



# **Hardware configuration manager**

## **Reference guide**

**For version 1.3.0**



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# Section 1: Getting started with Hardware Configuration Manager

The Hardware Configuration Manager (HCM) program is an initialization and addressing software tool for KMDigital series controllers. Use HCM to:

- Assign a unique address to each controller in the KMDdigital network
- Set the network baud for Tier 1 ports
- Set Tier 2 network baud
- Set Ethernet addresses
- Configuring selected controllers for Modbus and BACnet addresses networks.

## About this manual

This manual describes how to use the Hardware Configuration Manager (HCM) program to prepare KMD series direct digital controllers for use on a KMC digital network.

## Conventions used

Some of the text in this publication uses special formatting to indicate emphasis or keystrokes. The text conventions are as follows:

<b>Menu and dialog items</b>	Highlights items in the program interface, including buttons, dialog names, menus and commands in menus.
<i>File names</i>	Highlights names of files and extensions.
<i>Italics</i>	Indicates a book or section title, a Control Basic keyword, mnemonic, or a value.
<b>KEY NAMES</b>	Indicates a specific key on the keyboard such as <b>SHIFT</b> , or <b>ENTER</b> .

## If you encounter difficulty

If you experience difficulty with HCM, KMC Controls provides the following assistance.

**Help** Programs from KMC Controls are install with a Help system. Click the question mark icon to view a detailed explanation about the subject.

**The KMC Controls web site** Navigate to the support section on the KMC Controls partner web site for the latest information for HCM and other KMC Controls products.

[partners.kmccontrols.com](http://partners.kmccontrols.com)

**KMC technical support** Our distribution partners have unlimited and free access to our team of Technical Support representatives. We provide coast-to-coast, and toll-free, support from 8:00 AM to 5:00 PM.

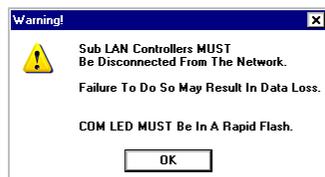
Toll-Free Technical Support: 866.303.4562

## Starting HCM

HCM is installed as part of Tech Tools available from the KMC Controls web site. To start Hardware Configuration Manager, choose *Start>KMC Controls>Tech Tools> HCM*.

When HCM starts, it returns to the last controller type selected. If the last controller was a Tier 2 controller, the Tier 2 Warning dialog box opens. If the last controller was a Tier 1 controller, HCM opens the communication link dialog box.

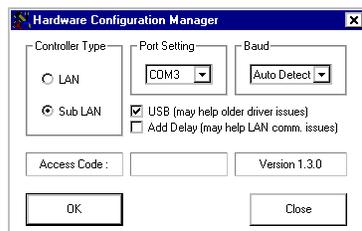
### Illustration 1–1 HCM Tier 2 warning



Use the settings in the initial HCM window to open a communications link to the controller. When the following settings are correct for the controller to which the computer is connected, click **OK**. Choosing **Close** exits HCM.

If a Tier 2 controller is the target controller, the dialog [HCM Tier 2 warning on page 6](#) opens.

### Illustration 1–2 HCM communications link dialog



**Controller Type** Choose the type of controller to which you are connected.

See the topic [Configuring a Tier 1 controller on page 9](#) for the following Tier 1 models:

- KMD-5200 series
- KMD-5100

See the topic [Configuring a Tier 2 controller on page 23](#) for the following Tier 2 models:

- KMD-5800 series
- KMD-6000 series
- KMD-7000 series

*Reference to the HCM communications link dialog*

**USB** Connects the computer to the controller through a universal serial bus connection.

**Port Setting** Select the serial port on the computer to which the controller is connected. Valid ports are COM1 through COM8.

**USB** Select to improve connection quality with Windows 7 and earlier.

**Add Delay** Improves connection quality for Tier 1 (KMD-5200 series) controllers.

**Enter Access Code** Enter password of the controller. Passwords are supplied by the system administrator.

**Baud** Baud sets the communication speed between the computer and controller. It does not change the speed of the network.

Clicking Baud scrolls through the allowable baud rates. Auto Detect is the preferred setting.



## Section 2: **Configuring a Tier 1 controller**

The topics in this section cover configuring a Tier 1 controller with HCM.

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The topics in this section cover configuring a Tier 1 controller with a KMDigital network address. They cover also configuration of additional features for the network address, BACnet, and Modbus. KMDigital Tier 1 controllers include the following models.

- KMD-5205 series
- KMD-5210 series
- KMD-5270 series

To begin, see the topic [Adding an address to a Tier 1 controller on page 12](#).

For Tier 2 controllers, see the topic [Configuring a Tier 2 controller on page 23](#).

### Topics in this section

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Configuring a KMD-5270 to send email .....	15
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### Adding the network IP address

The IP address for the controller is added to the IP Routing Table. The IP Routing Table is a list of all Tier 1 controllers that make up the KMDigital network. For every Tier 1 controller that makes up the KMDigital network, you will need the following information:

- An IP address for every controller.
- The subnetwork mask for the controller that is being configured.
- The Tier 1 panel number, IP address, subnetwork mask, and gateway address for all other Tier 1 controllers on the local area network.

Before configuring a KMC controller for a local area network, consult with the network administrator to obtain the required addresses, gateway addresses, and subnetwork masks.

To add the IP Routing Table, do the following:

- 1** As described in the topic [Adding an address to a Tier 1 controller on page 12](#), connect the controller and start HCM.
- 2** After the LAN Controller Configuration dialog opens in Step 8, click **Ethernet Configuration**. The IP Routing Table dialog opens.

Panel	IP Address	MAC Address	Gateway	Broadcast Server	Interval
1	10 . 1 . 22 . 150	00-FF-FF-FF-FF-FF	255.255.255.255	<input checked="" type="checkbox"/>	20 sec.
2	255.255.255.255	FF-FF-FF-FF-FF-FF	255.255.255.255	<input type="checkbox"/>	20 sec.
3	10 . 1 . 22 . 151	00-D0-6F-00-02-FD	255.255.255.255	<input checked="" type="checkbox"/>	20 sec.
4	255.255.255.255	FF-FF-FF-FF-FF-FF	255.255.255.255	<input type="checkbox"/>	20 sec.

Subnet Mask: 255.255.0.0    MTU: 1400

File Open    File Save

Load    Send    Clear    Close

- 3 In **Subnet Mask**, enter the subnetwork mask value provided by the network administrator.
- 4 For each Tier 1 controller on the network, enter the controller's IP address and Gateway address next to the controller's Panel number.
- 5 Select Broadcast Server check box. Interval is typically set to 20 seconds.
- 6 Click **Send** when finished.
- 7 Cycle the controller's power to make the changes permanent.



**Note:** The IP Routing Table settings do not change in a controller until the power is cycled.



**Tip:** To save time, after entering the IP Routing table, save the table to a file. Then load the file into all other Tier 1 controllers that are in the routing table.

This completes adding the IP address to the controller. Any of the following features can also be added.

- [Adding an address to a Tier 1 controller on page 12](#)
- [Configuring a KMD-5270 to send email on page 15](#)
- [Configuring BACnet device settings on page 16](#)
- [Modbus settings in Tier 1 controllers on page 18](#)
- [Enabling Tier 1 IO cards on page 19](#)
- [Configuring baud for Tier 2 networks on page 20](#)

*Reference to the Tier 1 IP Routing Table*

### **Illustration 2–1 IP Routing Table dialog**

Panel	IP Address	MAC Address	Gateway	Broadcast Server	Interval
1	10 . 1 . 22 . 150	00-FF-FF-FF-FF-FF	255.255.255.255	<input checked="" type="checkbox"/>	20 sec.
2	255.255.255.255	FF-FF-FF-FF-FF-FF	255.255.255.255	<input type="checkbox"/>	20 sec.
3	10 . 1 . 22 . 151	00-D0-6F-00-02-FD	255.255.255.255	<input checked="" type="checkbox"/>	20 sec.
4	255.255.255.255	FF-FF-FF-FF-FF-FF	255.255.255.255	<input type="checkbox"/>	20 sec.

Subnet Mask: 255.255.0.0    MTU: 1400

File Open    File Save

Load    Send    Clear    Close

**IP address** The identifier for the controller on the Local Area Network. Obtain an IP address for each controller from the network administrator.

Tier 1 controllers use two UDP ports.

- Port 21068 is used for computer-to-Tier 1 communications.
- Port 21069 is used for Tier 1-to-Tier 1 communication.

**Broadcast Server** Every Tier 1 controller in a KMC digital network sends, at an interval specified by the Interval setting, broadcast messages. The broadcast messages include some or all of the following information: the controller status, want-point data and the list of want-points the controller is requesting from other controllers. Every two minutes a time synchronization message is also transmitted. The messages are transmitted by two different methods.

A controller designated as a broadcast server sends the broadcast messages directly to every controller listed in the routing table.

A controller not designated as a broadcast server sends the messages to the first controller in its routing table that is marked as a broadcast server. The broadcast server then forwards it to every other controller, except the originator, listed in the routing table. If the first broadcast server drops off of the network, the next on-line controller in the list marked as a broadcast server is used.

For the most fault tolerant and robust system operation, set all Tier 1 controllers as broadcast servers. HCM limits the total number of broadcast servers to 16. However, by using routing tables with the *same* IP address and *different* broadcast server settings, all controllers in a KMC system can be marked as broadcast servers.

**Interval** Set the interval between broadcast messages. The range is 0.5 to 60 seconds. The default setting of 20 seconds will work for most applications. Use a shorter setting in only a few controllers with critical data to exchange.

**MAC address** A unique hardware address that identifies each device on a network. The MAC address can be changed for any controller except for the controller to which HCM is currently connected. This is for informational purposes only with recent versions of WinControl XL and Tier1 controllers. Versions of WinControl XL prior to 2.0 require an entry other than all 0's and all F's.

**Gateway** The IP Addresses required to bridge to another segment of the local area network. If there is a router or similar network-managing device between controllers, its IP address must be entered to enable communication between Tier 1 controllers that reside on separate network segments. The Gateway address is the physical port IP Address to which the controller is connected.

**Subnet Mask** Subnet Mask determines which part of the IP address is used for a network identifier and what part is used for a device identifier. The network system administrator assigns subnetwork masks.

**MTU** Sets the Maximum Transfer Unit size in bytes. MTU is the largest packet size that a controller may send. For most networks, MTU may be set to 1400 but can be set lower.

**File Save** Saves the Ethernet settings in a .NET file to reuse with other controllers.

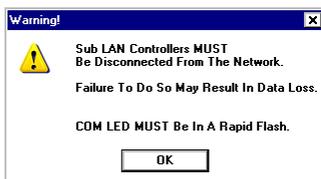
**File Open** Opens a previously saved .NET file.

## Adding an address to a Tier 1 controller

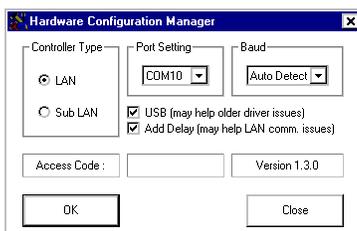
This procedure configures a Tier 1 controller with a KMDigital address or Panel number. Adding other features, such as the IP address, or BACnet and Modbus settings are covered in additional topics.

To add a KMDigital address to a Tier 1 controller, do the following:

- 1 Connect the computer running HCM to the controller. Use one of the methods described in the topic [Tier 1 connections on page 29](#).
- 2 Power the controller. See the instruction manual supplied with the controller for the exact power requirements.
- 3 Start HCM. If a Tier 2 controller was the last controller configured, the *Warning* dialog opens.



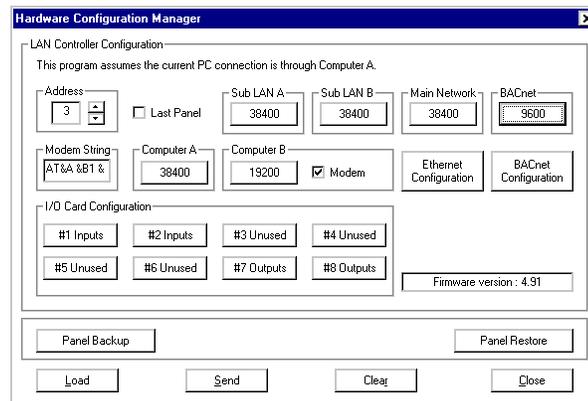
- 4 Click **OK** to proceed.
- 5 In the communications dialog, set the **Controller Type** to **LAN**.



- 6 Select the following items:
  - Select the **Port Setting** that matches the serial port of the computer running HCM.
  - Select **Baud** to match the speed of the controller. The **Auto Detect** setting is recommended. The KMC Controls default setting for Baud is 38,400.
  - Select **USB** to improve connections with versions of Windows earlier than Windows 8.
  - Select **Add Delay**.
- 7 Enter the password in **Access Code**.

- 8 Click **OK**. The LAN Controller Configuration dialog opens.

**Note:** The dialog that opens for KMD-5205 and KMD-5270 controllers does not include all of the properties in the LAN Controller Configuration dialog.



- 9 In **Address**, enter the KMDigital address for the controller either by clicking the arrows or by entering the address.
- 10 If this is the highest numbered controller on the network, select **Last Panel**. Last Panel is required only for a Main Network connection.
- 11 Click **Send** when finished.

This completes adding the KMDigital address to the controller. Any of the following features can now be added.

- [Configuring a KMD-5270 to send email on page 15](#)
- [Adding the network IP address on page 9](#)
- [Configuring BACnet device settings on page 16](#)
- [Modbus settings in Tier 1 controllers on page 18](#)
- [Enabling Tier 1 IO cards on page 19](#)
- [Configuring baud for Tier 2 networks on page 20](#)

*Reference to the LAN Controller Configuration dialog*

With the exception of setting the SMTP email server for the KMD-5270, the procedures for configuring a KMD-5205, KMD-5210 and KMD-5270 are nearly identical.

## Illustration 2–2 LAN Controller Configuration dialog

**Address** Sets the address number of the Tier 1 controller. The address must be unique among the Tier 1 controllers on the KMC network. Enter a number either by clicking the arrows or by entering the number of the address assigned to the controller.



**Note:** When connecting a Tier 1 controller with a BACnet MS/TP interface, the panel address is also the BACnet MS/TP MAC address.

**Last Panel** Checking this box designates the controller as the highest numbered address in the system. The last controller passes the token back to Controller 1. If left unchecked, the selected controller will attempt to pass the token to the controller with the next address.

Last Panel is required only for Tier 1 controllers that are using the *Main Net* or *Tier 1* connection between Tier 1 controllers. *Main Net* or *Tier 1* uses EIA-485 network wiring instead of the local area network.

**SubLAN A and SubLAN B** Sets the connection speed of the Tier 2 port to which the LAN controller is connected. The SubLAN buttons step through a list of permissible baud rates. Set all controllers on each of the Tier 2 (SubLAN) networks to the same baud.

**Main Network** (KMD-5210 only) Sets the connection speed of the *Main Network* or *Tier 1* port to which the LAN controller is connected. The *Main Network* button steps through a list of permissible baud rates. Set all controllers on each main network to the same baud. *Main Net* or *Tier 1* uses EIA-485 network wiring instead of the local area network.

**BACnet** (KMD-5210-002 only) Sets the connection speed of the BACnet MS/TP port to which the LAN controller is connected. The *BACnet* buttons step through a list of permissible baud rates. Set all controllers on a BACnet MS/TP network to the same baud.

**Computer A** Sets the baud for directly connecting a computer connected to the *Computer A* terminals.

**Computer B** Sets the baud for directly connecting a computer or modem connected to the *Computer B* terminals. Typical modem-to-modem connections operate reliably at rates up to 19,200 baud. When using an external modem to dial a paging service, the baud must match the speed required by the service.

**Modem string** Sends commands to initialize an external modem. The default initialization string is AT&A &B1 &C1 &D2 &H1 &K0 &R1.

**Modem** Select to enable the Modem port and disable the Computer B connection. See [Computer B](#) for modem baud settings.

**Input/Output Cards** (KMD-5210 only) If the Tier 1 controller has input or output cards attached, In Cards and Out Cards enables them. Clicking the button steps through the choices. See the topic [Enabling Tier 1 IO cards on page 19](#) for additional details.

**Panel File Backup** Panel File Backup retrieves all settings, programming, schedules, variables and descriptors from the controller and saves them in a controller configuration file.

**Panel File Restore** To configure a controller from a file, use Panel File Restore. HCM will open the panel configuration file and send it to the controller.

**Load** Load retrieves information from the controller and displays it in the HCM configuration window.

**Send** Moves information displayed in the HCM window and stores it in the memory of the connected controller. Once you have sent the configuration parameters to the controller, you may exit HCM or configure additional controllers.

**Clear** Removes all programs and setup information from the controller. Only address and baud information remains in the controller.

## Configuring a KMD-5270 to send email

To send email with a KMD-5270 controller, you must enter the IP address of the email SMTP server. Other settings are similar to a standard Tier 1 controller.



**Note:** The IP address for the server must be a static IP address that is supplied by the email provider.

To add the email server address routing, do the following:

- 1 In the topic [Adding an address to a Tier 1 controller on page 12](#), perform Steps 1-8. The Web Lite Configuration dialog opens in Step 8.

Enter the static IP address of an SMTP email server.

- 2 In **SMTP IP Address** text box, enter the IP address of the SMTP email server.

**Note:** The server address must be a static address.

- 3 Click **Send** when ready.

### Related topics

- [Adding an address to a Tier 1 controller on page 12](#)
- [Adding the network IP address on page 9](#)
- [Configuring BACnet device settings on page 16](#)
- [Modbus settings in Tier 1 controllers on page 18](#)
- [Configuring baud for Tier 2 networks on page 20](#)

## Configuring BACnet device settings

In addition to the KMDigital and network configuration, BACnet device properties in controllers with a BACnet license must also be configured.

To configure the controller for the KMDigital network, see also the topic [Adding an address to a Tier 1 controller on page 12](#).

To configure the BACnet device properties, do the following:

- 1 As described in the topic [Adding an address to a Tier 1 controller on page 12](#), connect the controller and start HCM.
- 2 After the LAN Controller Configuration dialog opens in Step 8, click **BACnet Configuration**. The BACnet Configuration dialog opens.

- 3 Enter the BACnet properties.
- 4 Click **OK** when finished.
- 5 Cycle the controller's power to make the changes permanent.



**Note:** When connecting a controller with a BACnet MS/TP interface, the panel address is also the BACnet MS/TP MAC address.

This completes adding the BACnet properties to the controller. Any of the following features can also be added.

- [Adding an address to a Tier 1 controller on page 12](#)
- [Configuring a KMD-5270 to send email on page 15](#)
- [Modbus settings in Tier 1 controllers on page 18](#)
- [Enabling Tier 1 IO cards on page 19](#)
- [Configuring baud for Tier 2 networks on page 20](#)
- [Adding the network IP address on page 9](#)

Reference to BACnet properties

### Illustration 2–3 BACnet dialog

**Instance** The device instance number is assigned by the BACnet system designer. Instance numbers are required, must be unique internetwork wide and fall within a range from 1 to 4,194,302.

**Name** The name assigned to this device. It is required for BACnet operation and must be unique on the internetwork.

**Location** This information is optional and is used only to further identify the controller.

**Description** This information is optional and is used only to further identify the controller.

See [Address](#) under the topic [Adding an address to a Tier 1 controller on page 12](#).

**APDU Timeout** Indicates the period—in milliseconds— between retransmissions of an APDU requiring an acknowledgment for which no acknowledgment has been received. The default value is 3000 milliseconds.

**MS/TP Token Timeout** Sets the period a controller must wait to see if a remote node responds to a request or starts using the token. The range is 20-100 milliseconds.

**Max Master** (MS/TP controllers only) Indicates the highest MAC address the device will attempt to locate while polling for a master device on an MS/TP network. Typically, Max Master is set only on the controller with the highest MAC address on the internetwork. Setting it lower than the highest numbered MAC address will result in undiscovered controllers.

Setting Max Master to allow an additional five controllers beyond the number of controllers connected to the local network will not significantly decrease response time.

Setting Max Master significantly higher than the highest numbered device will result in increased polling and slower response times.

**OK** Sends the BACnet configuration to the LAN controllers.

**Clear** Clears data from the BACnet configuration dialog, but does not clear the controller until **OK** is clicked.

**Cancel** Returns to the LAN controller configuration dialog.

## Modbus settings in Tier 1 controllers

The Modbus settings for Tier 1 controllers set the serial port communications parameters.



**Note:** This topic applies only to Modbus licensed controllers.

- 1 As described in the topic [Adding an address to a Tier 1 controller on page 12](#), connect the controller and start HCM.
- 2 When the WebLite Configuration dialog opens in Step 8, click **Mode** until it changes to **Modbus**.

- 3 Click **Sub LAN A** until it matches the speed of the Modbus network.
- 4 Click **Parity** until it matches parity for the Modbus network.
- 5 Click **Send** when finished.



**Note:** Use InterProtocol Points in KMC Connect or TotalControl to map Modbus registers to Variable points in the controller.

This completes adding the Modbus properties to the controller. Any of the following features can also be added.

- [Adding an address to a Tier 1 controller on page 12](#)
- [Configuring a KMD-5270 to send email on page 15](#)
- [Configuring BACnet device settings on page 16](#)
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- [Adding the network IP address on page 9](#)

*Reference to Modbus properties*

**Mode** Mode changes the connection protocol at the EIA-485 terminals. Click **Mode** until the button label changes to **Modbus**.

**Parity** Sets the parity bit for the Modbus serial communication network. All parity settings configure communications for 8 data bits and 1 stop bit. The choices are:

- No parity (N-8-1)
- Even parity (E-8-1)
- Odd parity (O-8-1)

**SubLan A** SubLan A sets the speed of the Modbus network. Click **SubLan A** to step through a list of permissible baud rates. All Modbus devices connected to the controller must be set to the same baud. Supported rates are 9600, 19,200 and 38,400 baud.



**Note:** Modbus devices are addressed by various methods that are covered in the manufacturers guide supplied with the devices. Hardware Configuration Manager cannot change a Modbus address.

## Enabling Tier 1 IO cards

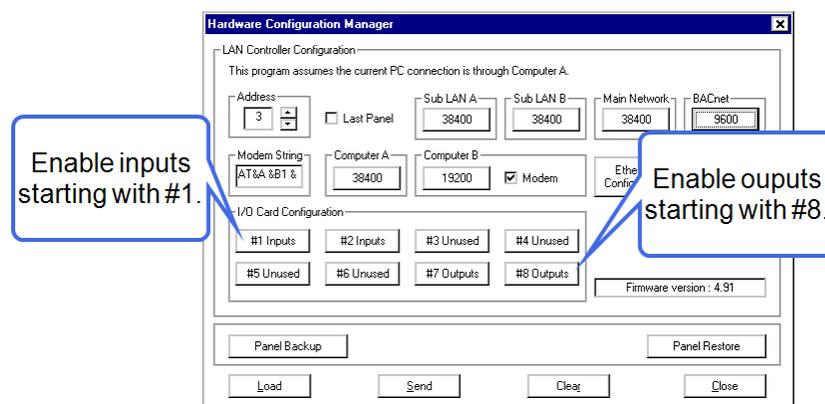
Input and output cards for Tier 1 controllers must be enabled with HCM. Up to eight input cards, eight output cards or any combination of eight input and output cards may be connected to a KMD-5210 controller. Cards are connected as follows:

- Input cards are connected to the controller starting at position #1, then position #2, etc.
- Output cards are connected starting at position #8, then position #7, etc.
- Up to eight input cards, eight output cards or any combination of eight cards can be connected to one controller.

Before enabling or connecting the input and output cards, review the instructions supplied with the controller.

To enable input and output cards, do the following:

- 1 In the topic [Adding an address to a Tier 1 controller on page 12](#), perform Steps 1-8. The LAN Controller Configuration dialog opens in Step 8.



- 2 As needed, click the buttons in **I/O Card Configuration** to cycle from **Unused**, **Input**, and **Output**.
  - Enable input cards starting with Button #1. Click Button #1 until the button changes to #1 Inputs.
  - Enable output cards starting with Button #8. Click Button #8 until the button changes to #8 Outputs.
- 3 Click **Send** when ready. Click **Load** to refresh the dialog with the settings in the controller.

This completes configuring a controller for IO cards. Any of the following features can also be added.

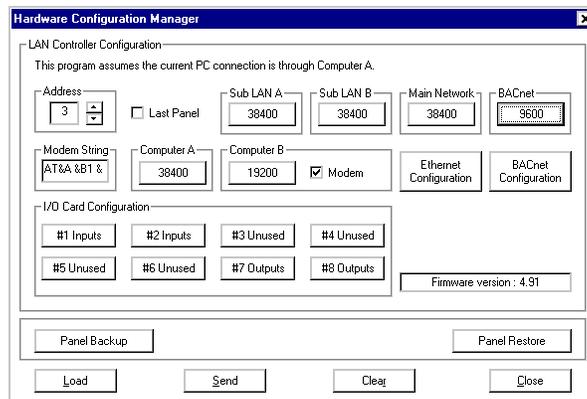
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- [Adding the network IP address on page 9](#)

## Configuring baud for Tier 2 networks

The Sub Lan A and Sub Lan B buttons set the connection speed of the controller's Tier 2 ports. The buttons step through a list of permissible rates. Set all controllers on each of the Tier 2 (Sub LAN) networks to the same baud.

To configure the baud for the Tier 2 networks, do the following:

- 1 In the topic [Adding an address to a Tier 1 controller on page 12](#), perform Steps 1-8. The LAN Controller Configuration dialog opens in Step 8.



- 2 Click **Sub LAN A** or **Sub LAN B** until it matches the speed of the Tier 2 network.  
**Note:** The KMD-5205 and KMD-5270 controllers have only a Sub LAN A button.

- 3 Click **Send** when ready.

This completes adding the BACnet properties to the controller. Any of the following features can also be added.

- [Adding an address to a Tier 1 controller on page 12](#)
- [Configuring a KMD-5270 to send email on page 15](#)
- [Modbus settings in Tier 1 controllers on page 18](#)
- [Enabling Tier 1 IO cards on page 19](#)
- [Configuring BACnet device settings on page 16](#)
- [Adding the network IP address on page 9](#)

## Saving and restoring from backup files

Use HCM to back up a controller with a configuration file or restore the configuration of a controller from a file. The files used for save or restore are panel files with the extension .PNL. Panel files are unique to KMDigital controllers and can be interchanged among HCM, WinControl XL, and WinControl XL Plus.

Before backing up or restoring a controller, become familiar with the procedure [Adding an address to a Tier 1 controller on page 12](#).

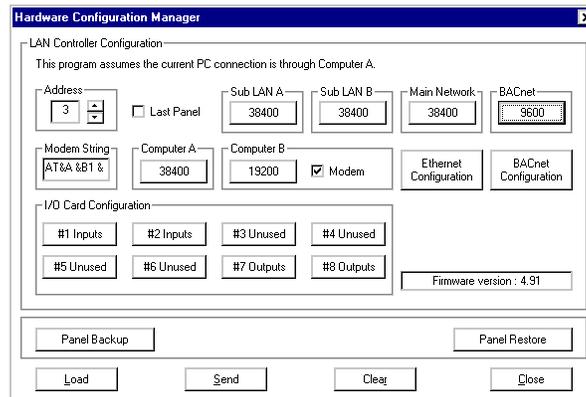
To save a backup panel file, do the following:

- 1 Connect the controller and start HCM as described in the procedure [Adding an address to a Tier 1 controller on page 12](#). Return to these instructions at Step 8.

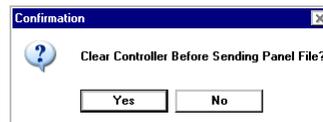
- 2 Click **Panel Backup**.
- 3 Browse to the location to save the file.
- 4 Enter a name for the file. HCM will automatically add the extension .PNL.
- 5 Click **Save** when ready.
- 6 Click **Yes** to save the file or **No** to cancel.  
HCM will begin saving the file as soon as Yes or No is clicked.

To restore a controller from a backup panel file, do the following:

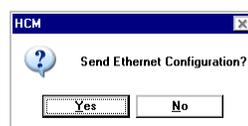
- 1 Connect the controller and start HCM as described in the procedure [Adding an address to a Tier 1 controller on page 12](#). Return to these instructions at Step 8.



- 2 Click **Panel Restore**.
- 3 Browse to the location of the .PNL backup file.
- 4 Select the file and click **Open**.
- 5 In the Confirmation dialog, click **Yes** to delete point labels, descriptors, and configuration settings before starting the restoration. Clicking **No** proceeds without deleting existing settings.



- 6 When the HCM dialog opens, click **Yes** to use the Ethernet address configuration in the file or **No** to use the address configuration in the controller. As soon as Yes or No is clicked, the restoration begins.



- 7 When the restore is finished, cycle the controller's power to make the changes permanent.



**Note:** The IP Routing Table settings do not change in a controller until the power is cycled.

## Section 3: **Configuring a Tier 2 controller**

The topics in this section cover configuring a Tier 2 controller with HCM.

---

The topics in this section cover configuring a Tier 2 controller with a KMDigital address or Panel number and Modbus configuration. KMDigital Tier 2 controllers include the following models:

- KMD-5800 series
- KMD-6000 series
- KMD-7000 series
- KMD-7100 series
- KMD-7400 series

To begin, see the topic [Adding an address to a Tier 2 controller on page 23](#).

For Tier 1 controllers, see the topic [Configuring a Tier 1 controller on page 9](#).

### Topics in this section

Adding an address to a Tier 2 controller .....	23
Configuring Tier 2 controllers with Modbus .....	26
Saving and restoring from backup files .....	27

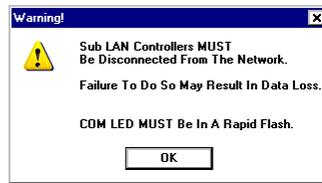
## Adding an address to a Tier 2 controller

This procedure configures a Tier 2 controller with a KMDigital address or Panel number. Adding Modbus is covered in an additional topic.

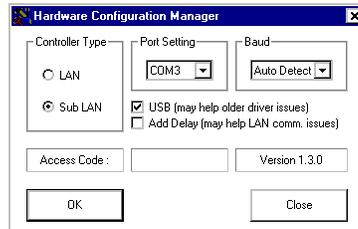
To add a KMDigital address to a Tier 2 controller, do the following:

- 1** If connected, disconnect the controller from the network by doing one of the following:
  - Remove the isolation bulbs.
  - Pull the Tier 2 network block.
  - Remove the Tier 2 network wires.
- 2** Connect the computer running HCM to the controller. Use one of the methods described in the topic [Tier 2 connections on page 30](#).
- 3** Power the controller. See the instruction manual supplied with the controller for the exact power requirements.

- 4 Start HCM. If a Tier 2 controller was the last controller configured, the *Warning* dialog opens.



- 5 Click **OK** when the controller is disconnected from the network.
- 6 The communications dialog opens.



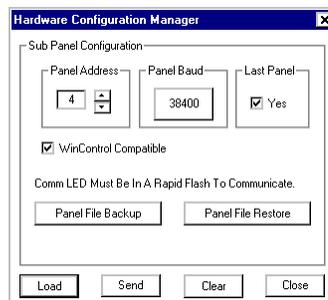
- 7 Set the **Controller Type** to **Sub LAN**.

When switching from *LAN* to *Sub LAN*, the *Warning* dialog opens.



Click **OK** when ready.

- 8 Select the following items:
- Select the Port Setting that matches the serial port of the computer running HCM.
  - Select Baud to match the speed of the network. The **Auto** setting is recommended.
- 9 Enter the password in **Access Code**.
- 10 Click **OK**. The Sub Panel Configuration dialog opens.

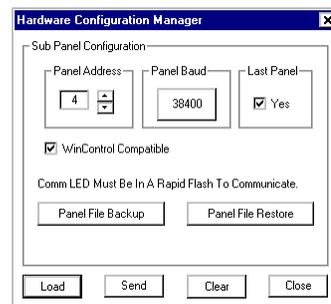


- 11 In the Sub Panel Configuration dialog, set the following:
  - **Panel Address** The Panel Address must be in the range of 1-124.
  - **Baud** All controllers on the same Tier 2 network must be set to the same baud.
  - **Last Panel** If this is the highest numbered controller on the network, select Last Panel.
- 12 Click **Send** when finished.

*Reference to the Sub Panel Configuration dialog*

Use the Tier 2 configuration window to enter settings for a Tier 2 controller.

### Illustration 3–1 Sub Panel Configuration dialog



**Panel Address** Enter a number from 1–124 by clicking either the arrows or by entering the number of the address assigned to the controller.

**Last Panel** Checking this box designates the controller as the highest numbered address in the system. The last controller passes the token back to controller #1. If left unchecked, the selected controller will pass the token on to the next numbered address.

**Panel Baud** Panel Baud sets the speed of the Tier 2 network. Click Panel Baud to step through a list of permissible baud rates. All controllers must be set to the same baud.

**WinControl Compatible** Check this option for all new KMD–5800 series controllers. This feature maintains compatibility with legacy software. Do not check the WinControl Compatible box for the following controllers:

- KMD–5801 and KMD–5802 before build 34.1
- KMD–5821 before build 1.7
- KMD–5831 before build 3.7

For additional information see Technical Bulletin TB0305A, *WinControl Compatible Checkbox*, which is available on the KMC Controls web site.

**Clear** Removes all programs and setup information from the controller. Only address and baud information remains in the controller. For KMD-6000, KMD-7000 series or other controllers with factory programming, Clear restores the controller to its original factory-programmed state. Clear can be used also with all local controllers to restore the master password.

**Load** Load retrieves information from the controller and displays it in the Sub Lan dialog.

**Send** Moves information displayed in the HCM window and stores it in the memory of the connected controller. Once you have sent the configuration parameters to the controller, you may exit HCM or configure additional controllers.

**Panel File Backup** Panel File Backup retrieves all settings, programs, schedules, variables and descriptors from the controller and saves them in a controller configuration file. Configuration files are saved with the extension .PNL. See the procedure [Saving and restoring from backup files on page 27](#) to use Panel File Backup.

**Panel File Restore** To configure a controller from a file, use Panel File Restore. HCM will open the panel configuration file and send it to the controller.

#### Related topics

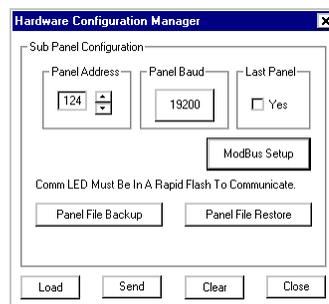
- [Adding an address to a Tier 1 controller on page 12](#)
- [Configuring Tier 2 controllers with Modbus on page 26](#)

## Configuring Tier 2 controllers with Modbus

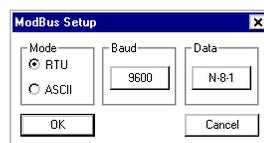
In addition to [Adding an address to a Tier 2 controller on page 23](#), controllers such as the KMD-5540-005 require additional, Modbus specific settings. When connecting to a KMC controller with Modbus, the Tier 2 configuration manager opens with an additional Modbus button.

- 1 Connect the controller and start HCM as described in the procedure [Adding an address to a Tier 2 controller on page 23](#). Return to these instructions at Step 10.
- 2 When the Sub Panel Configuration dialog opens, click **ModBus Setup**.

**Note:** The ModBus Setup button is only visible when connected to controllers that are Modbus compatible.



- 3 In the **ModBus Setup** dialog, enter the settings that match the other devices on the Modbus network. Refer to the instructions supplied with the Modbus devices for network settings.



- 4 When finished, click **OK**.

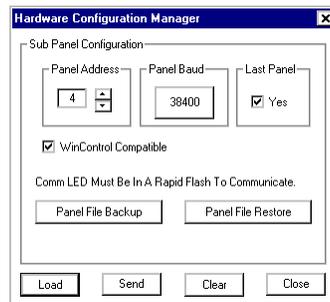
## Saving and restoring from backup files

HCM can be used to back up a controller with a configuration file or restore the configuration of a controller from a file. The files used for save or restore are panel files with the extension .PNL. Panel files are unique to KMDigital controllers and can be interchanged among HCM, WinControl XL, and WinControl XL Plus.

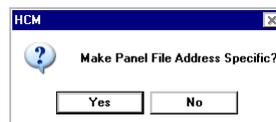
Before backing up or restoring a controller, become familiar with the procedure [Adding an address to a Tier 2 controller on page 23](#).

To save a backup panel file, do the following:

- 1 Connect the controller and start HCM as described in the procedure [Adding an address to a Tier 2 controller on page 23](#). Return to these instructions at Step 10.



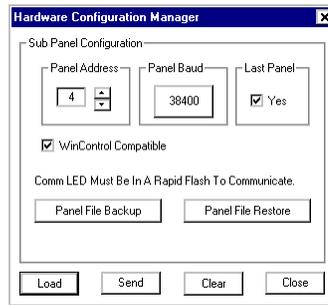
- 2 Click **Panel File Backup**.
- 3 Browse to the location to save the file.
- 4 Enter a name for the file. HCM will automatically add the extension .PNL.
- 5 Click **Save** when ready.
- 6 When the **Make Panel File Address Specific** dialog opens, do one of the following:
  - Click **Yes** to save a 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 begin saving the file as soon as Yes or No is clicked.

To restore a controller from a backup panel file, do the following:

- 1 Connect the controller and start HCM as described in the procedure [Adding an address to a Tier 2 controller on page 23](#). Return to these instructions at Step 10.



- 2 Click **Panel File Restore**.
- 3 Browse to the location of the `.PNL` backup file.
- 4 Select the file and click **Open**. HCM will immediately begin to read the file and send it to the controller.

## Section 4: Computer Connections to KMC controllers

This section describes methods to directly connect a computer to a KMDigital controller for use with HCM or WinControl.

Each type of KMD controller has a specific connection requirements. Choose the method that is appropriate for the type of controller or building automation system.

### Topics in this section

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Tier 2 connections .....	30

### Tier 1 connections

There are two different types of connections for KMDigital Tier 1 controllers.

- KMD-5205 and KMD-5270, the LanLite and WebLite controllers, use a 9-pin, D-shell connector to connect to a serial port.
- KMD-5210 series LanControllers use a 3-pin terminal block to connect to a serial port.

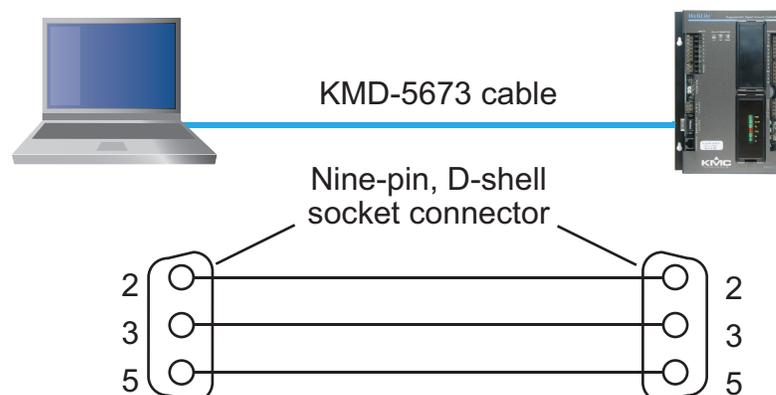


**Tip:** If the computer does not have a 9-pin serial port, use a third-party USB-to-serial adapter.

### Tier 1 controllers with 9-pin connectors

To connect to a computer with a 9-pin serial connector, use a KMD-5673 cable between a serial port on the computer and the RS-232 port on the controller.

**Illustration 4-1 Tier 1 9-pin RS-232 connection**



## Tier 1 controllers with terminal blocks

Connect a computer directly to the terminal marked *Computer A* on a KMDigital, Tier 1 LanController.

**Illustration 4–2 Connecting to LAN controllers**



## Tier 2 connections

KMDigital Tier 2 controllers include the following models.

- KMD-5800 series
- KMD-6000 series
- KMD-7000 series
- KMD-7100 series
- KMD-7400 series

To connect a computer to a Tier 2 controller, use either a KMD-5559 CommTalk or a KMD-5576 USB Communicator.

In addition to the serial-to Tier 2 conversion, the KMD-5559 includes alarm and modem features. It is often used as a permanent part of a small network and requires a 24 VAC power source.

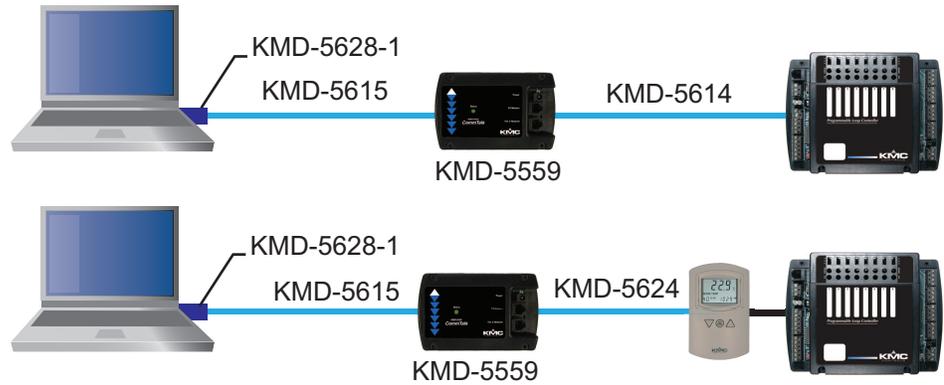
The KMD-5576 is a simple, USB-to-Tier 2 converter that is convenient for configuration or other temporary applications. No external power is required.

### Connecting to Tier 2 with a KMD-5559

Connection with a KMD-5559 may be made through a NetSensor or directly to the controller. The following illustration shows the details and required cables for both methods.

 **Tip:** If the computer does not have a 9-pin serial port, use a third-party USB-to-serial adapter.

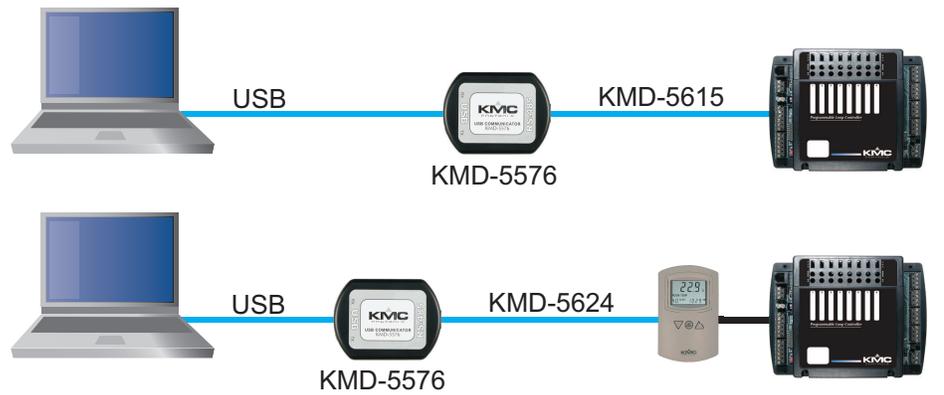
**Illustration 4-3 Connecting with KMD-5559**



### Connecting to Tier 2 with a KMD-5576

For computers with USB (Universal Serial Bus) ports, use the KMD-5576 USB adapter to connect to a Tier 2 controller.

**Illustration 4-4 Connecting a KMD-5576**



You may use also a third-party, optically-isolated USB-to-EIA-485 converter to connect to a Tier 2 controller.



## Appendix A: About KMDigital networks

This section is a brief description of KMDigital networks and addresses. It describes also the fundamentals of the KMDigital protocol.

---

The KMDigital protocol is a proprietary building automation protocol that is made up of Tier 1 and Tier 2 controllers. Either type of controller can operate as a stand-alone controller or they can be combined with other controllers to form a KMDigital network.

Tier 1 controllers, also referred to as Main Panels, are the backbone of large networks. Typically, they are joined together using the facilities LAN (Local Area Network). In some systems, typically older networks, the Tier 1 controllers are connected using the alternative Main Net network. Main Net networks were common before facilities included the modern network infrastructure that is in place today. Main Net networks use EIA-485 wiring and the token ring topology. Up to 31 controllers can be connected to a Tier 1 network.

Tier 2 controllers are connected to each other with a token passing, peer-to-peer, EIA-485 network communications. Up to 124 controllers can be connected to a Tier 2 network. Tier 2 controllers are also referred to as a subnet controllers or sub-panels.

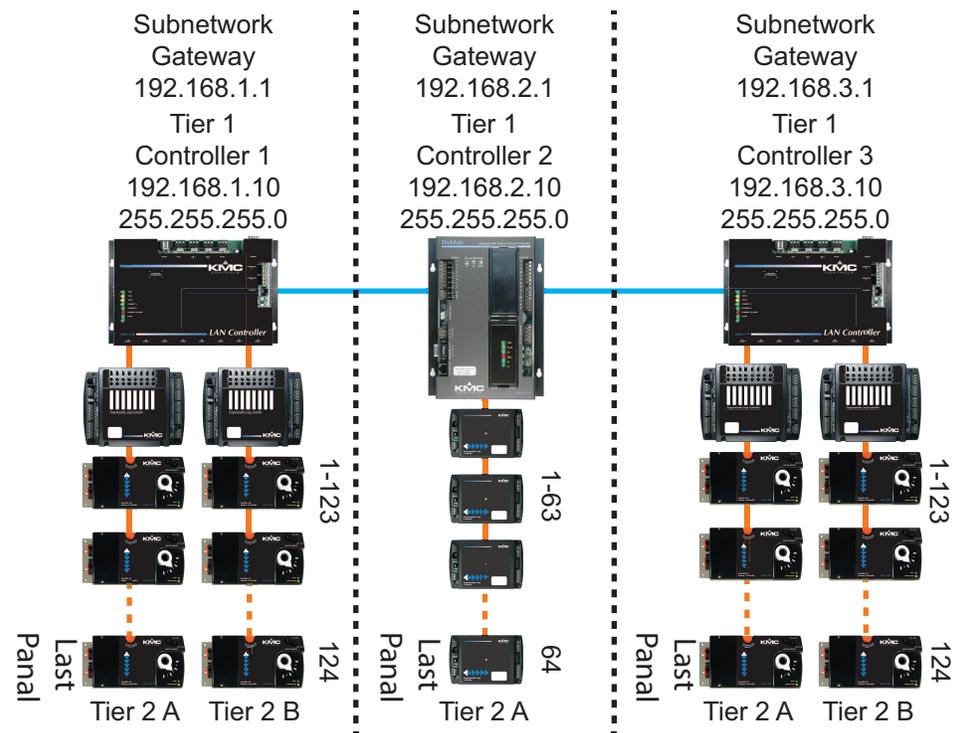
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## An example network

In the Illustration [Example KMDigital network on page 34](#), the three Tier 1 controllers are connected together using the facility's LAN and are connected to three different LAN subnetworks. The controllers are assigned KMDigital addresses 1-3. Each controller is assigned also an IP address and subnetwork mask that is appropriate for the subnetwork to which it is connected. In addition, each controller contains an IP Routing table. The table is a list of all KMDigital Tier 1 controllers that are part of the network and the addresses of the appropriate subnetwork gateways for each controller. The IP addresses for the controllers, the gateways, and the subnetwork masks are assigned by, and coordinated with, the IT department.

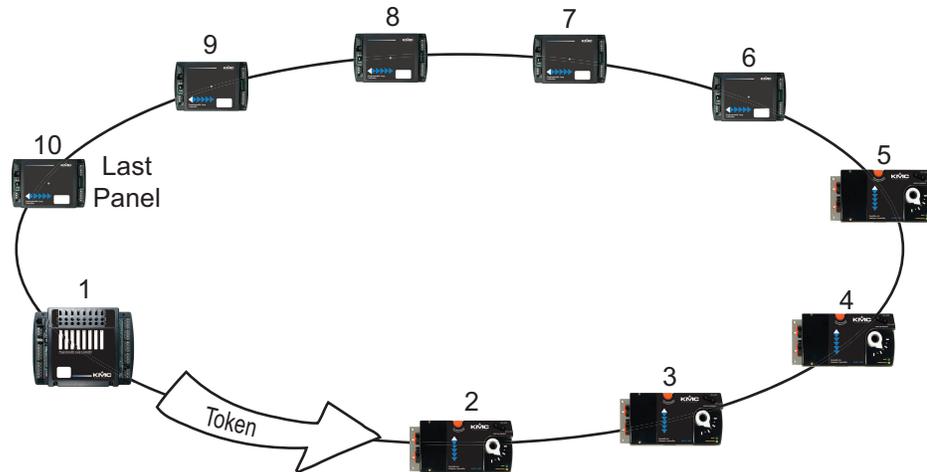
**Illustration A-1 Example KMDigital network**



The Tier 2 networks are connected directly to Tier 1 controllers. Valid addresses for Tier 2 controllers are 1-124 when connected to KMD-5210 controllers and 1-64 when connected to KMD-5205 or KMD-5270. The highest numbered controller on every Tier 2 network is designated as the Last Panel to signify that no other controllers are part of the network. The Last Panel designation is important to token passing on the Tier 2 networks.

## KMDigital token passing networks

KMDigital Tier 2 and Main Net networks are a peer-to-peer communications format based on the token ring network topology. A token is a special network message that is passed to each controller on the network. Only the controller that has the token can transmit data on the token ring network.

**Illustration A-2 Example token ring**

The token ring topology gets its name because the token is always passed one-way, in a logical circle, from a low numbered controller to the next highest numbered controller. The token is passed until it reaches the controller designated as the Last Panel controller. The Last Panel controller, which is the highest numbered controller on the network, then passes the token back to the controller with the lowest known address number, typically Controller 1.

**Passing the token**

Token passing starts at Controller 1. As long as Controller 1 has possession of the token, it is the only controller that can transmit information to the network. When Controller 1 is finished transmitting, it passes the token to Controller 2. When Controller 2 is finished transmitting, it passes the token to Controller 3 and so on. At the end of the network, Controller 10, designated as Last Panel, passes the token back to Controller 1 and the sequence is then repeated. The Last Panel controller is always the controller with the highest KMDigital address number on the network. If a Last Panel is not specified, the system will default to 124—the highest valid address—as the last controller.

Tier 1 controllers connected with a Main Net network pass the token following the same rules.

**Correcting for missing controllers**

The KMDigital protocol includes logic to account for missing controllers. One example of a faulty network is a missing Last Panel.

In this example, a network consists of 10 controllers and the Last Panel has not been specified. Beginning with Controller 1, the token will pass from controller to controller until it reaches Controller 10. When Controller 10 is finished with the token, it will attempt to pass it to Controller 11. If Controller 11 does not respond, Controller 10 will try passing the token to Controller 12 and then to Controller 13 until it tries Controller 124. After Controller 124 does not respond, Controller 10 will pass the token back to Controller 1 because no other controller responded.

Although the sequence of searching for nonexistent controllers takes only fractions of a second, it is time consuming and is one reason for a slow network. To compensate for missing controllers and improve network performance, logic is built into the protocol to remember which controller was last available to receive the token. In this example, for

approximately the next two minutes, Controller 10 will not attempt to pass the token to missing controllers and will immediately pass the token directly to Controller 1. After two minutes, Controller 10 will again attempt to pass the token to missing controllers to see if they are on-line.

If controllers with an address higher than the controller designated as Last Panel are part of the network, they will not be included in the network. In the example network, if Controller 10 is designated as the Last Panel, it will always pass the token back to Controller 1. If two new controllers are added, Controller 11 and 12, Controller 10 will not pass the token to them and they will not be part of the network.

## Tier 1 broadcasting

When Tier 1 controllers are connected using the LAN to form a KMDigital network, they communicate among themselves with broadcast messages. However, it is not a broadcast by traditional network standards because the KMDigital messages are sent only to other Tier 1 controllers with a UDP datagram. The broadcast message is sent at specific intervals and includes some or all of the following information: the controller status, point-passing data, and point passing requests. In addition, every two minutes a time synchronization message is also transmitted. Broadcast messages are transmitted from controllers that may or may not be designated as broadcast servers.

**Broadcast servers** A controller designated as a broadcast server sends the broadcast messages directly to every controller listed in its IP routing table.

**Non broadcast servers** A controller not designated as a broadcast server sends the broadcast message to the first controller in its routing table that is marked as a broadcast server. The broadcast server then forwards it to every other controller, except the originator, listed in its IP routing table. If the first broadcast server drops from the network, the next on line controller in the list marked as a broadcast server is used.

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