NOTE: Refer to the CAN-5901 I/O Expansion Module Installation Guide for more information.

Green ETHERNET LED L

The Ethernet status LEDs indicate network connection and communication speed.

- The green Ethernet LED is ON when the controller is communicating with the network.

- The green Ethernet LED is OFF when the (powered) controller is not communicating with the network.

Amber ETHERNET LED M

- The amber Ethernet LED flashes when the controller is communicating with a 100BaseT Ethernet network.

- The amber Ethernet LED remains OFF when the (powered) controller is communicating with the network at only 10 Mbps (instead of 100 Mbps).

  NOTE: If both the green and amber Ethernet LEDs remain OFF, check the power and network cable connections.

CAN-590X EIO NETWORK ISOLATION BULBS

The two EIO network isolation bulbs N serve three functions:

- Removing the (HPO-0055) bulb assembly opens the EIO circuit and isolates the controller from the network.
- If one or both bulbs are ON, the network is improperly phased. This means the ground potential of the controller is not the same as other controllers on the network. If this happens, fix the wiring. See Connect (Optional) Tier 2 Network(s) on page 6.
- If the bulbs are OFF, then the circuit has been opened due to voltage or current on the network that exceeded safe levels.
- If this happens, correct the problem and replace the bulb assembly.

CONFIGURE THE CONTROLLER

Before placing a controller into service, it must be initialized and addressed.
See the following table for the most relevant KMC Controls tool for configuring, programming, and/or creating graphics for the controller. See the tools' documents or Help systems for more information.
NOTE: A KMD-5290E can be configured by connecting an HTML5-compatible web browser to the controller's default IP address (192.168.1.251). See Configure with Web Pages on page 19 for more information about the built-in configuration web pages

Table 1 - Setup Process Options			KMC CONTROLS TOOL
Configuration	Programming (Control Basic)	Web Page Graphics*	
✔			Hardware Configuration Manager (HCM)
✔			Internal configuration web pages**
✔	✔		KMC Connect™ software
✔***	✔***	✔***	TotalControl™ software

*Custom graphical user-interface web pages can hosted on a remote web server, but not in the controller.
**The KMD-5290E can be configured with an HTML5 compatible web browser from pages served from within the controller.
For information, refer to Configure with Web Pages on page 19.

***Full configuration and programming of KMDigital controllers is supported starting with TotalControl™ ver. 4.0.

TRANSFERRING CONFIGURATION FILES

The most efficient way to integrate a KMD-5290E into an existing network is to copy the configuation settings from an existing Tier 1 controller on the network. The original settings can be saved as a panel file and transferred to the new controller using the Hardware Configuration Manager (HCM) software application.

CONFIGURING A CONTROLLER WITH HCM

The KMC Hardware Configuration Manager (HCM) software application is available on the KMC Controls website. Complete instructions for HCM are included in the Hardware Configuration Manager manual and the context-sensitive help system within HCM.

To configure with Hardware Configuration Manager (HCM) or other software, a computer must be able to access the controller.

Direct PC Connection

An RS-232 serial port on the controller is used for a direct Tier 1 connection to a PC. This connection uses a KMD–5672 PC-to-Controller cable if an RS-232 port is not available on the computer. See Connect Directly to PC (Optional) on page

Materials

Before starting to install a KMD-5290E LAN Controller, have available the following materials.

- System plans with controller addresses
- USB to RS-232 serial adapter cable (for a Tier 1 serial connection to a PC with no RS-232 port)
- Hardware Configuration Manager (software application, available for download from the KMC Controls Partner Portal at **kmccontrols.com**)

Related Materials

In addition to the material presented in this document, review and have available the following reference materials.

- Hardware Configuration Manager Reference Guide
- CAN-5900 Series Expansion Module Installation Guide

CREATING A BACKUP PANEL FILE

To create a backup panel file, do the following:

1. Start HCM, connect the controller to the computer and establish communications with the controller.
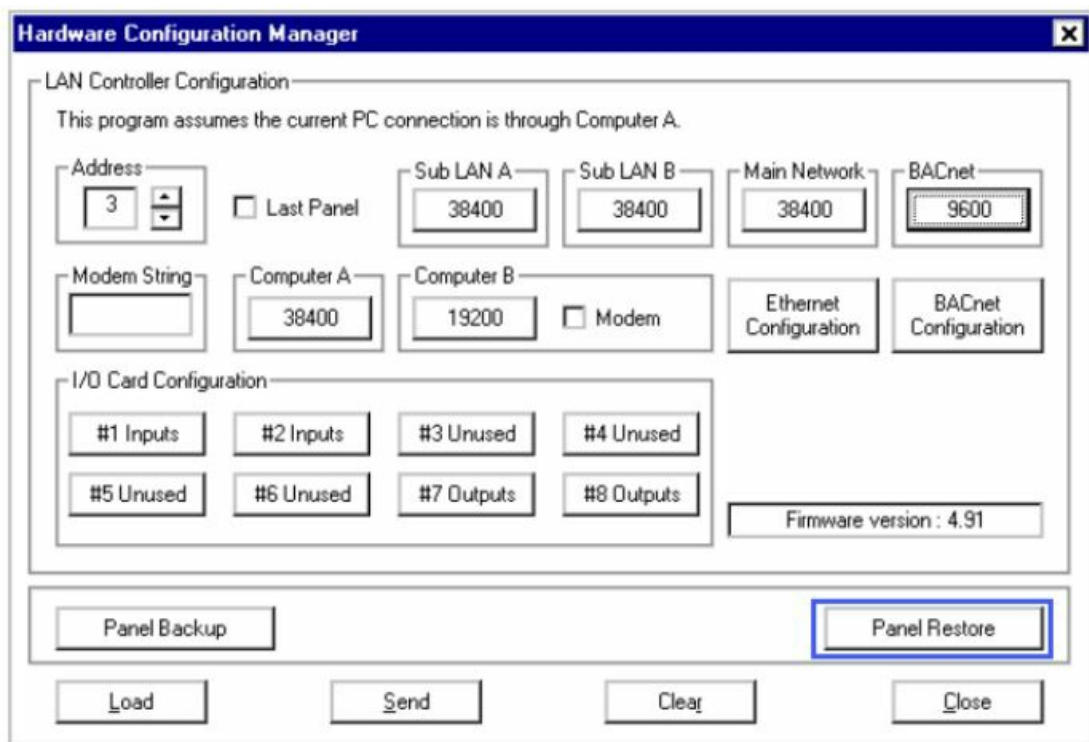2. In the LAN Controller Configuration screen in HCM, click Panel Backup.

3. Browse to the location where the file will be saved.

4. Enter a name for the file. HCM will automatically add the extension .PNL.

5. When ready, click Save.

6. When the Make Panel File Address Specific dialog opens, do one of the following.

   - Click Yes to save the file that can be used only with a controller of the same address number.

   - Click No to save a file that can be used with any compatible controller number.

HCM will be begin saving the file as soon as Yes or No is clicked.

RESTORING WITH A BACKUP PANEL FILE
To restore a controller from a backup panel file, do the following:

1. Connect the computer running HCM to the controller and start HCM.

2. Power the controller.

3. In the LAN Controller Configuration screen in HCM, click Panel Restore.
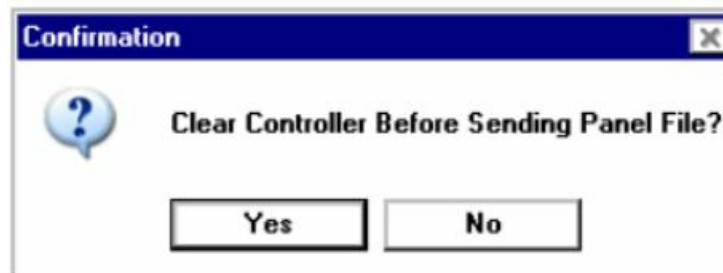
4. Browse to the location of the .PNL backup file.

5. Select the file and click Open.

6. In the Confirmation dialog, do either of the following.

   - Click Yes to delete point labels, descriptors, and configuration settings before starting the restoration.

   - Click No to proceed without deleting existing settings.

7. When the HCM dialog opens, do either of the following.

   Click Yes to use the Ethernet address configuration in the file .

   Click No to use the address configuration in the controller.

8. When the restoration is finished, cycle the controller's power to apply the changes. The controller can now be connected to a network and additional configuration can be performed using the controller's internally served web pages or TotalControl, KMC Connect, or KMC Converge software.

Note: IP Routing Table settings do not change in a controller until the power is cycled.
For more information, see the Hardware Configuration Manager Reference Guide.

KMDIGITAL NETWORK CONFIGURATION

The entries in the table HCM Configuration Screen Setup Fields are required for controller-to-controller communications on a KMC Controls Digital (KMD) network.

Table 2 – HCM Configuration Screen Setup Fields	
Setting	**Description**
Address	Enter the address that is assigned to the controller on the network. Valid numbers are 1–31.
Last Panel	Check this box only if the controller is assigned to the highest address number in the system. This controls token passing in the network. Last Panel is not applicable to Tier 1 controllers connected by Ethernet.
SubLAN A (Tier 2) SubLAN B (Tier 2) BACnet (MS/TP)	Sets the connection speed of the Tier 2 BACnet port to which the LAN controller is connected. Set each transmission rate to match that of the other controllers on each network.
Computer A	Use this field to set the communication speed if a PC is directly connected to this port.

ETHERNET ROUTING TABLE

The Ethernet routing table is a list that associates the KMC network addresses assigned to KMD Tier 1 controllers with the IP addresses required by the LAN protocol. If the controller is not configured correctly, it will not communicate with other controllers and may cause problems with the rest of the network. Before starting the initialization process, you will need the information about the controller and the LAN summarized in Table 3.

NOTE: Ethernet settings do not take effect in a controller until the power is cycled.

BACNET CONFIGURATION

If the controller is configured for BACnet and connected to a BACnet network, the controller must be configured to communicate with the network.

Table 4 – Tier 1 BACnet Settings	
Setting	**Description**
Instance	The device instance number as assigned by the BACnet system designer. Instance numbers are required, must be unique among all devices on the internetwork and range from 0 to 4,194,303.
Name	A required 16-character label of the device. Name must be unique among all devices on the inter network. The set of characters used in Name is restricted to printable characters.
Location	Optional information used to further identify a piece of equipment
APDU Timeo ut	Indicates the period — in milliseconds — between retransmissions of an APDU requiring an ack nowledge- ment for which no acknowledgment has been received. The default value is 3000 milli seconds.
Max Master	Enter the highest MAC address the controller will attempt to locate while polling for a master devi ce on the local network.
Token Timeo ut	Enter the period a controller must wait to see if a remote node responds to a request or starts usi ng the token. The range is 20-100 milliseconds.

PROGRAMMING FOR BACNET IN CONTROL BASIC
The LAN Controller supports the BACnet object types listed in Table 5.

Table 5 – Supported BACnet Object Types	
Mnemonic	**Object Type**
AI	Analog Input
AO	Analog Object
BI	Binary Input
BO	Binary Output
AV	Analog Value
BV	Binary Value

Program the LAN Controller as you would other KMDigital controllers.
Observe the following details when programing an interface to a BACnet internetwork:

- Only inputs, outputs and variables within the LAN Controller appear as objects in a device on the BACnet

  internetwork.
- A point configured as a KMD digital point will appear as a BACnet binary object. Analog points appear as analog

objects.

- To be visible as an object to BACnet devices or operator workstation, configure the KMD point in KMC Connect or TotalControl with both a description and name.
- Use BAC-SET, BAC-GET and BAC-RLQ in Control Basic to read and write other objects on other BACnet devices.

KMC Controls recommends that all BACnet services have adequate error handling protocols within your control program. A sample Control Basic code segment is provided below to demonstrate reading the state of Binary Input 8 in a BACnet device with instance number 1.

Example:

```
250 G = BAC-GET( 1 , BI8 ) : REM BACnet read
260 ON-ERROR 280 : REM If error, bad read, don't use it
270 1-VAR16 = G : REM Read was good, use the value.
280 WAIT 0:00:15 : REM Release so other CB programs can run
290 END
```

Accessing the LAN Controller for BACnet

To access the LAN Controller for use with a BACnet network, use a BACnet operator workstation such as KMC Connect or TotalControl.
Note the following when working with BACnet and the LAN Controller:

- The LAN Controller will appear in the device list, but it cannot be selected from the operator workstation software to change the configuration of its objects.
- The configured points within the KMD-5290E are the only points visible in a BACnet network.
- Use the BACnet Read/Write Property under the System menu to manually view or change properties.
- KMC BACnet controllers and third-party devices may read from and write to the objects in the KMD-5290E with off-panel reads and writes.

CONFIGURE WITH WEB PAGES
Before placing a controller into service, it must be initialized and addressed with KMC Hardware Configuration Manager (HCM) software appliction available on the KMC Controls website. Complete instructions for HCM are included in the Hardware Configuration Manager manual and the context-sensitive help system built into HCM. The KMD-5290E can be configured with an HTML5 compatible web browser from pages served from within the controller. The controllers have the following default network address values:

- IP address—192.168.1.251
- Subnet mask—255.255.255.0
- Gateway—192.168.1.1

NOTE: The KMD-5290E LAN Controller can still be configured using HCM, KMC Connect or TotalControl software.

Login Window
To configure a KMD-5290E with its own internally served web pages:

1. Connect the controller to an Ethernet port by doing one of the following:
   1. Connect directly to the computer, which typically requires changing the computer IP address. See Changing a Computer's Address on page 26.
   2. Connect to a subnet that recognizes address 192.168.1.251.
2. Connect power to the controller. (See Connect Power on page 9.)
3. Open a new browser window on the computer.
4. Type the default controller IP address 192.168.1.251.
5. In the login window User name field, type admin.
6. In the login window Password field, type admin.

   NOTE: The login screen will be accessible for about 30 seconds after a controller has restarted or when power was applied.
7. After logging in, change the controller parameters as needed:
   - To change the IP address, see Device Window on page 20.
   - To change passwords and add users, see Security on page 24.
   - To change application parameters, see Firmware (Update) Window on page 25.

NOTE: If you change the IP address, place the controller on the new subnet and log in using the new address. After the address is changed and saved, the controller will not respond to the old address.

After login, a one-hour timeout starts. The timer resets to one hour for any of these conditions:

- A page is refreshed or saved.
- The menu (on left side of screen) is clicked to navigate to a different page.
- The flashing Reset Session Timer (which appears two minutes before the end of the timeout period) is clicked.

Device Window
The Device window shows IP settings, KMD settings, CAN Module status, and BACnet settings. The Device window also configures the controller for the Local Area Network (LAN).

Illustration1 – Device Window

The IP Settings section displays the following parameters.

- IP Address — The internal or private network address of the controller. This is supplied by the building's IT department system administrator.(To recover a lost address, see Recovering an Unknown IP Address on page 30.)
- MAC — The Media Access Control address of the controller. This must be unique and in the range from 0 to 127. The number is assigned by the manufacturer and cannot be changed.
- Subnet Mask — The Subnet Mask determines which part of the IP address is used for a network identifier and which part is used for a device identifier. This is supplied by the building's IT department system administrator. The mask must match the mask for the network gateway router and other devices on the subnet.
- Default Gateway — The address of the network gateway router. This is supplied by the building's IT department system administrator. The controller and gateway router must be part of the same LAN subnet.

The KMD Settings section displays the following parameters:

- Panel Address — The panel address of the controller.
- PC Port Baud — The baud rate of the PC Port on the controller.
- KMD SubLAN A Baud — The baud rate of the SubLAN A port.
- KMD SubLAN B Baud — The baud rate of the SubLAN B port.

NOTE: Navigate to the IP Table page to adjust panel addresses and IP settings.
The CAN Modules section displays the status of up to four CAN expansion modules connnected through the EIO port.

- Running — Indicates the network is active.

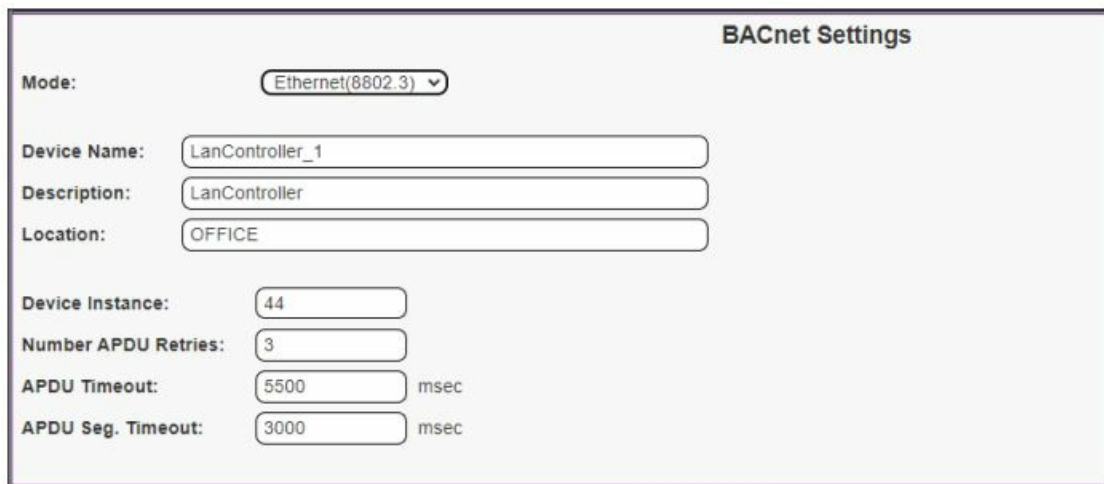- Inactive — Indicates the device is inactive on the network.

The BACnet Settings section is used to set the BACnet connection type, identify the controller as a BACnet device and set BACnet communication properties. Parameters vary depending on whether Ethernet or MS/TP is selected:
Click the drop-down menu next to Mode to choose MS/TP (available through the SubLAN B terminal only), Ethernet(8802.3), or Disabled (the default setting).
To save changes, click *Save near the upper right corner of the page. After changes in the window are saved, the controller will use the new settings and will require a log in at the new address. If the controller is not on the same subnet as the network gateway router, it will not function correctly.

The following parameters are available for an Ethernet 8802.3 connection:

Illustration 2 – BACnet Settings – Ethernet 8802.3

- Device Name — A name that must be unique among all devices on the BACnet internetwork.
- Description — Optional information not included in the device name.
- Location — An optional value that describes the controller's physical location.
- Device Instance — A number that identifies the controller on the internetwork. The device instance must be unique on the internetwork and in the range from 0–4,194,302. The device instance is assigned by the BACnet system designer. The default device instance on KMDigital controllers is 124 and must be changed to a unique number to avoid conflict with other devices.
- Number APDU Retries — Indicates the maximum number of retries that an APDU (Application Layer Data Unit) is retransmitted.
- APDU Timeout — Indicates the time (in milliseconds) between retransmissions of an APDU requiring an acknowledgment for which no acknowledgment has been received
- APDU Seg. Timeout — The Segment Timeout property indicates the time (in milliseconds) between retransmissions of an APDU segment.

Parameters avaiable for a BACnet MS/TP connection (active through the SubLAN B port):

Illustration 3 – BACnet Window – MS/TP

BACnet Settings

*Note: BACnet MSTP active on KMD Sublan B connector

Mode:	MS/TP
Device Name:	LanController_1
Description:	LanController
Location:	OFFICE
Device Instance:	44
Number APDU Retries:	3
APDU Timeout:	5500 msec
APDU Seg. Timeout:	3000 msec
MAC Address:	0
Buad Rate:	38400
Max Master:	127
Max Info Frames:	4

- Device Name — A name that must be unique among all devices on the BACnet internetwork.
- Description — Optional information not included in the device name.
- Location — An optional value that describes the controller's physical location.
- Device Instance — A number that identifies the controller on the internetwork. The device instance must be unique on the internetwork and in the range from 0 to 4,194,302. The device instance is assigned by the BACnet system designer. The default device instance on KMDigital controllers is 124 and must be changed to a unique number to avoid conflict with other devices. The default device instace for Conquest controllers is 1 and must be changed to a unique number to avoid conflict with other devices.
- Number APDU Retries — Indicates the maximum number of retries that an APDU (Application Layer Data Unit) is retransmitted.
- APDU Timeout — Indicates the time (in milliseconds) between retransmissions of an APDU requiring an acknowledgment for which no acknowledgment has been received
- APDU Seg. Timeout — The Segment Timeout property indicates the time (in milliseconds) between retransmissions of an APDU segment.
- MAC Address — The Media Access Control address assigned to the controller for the MS/TP network.
- Baud Rate — Click the drop-down arrow to select from a range of settings. The baud rate for the router and all devices connected to the MS/TP network must be the same.
- Max Master — Set to 127 or no lower than the highest MAC address on the network.
- Max Info Frames — The largest number of frames that will be sent by the controller before it releases the token.

IP Table Configuration Window
The IP Table window is used to view and adjust panel addresses and IP settings. The table shows up to 31 panels.

Illustration 4 – IP Table Configuration Window

Parameters available in this window are:

- Panel Address — The address of the panel shown in the window.
- MTU (Maximum Transmission Unit) — The largest packet or frame size, specified in octets (eight-bit bytes) that can be sent in a packet- or frame-based network.
- Panel Number — Shows the sequential number of the panel.
- IP Address — The internal or private network address of the controller. This is supplied by the building's IT department system administrator.(To recover a lost address, see Recovering an Unknown IP Address on page 30.)
- Subnet Mask — The Subnet Mask determines which part of the IP address is used for a network identifier and which part is used for a device identifier. This is supplied by the building's IT department system administrator. The mask must match the mask for the network gateway router and other devices on the subnet.
- Default Gateway — The address of the network gateway router. This is supplied by the building's IT department system administrator. The controller and gateway router must be part of the same LAN subnet.
- Broadcast Server — When checked, shows that the device is a broadcast server.
- Panel to Panel Message Interval(secs) — Shows the interval, in seconds, between broadcast server message transmissions.

To load an external IP Table configuration, click Choose File and select the file from the drop-down list. To update the information in the table, click Refresh.
To save the current IP Table configuration, click Save.
To save an IP Table configuration, click save table to file and choose the location for the file to be saved.

Security Window
The Security window sets user access to the controller.

Illustration 5 – Security Window

The KMD-5290E is configured with the following default user name and password.

- User name: admin
- Password: admin

Note the following.

- During configuration, the default admin/admin defaults should be changed to enhance security.
- The user name list must include at least one name with Administrator privileges.
- User names and passwords are case sensitive.

The controller has multiple levels of user access:

- A View Only user may view configuration pages but not make any changes.
- An Operator may make configuration changes but cannot modify security settings.
- An Administrator may make configuration and security changes.
- A Custom access user has a combination of access options as selected by an Administrator.

Table 6 – Security Access Levels

	Configure	Diagnostic	Security
Administrator	Display Modify	Display Modify	Display Modify
View Only	Display	Display	
Operator	Display Modify	Display Modify	
Custom	Display* Modify*	Display* Modify*	Display* Modify*

Firmware (Update) Window

KMD-5290E firmware can be updated through the web browser after downloading the latest firmware from the KMC Controls website.

Illustration 6 – Firmware Window
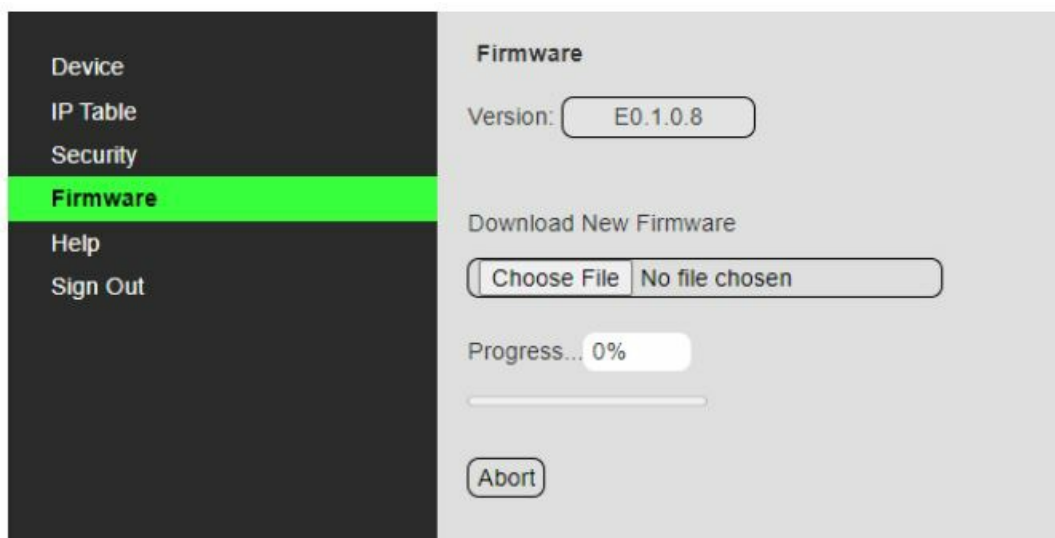
To download from KMC and install the firmware file onto the computer:

1. Log into the KMC Controls web site (www.kmccontrols.com) and download the latest zipped firmware file from the KMD controller's product page.
2. Find and extract the "Over-The-Network" (not the "HTO-1104_Kit") EXE file for the relevant model controller.
3. Run the KMD-5290E_OverTheNetwork.exe file.
4. Click Yes to allow Windows to install the program.
5. Click OK on the Firmware License dialog box.
6. Click Unzip in the WinZip Self-Extractor dialog box to then load the firmware from the computer into the controller:

7. Log in to the controller's web page. See Login Window on page 19.

8. In the controller's Firmware window, click Choose File.

9. Locate the new firmware zip file (it should be in a subfolder of C:\ProgramData\KMC Controls\Firmware Upgrade Manager\KMD).

10. Click Open.

11. At the prompt asking whether to proceed with the download, click OK. The new firmware starts loading into the controller.

    NOTE: To cancel the update and leave the devices with the original firmware intact, click the Cancel or Abort button.

12. After the new firmware is loaded, you will be asked if you want to commit to the download. To finish the update, click OK.

13. For the firmware change to go into effect, the controller will need to be restarted. When asked if you want to restart the device, click OK.

    After the controller restarts, you will need to log in again to continue any additional configuration.

Help Window
NOTE: This feature will be available for the public release of the KMD-5290E.
This is a connection to the KMC public web site with downloadable documentation and applications, such as the KMD-5290E LAN Controller Data Sheet, the Hardware Configuration Manager Reference Guide, and the Hardware Configuration Manager (HCM) software application. An active Internet connection is necessary for the link to work.

Illustration 7 – Help Window

NOTE: Bulletins and firmware are available only after logging into the web site.

Changing a Computer's Address
To directly connect a computer to a controller, you must temporarily set the IP address of the computer to be compatible with the IP address of the controller. The IP address of a computer can be changed with utility software or manually.

Change a Computer's IP Address with a Utility
The easiest method for users who will change their IP address on multiple occasions is to install an IP address changing utility (such as Simple IP Config available from GitHub). See the instructions packaged with the software. In the software:
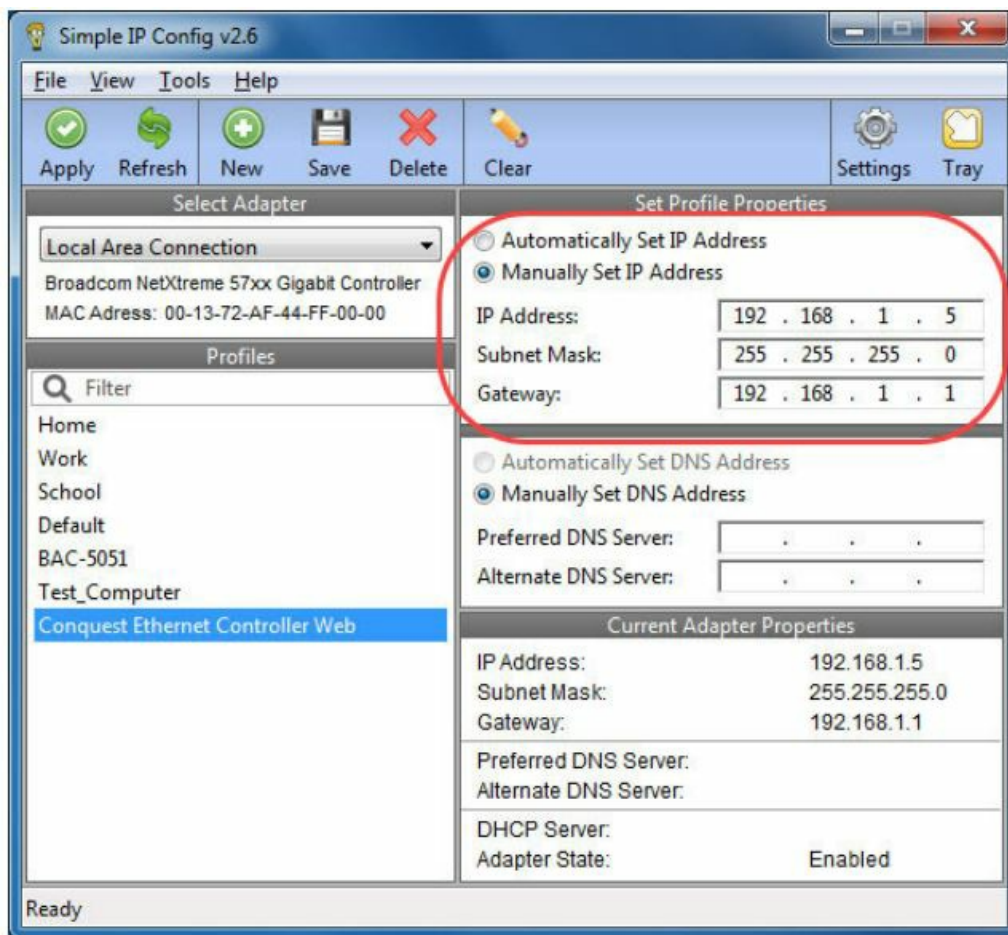
1. Save a record/setting of your existing computer's address information!
2. Enter the following for the computer's temporary new IP address, Subnet mask, and Gateway:

    IP address — 192.168.1.x (where x is a number between 1 and 250)

    Subnet mask — 255.255.255.0

    Gateway — Leave empty or unchanged (or if that does not work, use 192.168.1.***, where the last digits are different than the IP address in the computer or controller)

    NOTE: After configuration of the controller is complete, return the computer to the original IP settings.

Change a Computer's IP Address Manually

Introduction
To change your computer's IP address manually, follow the instructions (or the equivalent for your hardware and operating system) for Windows 10 (Settings) on page 27 or Windows 7 (Control Panel) on page 28.

NOTE: Screens will look different in different versions of Microsoft Windows.
**NOTE:** Depending on the computer and version of Windows, the exact name for the connection to the controller may be Ethernet, Local Area Connection, or something similar.

Windows 10 (Settings)

1. Click the Start button.
2. In the Start menu, click Settings (the gear icon).
3. In Windows Settings, click Network & Internet.
4. Click Ethernet.
5. Click Network and Sharing Center.

6. Click Connections: Ethernet.

7. Click Properties.

8. Click Internet Protocol Version 4 (TCP/IPv4).

9. Click Properties.
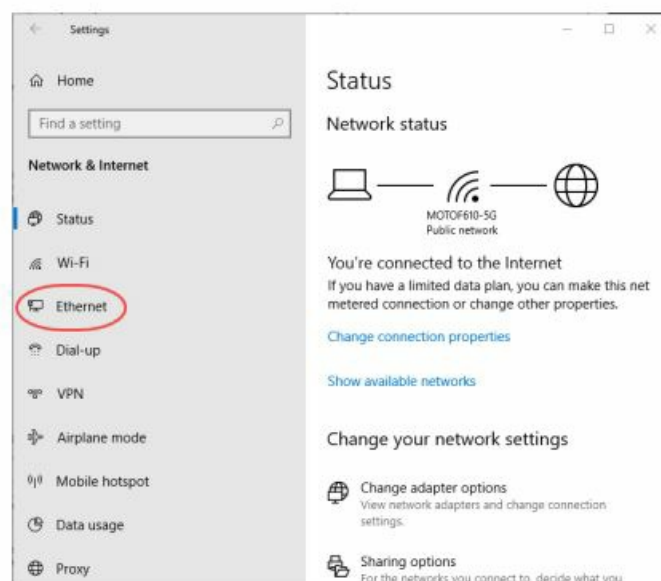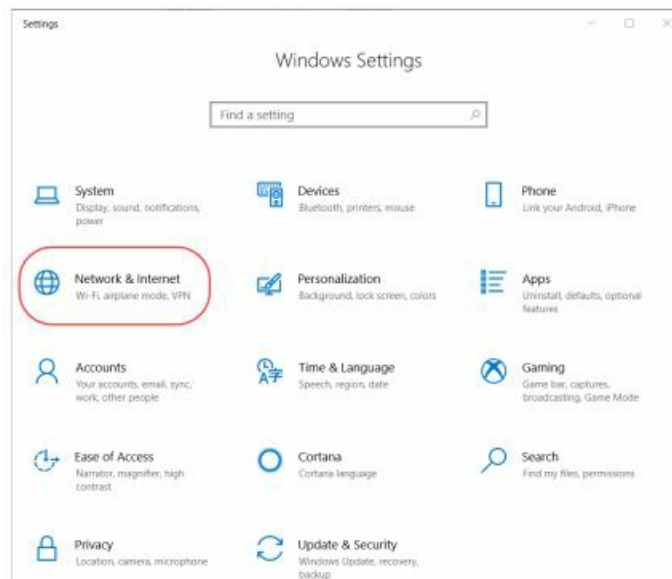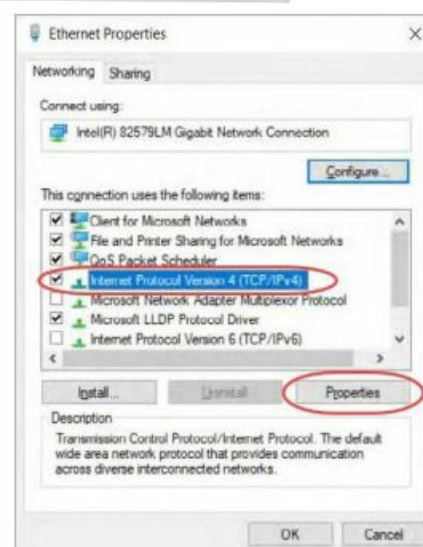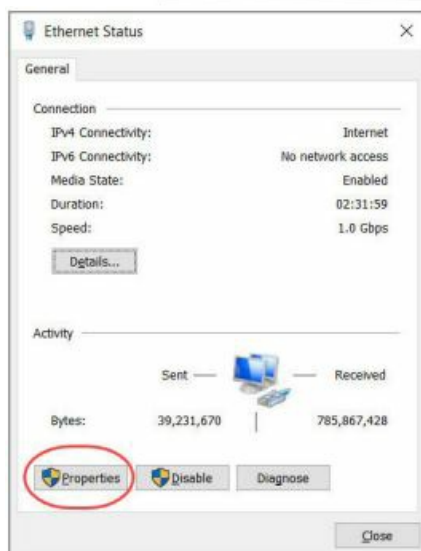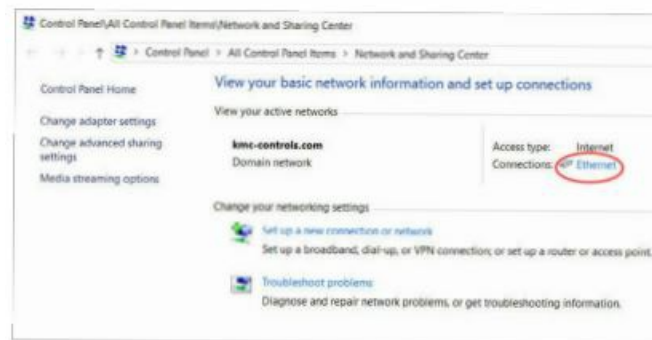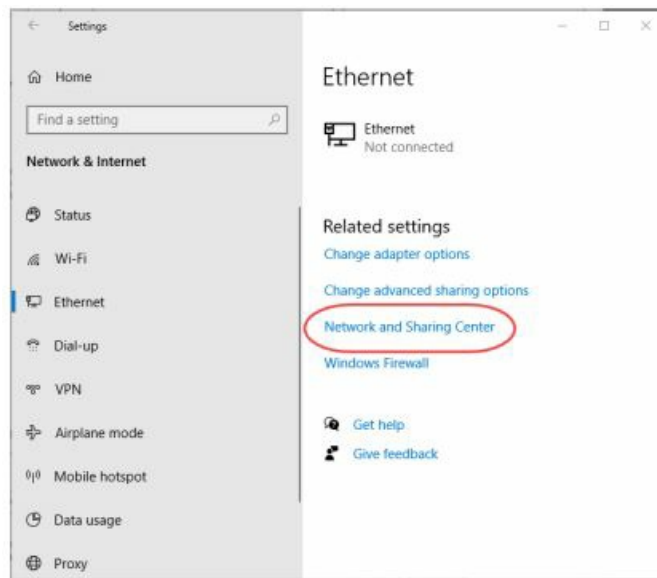
NOTE: Record the EXISTING settings of the Property dialog!

NOTE: If Obtain an IP address automatically is selected, the IP address and Subnet mask of the computer are not shown. They can be seen, however, by running the ipconfig app from a command prompt. To run ipconfig, in the Search box, type cmd. At the Command Prompt, press Enter. Type ipconfig at the prompt and press Enter.

Internet Protocol Version 4 (TCP/IPv4) Properties ✕

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:

IP address: 192 . 168 . 1 . 1
Subnet mask: 255 . 255 . 255 . 0
Default gateway: . . .

○ Obtain DNS server address automatically
● Use the following DNS server addresses:

Preferred DNS server: . . .
Alternate DNS server: . . .

☐ Validate settings upon exit   Advanced...

OK   Cancel

10. Select Use the following IP address and then enter the following for the IP address, Subnet mask, and Gateway.

   IP address — 192.168.1.x (where x is a number between 2 and 255)

   Subnet mask — 255.255.255.0

   Gateway — Leave empty or unchanged (or, if that does not work, use 192.168.1.***, where the last digits are different than the IP address in the computer or KMC Commander

11. When all information is correct, click OK.

12. Click OK.

   NOTE: The changes should take effect after a few seconds.

Windows 7 (Control Panel)

1. Click the Start button and select Control Panel.

2. From the Control Panel:

   (When viewed by icons) Click Network and Sharing Center.

   (When viewed by category) Click Network and Internet and then Network and Sharing Center.

OR

3. Click the local connection for the LAN. Depending on the computer and version of Windows, the exact name for the connection may be Ethernet, Local Area Connection, or something similar.

4. In the Local Area Connection (or similar) Status dialog, click Properties.
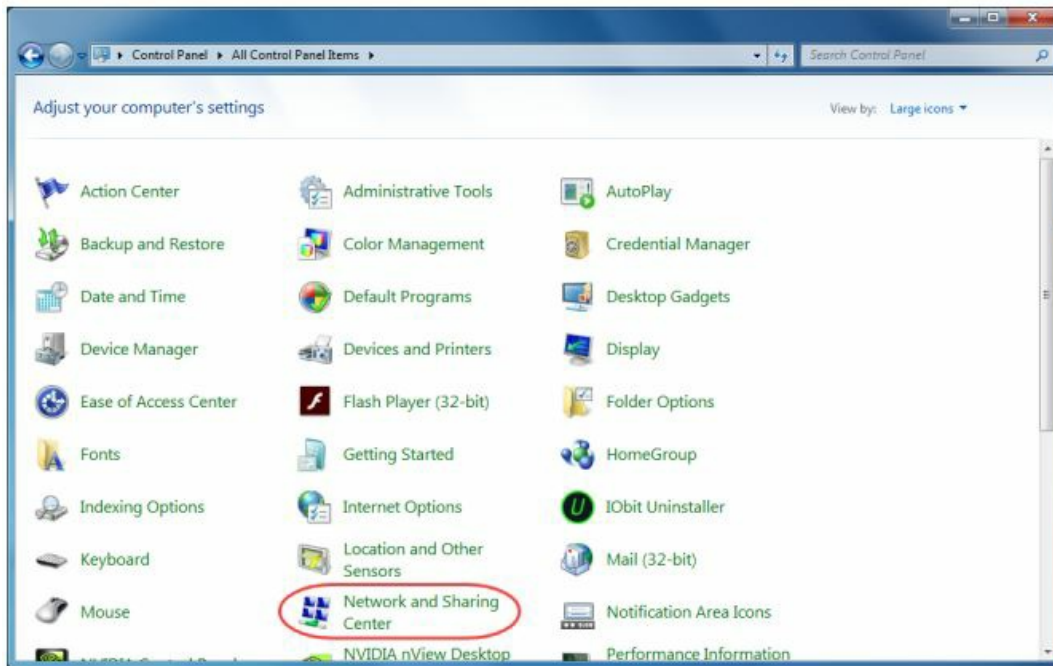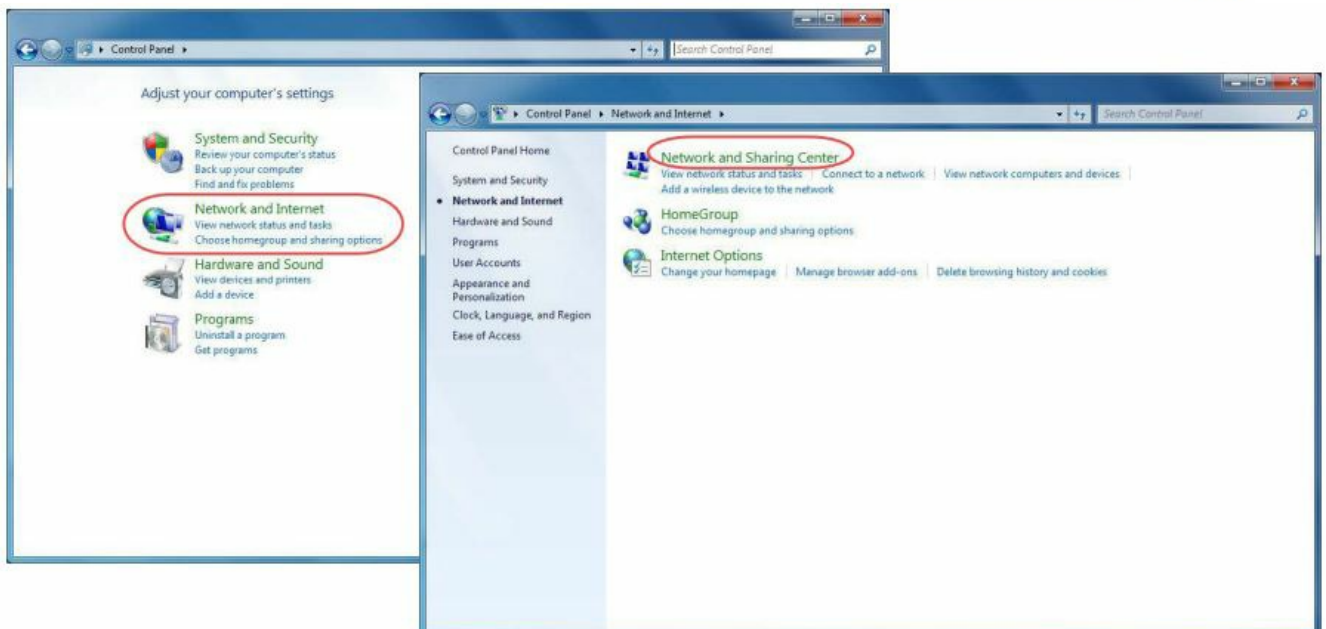
5. Click the Internet Protocol Version 4 (TCP/IPv4).

6. Click Properties.

   NOTE: Record the EXISTING settings of the Property dialog!NOTE: If Obtain an IP address automatically is selected, the IP address and subnet mask of the computer are not shown. They can be seen, however, by running ipconfig from a command prompt. To run ipconfig, click the Start button. In the Search box, type cmd. Press Enter. At the prompt, type ipconfig. Press Enter.

7. In the Properties dialog, select Use the following IP address and then enter the following for the IP address, Subnet mask, and Gateway.

   IP address — 192.168.1.x (where x is a number between 1 and 250)

   Subnet mask — 255.255.255.0

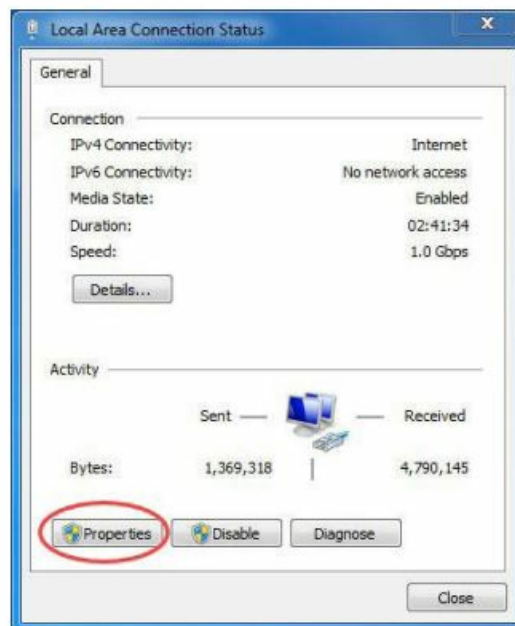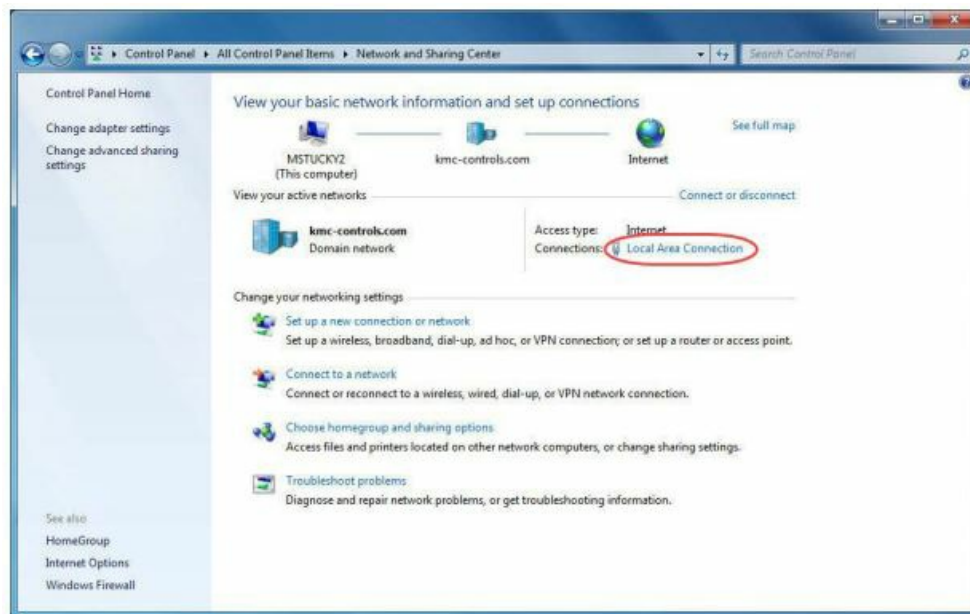   Gateway — Leave empty or unchanged (or, if that does not work, use 192.168.1.***, where the last digits are different than the IP address in the computer or controller).
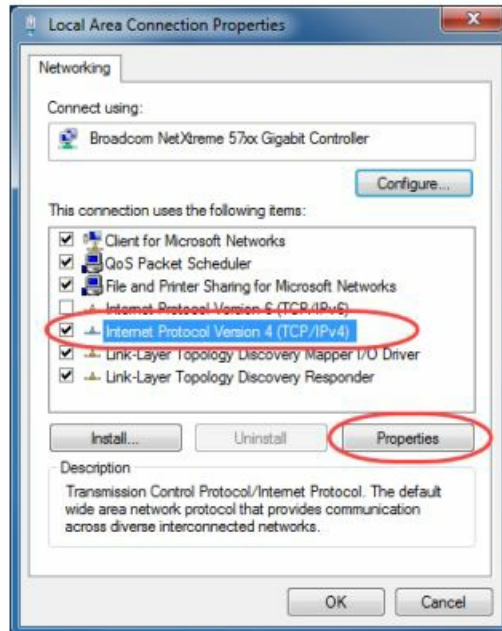
8. When all information is correct, click OK.

9. Click Close.

   NOTE: The changes should take full effect after a few seconds.

   NOTE: After configuration of the controller is complete, repeat this process using the original IP settings.

Local Area Connection Properties

Networking

Connect using:

Broadcom NetXtreme 57xx Gigabit Controller

Configure...

This connection uses the following items:

☑ Client for Microsoft Networks
☑ QoS Packet Scheduler
☑ File and Printer Sharing for Microsoft Networks
☐ Internet Protocol Version 6 (TCP/IPv6)
☑ Internet Protocol Version 4 (TCP/IPv4)
☑ Link-Layer Topology Discovery Mapper I/O Driver
☑ Link-Layer Topology Discovery Responder

Install... | Uninstall | Properties

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

OK | Cancel

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:

IP address: 192 . 168 . 1 . 10
Subnet mask: 255 . 255 . 255 . 0
Default gateway: . . .

○ Obtain DNS server address automatically
● Use the following DNS server addresses:

Preferred DNS server: . . .
Alternate DNS server: . . .

☐ Validate settings upon exit

Advanced...

OK | Cancel

Troubleshooting

- Check the network and connections.
- Restart the controller. See Resetting the Controller on page 33.
- Review IP address and login information.
- See the Communication Issues—Ethernet section in the KMC Conquest Controller Application Guide.

Recovering an Unknown IP Address

If the network address of the controller is lost or unknown, the controller will respond to the default IP address for approximately the first 20 seconds after power is applied

To discover an unknown IP address:

1. Change the IP address to match 192.168.1.xxx.
2. Disconnect the controller from the LAN and connect the controller as described in Login Window on page 19.

3. On the computer, open a browser window and enter the default address of 192.168.1.251.

4. Reconnect the controller to the power source and immediately attempt to connect with the browser. The browser will respond with the controller's IP address and subnet mask.

5. Once the address is known, connect the controller to the relevant IP subnet for normal operation or controller configuration.

   NOTE: A controller's IP address can also be found using Hardware Configuration Manager (HCM), KMC Connect, TotalControl, and KMC Converge when the controller is properly connected to the network.

FIREWALLS AND NETWORK COMMUNICATIONS

Firewalls are commonly installed on networks to prevent unauthorized traffic or electronic probes from entering the network. LAN controllers communicate through one of two Ethernet Ports.These ports must be open for commmunications to pass through a firewall. If the LAN Controller must communicate with a network where a firewall is in place, the following actions must be taken.

- The LAN Controller will appear in the but cannot be selected. Its objects are not accessible for configuration from the BACstage Object menu.
- The configured points within the KMD-5290E are the only points visible in BACnet.
- In BACstage, use BACnet Read/Write Property under the System menu in BACstage to manually view or change properties.
- KMC BACnet controllers and third-party devices may read and write to the objects in the KMD-5290E with off-panel reads and writes.

If the LAN Controller resides behind a Network Address Translation (NAT) router, the IP address for the controller must be preceded by the lowercase letter "r" in the system menu. (For example, r128.1.1.5.). Adding this prefix letter will cause KMC Connect or TotalControl to disregard the IP table and download from the panel itself.

NOTE: This method allows a connection to only one LAN Controller through the router.

OPERATION

This section provides general operating instructions for the KMD-5290E LAN Controller. Included are a description of the Isolation Bulbs, the LED status displays, connections, and instructions for resetting the controller. Carefully review this infor-mation as it applies to the task at hand.

Applying Power
The KMD-5290E LAN Controller is automatically powered when the power supply module is connected and plugged in. Verify all external connections are complete before applying power to the controller.
If an error in an EIA–485 network is indicated by an illuminated lamp near one of the EIA–485 connectors, remove power and troubleshoot the circuit before reapplying power to the controller. See Isolation Bulbs in the following section.

Lights and Indicators
The KMD-5290E LAN Controller is equipped with status and diagnostics indicators. These are described in this section.

Isolation Bulbs
Located near the EIO expansion network connector is an assembly containing two small glass lightbulbs. They serve as protective isolation devices for the EIO expansion network in the following ways.

- When illuminated, they indicate improper network phas-ing. Improper phasing occurs when the ground potential of the controller is higher than the phase or the ground potential of other controllers on the network.

- The bulbs protect the controller from damage by limiting the input signal. If voltage or current exceeds safe operating conditions, the bulbs act as fuses and open the connections between the controller and the network. In this event, fix the problem and replace the bulb assembly (HPO-0055).

- The bulbs can be removed from their sockets in order to isolate the controller from the associated network.

LED Indicators

The LAN Controller uses LEDs to indicate the status of the controller and the different networks connected to the controller. The following table lists the LEDs and their functions.

Table 7 – Status LED Indicators	
LED	**Function**
EIO	This green LED indicates the status of the CAN-590x Expansion Module network. This LED blinks whenever the controller is transmitting data.
SubLAN A	This amber LED indicates the status of the SubLAN Tier 2 A RS–485 network. This LED blinks whenever the controller is transmitting data.
SubLAN B	This amber LED indicates the status of the SubLAN Tier 2 B RS–485 network. This LED blinks whenever the controller is transmitting data.
Ethernet (Green)	The green Ethernet LED is ON when the controller is communicating with the network. The green Ethernet LED is OFF when the (powered) controller is not communicating with the network.
Ethernet (Amber)	The amber Ethernet LED flashes when the controller is communicating with a 100BaseT Ethernet network. The amber Ethernet LED remains OFF when the (powered) controller is communicating with the network at only 10 Mbps (instead of 100 Mbps).
Power	The green power LED indicates the status of the controller: *Steady Blink* – If the controller is operating normally, the LED blinks at a steady rate. *Dark/Not Lit* – If the LED is not illuminated, it may indicate the controller is locked or does not have power. You can try restarting or resetting the controller. *Erratic or Repeating Pattern Blink* – If the LED is blinking, but not at a steady rate, the controller is indicating there is a problem. Contact KMC Controls for assistance.

SYSTEM TIME KEEPING
KMD LAN controllers feature real-time clocks. Once the clock is set with KMC Connect or TotalControl, the controller maintains accurate time even during power loss.
A KMDigital network uses the lowest addressed Tier 1 (LAN) controller with a real-time clock as the system time keeper.
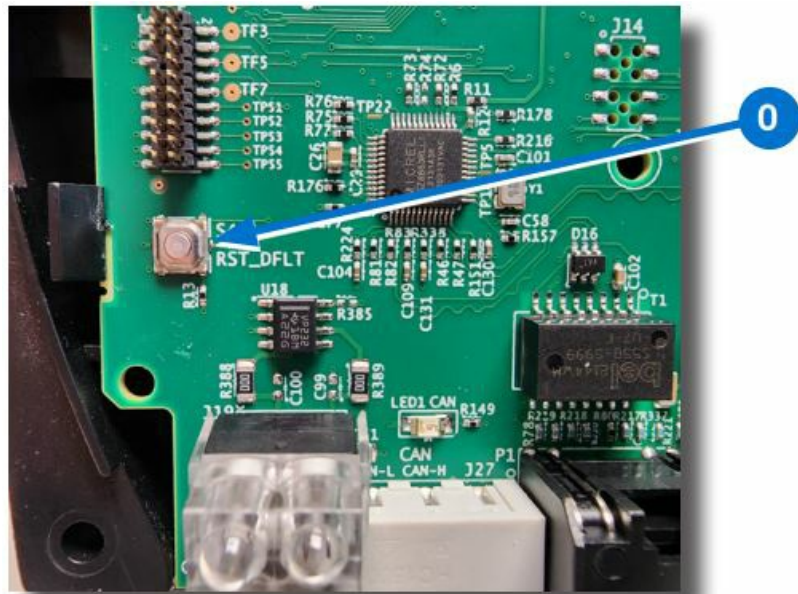
RESETTING THE CONTROLLER
Should the controller appear to lock up or stop operating, you must reset the controller to the factory default state. After the controller is reset, you must reload any existing panel files to restore normal operation. See Configuring a Controller with HCM on page 12 for additional details.

To reset the KMD-5290E LAN Controller:

1. Remove power from the controller by unplugging the power supply.
2. Remove the RS-485 three–terminal connector blocks for all connected RS–485 ports. Also, remove Ethernet cables, modem cables, and any PC connections.
3. Unplug all input and output cables.
4. Remove the case from the controller.

5. Press and hold the Reset button O in the lower left corner of the circuit board while reestablishing power to the LAN Controller.

6. Continue to hold the reset button until the READY, SUB A and SUB B LEDs illuminate.

   CAUTION

   DDo no not remove power during the reset process. Damage may result to the board if this happens.

7. Release the Reset Button and allow the controller to continue to power up (steady blink Power LED).

8. Remove power from controller.

9. Return all cables and terminal blocks to their proper positions.

10. Reapply power to the LAN Controller and allow it to return to the normal operating state (indicated by a blinking Power LED).

11. Re-attach the case to the controller.

12. If this is a new installation, the controller must be configured before it can be placed into operation. Refer to Configure the Controller on page 12 for instructions.

13. If you are resetting the controller but not replacing it, use the HCM program to reload panel files.

14. Cycle power to the controller to establish the newly configured operating parameters.

IMPORTANT NOTICES

DISCLAIMER

SUPPORT
Additional resources for installation, configuration, application, operation, programming, upgrading, and much more are available on the web at **www.kmccontrols.com**. Log-in to see all available files.

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Documents / Resources

KMC KMD-5290E LAN Controller [pdf] Instruction Manual
KMD-5290E LAN Controller, KMD-5290E, LAN Controller, Controller

References

- ◆ **KMC Controls | Building Automation and Control Solutions**
- ◆ **KMC Controls | Building Automation and Control Solutions**
- **User Manual**