![sapling]

Installation Manual V2.0

SLD Premium Large Digital Clock

Current as of April 2019

Large Digital Clocks

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Wi-Fi & Wired LAN Sync Only

Wi-Fi Sync Only

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VERY IMPORTANT:

CONFIGURE YOUR CLOCK BEFORE MOUNTING IT TO A WALL OR CEILING. REFER TO THE SYNCHRONIZATION SYSTEM SETUP SECTION OF THIS MANUAL FOR INSTRUCTIONS.

All network and/or master clock equipment must be powered and configured before you install the clock. If the network and/or master clock equipment is not properly installed and powered, and if the clocks have not been configured to communicate with this equipment, the secondary clocks will not synchronize.

Important Safety Instructions

⚠ DANGER

⚡ SHOCK HAZARD

- Keep the electricity to this device turned OFF until the clock installation is complete.
- Do not expose the clock circuits to water, and properly close the wiring panel to prevent exposure to water after mounting.

NOTICE

- Do not hang objects from the clock or clock mounting parts. The clocks are not designed to support the weight of other objects.
- The clock face and housing may be cleaned with a damp cloth or disinfectant. Test other cleaning products on a small part of the clock housing before attempting to use on the rest of the clock. Avoid bleach and chemicals known to dissolve plastics.

⚠ WARNING

🔥 FIRE HAZARD

- Always follow your national and regional electrical codes or ordinances.
- The AC power circuit for the clock must be attached to a circuit breaker that can be reset by the user.

PHYSICAL INJURY HAZARD

- If you are standing on an object while installing your clock, make sure that the object can support your weight, and will not sway or move as you stand on it.
- Take precautions to avoid injury by potential safety hazards near the point of installation including (but not limited to) heavy machinery, sharp objects, hot surfaces, or exposed cables carrying an electric current.
- Follow all mounting instructions exactly as stated in this manual. Failure to do so may result in the device falling off the point of installation.
- Packaging materials and mounting items include plastic bags and small pieces, which pose a suffocation hazard to young children.

Identify Your Clock

The capabilities of your clock may be determined by looking at the clock's part number. A label containing the part number of your clock is attached to the clock packaging.

Look at the second group of letters in the part number.

Group Code	Synchronization Module	Wi-Fi Capabilities
WWB	Wi-Fi Network Adapter	Synchronization and Configuration
WPB	IP LAN Cable Network Adapter	Configuration Only
WSB	GPS Receiver	Configuration Only
WLB	900MHz Wireless Receiver	Configuration Only
WGB	2.4GHz Wireless Receiver	Configuration Only
WTB	900MHz TalkBack Receiver	Configuration Only
WTGB	2.4GHz TalkBack Receiver	Configuration Only
WDB	Wired (2-wire,RS485,Sync)	Configuration Only

For clock size, refer to the fourth group of digits of your part number.

Size Code	Size of Digits	Number of Digits
0604	6" (15.2cm)	Four
0606	6" (15.2cm)	Six
0904	9" (22.9cm)	Four
0906	9" (22.9cm)	Six
1204	12" (30.5cm)	Four
1206	12" (30.5cm)	Six

Clocks with 4" or 2.5" digits are NOT Large Digital Clocks.

For power source information, refer to the last digits of your part number.
If the part number ends in **4**, the clock requires a 24V power source.
If the part number ends in **12**, the clock requires a 110VAC or 230 VAC power source
If the part number ends in **0**, the clock requires its power from a Power-over-Ethernet (PoE) switch or injector.

The pictures provided in this manual are designed to accommodate the maximum number of models and configurations for this product. The clock that you order may appear slightly different than the one shown in the pictures, depending on the ordered synchronization system, number of digits, digit size, and mounting configuration. For example, the circuit board for the IP LAN cable network adapter will appear in all pictures of the main board in this manual, but will only be included in WPB models of the clock.

After identifying your clock, go to the "Preparing to Install - Network Requirements" page for your system.

Preparing to Install - Network Requirements - Wi-Fi Synchronization

To be able to set up an Wi-Fi-based synchronized clock network, you will need the following items:
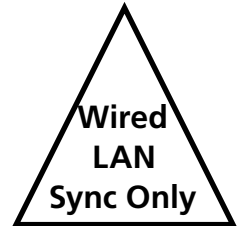
Wi-Fi Sync Only

- This manual
- A Wireless Local Area Network (WLAN) that has access to at least one of the following:
    - An in-house NTP server
    - The Internet
- A local firewall that is open on Ports 80 (TCP), 123 (UDP), and 1777 (UDP)
- At least one laptop or desktop computer with access to the following:
    - The same LAN as the clocks
    - The same subnet as the clocks
    - A web browser such as Internet Explorer, Microsoft Edge, or Mozilla Firefox.
    - An internal or external Wi-Fi network card.
- A wireless router or wireless access point for the LAN that broadcasts using an 802.11 b/g/n protocol.
    - Depending on the size of the network, you may need to install additional Wireless Access Points.
- A copy of the Network Monitor program.
- Security access to all of the above items.
- A means of keeping a record of the clock serial numbers, locations, and IP addresses. Create a table like the one shown below:

SERIAL #	LOCATION	IP ADDRESS

When ready, go to the "Preparing to Install - Accessing the Main Board" page.

Preparing to Install - Network Requirements - PoE / Wired LAN

To be able to set up an IP-based synchronized clock network, you will need the following items:

- This manual
- A Local Area Network (LAN) that has **DHCP enabled**, and access to at least one of the following:
  - An in-house NTP server
  - The Internet
- A firewall that is open on Ports 80, 123, and 1777
- At least one laptop or desktop computer with access to the following:
  - The same LAN as the clocks
  - The same subnet as the clocks
  - A web browser such as Internet Explorer, Microsoft Edge, or Mozilla Firefox.
  - An internal or external network card.
- A copy of the Network Monitor program.
- Security access to all of the above items.
- A Power over Ethernet Switch or Injector, if your clock supports it.
- A means of keeping a record of the clock serial numbers, locations, and IP addresses. Create a table like the one shown below:

Wired LAN Sync Only

SERIAL #	LOCATION	IP ADDRESS

When ready, go to the "Preparing to Install - Accessing the Main Board" page.

Preparing to Install - Network Requirements - All other systems

To be able to set up a large digital clock that does not synchronize over a computer network, you will need the following items:

- This manual
- At least one laptop or desktop computer with access to the following:
  - A web browser such as Internet Explorer, Microsoft Edge, or Mozilla Firefox.
  - An internal or external Wi-Fi network card.
  - A local firewall that is open on Port 80
- Security access to all of the above items.
- A means of keeping a record of the clock serial numbers, and locations. Create a table like the one shown above.

When ready, go to the "Preparing to Install - Accessing the Main Board" page.

Preparing to Install - Accessing the Main Board - **ALL SYSTEMS**

Initial Configuration of the clock requires access to the main board, regardless of which system you have purchased.

To access the main board, use a Phillips-head screwdriver to remove the screws surrounding the wiring panel. Store these screws in a safe place, as you will need to reinstall the panel later on.

During configuration, you will need to power the main board and may be asked to operate a pair of push-button switches. Refer to the diagram below.

Access to the clock can be controlled by changing the clock's connection mode. There are two modes:

Connection Mode and Direct Mode

The functions of each mode are as follows:

Direct Mode - In Direct Mode, a clock acts as its own Wi-Fi Access Point and can be accessed directly from any Wi-Fi capable computer in range of it.

While in Direct Mode, the clock is accessible through IP address to 192.168.240.1. A Wi-Fi synchronized clock will revert to whichever IP address is listed on the Network Settings address page once Direct mode has been ended.
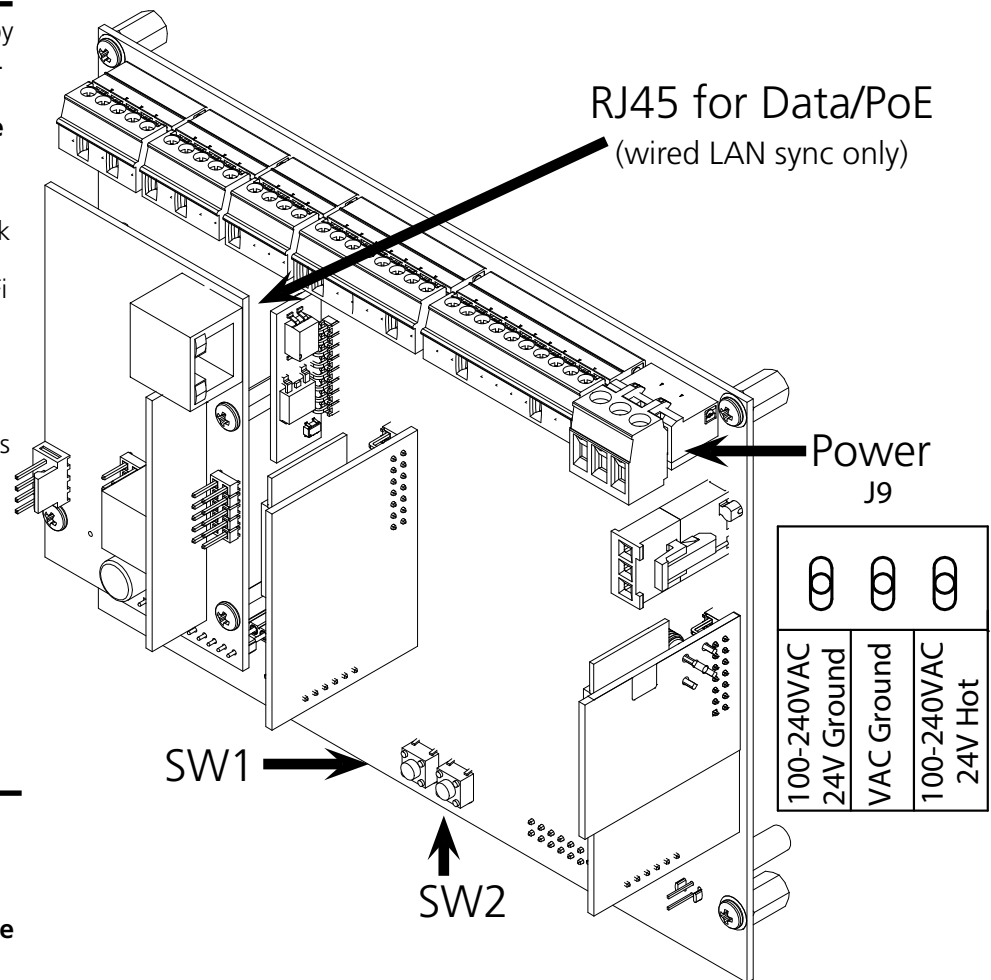
Connection Mode - In connection mode, a properly configured Wi-Fi clock is accessible over the facility's network, and will appear on Monitor software located on the same subnet. **This mode is only available if the user ordered the clock with Wi-Fi Synchronization.**

The clock is shipped in Direct Mode. **All clocks that do NOT use Wi-Fi synchronization will continually broadcast in Direct Mode. Wi-Fi clocks that are not connected to the network will always be accessible in Direct Mode.**

For clocks that use Wi-Fi Synchronization, once a network has been set by the user, the clock will always start in Connection Mode.

A clock in Connection Mode can be placed into Direct Mode by pressing SW1 on the main board twice. If performed correctly, the word "DIRECT" will appear on the display for a few seconds. On a 4-digit clock, only the letters "DIRE" will appear. In this mode, a clock will wait four minutes for the user to access it before automatically deactivating its Wi-Fi transceiver. Direct Mode will automatically activate if the network settings were not correctly entered, or if the clock cannot access the network.

RJ45 for Data/PoE
(wired LAN sync only)

Power
J9

100-240VAC 24V Ground | VAC Ground | 100-240VAC 24V Hot

SW1

SW2

When ready, go to the "Preparing to Install - System Setup" page for your system.

Preparing to Install - System Setup - Wi-Fi Synchronization

Positioning the Wireless Router or Wireless Access Point (WAP):

The main router or WAP should be installed in a central location. Depending on the transmission protocol of your router, the clocks must be located within the following ranges:

Wi-Fi Protocol	Range (Feet)	Range (Meters)
802.11 b	115 feet	35 meters
802.11 g	125 feet	38 meters
802.11 n	230 feet	70 meters.

Wi-Fi Sync Only

Check with the access point or router manufacturer, as some transmitters offer boosted ranges.

*NOTE: This clock is not compatible with 802.11a, 802.11ac, or 802.11ax protocols. Many AC and AX-compatible routers and access points are backwards compatible with 802.11n. Check your router settings for more information.

Be aware of walls or other obstructions made of thick concrete or sheet metal, as these may block the signal entirely.

Logging into the clock for the first time:

1. Power the clock. If this is not your first time attempting to access the clock, press and release SW1 on the main board twice.

2. On a Wi-Fi enabled computer, check the available Wireless Networks. Refresh the available networks until a network named **Wifi-Large-Digital-####** appears (where #### is the serial number of the clock). This may take up to 30 seconds. Once it appears, connect to this network.

SW1 SW2

3. Open a web browser and enter the following web address into the URL field:

   192.168.240.1/login.html

4. On the login page, use the password **6063** to log into the clock.

Password(Show): [ ]

Submit
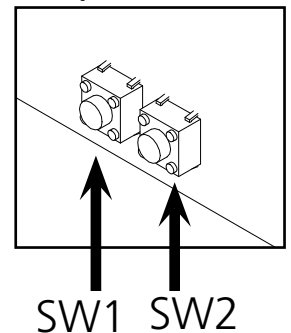
5. Click on the **Network Settings** button.

Network Settings

CONTINUES ON NEXT PAGE

Preparing to Install - System Setup - Wi-Fi Synchronization (ctd.)

NETWORK SETTINGS

Wi-Fi Sync Only

6	Clock Name:	Room 302
	Serial Number:	1109
	MAC Address:	60:36:96:0a:00:6d
	Select Network:	Series1 ▾
7	Network:	Series1
8	Network Password (Show):	
	DHCP Auto On:	On ▾
9	IP Address:	192.168.4.4
	Subnet Mask:	255.255.255.0
	Gateway Address:	192.168.4.1
10	Auto DNS:	On ▾
	DNS Address:	192.168.0.31
	Broadcast to Monitors:	On ▾
	Send Specific Monitor IP:	Off ▾
	Monitor IP Address:	0.0.0.0

11 Enterprise Settings Submit 12

6. Change the name of the clock to something memorable, or appropriate to the location where the clock is being installed.

7. In the **Select Network** field, click on the drop-down list and select the SSID of your preferred Wi-Fi network. This is the name that appears if you try to connect to that Wi-Fi network on any other computer, tablet, or smart phone. If your network SSID is hidden for security reasons, you may enter it manually in the **Network** field.

8. In the **Network Password** field, enter the password of your preferred Wi-Fi network. Network passwords must be twenty-six characters or fewer.

9. If you wish to set a static IP address, change DHCP Auto On from ON to OFF, then enter information for the Static IP address, Subnet Mask, and Gateway Address. To acquire this information, contact your network administrator.

10. If you wish to set a DNS server other than the one provided through DHCP, change Auto DNS and DHCP Auto On from ON to OFF, then enter an IP address for a new DNS server in the DNS Address field.

CONTINUES ON NEXT PAGE

Preparing to Install - System Setup - Wi-Fi Synchronization (ctd.)

Wi-Fi Sync Only

11 Enterprise Settings   Submit 12

11. If your network does not use Enterprise Encryption, skip this step. If your network uses WPA2-Enterprise Encryption, click on the **Enterprise Settings** button and fill in the fields appropriate to your network. To acquire this information, contact your network administrator. For more information on these fields, refer to the section of this manual labeled "Web Interface - Enterprise Settings."

WPA ENTERPRISE SETTINGS

User Name:
Outer Authentication: EAP-PEAP ▼
Inner Authentication: EAP-MSCHAP

Submit

When finished, press **Submit** to return to the main network page.

12. Press the **Submit** button on the Network Settings page.

13.   If you wish, you may configure other settings at this time, such as Display, Daylight Savings, or Input/Output settings. Refer to the appropriate section of this manual for each. You may also configure them later. When finished, click on the **Log Out** button.

14. Connect your computer to the clock's new network, then log in to the clock again and confirm that the clock is accessible on the network. You should be able to access the clock with either the Monitor software (If clock DHCP is on and the computer is on the same subnet as the clock) or the newly assigned static IP address (if clock DHCP is off).

15. If the clock is not accessible, disconnect and reconnect power to the clock. This will cause the clock to display its current IP address. If the clock is showing a correct IP address, but is still not accessible, refer to the section of this manual labeled "Troubleshooting."

Preparing to Install - System Setup - PoE / Wired LAN

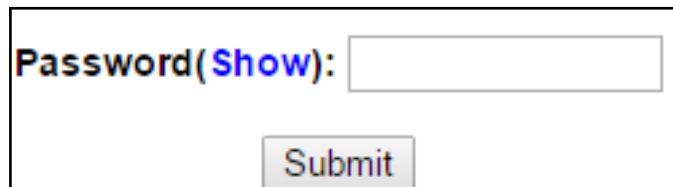**Positioning the Clock Relative to the Data Switch**

The clock is designed to work with network cables of type CAT5 and later. These cables can carry a signal an overall distance of about 300 feet (91.4m). If the cables are going to be run near magnets, motors, or cables carrying unshielded strong electrical current, then a shielded network cable must be used.

For clocks that are Power-over-Ethernet (PoE) compatible, the same range restrictions apply. Additionally, please verify that your clock supports PoE, as larger clocks require an additional, external power source to function.

**Wired
LAN
Sync Only**
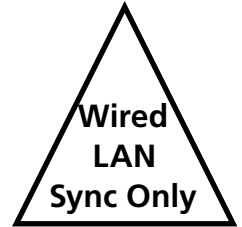
Logging into the clock for the first time:

1. Connect a data cable from your network to the RJ45 port on the main board of the clock. For clocks that do not use Power over Ethernet, connect the clock to an external power source as well.

2. On your network-connected computer, run the Network Monitor program. After a minute or two, the clock will appear on the monitor with the name **Large Digital-####** appears (where #### is the serial number of the clock). Double click on the name to launch a web browser with access to the clock.

Password(Show): [   ]

Submit

3. On the login page, use the password **6063** to log into the clock.
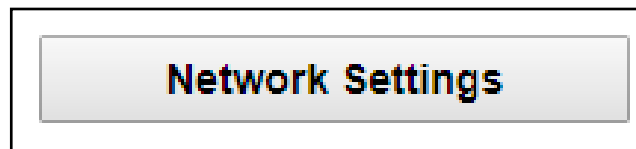
Network Settings

4. Click on the **Network Settings** button.

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Preparing to Install - System Setup - PoE / Wired LAN

NETWORK SETTINGS

5	Clock Name:	Large Digital-1126
	Serial Number:	1126
	MAC Address:	60:36:96:10:00:7e
6	DHCP Auto On:	On ▼
	IP Address:	192.168.0.186
	Subnet Mask:	255.255.255.0
	Gateway Address:	192.168.0.1
	Auto DNS:	On ▼
7	DNS Address:	192.168.0.31
	Broadcast to Monitors:	On ▼
	Send Specific Monitor IP:	Off ▼
	Monitor IP Address:	192.168.4.78

**Wired
LAN
Sync Only**

8 Submit
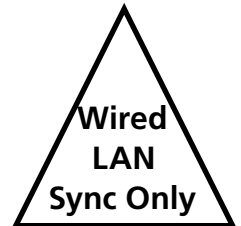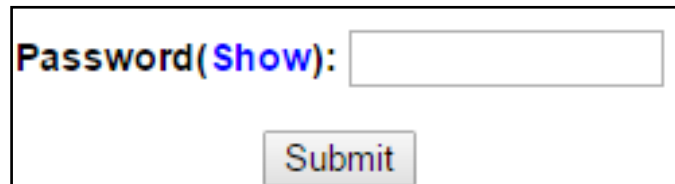
5. Change the name of the clock to something memorable, or appropriate to the location where the clock is being installed.

6. If you wish to set a static IP address, change DHCP Auto On from ON to OFF, then enter information for the Static IP address, Subnet Mask, and Gateway Address. To acquire this information, contact your network administrator.

7. If you wish to set a DNS server other than the one provided through DHCP, change Auto DNS and DHCP Auto On from ON to OFF, then enter an IP address for a new DNS server in the DNS Address field.

8. Press the **Submit** button.

9. If you wish, you may configure other settings at this time, such as Display, Daylight Saving Time, or Input/Output settings. Refer to the appropriate section of this manual for each. You may also configure them later. When finished, click on the **Log Out** button.

10. Log in to the clock again and confirm that the clock is accessible on the network. You should be able to access the clock with either the Network Monitor software (If clock DHCP is on and the computer is on the same subnet as the clock) or the newly assigned static IP address (if clock DHCP is off).

11. If the clock is not accessible, disconnect and reconnect power to the clock. This will cause the clock to display its current IP address. If the clock is showing a correct IP address, but is still not accessible, refer to the section of this manual labeled "Troubleshooting."

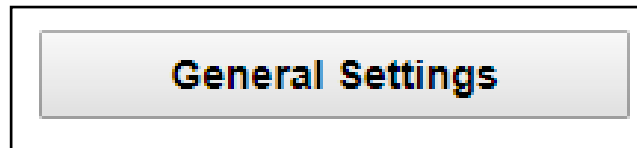## Preparing to Install - System Setup - All Other Systems

Logging into the clock for the first time:

1. Power the clock.

2. On a Wi-Fi enabled computer, check the available Wireless Networks. Refresh the available networks until a network named **Wifi-Large-Digital-####** appears (where #### is the serial number of the clock). This may take up to 30 seconds. Once it appears, connect to this network.

3. Open a web browser and enter the following web address into the URL field:

   192.168.240.1/login.html

4. On the login page, use the password **6063** to log into the clock.

5. Click on the **General Settings** button.

6. Configure **Display Settings** and any other settings necessary for operating the clock, including **Input/Output** (for wired synchronization systems) and **Elapsed Timer** if your system uses these. Refer to the appropriate section of this manual for each.

7. **Test and confirm all features are working properly, as it will be difficult to adjust these settings after the clock is attached to its final installation point.** When ready, click on the **Log Out** button, then disconnect the clock from power.

8. If you are using a wired synchronization method other than IP Power over Ethernet, familiarize yourself with the locations and functions of the necessary input and output ports on the board. Refer to the sections of this manual labeled Inputs and Outputs for additional information. **It is strongly recommended that you do this now, as it is difficult and potentially dangerous to check this information after installing the clock in a high place.**

Preparing to Install - Configuring multiple clocks with wifiDirectLoader

wifiDirectLoader.exe is a piece of software that lets a user rapidly duplicate existing clock settings to other clocks of the same type (analog or digital). This is useful for large clock systems, where a user may not have the time to configure many clocks individually.

NOTICE: Starting wifiDirectLoader.exe will take your computer off of its current Wi-Fi network. If you need to access your network while simultaneously running this software, connect the computer to the network using a LAN cable.

Obtaining the configuration file:

1) **DO NOT Start wifiDirectLoader.exe.** First, set up one clock using the steps described in the System Setup section of this manual.

2) Once you have completed all the steps, exit the clock.

3) Start wifiDirectLoader.exe by double-clicking on it. Enter the value **6063** in the password field.
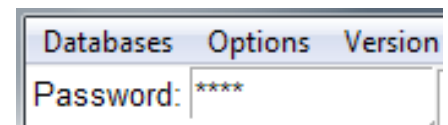
4) Power the clock. If the clock is not connected to a Wi-FI network, it should be broadcasting in direct mode. **If the clock was already connected to a network, press and release SW1 Button on the circuit panel twice.**

SW1 SW2
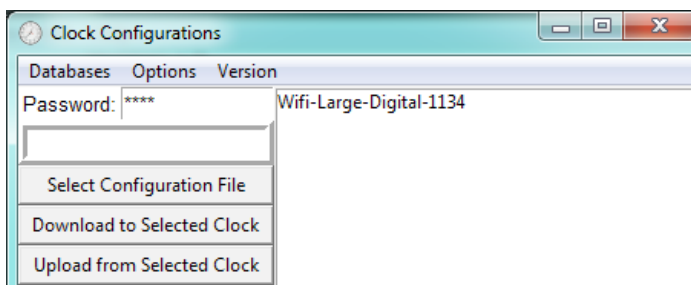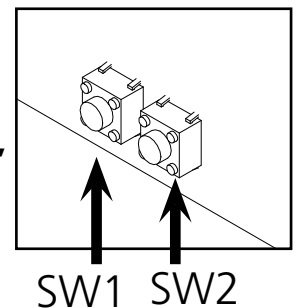
5) in the wifiDirectLoader.exe window, an entry should appear for the clock.

6) Click on the entry name for the clock, then press on the Upload from Selected Clock button.

7) Save the configuration file to an easily-accessible location, like your My Documents or Desktop folder.
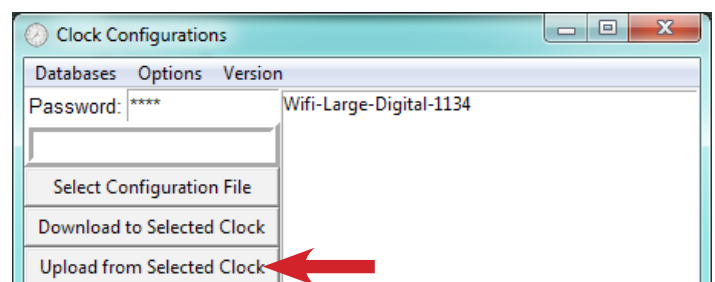
CONTINUES ON NEXT PAGE

# Preparing to Install - Configuring multiple clocks with wifiDirectLoader

Before Applying the configuration file:

The fastest way to perform this process is to collect all of the Wi-Fi clocks in a single room and run this program.

The clock should already be in direct mode, unless it was connected to a Wi-Fi network. If the clock was connected to a Wi-Fi network, follow step 4 on the previous page.

Applying the configuration file:

1) Press on the Select Configuration file button. Use the window to select the configuration file that you downloaded from the first clock. If you cannot see the file, confirm that the Files of Type field is set to Large Digital WiFi (*.ldwifi).
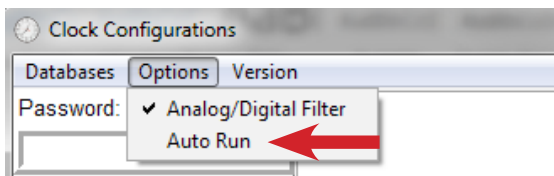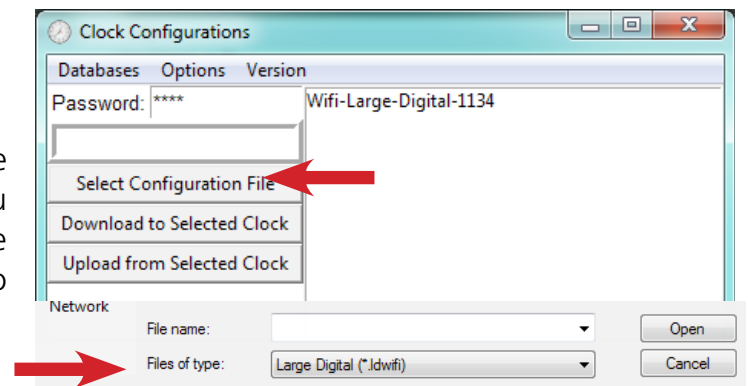
2) Under the Options menu, select Auto Run.

3) Power additional clocks and place them into direct mode using Step 4 from the previous page.

4) wifiDirectLoader.exe will automatically program every clock that appears. Clocks can be identified by their Serial Number, which will appear as part of the name of each clock that appears in the field to the right of the buttons.

5) Once each clock is programmed, the clock may be powered down, then mounted on the wall using the instructions in the following sections.

6) Once all clocks are programmed, exit out of wifiDirectLoader. You will be unable to access any other networks if wifiDirectLoader is still running.

Preparing to Install - Selecting a Location for the Clock

Wi-Fi

The clock should be installed within range of a Wi-Fi Access Point or Wi-Fi Router with a built-in Access Point. Consult the Access Point specifications for determining the maximum distance for clear communication.

The clock should be placed in a location where the signal is not interfered with or blocked. Be aware of large structures made of stone, concrete, bricks, or sheet metal as these materials will block a wireless signal. The installer should also be aware of other objects that may cause interference to the transmission including, but not limited to, large tanks of salt water, old microwave ovens, and large industrial machines.

Dedicated Wireless (Not Wi-Fi)

The clock must be placed within range of another transmitting wireless clock. The maximum transmission distance of the master clock transmitter in an unobstructed, open space is 3300 feet (1000 meters). Obstructions will reduce this distance, particularly obstructions made of the materials mentioned in the paragraph below.

The clock should be placed in a location where the signal is not interfered with or blocked. Be aware of large structures made of stone, concrete, bricks, or sheet metal as these materials will block a wireless signal. The installer should also be aware of other objects that may cause interference to the signal including, but not limited to, large tanks of salt water, old microwave ovens, and large industrial machines.

GPS

The clock should have a clear view of the sky, and should be placed in a location where the signal is not interfered with or blocked. Be aware of large structures made of stone, concrete, bricks, or sheet metal as these materials will block a GPS signal. Similarly, large cliff faces or thick foliage from trees may also block a GPS signal. The installer should also be aware of other objects that may cause interference to the signal including, but not limited to, large tanks of salt water, old microwave ovens, and large industrial machines.

For outdoor clocks, be aware that large amounts of snow or ice on the case can cause signal interference. This interference should go away after the ice or snow is removed.

LAN Network Cable

The clock should be installed within 300 feet (91.4m) of the nearest data switch or router. While Ethernet UTP cable of Cat5 or higher should be able to carry the data, take note to avoid running the cable past devices that produce a strong electric current or magnetic field, such as fluorescent lights or electric motors. If these cases are unavoidable, consult with your network administrator or cable installer, and determine if STP Ethernet cable would be sufficient to resolve the problem.

Other Wired Communication Methods

If the application requires this clock to receive time data from a wired connection to a master clock, then this clock should be installed close enough to the master clock (or converter box, in the case of the 2-Wire digital system) that the user can run data wires between both clocks. Research your communication protocol and provide an appropriate wire gauge and length to connect both clocks.

If you are mounting the clock housing directly to the wall, go to "Wall Mount Installation"

If you are mounting the clock housing to a pole or poles, then mounting the pole(s) to a wall or ceiling, go to "Double and Flag Mount Installation"
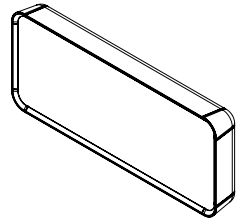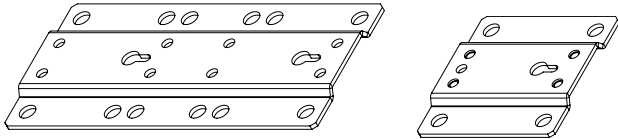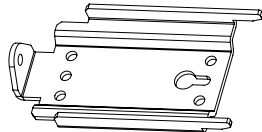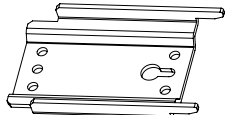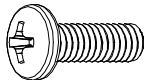
Wall Mount Installation

VERY IMPORTANT:

CONFIGURE YOUR CLOCK BEFORE MOUNTING IT TO A WALL. REFER TO THE SYNCHRONIZATION SYSTEM SETUP SECTION OF THIS MANUAL FOR INSTRUCTIONS.

All network and/or master clock equipment must be powered and configured before you install the clock. If the network and/or master clock equipment is not properly installed and powered, and if the clocks have not been configured to communicate with this equipment, the secondary clocks will not synchronize.

Included in Package

Description	Quantity	Picture
Large Digital Clock	1	
Mounting plate	2	
Mounting bracket	1 or 2 (depending on model)	
Upper Mounting bracket	0 or 2 (depending on model)	
Securing Screw	2	
Bracket Screw	8 or 16 (depending on model)	

You will also need eight screws to mount the clock to the wall or ceiling (4 per mounting plate). The type of screw you select depends on the material of the wall or ceiling, and the weight of the clock(s) you're installing. The screw thread should not exceed the 0.375" (0.95cm) diameter of the hole, and should be able to withstand pullout and sheer forces of 500lbs (227kg).

To power the clock, you will need a 3-conductor cable with double isolation. A PoE clock does not need this cable as power is provided through the network cable. PoE clocks can be identified by their part number, which will always end in 0. All other clocks require the 3-conductor cable.

Wall Mount Installation

1) Locate a section of wall capable of supporting the clock. If mounting the clock on wood drywall, locate two separate studs for attaching the mounting pieces.

2) Run power and communication wiring to the point of installation.

CHECK YOUR WIRING

The voltage between the hot and common wires should measure 105-126 volts AC in the 110 volt model, 207-253 volts AC in the 230 volt model, or Yellow & orange wires for 21.5-26.5 volts AC/DC in the 24 volt model.

If you are using the 24 volt model, make sure that the wiring leading to the clock is from an ISOLATED transformer.

To power your clock with a PoE connection, the clock must satisfy the following conditions:

• Has an RJ45 Port • Part number ends with "0"

• Has either a Red or Amber display

• Has either 6.0" or 9.0" digits.

If any of these conditions are not met, PoE cannot be used with the clock.

3) Using either the clock template or the holes on the wall plates and a level, mark holes for wall anchors. If on a section of drywall, all marked holes should overlap a wall stud. Use the topmost and bottommost holes to make these marks.
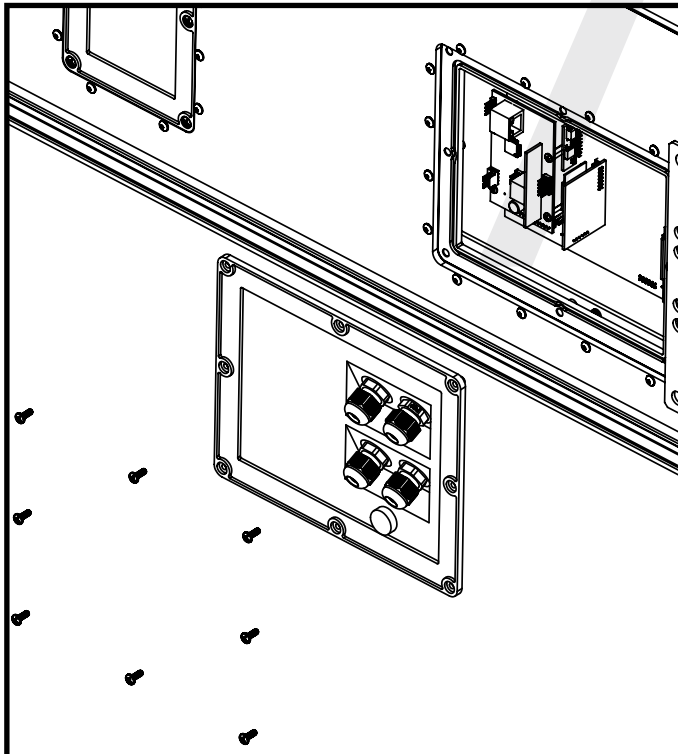
4) Use a drill to drill the holes into the wall.
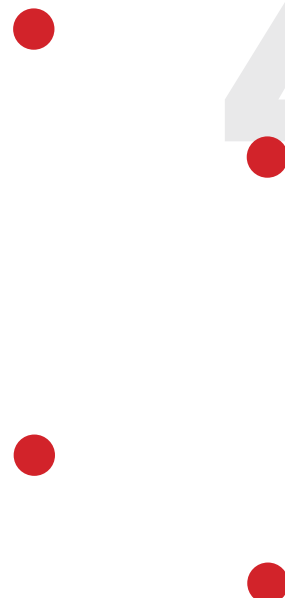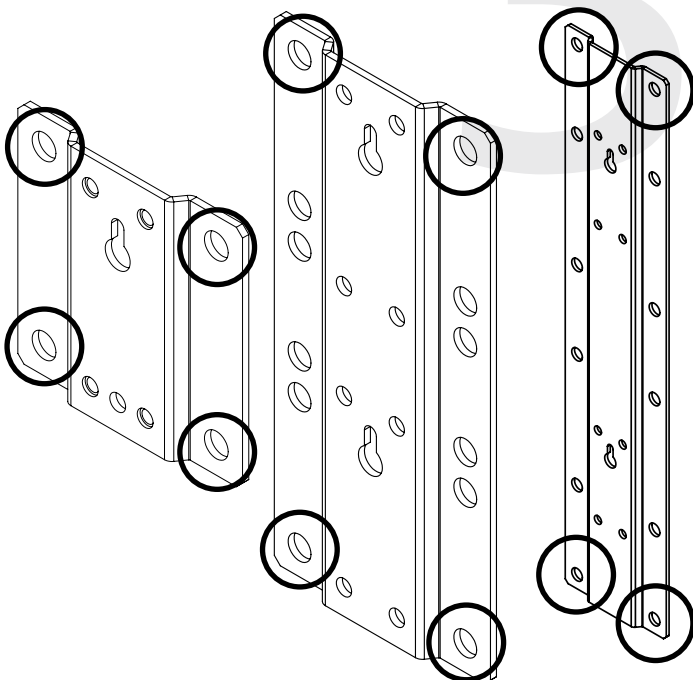
Wall Mount Installation

5) Pass screws through the washers, followed by the wall plates and wall anchors (if used). Secure tightly.

6) Attach the mounting pieces to the wall plate.
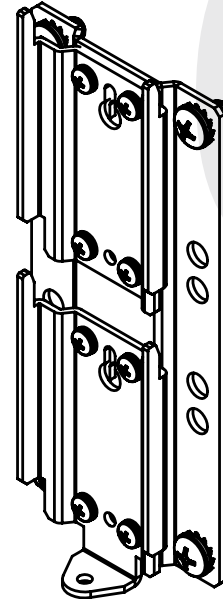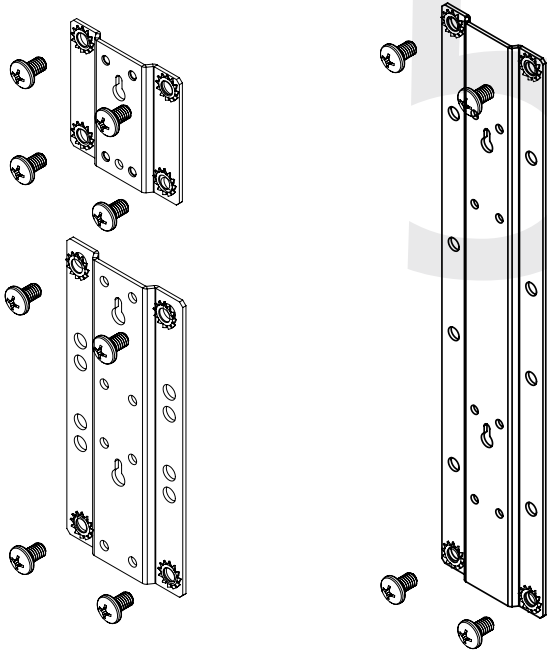
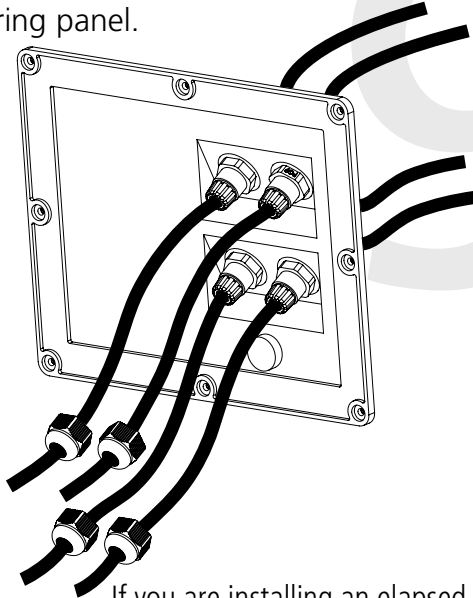7) Use a Phillips screwdriver to open the wiring panel. Store the screws in a safe place.

8) Unscrew the seal nuts that cover the gasket sizes that most closely resemble the diameter of your power cable. If you are also installing communication cables, do the same with a second seal nut and gasket. You may save or discard the sealing pegs for each gasket that's being replaced by a wire.
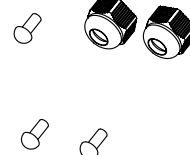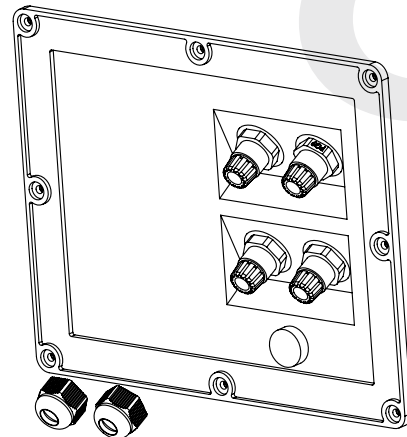
NOTE: Do not remove the seal nut or peg if you are not using the gasket that it covers.
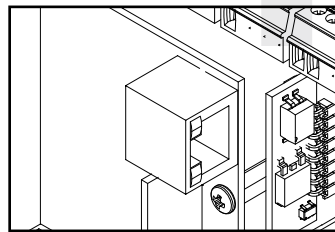
Wall Mount Installation

9) Pass all power and communication cables through the seal nut, followed by the gasket on the wiring panel.

10) Connect all power and communication cables to the appropriate ports on the circuit board. You should have already configured the clock using the instructions provided earlier. If not, please take the clock down and do so now. For information on wiring, refer to the sections of this manual labeled Inputs and Outputs.

Power over Ethernet

100-240VAC 24V Ground | VAC Ground | 100-240VAC 24V Hot

Locally Powered

If you are installing an elapsed timer, go to "Elapsed Timer Control Panel Installation - Optional Accessory"
If you are installing a temperature sensor, go to "Temperature Sensor Installation - Optional Accessory"

11) Screw the seal nuts back onto the wiring panel.

12) Use the Phillips screwdriver to close the wiring panel.
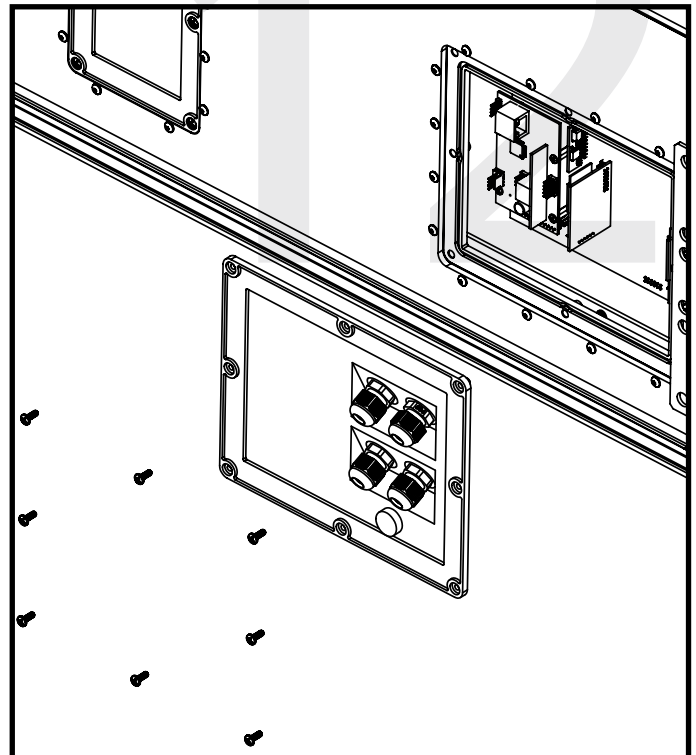
Wall Mount Installation

13) Slide the clock onto the mounting pieces. Peg A goes into Slot A, and Peg B goes into Slot B.
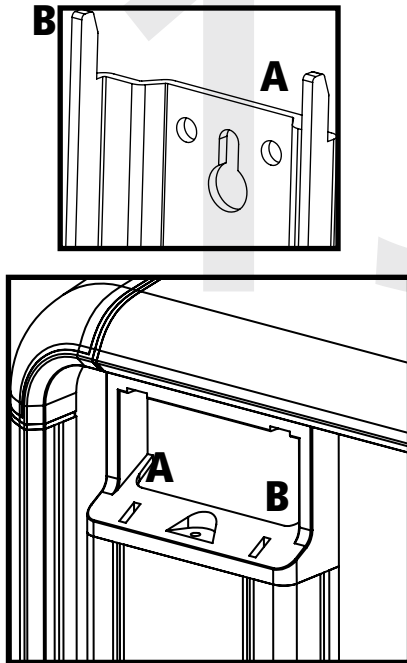
6" clocks use only one mounting piece.
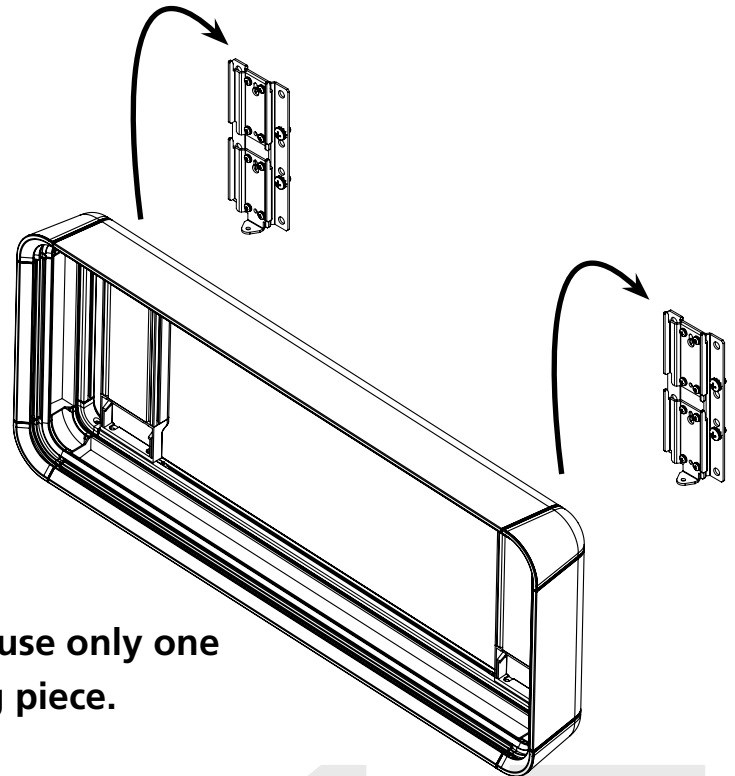
14) If you find that the mounting pieces are spaced too far apart, use a #2 Allen wrench to loosen the securing nut, slide the mounting receptacle to a better position, then tighten the securing nut again. Repeat until you are able to slide the clock onto the mounting pieces.

15) Use a Phillips screwdriver to insert and tighten the securing screws through the mounting piece and into the clock receptacle. Check to confirm that the clock is locked in place by attempting to lift the clock off of the mounting piece. If the clock does not move, then it was installed successfully. Removing these same screws will allow you to take the clock off of the wall if you feel the need to perform maintenance on it.

Double and Flag Mount Installation

VERY IMPORTANT:

CONFIGURE YOUR CLOCK BEFORE MOUNTING IT TO A WALL. REFER TO THE SYNCHRONIZATION SYSTEM SETUP SECTION OF THIS MANUAL FOR INSTRUCTIONS.

All network and/or master clock equipment must be powered and configured before you install the clock. If the network and/or master clock equipment is not properly installed and powered, and if the clocks have not been configured to communicate with this equipment, the secondary clocks will not synchronize.

Included in Clock Package(s)
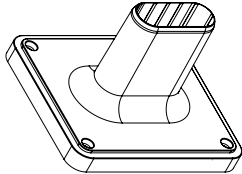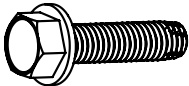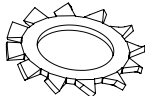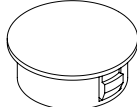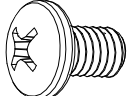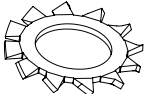
Description	Quantity	Picture
Large Digital Clock	1	
Mounting plate	2	
Mounting bracket	2	
Upper Mounting bracket	0 or 2 (depending on model)	
Securing Screw	2	
Bracket Screw	8 or 16 (depending on model)	

 Multiply everything on this page by two if you are setting up a double-mount clock.

To power the clock, you will need a 3-conductor cable with double isolation. A PoE clock does not need this cable as power is provided through the network cable. PoE clocks can be identified by their part number, which will always end in 0. All other clocks require the 3-conductor cable.

Double and Flag Mount Installation

Included in Pole Package(s)

Description	Quantity	Picture
Mounting pole base	1	
Mounting pole	1	
Pole Bolt	2 per base	
Grounding wire	1 per base	
Pole Lock washer (8X3/8)	2 per base	
Wire grommet (outdoor only)	2 per base	
Close cap (flag mount only)	1per base	
Mounting plate screw	16 per base	
Mounting plate washer (8X5/16)	16 per base	

You will also need enough screws to mount each base to the wall or ceiling (4 per base). The type of screw you select depends on the material of the wall or ceiling, and the weight of the clock(s) you're installing. The screw thread should not exceed the 0.39" (1.0cm) diameter of the hole, and should be able to withstand pullout and sheer forces of 500lbs (227kg).

Double and Flag Mount Installation

1) Locate a section of wall capable of supporting the clock. If mounting the clock on wood drywall, locate two separate studs for attaching the mounting pieces.

2) Run power, grounding, and communication wiring to the point of installation. Leave enough slack to run the cables all the way up the mounting pole and into the clock.

CHECK YOUR WIRING

The voltage between the hot and common wires should measure 105-126 volts AC in the 110 volt model, 207-253 volts AC in the 230 volt model, or Yellow & orange wires for 21.5-26.5 volts AC/DC in the 24 volt model.

If you are using the 24 volt model, make sure that the wiring leading to the clock is from an ISOLATED transformer.

To power your clock with a PoE connection, the clock must satisfy the following conditions:

• Has an RJ45 Port • Part number ends with "0"

• Has either a Red or Amber display

• Has either 6.0" or 9.0" digits.

If any of these conditions are not met, PoE cannot be used with the clock.

3) Using either the clock template or the holes on the pole bases and a level, mark holes for wall anchors. If on a section of drywall, all marked holes should overlap a wall stud.

4) Use a drill to drill the holes into the wall. When finished, install the wall anchors if needed for your application.
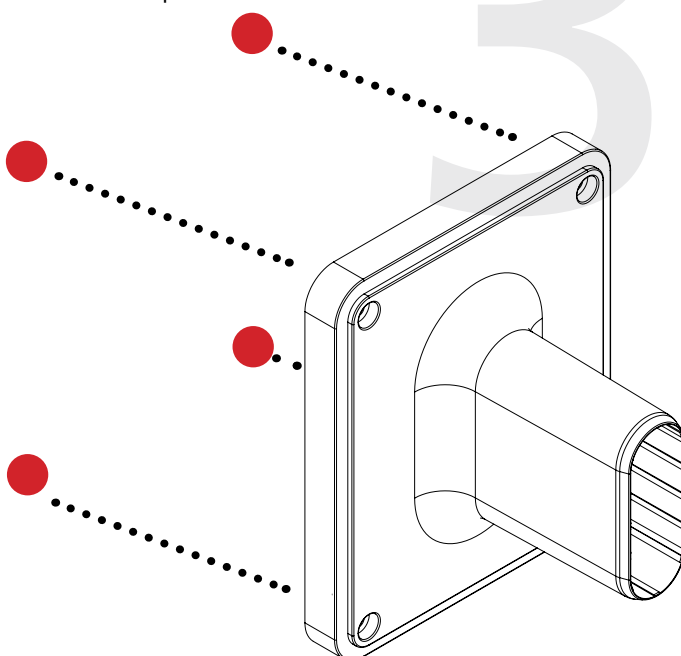
Double and Flag Mount Installation

5) Slide the pole into the mounting base.
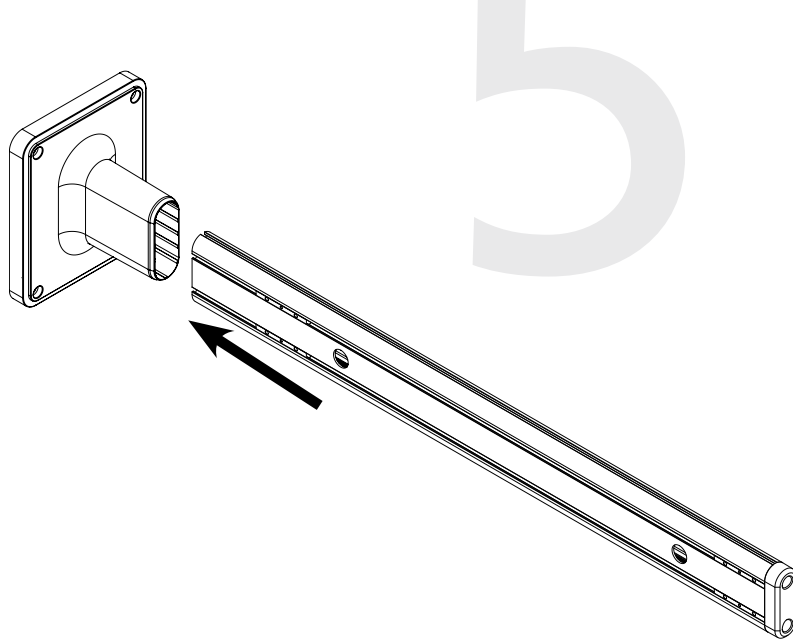
6) Secure the pole to the mounting base using the two pole bolts, lock washers, and grounding wire.
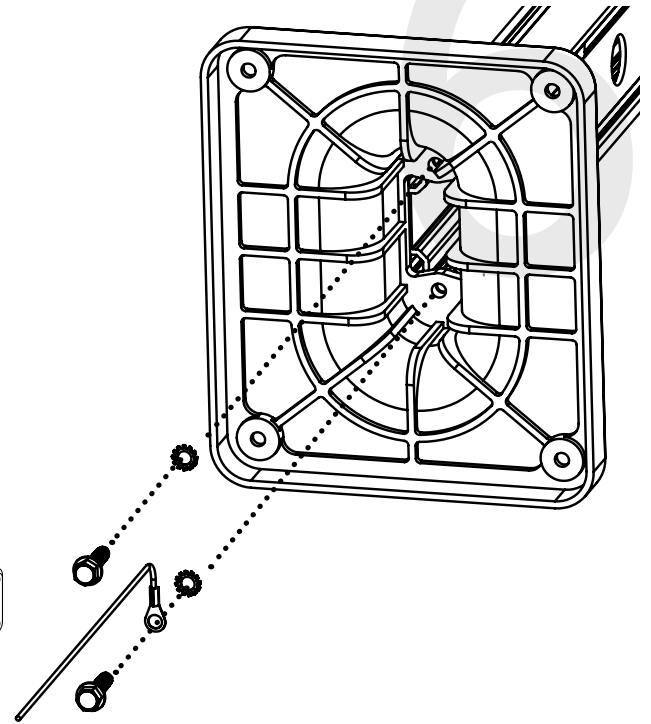
7) Attach the securing plates to the pole(s) in the desired position and orientation.
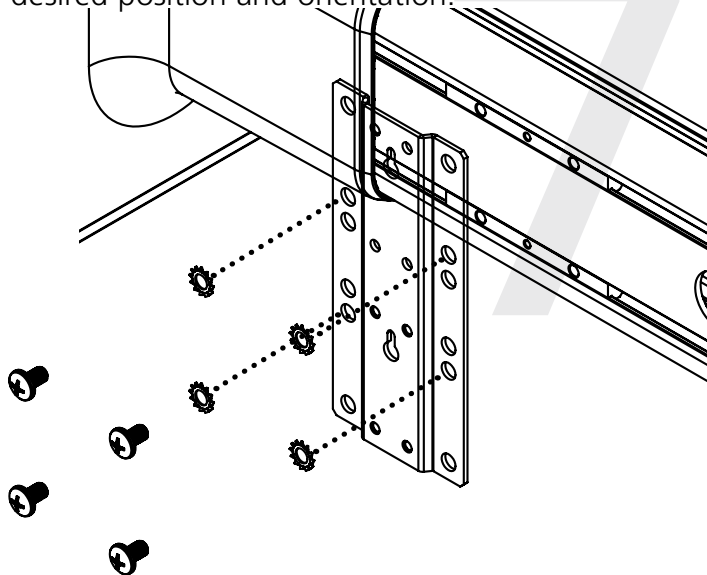
8) Connect the mounting brackets to the securing plates. Repeat for each bracket.
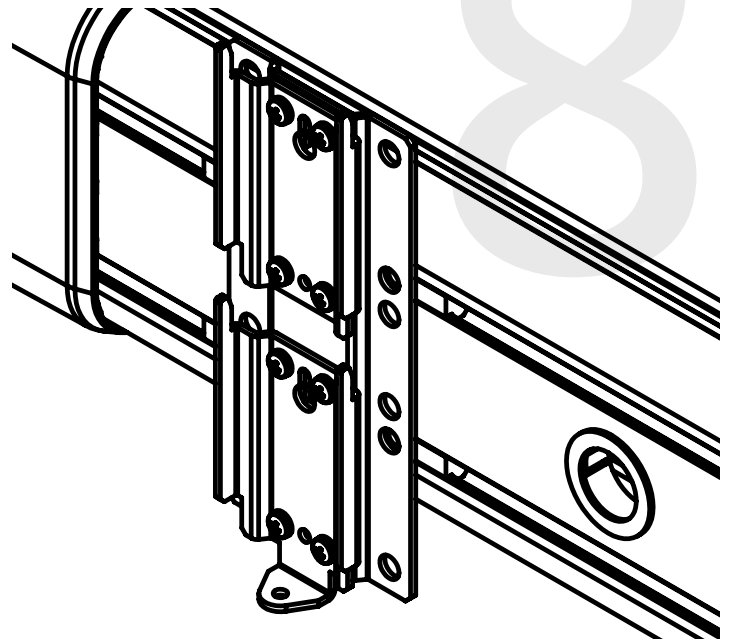
Double and Flag Mount Installation

9) Confirm that the set-up poles match the
configuration for your clock type.

6" and 9" Wall Mount
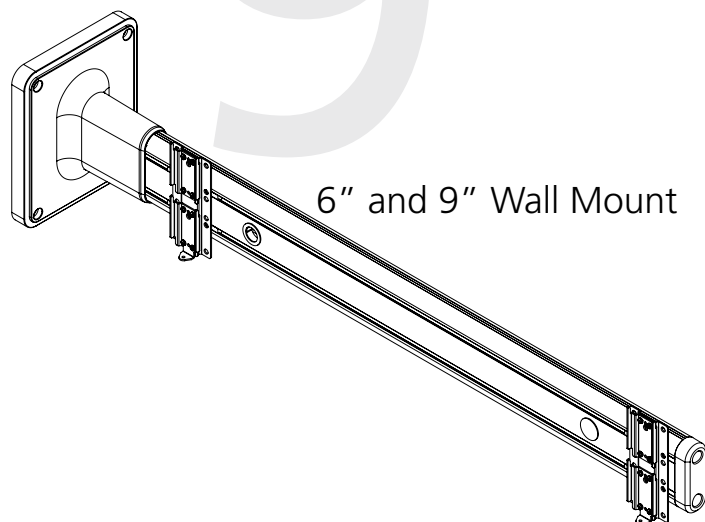
6" and 9" Ceiling Mount

12" Wall Mount
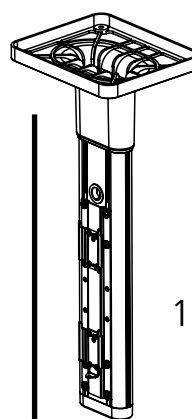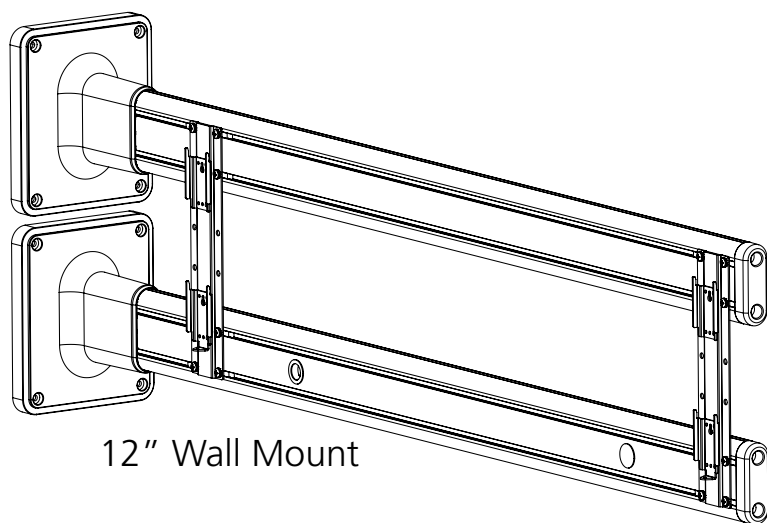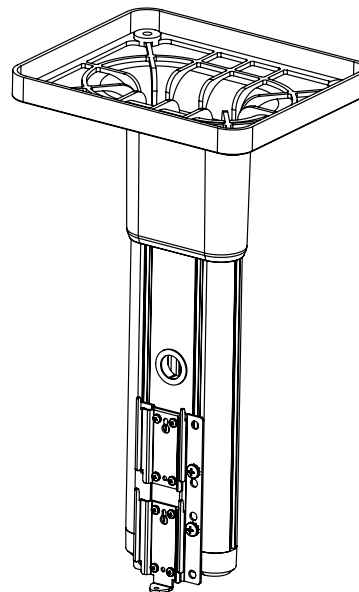
12" Ceiling Mount
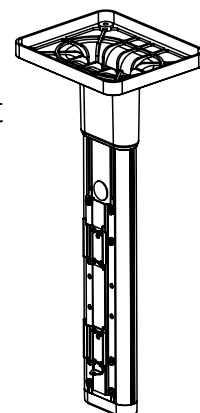
Double and Flag Mount Installation

10) Run power and communication wiring (if applicable) through the base of the mounting pole and out through the appropriate hole(s) in the sides of the pole. Look at the position of the wiring panel on the back of your clocks for help determining which hole is appropriate for your wires. *Connect the grounding wire in the pole to the grounding wire from the wall/ceiling at this time.*
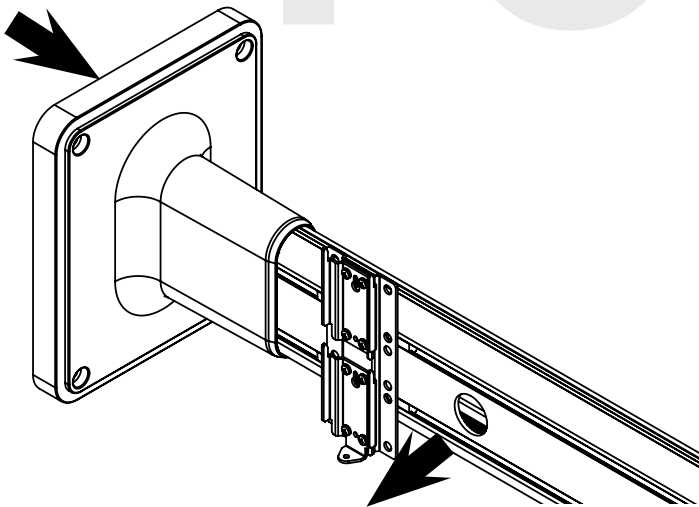
11) Pass screws through the base and into the wall anchors or drilled holes in the wall/ceiling. Secure tightly.
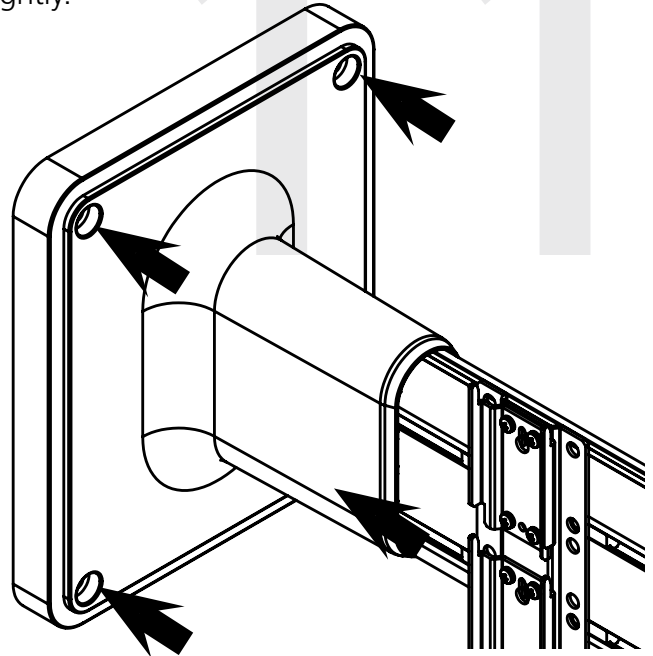
12) Pass wires through grommet(s) and connect grommet(s) to pole(s).
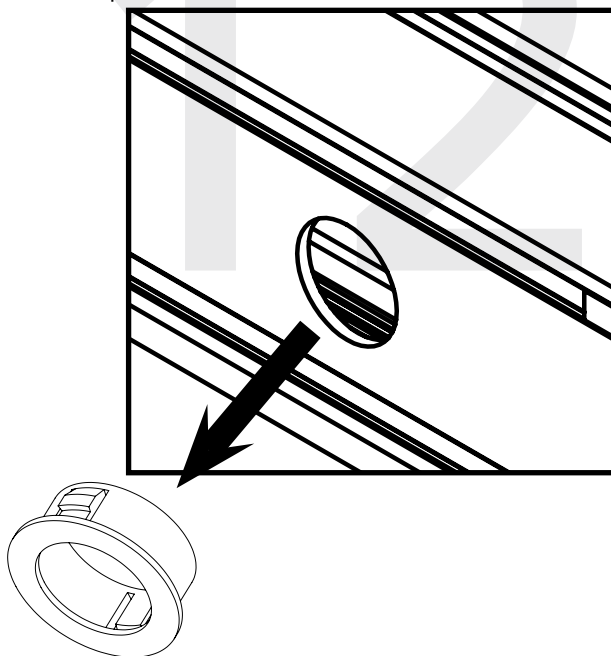
13) **If this is a flag-mount clock**, install the close cap in the unused hole.

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The Sapling Company, Inc.
670 Louis Drive
Warminster, PA 18974
USA

P. (+1) 215.322.6063
F. (+1) 215.322.8498
www.sapling-inc.com
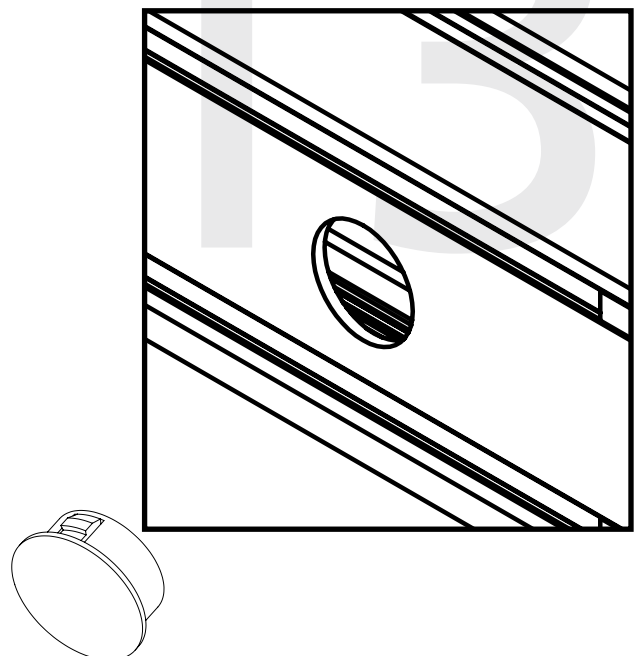
Double and Flag Mount Installation

14) Use a Phillips screwdriver to open each wiring panel. Store the screws in a safe place.

15) Unscrew the seal nuts that cover the gasket sizes that most closely resemble the diameter of your power cable. If you are also installing communication cables, do the same with a second seal nut and gasket. You may save or discard the sealing pegs for each gasket that's being replaced by a wire.

NOTE: Do not remove the seal nut or peg if you are not using the gasket that it covers.

16) Pass all power and communication cables through the seal nut, followed by the gasket on the wiring panel.

17) Connect all power and communication cables to the appropriate ports on the circuit board. You should have already configured the clock using the instructions provided earlier. If not, please take the clock down and do so now. For information on wiring, refer to the sections of this manual labeled Inputs and Outputs.

Power over Ethernet

100-240VAC 24V Ground | VAC Ground | 100-240VAC 24V Hot

Locally Powered

If you are installing an elapsed timer, go to "Elapsed Timer Control Panel Installation - Optional Accessory"
If you are installing a temperature sensor, go to "Temperature Sensor Installation - Optional Accessory"

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Double and Flag Mount Installation

18) Screw the seal nuts back onto the wiring panel.
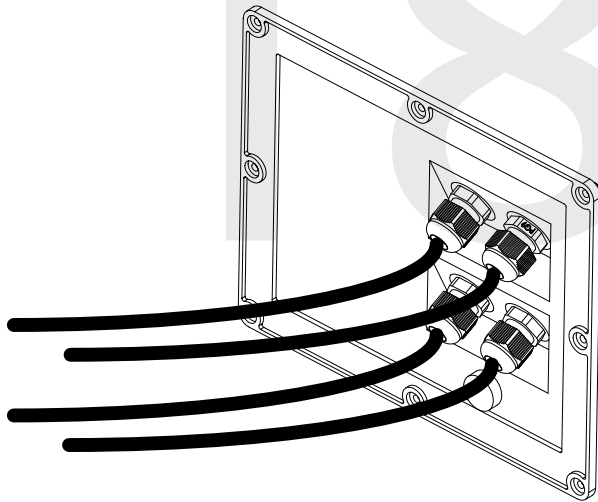
19) Use the Phillips screwdriver to close the wiring panel.
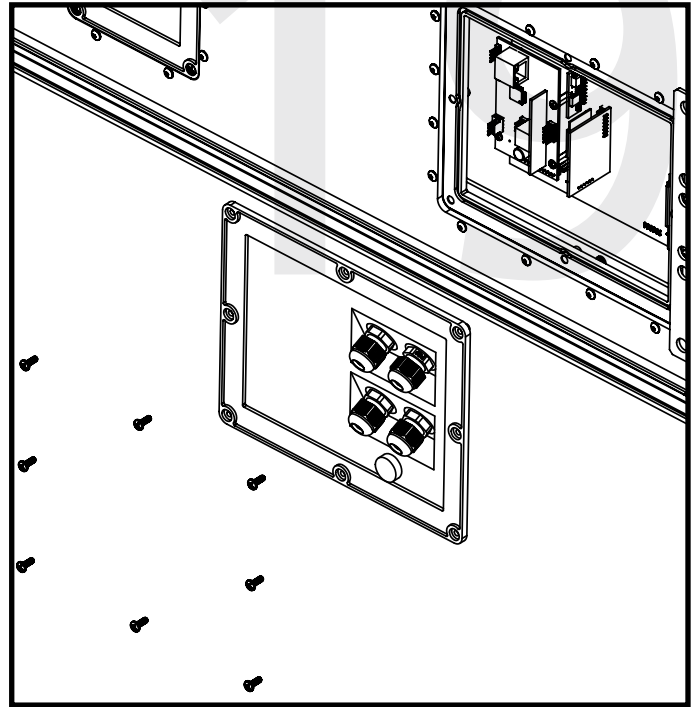
20) Slide the clock onto the mounting pieces. Slide the clock onto the mounting pieces. Peg A goes into Slot A, and Peg B goes into Slot B.
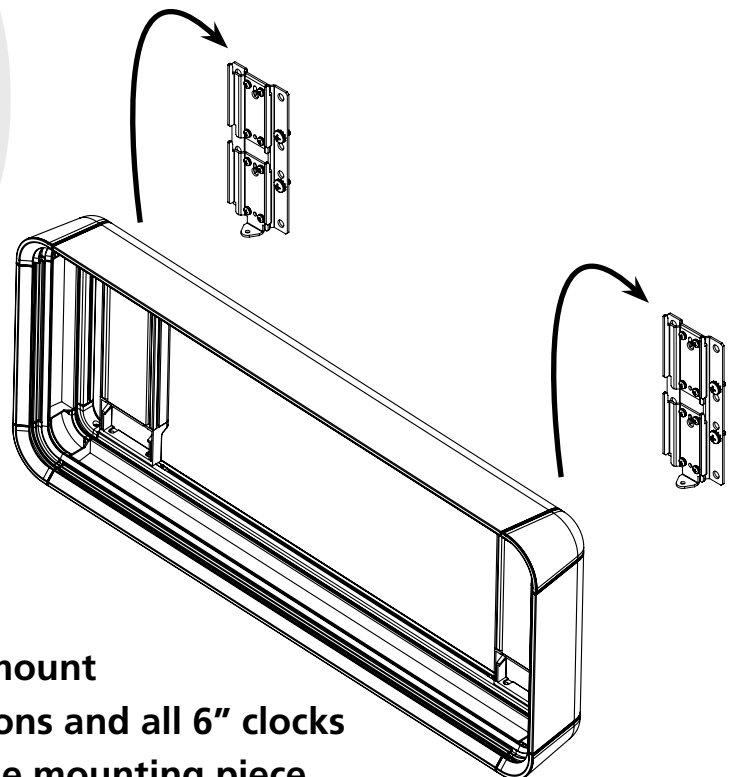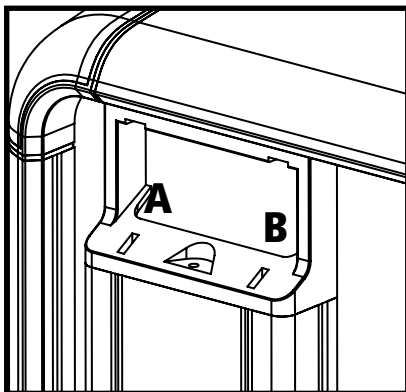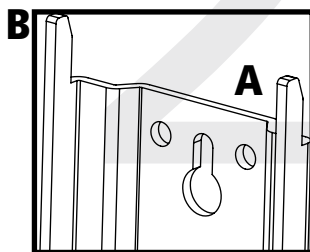
9" Ceiling-mount configurations and all 6" clocks use only one mounting piece.

Double and Flag Mount Installation

21) If you find that the mounting pieces are spaced too far apart, use a #2 Allen wrench to loosen the securing nut, slide the mounting receptacle to a better position, then tighten the securing nut again. Repeat until you are able to slide the clock onto the mounting pieces.
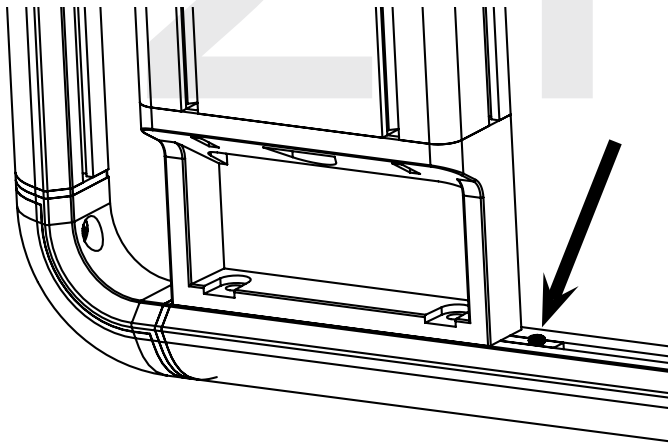
22) Use a Phillips screwdriver to insert and tighten the securing screws through the mounting piece and into the clock receptacle. Check to confirm that the clock is locked in place by attempting to lift the clock off of the mounting piece. If the clock does not move, then it was installed successfully. Removing these same screws will allow you to take the clock off of the wall if you feel the need to perform maintenance on it.
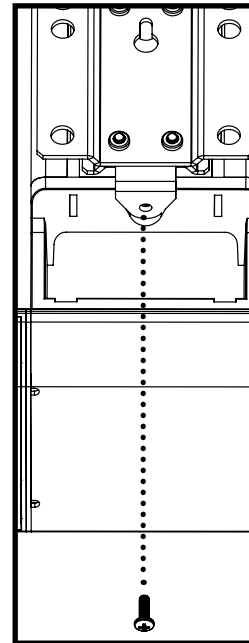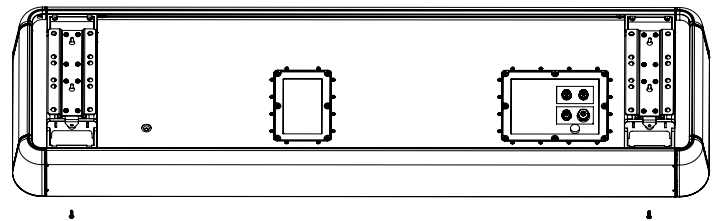
Elapsed Timer Control Panel Installation - Optional Accessory

Reminder: Electricity can be dangerous at higher voltages. Keep the electricity to this device turned off until after the wiring has been added. Do not add new circuitry while the device is operating.

CAT5 Cable up to 100ft (33.3m) long
Pin 5 - Should be left empty.
Pin 4 - Blue & Blue/White
Pin 3 - Green & Green/White
Pin 2 - Orange & Orange/White
Pin 1- Brown & Brown/White
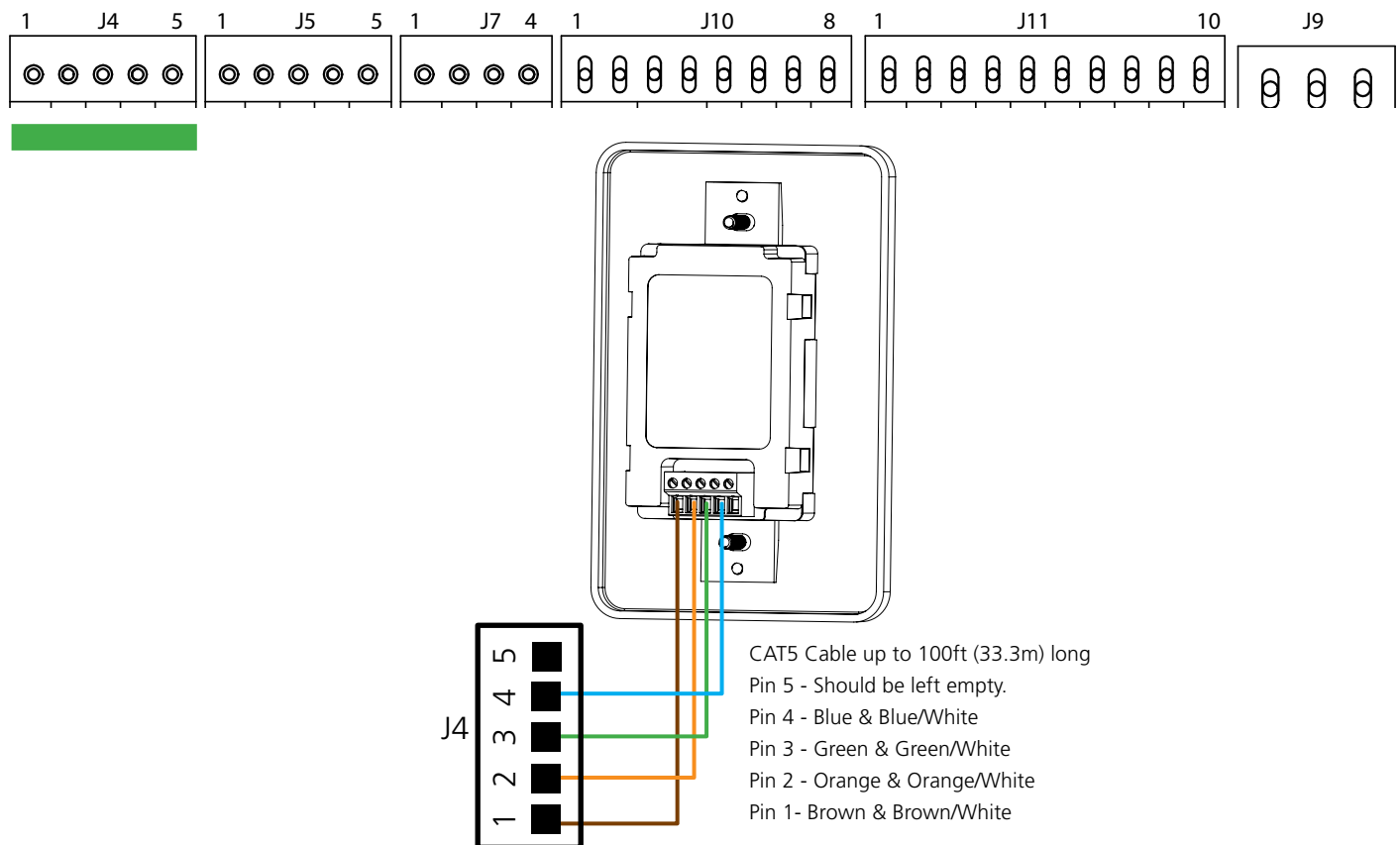
CAT5 Cable Notes:

Use an 8 conductor 24AWG CAT5 cable up to 100 feet long, and use the wire colors shown above. Pin 1, Pin 2, Pin 3, and Pin 4 each use the wire pair described above. Both of the green 5-pin connectors should be wired the same way: a wire going into port 1 on one connector should also go into port 1 on the other connector.

Strip the insulation back 1/4 inch on all wires and twist the two wires of each pair together. Insert each pair of wires into the appropriate port on the connector and tighten the screws.

*Customer must supply CAT5 cable to connect the Elapsed Timer to the digital clock.

Temperature Sensor Installation - Optional Accessory

(**IMPORTANT:** Detach clock from power source before installing new circuitry. DO NOT add new circuitry while the clock is operating)

Attach the end of the Temperature Sensor Wire to the circuit board in the following manner:
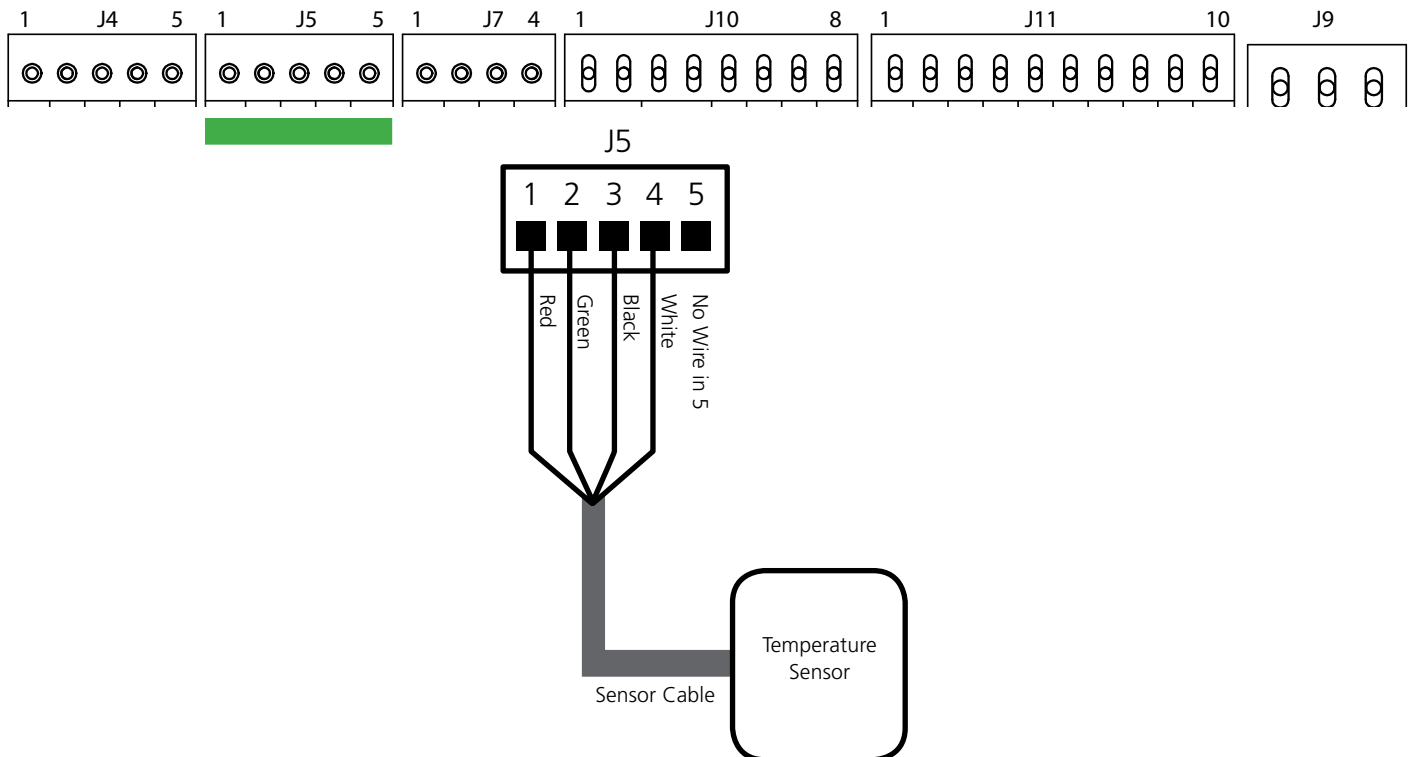
The green connector is not designed to fit through the seal nut or gasket on the main board wiring panel. After threading the cable through a seal nut and gasket of your choice on the wiring panel, use a small screwdriver to secure the wires to the connector ports shown above.

The Sensor Cable is 6 feet (1.83 meters) long, and so the sensor should be positioned within 6 feet of the clock. The cable is unshielded, 4 conductor, 22AWG (.33mm²). If longer than 6 feet is required, the wire would have to be terminated in an electrical box, and the longer wire would have to be provided by the customer.

Data from the temperature sensor will be sent to your clock when the clock is powered on. For more information on how to make the digital clock display temperature, please see the section labeled "Web Interface - Display Settings".

Buzzer - Optional Accessory

(**IMPORTANT:** Detach clock from power source before installing new circuitry. DO NOT add new circuitry while the clock is operating)

The Buzzer accessory kit (L-BUZZ-3300-1**) comes with all wires already installed in the correct ports for the J10 and J11 connectors, and installation can be completed by attaching these connectors to the J10 and J11 sockets on the clock main board.**

If you wish to set up the buzzer on existing connectors, use the instructions below.

You will need the buzzer, the small yellow 26AWG wire, a wire stripper, and an eyeglass screwdriver.

1) Use the eyeglass screwdriver to open connector ports J10-3, J10-4, J11-1, and J11-3. Refer to the diagram below for the position of each port.

2) Connect the red wire on the buzzer to port J11-3.
3) Connect the black wire on the buzzer to port J10-3 (relay 2) on the main board.
4) Strip the ends of the extra yellow wire and use it to connect J10-4 (relay 2) to J11-1.
5) Use the eyeglass screwdriver to close all four ports. Tug gently on each wire to confirm that each wire end is secure.
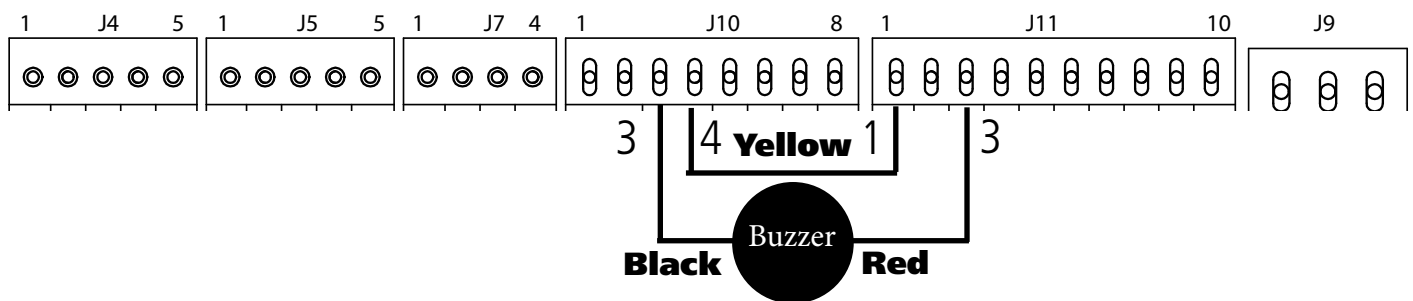
To activate the buzzer with a countdown, log on to the web interface and perform the following actions:

1. Click on the "Input and Relay Settings" button, followed by the "End Countdown" button. Find the drop-down menu next to "On Countdown complete, close" and select "Relay 2"
2. In "for ____ seconds" set the amount of time that you wish the buzzer to sound when the countdown ends. The number must be a whole number from 1 to 60.
3. Press the Submit button.

To activate the buzzer without a countdown, click on the Input and Relay Settings button, followed by either the Elapsed Timer or Inputs button. For the button or input that you wish to trigger the buzzer, set the Action as Relay 2. Press the submit button after inputting these settings.

Pressing the button on the Elapsed Timer Control Panel or activating the input will cause the Relay to toggle to the opposite of its current setting and remain that way until the button or input is activated again. If the Buzzer is currently off, this will turn the buzzer on. If the buzzer is currently on, this will turn the buzzer off.

Inputs - Sync-Wire and 2-Wire Digital

If your clock is set to receive data through wires from another device as its primary time input, the wires must be attached to the proper ports on the clock. The diagram below shows the locations and the functions of each port.

1	2	3	4	5	6	7	8	9	10
Common	5V, 40MA	9-12V, 40MA	AUX	5V Dry Contact	Dukane Pulse	Dukane Reset	24 VAC Sync	120/230 VAC Sync	AC/DC Common
Sync Inputs									
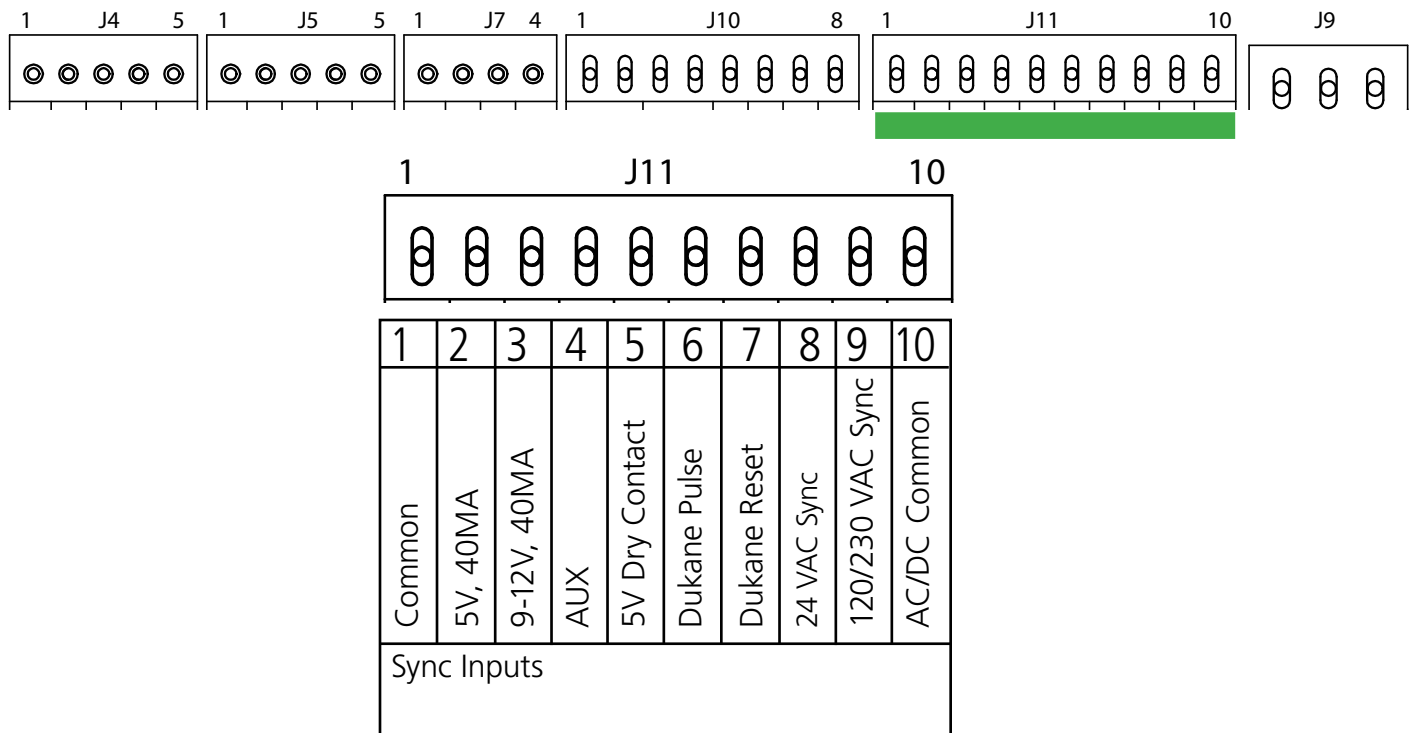
Consult the wiring diagrams on the following pages for information on how to install wiring specific to your synchronization method. Relevant port numbers will be listed with each diagram.

IMPORTANT: Your clock will only accept input from another device if you command it to do so through the web interface. For information on how to do this, please see the section labeled **Web Interface - Inputs** and select the appropriate Input Sync Relay option.

2-Wire Digital

Input
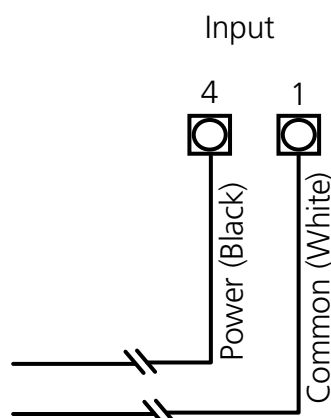
While a 2-wire digital converter box can provide enough power for a single Large Digital Clock, it does not leave much power for additional clocks on the system. To address this, 2-wire digital clocks should be locally powered using the voltage listed at the end of your part number.

Inputs - Sync-Wire

59 Minute Correction

Dry Contact Closure

| 2 | 10 | 5 | 1 |

N.O.
COM

110VAC Interface or 240VAC Interface

| 10 | 9 |

110VAC Neutral
110VAC Hot

24VAC Interface

| 10 | 8 |

24VAC Neutral
24VAC Hot
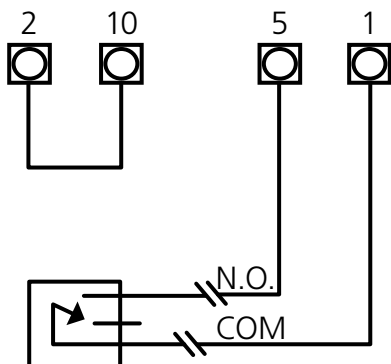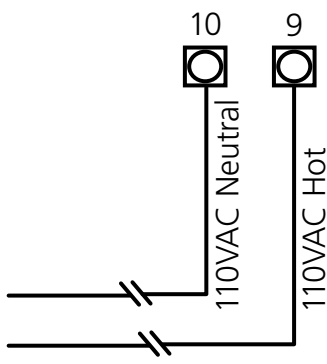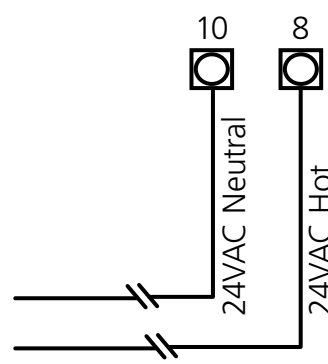
58 Minute Corrections 1–4

Dry Contact Closure

| 2 | 10 | 5 | 1 |

N.O.
COM

110VAC Interface or 240VAC Interface

| 10 | 9 |

110VAC Neutral
110VAC Hot

24VAC Interface

| 10 | 8 |

24VAC Neutral
24VAC Hot
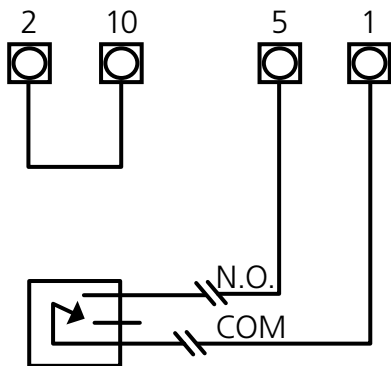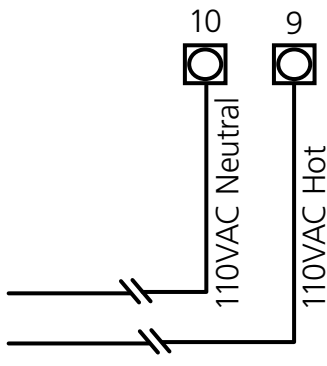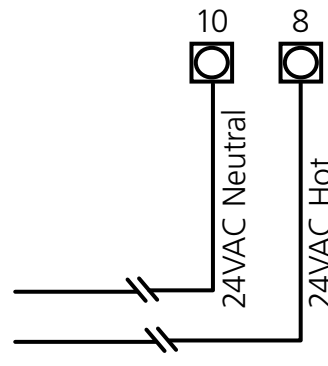
Inputs - Sync-Wire

National Time/Rauland

Dry Contact Closure

2   10   5   1

N.O.
COM

110VAC Interface or
240VAC Interface

10   9

110VAC Neutral
110VAC Hot

24VAC Interface

10   8

24VAC Neutral
24VAC Hot

Rauland Digital

Input

10   2

Dig Line
+5V

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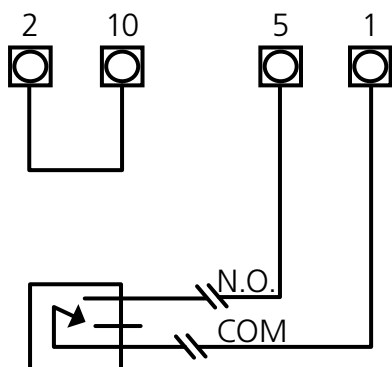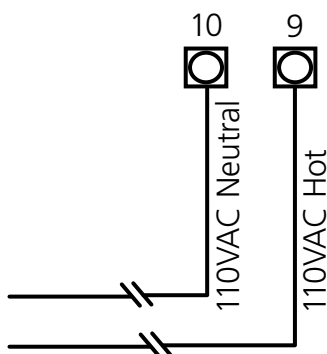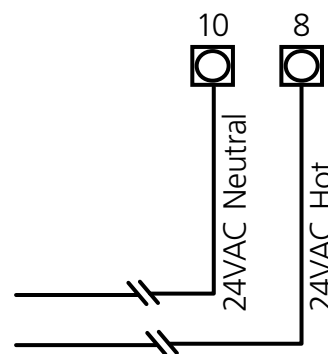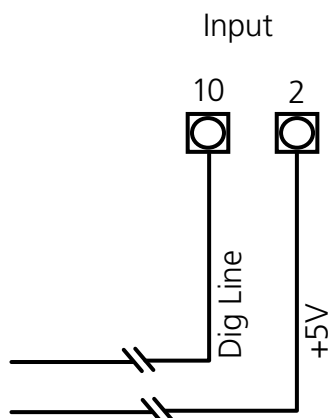
Inputs - Sync-Wire

Dukane Digital

2   10   7   6   1

Reset

Minute Pulse

Ground
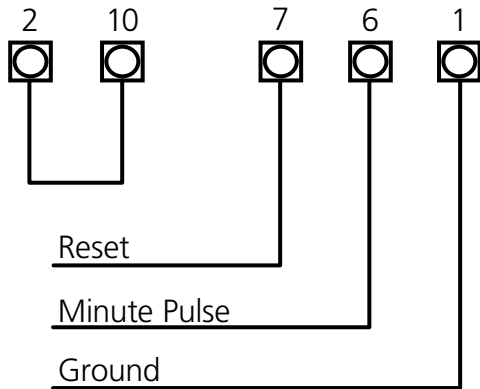
Once a Day Pulse

Dry Contact Closure

2   10   1   5

N.O.

COM

Inputs - RS485

1   J4   5   1   J5   5   1   J7   4   1   J10   8   1   J11   10   J9

1   J7   4

1	2	3	4
Input A	Input B	Output A	Output B
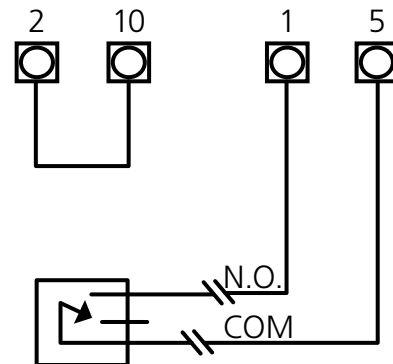
RS485
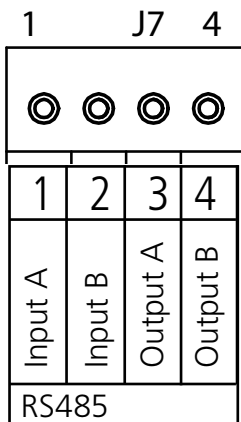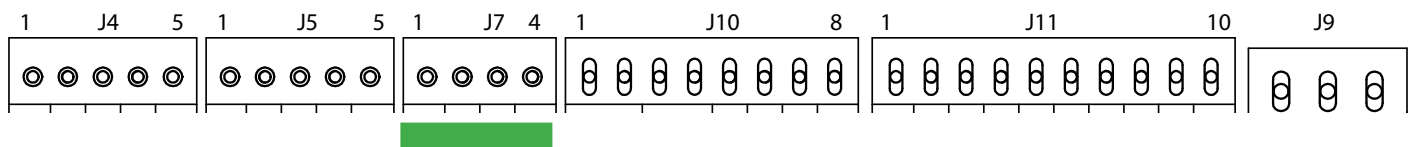
Master Clock Output

21 20 19 18

Refer to the Master Clock
Manual for additional details

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User Input Installation

(**IMPORTANT:** Detach clock from power source before installing new circuitry. DO NOT add new circuitry while the clock is operating)

During installation, wires for the inputs should be installed in the appropriate ports on the right side of block J10, while ground should be run to port 1 on the left side of block J11. Refer to the diagram for details. The four available inputs are assigned per the diagram below.

Use a dry contact closure between any of the Input ports on J10 and the Common port on J11 activate one of the numbered user inputs. This input is a *dry contact closure*, which means that **the user should not be providing external power on either of the lines leading from the relay to the clock.** The dry contact closure only needs to complete the circuit when activated, and can be a simple switch or button.

To configure what a given input does to the clock when activated, refer to the section of this manual labeled "Web Interface - Inputs."

EXAMPLE
(Triggers Input 1)
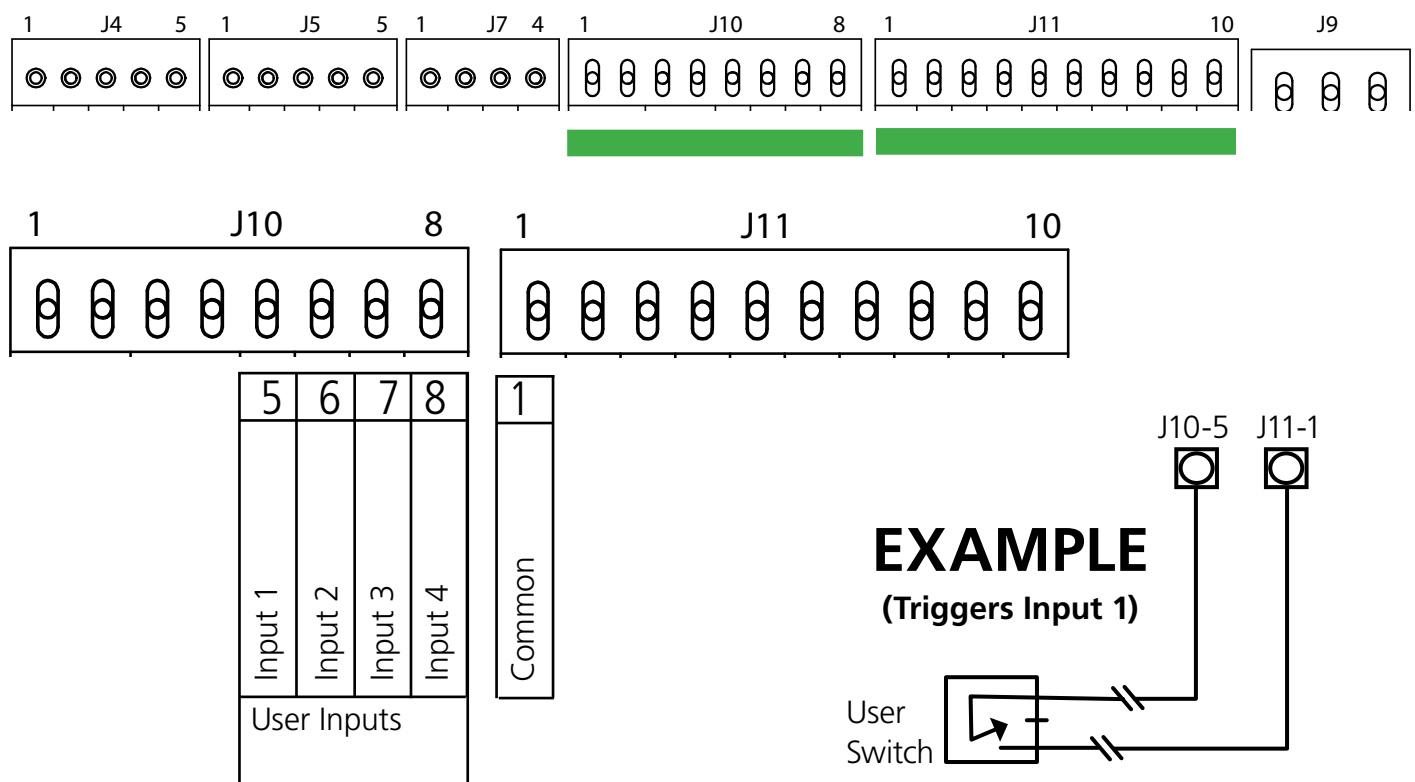
The action performed once an input has been triggered must be configured on the web interface. Refer to the section of this manual labeled "Web Interface - Inputs" for more information.

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Outputs

RS485 and 2-Wire Digital - Master Mode

During a loss of communication with the Master Clock, the digital clock can act as a temporary, backup master clock for other clocks in the system. There are inputs and outputs for RS485 wires on block J7. Refer to the diagram for details. For J7, the ports in the block are listed as 1-4, starting with port 1 on the left and ending with port 4 on the right.

This feature must be activated through the web interface. Refer to the section of this manual labeled "Web Interface - Outputs" for instructions on activating this system.
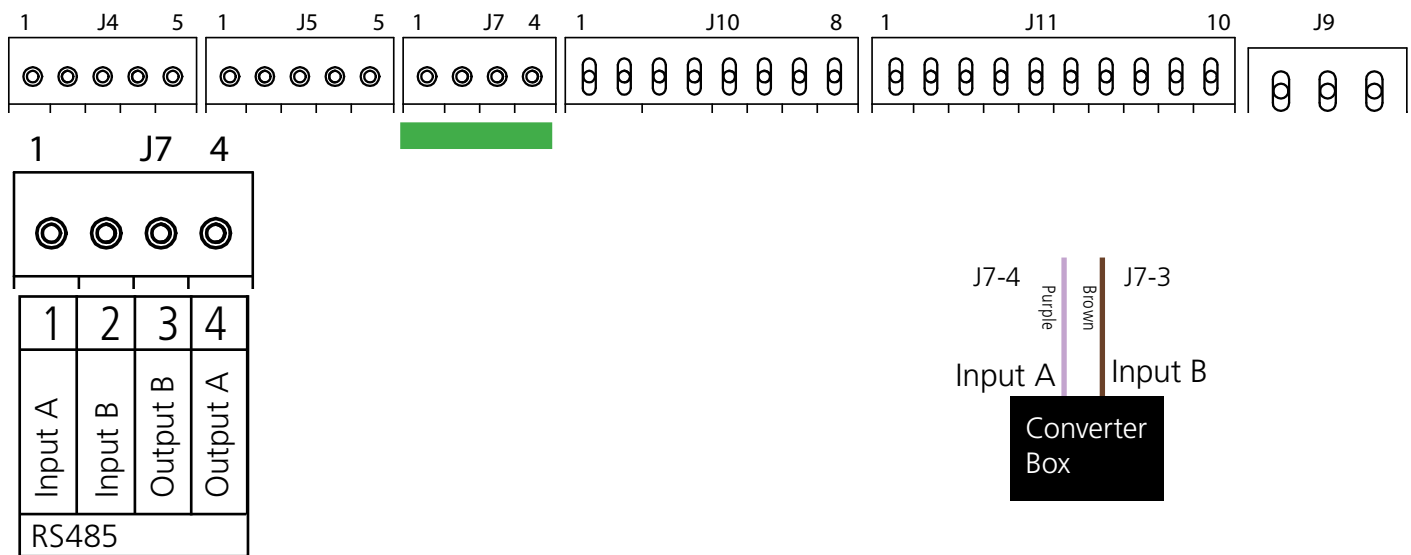
Output Relays (Including Sync-Wire)

(**IMPORTANT:** Detach clock from power source before installing new circuitry. DO NOT add new circuitry while the clock is operating)

There are two programmable relays on the main board, located on the left side of port block J10. Each relay consists of two ports. The leftmost pair is Relay 1, while the rightmost pair is Relay 2.
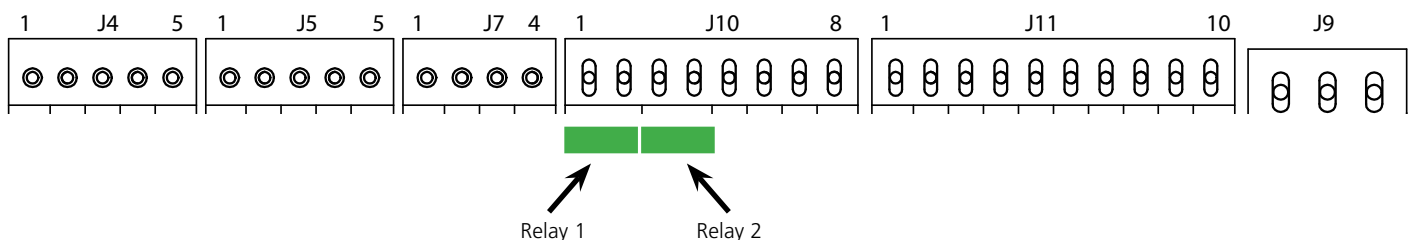
For each relay, one port should contain a power line, while the other port should contain the reset line. When configured in this fashion, the relay can be used to operate an intercom, paging system, bell or, other device. Both relays are configured to remain Open unless they are activated. If the relay is activated, it will close the circuit by connecting the two lines.

This feature must be activated through the web interface. Refer to the section of this manual labeled "Web Interface - Outputs" for instructions on activating this system.

Network Monitor Software - Main Screen

YOUR COPY OF THE NETWORK MONITOR MAY HAVE ADDITIONAL COLORS OR BRANDING.

THE MONITOR SHOWN IN THIS MANUAL CONTAINS NO BRANDING OR COLORS.

ALL FEATURES REMAIN THE SAME.

Wi-Fi & Wired LAN Sync Only
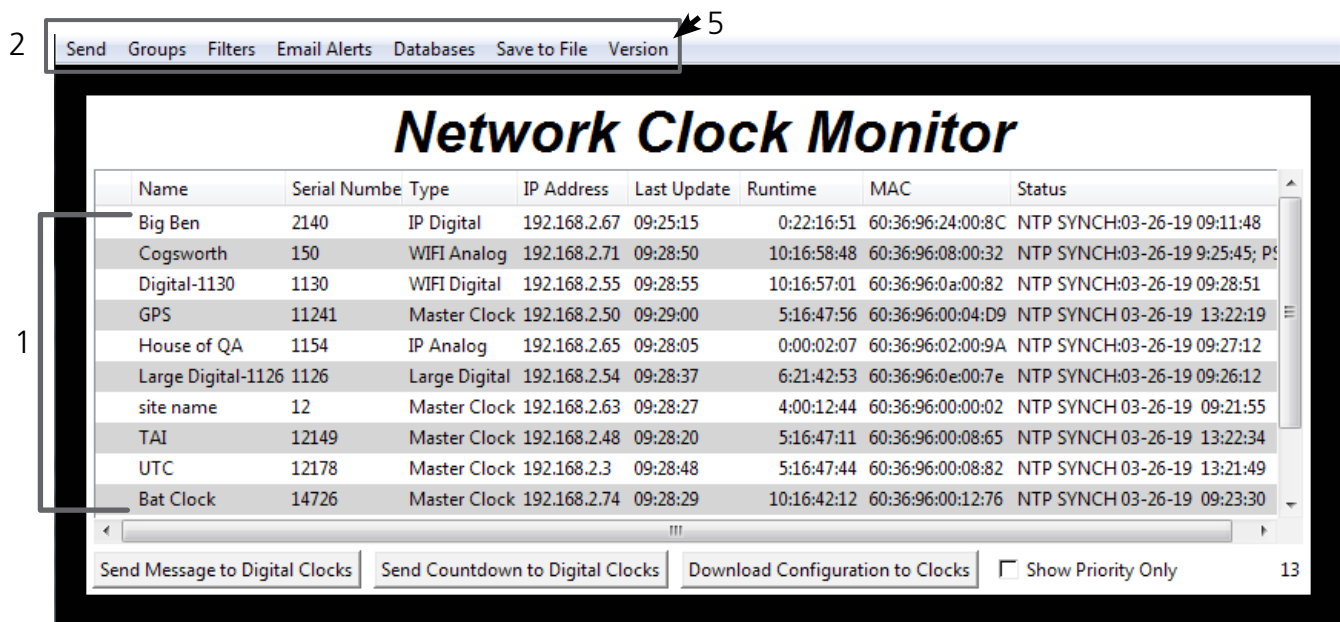
1. **Device List** - Displays all of the relevant IP devices that are active on the system subnet. The monitor screen displays the name of the clock, serial number, type of clock, IP address, last updated time, how long the clock has been running, and the status of the clock. Double clicking on a device in the device list will open the web interface for that device.

Using a right-handed mouse to right-click on any row in the Device List will open the **Quick Access Menu**. See the section in this manual labeled "Network Monitor Software - Quick Access Menu" for more information.

2. **Task Bar -** See the section in this manual labeled "Network Monitor Software - Task Bar Options"

3. **Show Priority** - By selecting this option, the IP device(s) that the user previously "marked as priority" will be the only clocks shown in the program window.

4. **Device Count** - This number is the amount of IP devices that are displayed on the Network Monitor Software.

The Network Monitor has two subtypes:

CFA - Intended for use with Wi-Fi Clocks, Master Clocks, Network Repeaters, Wi-Fi Large Digital Clocks, and Network Repeaters.

CFL - Intended for use with IP-PoE Digital, Wired IP Large Digital, and IP-PoE Analog Clocks. You can check the type by clicking on "Version" (5) at the top of the Monitor window.

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Network Monitor Software - Main Screen

Wi-Fi & Wired LAN Sync Only
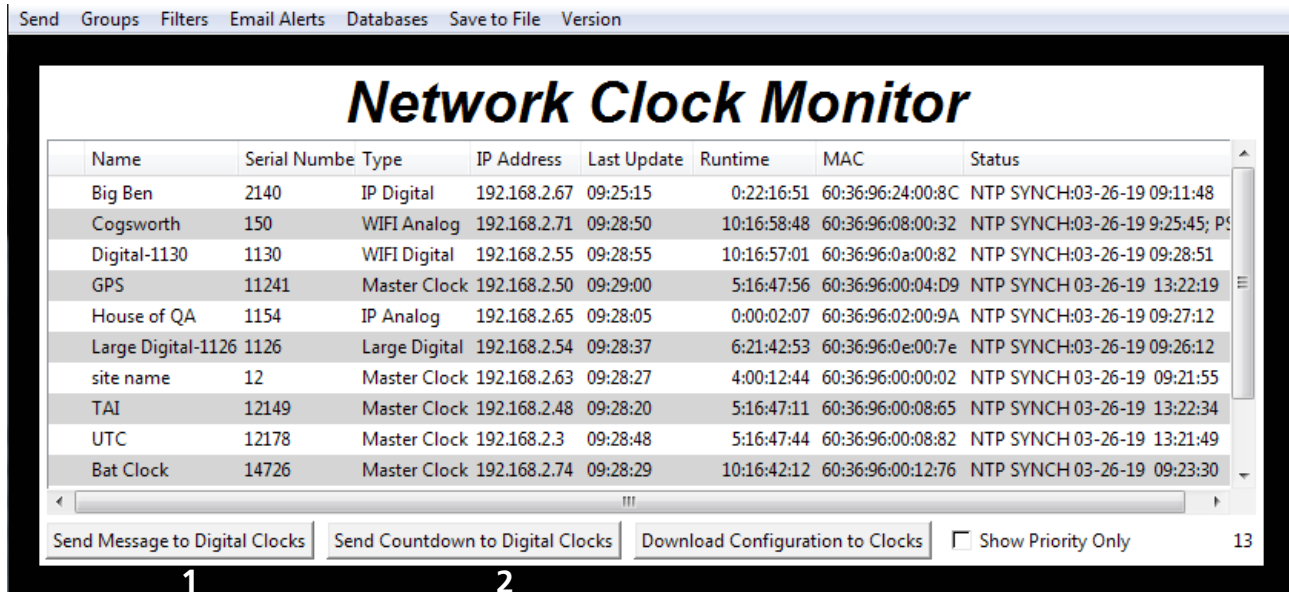
1. **Send Message to Digital Clocks** -Allows the user to generate a message that will be sent to digital clocks.

   a.   **Enter Password -** The default password is 6063

   b.   **Message to be displayed -** Lets the user enter a message to be displayed on digital clocks. Messages may consist of the digits 0-9 and the English letters A-Z. The message is generated in a font that matches its appearance on the clock, so you can preview the appearance of each message before sending it. The message will repeat ten times once sent.

   c.   **Send to Selected Clocks -** Applies the message to whichever clocks have been highlighted on the Device List.

   d.   **Send to All Digital Clocks -** Applies the message to all IP-PoE Digital, Wi-Fi Digital, and Large Digital Clocks.
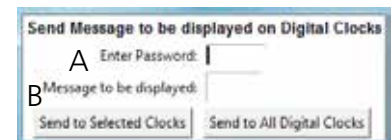
2. **Send Countdown to Digital Clocks** - Allows the user to generate a countdown that will be sent to digital clocks.

   a.   **Enter Password -** The default password is 6063

   b.   **Start values -** Enter the starting hour, minute, and second into the fields. For example, entering a 1 into each field will start a countdown from 1:01:01

   c.   **Send to Selected Clocks -** Applies the countdown to whichever clocks have been highlighted on the Device List.

   d.   **Send to All Digital Clocks -** Applies the countdown to all IP-PoE Digital, Wi-Fi Digital, and Large Digital Clocks.
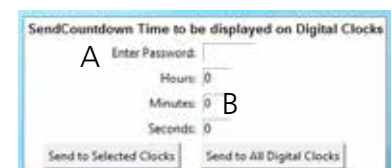
Network Monitor Software - Main Screen (ctd.)

Wi-Fi & Wired LAN Sync Only
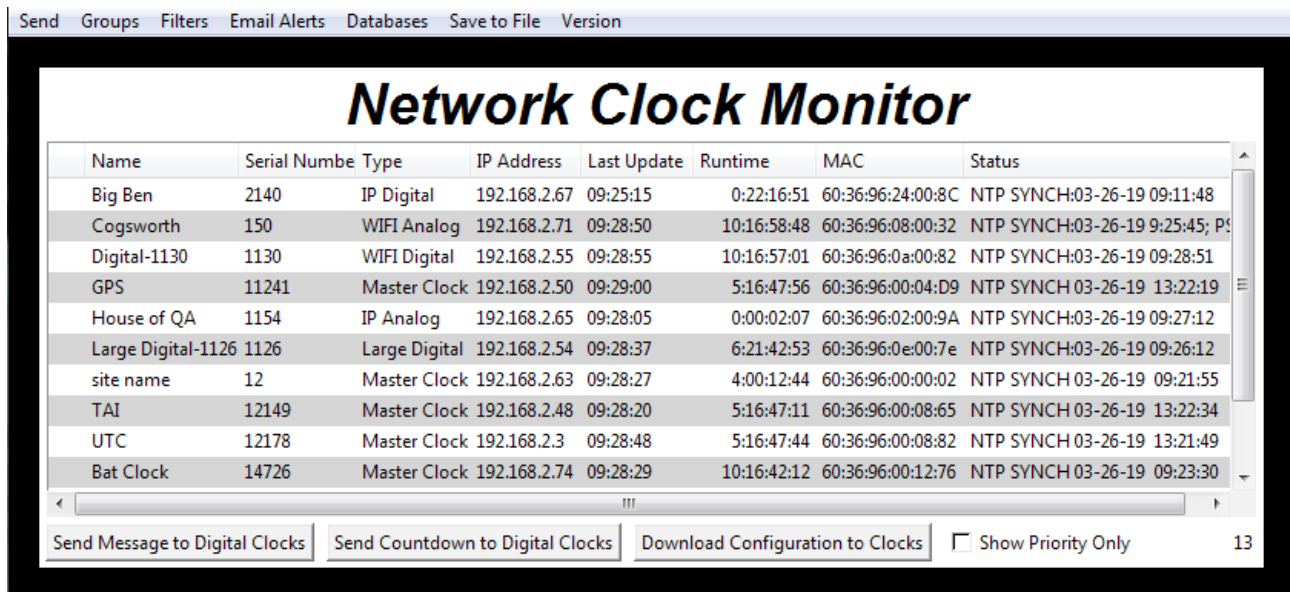
1

1. Download Configuration to Clocks - If a configuration file was created using "Upload and Save Configuration" on the Quick Access Menu, this option lets the user apply the configuration file to other clocks highlighted within the monitor. For more information, see the section of this manual labeled "Network Monitor Software - Quick Access Menu."

Pressing this button will cause the Download Configuration window to appear:

a.   **Enter Password -** The default password is 6063

b.   **Select Configuration -** Pressing the button allows the user to browse their computer for a previously-saved configuration file.

c.   **Send to Selected Clocks -** Applies the configuration file to whichever clocks have been highlighted on the Device List.

d.   **Send to All Valid Clocks -** Applies the configuration file to all applicable devices on the Device List. For instance, an Analog IP clock configuration file would be applied to every Analog IP clock on the Device List.

Network Monitor Software - Task Bar Options

1. **Send -** When clicked, this button will display the following options:

   Send Message - Performs the same action as the Send Message to Digital Clocks button. Applies only to Digital Clocks.

   Send Looping Message - Refer to the section of this manual, "Network Monitor Software - Quick Access Menu." Applies only to Digital Clocks.

   Send Countdown - Performs the same action as the Send Countdown to Digital Clocks button. Applies only to Digital Clocks.

   Find Hands - Commands Analog Clocks to resynchronize their hands. The user will be prompted to enter a password to authenticate their permissions. This command can be sent to one analog clock, a selected group of analog clocks, or all of the analog clocks in the system. Applies only to analog clocks.

Network Monitor Software - Task Bar Options

Wi-Fi & Wired LAN Sync Only

CONFIGURE GROUPS
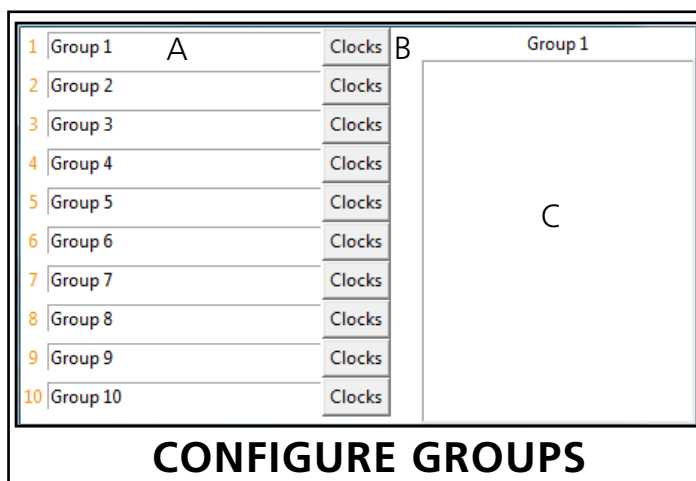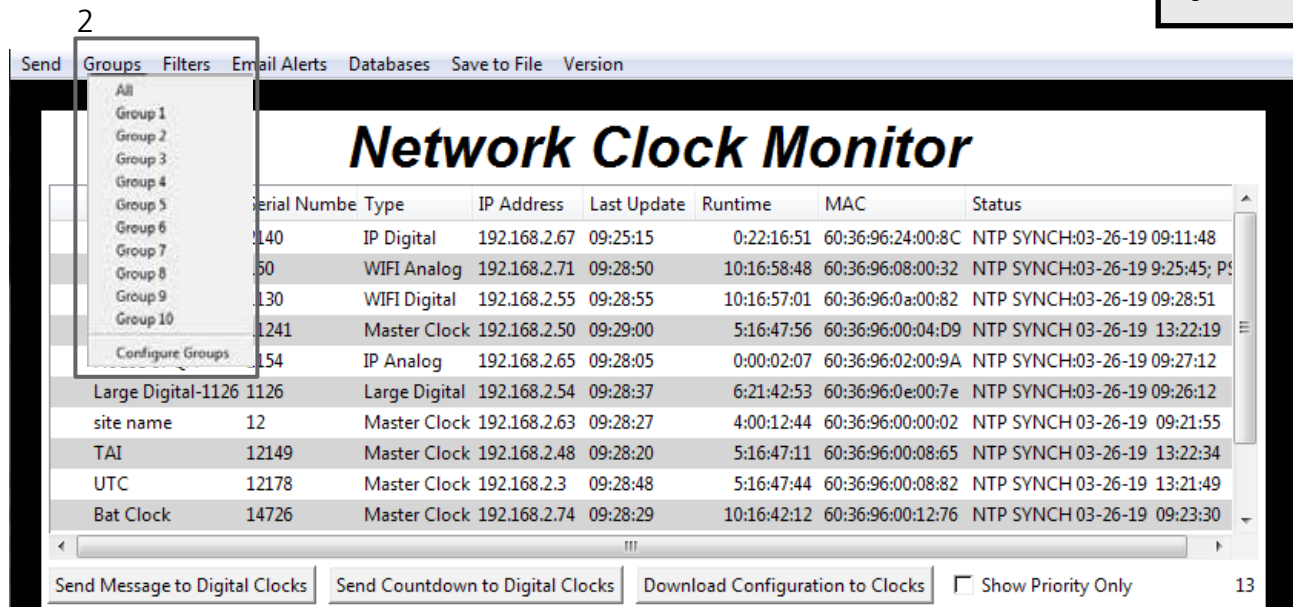
2. Groups - When clicked, this button will open the Groups drop-down menu.

All - Clicking on this option will cause the monitor to display all compatible IP devices on the network.

"Group Name" - Clicking on the name of a group will cause the monitor to display all of the IP devices in that group. Example: Clicking on "Group 1" will cause the monitor to show only the devices that have been added to Group 1 through the Configure Groups menu.

Configure Groups - Opens the group configuration menu (see left).

A. Text Boxes - Entering a name into the text box will change the name of the group. For example, the first text box currently contains the name "Group 1". This will cause the first group to be shown as "Group 1" in the drop-down menu.

B. Clocks buttons - Clicking on a Clocks button will display each of the group's devices in the box to the right.

C. Device Box - Displays the devices for the selected group. The name of the selected group will appear above the device box.

To add a device to the group, click on a device on the Network Monitor. While holding down the button on the mouse, drag the name of the device over to the device box, then release the button on the mouse.

To remove a device from the group, click on a device in the device box. While holding down the button on the mouse, drag the name of the device outside of the device box, then release the button on the mouse.

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Network Monitor Software - Task Bar Options

Wi-Fi & Wired LAN Sync Only
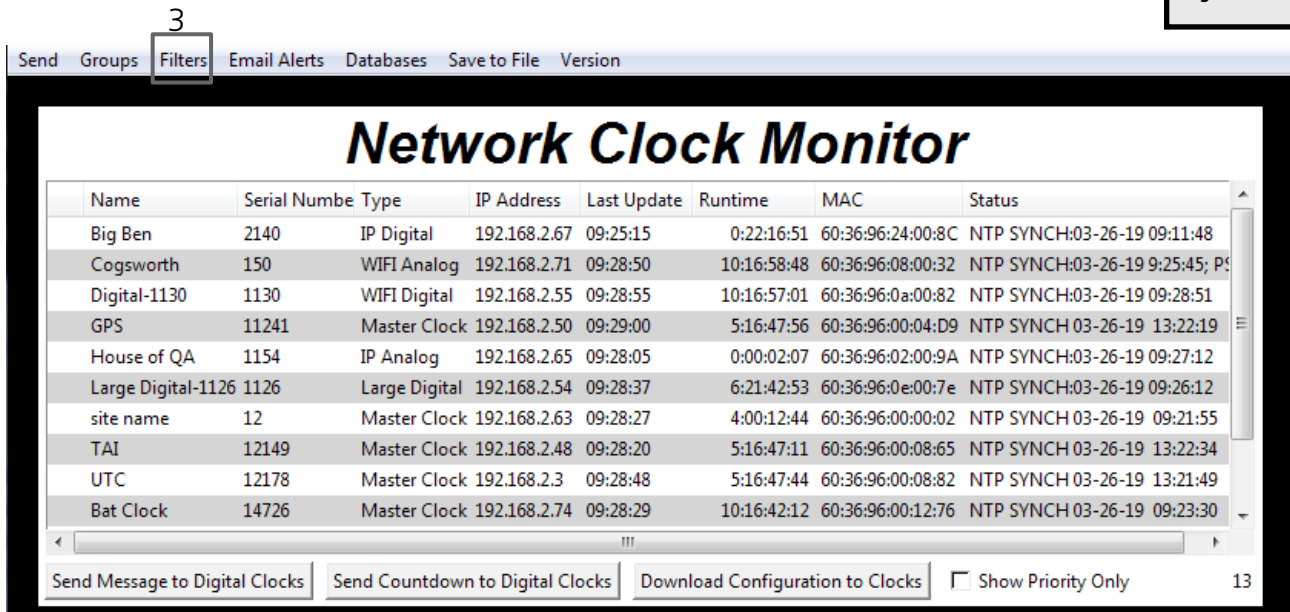
3. Filters - When clicked, this button will display the following options:

Filter By Clock Type - By selecting this option, the user is able to view specific clock types on the Monitor Screen. The clock types users can filter through are: Master Clocks, Network Repeaters, Wi-Fi Analog, Wi-Fi Digital, IP Analog, and/or IP Digital clocks. When the box next to the clock type is checked, the user will be able to view that clock type on the Monitor Screen.

Filter By Name - By selecting this option, the user is able to search for specific clocks by name on the Monitor Screen. The user must type in the name of a clock and check the box next to the word Enable. Once checked, the clocks that match the name will appear.

Please Note: When using this option, the submitted name must be identical to the name of the clock in order to receive a match. There are a few special sequences/characters listed below that may be used when filtering by name:

*	Matches any sequence of 0 or more characters in the name
?	Matches any single character in the name
[chars]	Matches any character in the set given by chars. If a sequence of the form x-y appears in chars, then any character between x and y, inclusive, will match.
{[A-Za-z]}	Will match any alphabetical character.
\x	Matches the single character x. This provides a way of avoiding the special interpretation of the characters *?[]\ in pattern.

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Network Monitor Software - Task Bar Options

Wi-Fi & Wired LAN Sync Only
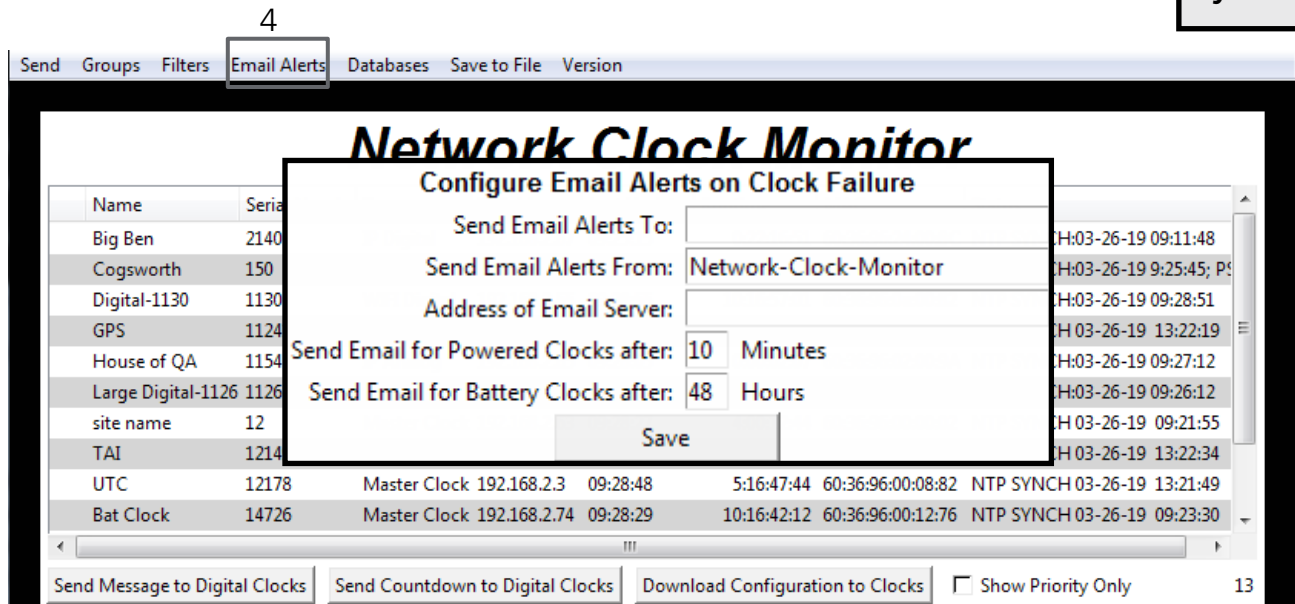
4. Email Alerts - When clicked, this button will display the following options:

Enable Missing Clock Email Alerts - By selecting this option, the user will receive an email alert if the Network Monitor Software hasn't heard from a listed clock or other network device after a certain amount of time. This function will not work if the monitor is turned off. Does not apply to battery-powered clocks.

Enable Low Battery Email Alerts - By selecting this option, the user will receive an email alert if a battery-powered Wi-Fi Analog clock is synchronizing while low on batteries. This function will not work if the monitor is turned off. Applies only to battery-powered analog clocks. This option is not available with the CFL version of the monitor.

Configure Email Alerts - By selecting this option, the user is able to choose which email address the alerts are sent to, the email identity of the sender, the address of the email server, and the amount of time between an event and the email being sent. Once the information is filled in, click the save button. When pressed, this will save all of the settings that were entered.

Send Test Email - By selecting this option, the user is able to send a test email to the email address specified in the Configure Email Alerts option.

Network Monitor Software - Task Bar Options

Wi-Fi & Wired LAN Sync Only
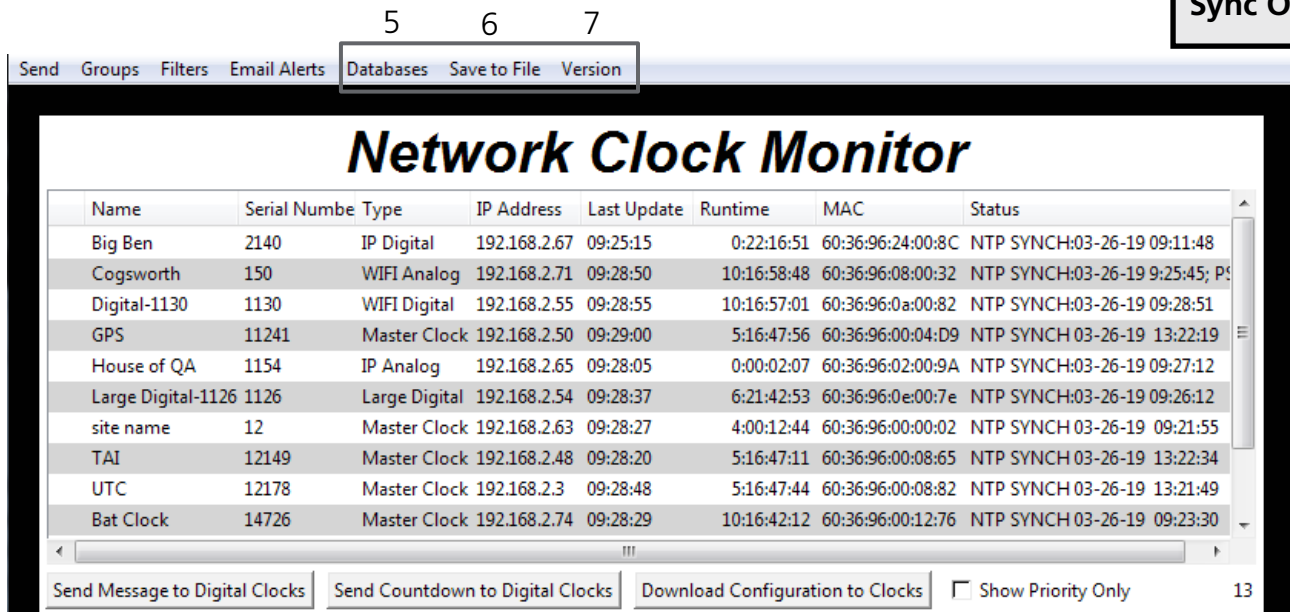
5. **Databases** - When clicked, this button will display the following options:

Download Configuration - By selecting this option, the user can load a clock's setting from a PC to another clock of the same type.

Upload Configuration - By selecting this option, the user can load the settings from a Wi-Fi clock and save them to a PC.

Get Wi-Fi Clock Firmware From Server - Updates software on the selected clock by downloading the latest version from the manufacturer's servers. Applies only to Wi-Fi enabled clocks. This option is not available with the CFL version of the monitor.

Get Wi-Fi Clock Web Pages From Server - Updates software on the selected clock's network card and web interface by downloading the latest version from the manufacturer's servers. Applies only to Wi-Fi enabled clocks. This option is not available with the CFL version of the monitor.

6. **Save to File** - When clicked, allows the user to save the all of the information in the Network Monitor device list as a .CSV file, which can be printed from Microsoft Excel. If the monitor is showing devices from a specific Group, then the .CSV file will contain only the devices in that group.

7. **Version** - When clicked, this button will display version number information of the Network Monitor Software and the Software Version Number (SVN). This information is needed only when contacting technical support and will not affect your usage of the Network Monitor Software. This button will also display the Monitor subtype.

The Network Monitor has two subtypes:

CFA - Intended for use with Wi-Fi Clocks, Master Clocks, Network Repeaters, Wi-Fi Large Digital Clocks, and Network Repeaters.

CFL - Intended for use with IP-PoE Digital, Wired IP Large Digital, and IP-PoE Analog Clocks.

Network Monitor Software - Quick Access Menu
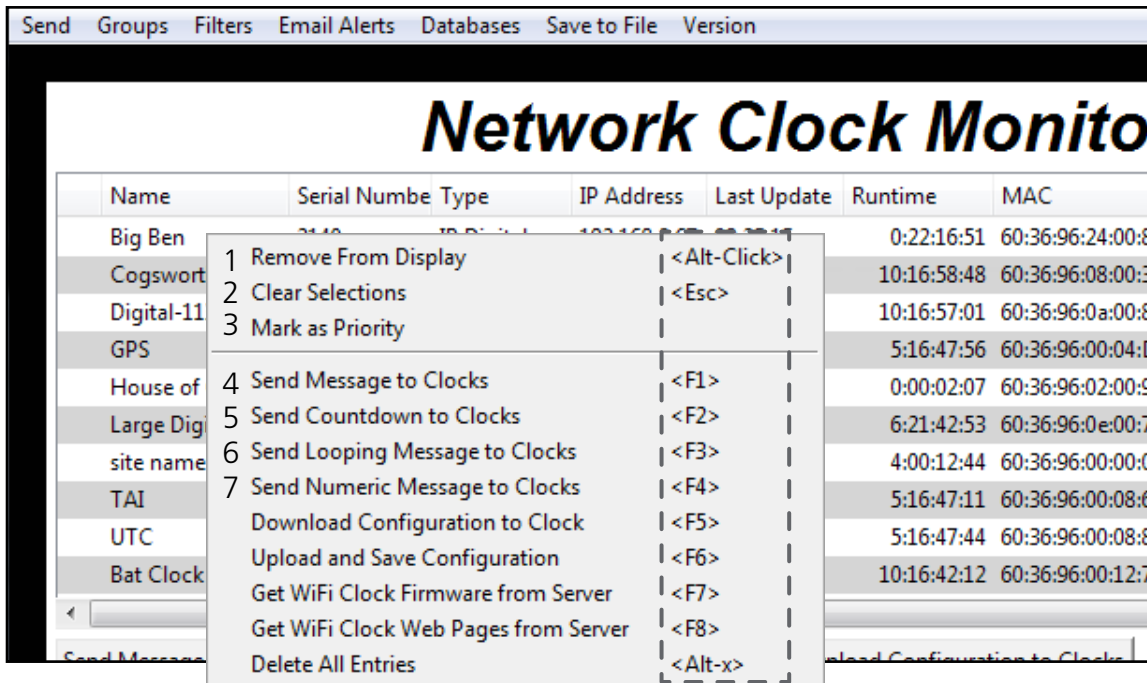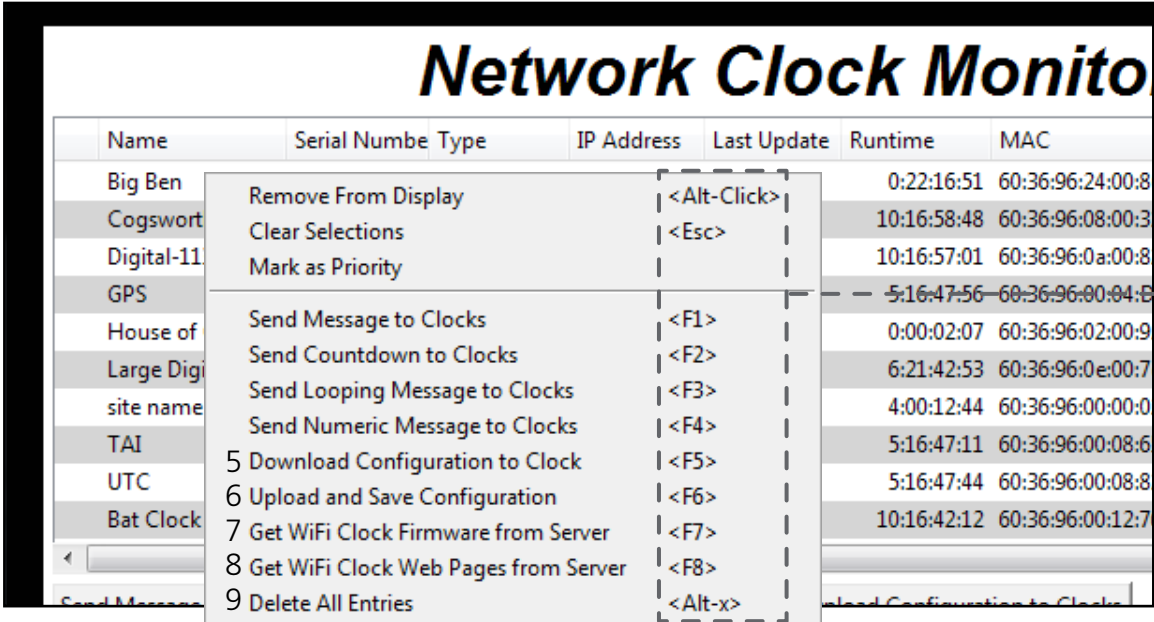
Wi-Fi & Wired LAN Sync Only

Please note: These options can also be accessed by using the keyboard shortcuts noted in the Quick Access Menu

Using a right-handed mouse to right-click on any row in the Device List will open the Quick Access Menu.

1. **Remove from Display** - When clicked, this option will remove the selected clock from the Device List.

2. **Clear Selections** - This option will deselect any highlighted items on the Device List.

3. **Mark as Priority** - Marking a clock(s) as priority is another filtering option for a user to segment the clocks. Once a clock is marked as priority, there will be an asterisk (*) next to the chosen clock.

4. **Send Message to Clocks** - Performs the same action as the Send Message to Digital Clocks button.

5. **Send Countdown to Clocks** - Performs the same action as the Send Countdown to Digital Clocks button.

6. **Send Looping Message to Clocks** - Performs a similar action to the Send Message to Digital clocks, but allows the user to select the number of times that the message will repeat. It also provides a longer text box for sending longer messages.

7. **Send Numeric Message to Clocks** - Performs the same action as the Send Message to Digital Clocks button, but messages are limited to four digits consisting of numbers 0-9.

Network Monitor Software - Quick Access Menu

Using a right-handed mouse to right-click on any row in the Device List will open the Quick Access Menu.

5. Download Configuration to Clock - If a configuration file was created using "Upload and Save Configuration" on the Quick Access Menu, this option lets the user apply the configuration file to other clocks highlighted within the monitor. This function will not work with Wi-Fi enabled clocks in Direct Mode. Clicking on this item will cause the Download Configuration window to appear:

A. Enter Password - The default password is 6063

B. Select Configuration - Pressing the button allows the user to browse their computer for a previously-saved configuration file.

C. Send to Selected Clocks - Applies the configuration file to whichever clocks have been highlighted on the Device List.

D. Send to All Valid Clocks - Applies the configuration file to all applicable devices on the Device List. For instance, a Digital IP clock configuration file would be applied to every Digital IP clock on the Device List.

6. Upload and Save Configuration - By selecting this option, the user can copy the settings from an IP device and save them to whichever computer is running the Network Monitor. Your computer will automatically prompt you for the location of the saved configuration file. This function will not work with Wi-Fi enabled clocks in direct mode.

7. Get Wi-Fi Clock Firmware From Server - Updates software on the clock by downloading the latest version from the manufacturer's cloud server. Applies only to Wi-Fi enabled clocks. This option is not available with the CFL version of the monitor.

8. Get Wi-Fi Clock Web Pages From Server - Updates software on the network card and web interface by downloading the latest version from the manufacturer's cloud server. Applies only to Wi-Fi enabled clocks. This option is not available with the CFL version of the monitor.

9. Delete All Entries - Clears all clocks from the Monitor. Clocks will be re-added to the monitor as they check in.

Network Monitor Software - Error messages

1. **Characters are Red** - When the characters of a clock have turned red, then the clock has not sent its status within the last 10 minutes.

2. **Characters are Gray** - When the characters of a clock have turned gray, then the clock was once displayed on the Network Monitor, but upon launching the Network Monitor program this most recent time, the clock cannot be found on the network.

3. **Characters are Black** - When the characters of a clock are black, this means that the clock is working normally.
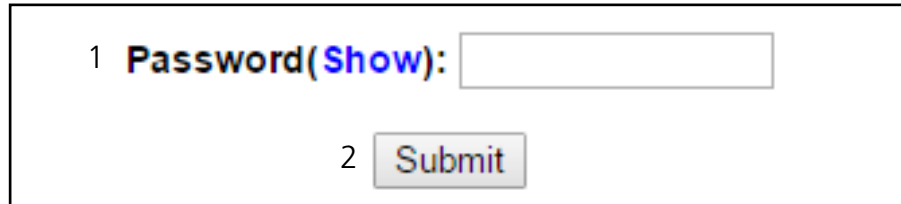
Wi-Fi & Wired LAN Sync Only

The CFA and CFL versions of the Monitor cannot run at the same time. If managing Wi-Fi clocks and IP clocks at the same time, use the CFA Network Monitor instead of the CFL Network Monitor. Be aware, not all features on the CFA Monitor will function on IP-LAN clocks.

You can check if you have the CFA or CFL version by clicking on "Version" at the top of the monitor window.

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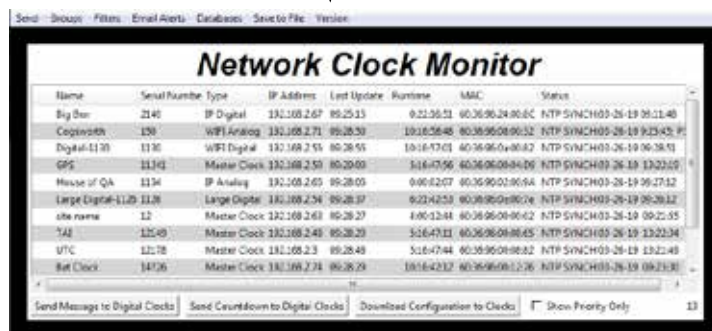
Web Interface - Log In
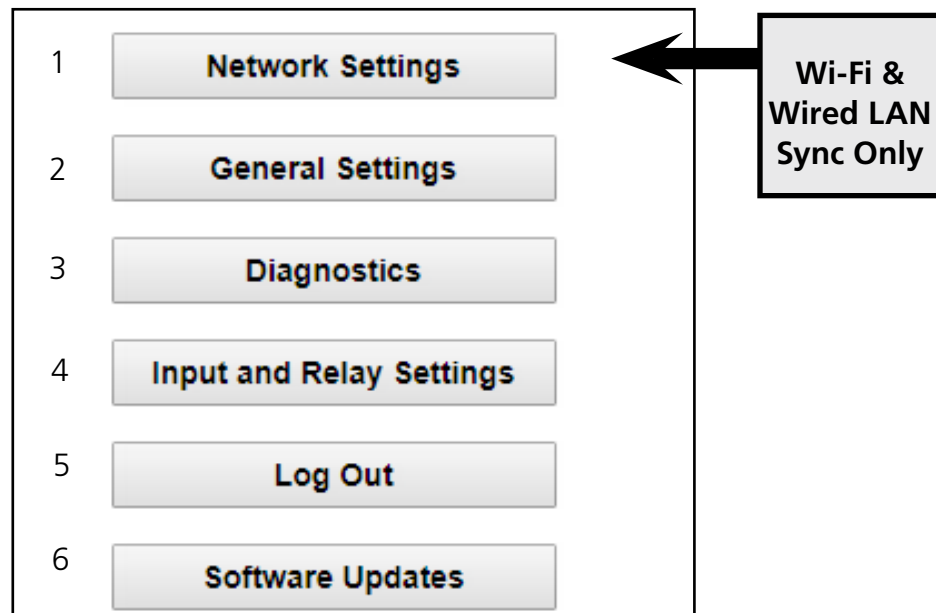
1 **Password(Show):** [   ]

2 [Submit]

1. **Password** - Location where the password is entered. The default password is 6063, but this can be changed within the settings.

2. **Submit** - When pressed, the program will check the password. If the password is correct, it will grant the user access to the Web Interface.

Web Interface - Home Page

1 [Network Settings] ← **Wi-Fi & Wired LAN Sync Only**

2 [General Settings]

3 [Diagnostics]

4 [Input and Relay Settings]

5 [Log Out]

6 [Software Updates]

1. **Network Settings** - Takes the user to the Network Settings page. Network Settings includes any setting used by the clock to communicate with the network. This button is absent on clocks that do not use a LAN for time synchronization.

2. **General Settings** - Takes the user to the General Settings page. General Settings includes settings for Time Configuration, Daylight Saving Time, NTP Servers, and Login Settings.

3. **Diagnostics** - Takes the user to the Diagnostics page.

4. **Input and Relay Settings** - Takes the user to the Input and Relay Settings page.

5. **Log Out** - Logs the user out of the clock software. The user will need to log back in before they are able to change any settings.

6. **Software Updates** - Takes the user to the Software Updates page.

Web Interface - Network Settings

NETWORK SETTINGS

#	Field	Value
1	Clock Name:	Room 302
2	Serial Number:	1109
3	MAC Address:	60:36:96:0a:00:6d
4	Select Network:	Series1 ▼
5	Network:	Series1
6	Network Password (Show):	
7	DHCP Auto On:	On ▼
8	IP Address:	192.168.4.4
	Subnet Mask:	255.255.255.0
	Gateway Address:	192.168.4.1
	Auto DNS:	On ▼
	DNS Address:	192.168.0.31
	Broadcast to Monitors:	On ▼
	Send Specific Monitor IP:	Off ▼
	Monitor IP Address:	0.0.0.0

Wi-Fi & Wired LAN Sync Only

Wi-Fi Sync Only

1. **Clock Name** - This field allows the user to set a name used to identify the clock on the Network Monitor. This name is also used to identify the clock in a network list while the clock is in Direct-Connect mode. The name must be fewer than 26 characters.

2. **Serial Number** - The clock's serial number. It cannot be changed.

3. **MAC Address** - This field shows the clock's permanent machine address. It cannot be changed.

4. **Select Network*** - The clock scans for access points that are broadcasting their network name (SSID), and allows the user to select one instead of manually entering the name in the Network box. You may need to refresh the web page for more network names to appear.

5. **Network*** - This field allows the user to connect the clock to a wireless network by entering the network name (SSID). The information in this field is overridden if a value was selected in the Select Network field.

6. **Network Password*** - This field allows the user to connect the clock to a wireless network by entering the network password. Network passwords must be 25 characters or fewer. The characters of the password can be shown by placing the computer's cursor over the word "show." **THIS IS ALSO USED AS THE PASSWORD FIELD FOR WPA2-Enterprise NETWORKS.**

7. **DHCP Auto On** - Allows the user to set whether or not the clock will use a DHCP server to determine the IP address for the clock.

8. **IP Address** - This field will display the clock's IP address. If DHCP Auto On is enabled, this address will be assigned by the DHCP server. If DHCP Auto On is disabled, then the user may set their own static IP address.

* Not present when connecting to the clock with a physical network cable.

CONTINUES ON NEXT PAGE

Web Interface - Network Settings (ctd.)

Clock Name:	Room 302
Serial Number:	1109
MAC Address:	60:36:96:0a:00:6d
Select Network:	Series1 ▼
Network:	Series1
Network Password (Show):	
DHCP Auto On:	On ▼
IP Address:	192.168.4.4
Subnet Mask:	255.255.255.0
Gateway Address:	192.168.4.1
Auto DNS:	On ▼
DNS Address:	192.168.0.31
Broadcast to Monitors:	On ▼
Send Specific Monitor IP:	Off ▼
Monitor IP Address:	0.0.0.0

Wi-Fi & Wired LAN Sync Only

9
10
11
12
13
14
15

16 Enterprise Settings   Submit 17

9. Subnet Mask - This field allows the user to set the subnet mask for their clock. If DHCP Auto On is enabled, this address will be assigned by the DHCP server. If DHCP Auto On is disabled, then the user may set their own subnet mask.

10. Gateway Address - This field allows the user to set the gateway IP address. If DHCP Auto On is enabled, this address will be assigned by the DHCP server. If DHCP Auto On is disabled, then the user may set their own Gateway Address.

11. Auto DNS - Allows the user to set whether or not the clock will obtain an Domain Name Server (DNS)address from the network's DHCP server.

12. DNS Address - This field allows the user to set the DNS Router IP address. If Auto DNS and DHCP Auto On is enabled, this address will be assigned by the DHCP server. If Auto DNS and DHCP Auto On is disabled, then the user may set their own DNS Address.

13. Broadcast to Monitors - Broadcasts the clock's presence to all instances of Network Monitor Software running on the network.

14. Send Specific Monitor IP - When set to ON, broadcasts the clock's presence to an instance of the Network Monitor Software running on a specific IP address.

15. Monitor IP Address - When Send Specific Monitor IP is set to ON, the clock will broadcast its presence to the IP address entered in this field. If Send Specific Monitor IP is set to off, this field is not accessible.

16. Enterprise Settings* - Takes the user to a page for WPA2 Enterprise Encryption Settings. See next page.

17. Submit - Applies any changes to the previous options when pressed. Note that changes to some fields, including IP Address, Subnet Mask, and DNS Address will not be applied until after logging out of the clock.

* Not present when connecting to the clock with a physical network cable.

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Web Interface - Enterprise Settings

WPA ENTERPRISE SETTINGS

1 **User Name:** [   ]

2 **Outer Authentication:** EAP-PEAP ▼

3 **Inner Authentication:** EAP-MSCHAP

[Submit]

Wi-Fi Sync Only

THIS SECTION IS REQUIRED ONLY IF YOUR NETWORK USES
WPA2-ENTERPRISE ENCRYPTION

WPA2-PSK NETWORKS DO NOT REQUIRE USE OF THESE SETTINGS. IF YOUR WI-FI NETWORK PROMPTS YOU FOR A PASSWORD BUT NO USER NAME WHEN CONNECTING, YOU ARE LIKELY USING A WPA2-PSK NETWORK. CONSULT WITH YOUR ORGANIZATION'S NETWORK ADMINISTRATOR FOR QUESTIONS ABOUT YOUR NETWORK SECURITY SETTINGS.

1. **User Name** - This field allows the user to enter a username for RADIUS Authentication.

    Password - Is entered on the main network page.

2. **Outer Authentication** - Allows the user to set the outer authentication scheme. The available protocols are EAP-FAST, EAP-TTLS EAP-PEAP

3. **Inner Authentication** - Allows the user to see the inner authentication scheme. The only available protocol is EAP-MSCHAP.

4. **Submit** - Applies any changes to the previous options when pressed.

Web Interface - General Settings

GENERAL SETTINGS

1 Time Settings

2 Daylight Saving Time

3 Servers ← **Wi-Fi & Wired LAN Sync Only**

4 Display Settings

5 Login Settings
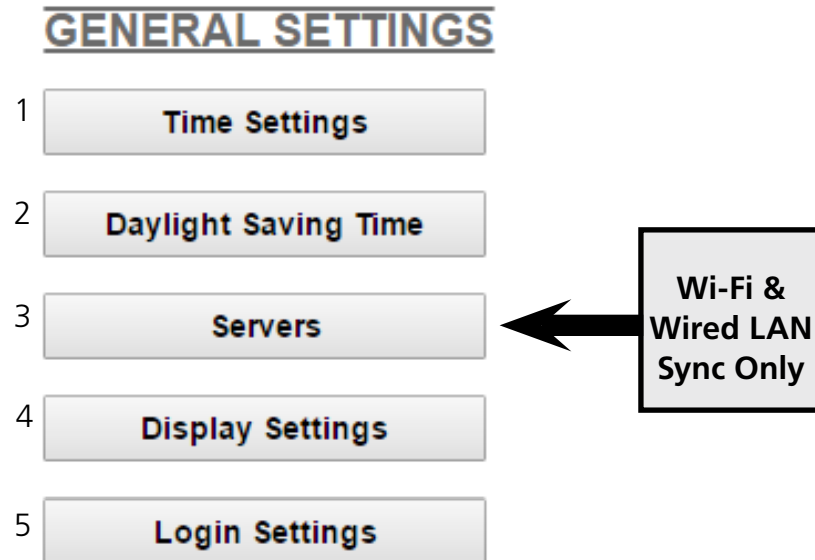
1. **Time Settings** - Takes the user to the Time Settings page. **Not used with wired and standard wireless clocks.**

2. **Daylight Saving Time** - Takes the user to the Daylight Saving Time page. **Not used with wired and standard wireless clocks.**

3. **Servers (Wi-Fi & Wired LAN Sync Only)** - Takes the user to the Servers page. **Not used with wired and standard wireless clocks.**

4. **Display Settings** - Takes the user to the Display Settings page.

5. **Login Settings** - Takes the user to the Login Settings page.

Web Interface - Time Settings

TIME SETTINGS

1 **Set Time** [02 ▼] : [08 ▼] [PM ▼]

2 **Set Date** 09/27/2016

3 [Change Time]

4 **GMT Offset** -4

5 **Bias Seconds** 0

6 [Change Bias/Offset]

1. **Set Time** - This setting allows the user to set the clock to a specific time. Fields for each portion of the time may be accessed via the drop-down menu. New time data will override this information.

2. **Set Date** - This setting allows the user to set the clock to a specific date. The date must be entered in the following multi-digit format: mm/dd/yyyy where m is a month digit, d is a day of the month digit, y is a digit of the year. New time data will override this information.

3. **Change Time** - Applies the information configured in the Set Time and Set Date settings.

4. **GMT Offset** - This setting allows the user to set which time zone the clock will use when displaying the time. For instance, London is an offset of 0, New York is an offset of -5 and Hong Kong is an offset of +8. The clock may be configured to function as part of a Zone Clock through this option.

5. **Bias Seconds** - This setting allows the user to alter how much faster or slower the IP clock will run in relation to synchronized time. The range is recommended for values between -3600 seconds to +3600 seconds. This translates to a range of one hour either way, but the time must be entered as a number of seconds. For ranges larger than this, the user should change the GMT offset to account for additional hours. The field permits values within +/- 32,768 seconds, but values beyond 3600 are not recommended due to increasing the complexity of maintenance and troubleshooting.

6. **Change Bias/Offset** - Applies the information configured in the GMT Offset and Bias Seconds settings.

Web Interface - Daylight Saving Time

1. **Method for Defining DST** - There are four methods for defining Daylight Saving Time. The method can be selected from the drop-down menu. Clicking on the Select button displays additional options for that method.

- **Day of the Week in Month** - This mode allows the user to select the day of the week, month, and time for when the clock will switch to Daylight Saving Time. Once the day, month, and time have been set, click Submit to apply the settings to the clock. Example: Second Sunday of March at 2:00.

- **Day of the Month** - This mode allows the user to select the specific day of the month and time for when the clock will switch to Daylight Saving Time. Once the date, month, and time are set, click Submit to apply the settings to the clock. Example: March 1st at 2:00.

- **By Country** - This mode allows the user to select preset Daylight Saving Time information associated with a specific country or group of countries. Select the preset from the drop-down menu, then click Submit to apply the settings to the clock. The next time you enter the DST page, you will see the Day of Week in Month or Day of Month associated with the selected country or countries.

- **None** - This mode does not change the clock for Daylight Saving Time.

2. **Submit** - Applies any changes to the previous options when pressed.

Web Interface - Servers

SERVER SETTINGS

		Server Performance
1st Server Address:	us.pool.ntp.org	EXCELLENT
2nd Server Address:	ca.pool.ntp.org	EXCELLENT
3rd Server Address: ●	de.pool.ntp.org	EXCELLENT
4th Server Address:	ru.pool.ntp.org	EXCELLENT
5th Server Address:	uk.pool.ntp.org	EXCELLENT

1

2 Rotate Servers: ☑

3 Network Sync Every: [4 Hours ▼]

Server Performance

1-20%   POOR
20-40% SATISFACTORY
40-60% FAIR
60-80% GOOD
80-100% EXCELLENT

4 [Submit]

Wi-Fi & Wired LAN Sync Only

1. **Server Addresses** - These fields allow a user to set the address that the clock will use to obtain NTP time. Web addresses may be entered as a URL or IP number. The active server is identified by the red dot.

2. **Rotate Servers** - When left unchecked, the clock will only attempt to obtain time from the selected NTP server, and will only attempt to try other servers if the selected server fails. When checked, the clock will rotate through the listed addresses each time the clock performs a synchronization check.

3. **Network Sync Every** - Allows the user to decide how often the clock will power its Wi-Fi transmitter in an attempt to acquire NTP time.

4. **Submit** - Applies any changes to the previous options when pressed.

Web Interface - Display Settings

DISPLAY SETTINGS

1 **Time Format:** 12 Hour ▼
2 **Date Format:** MM:DD:YY ▼
3 **Temperature Format:** Fahrenheit ▼
4 **Brightness:** Low ▼
5 **Seconds Time Displayed:** 8
6 **Seconds Date Displayed:** 2
Seconds Temp Displayed: 2
Character Set: 2
Blink Colon After: 60 **Minutes**
0 **Seconds**

Submit

1. **Display Format -** Allows the user to select how the time is displayed on the clock. There are two options: 12 hour format (3:00AM/3:00PM) or 24 hour format (3:00/15:00).

2. **Date Format -** Sets the date to display in either American style: MM:DD:YY or European style: DD:MM:YY. For 4 digit clocks, the date will display in either American style: MM:DD or European style: DD:MM.

3. **Temperature Format -** If a temperature sensor was installed on the clock, this option allows a user to select whether the temperature appears in Fahrenheit or Celsius.

4. **Brightness -** Sets the brightness level that the clock will display. There are a few levels to choose from: Auto, High, Medium, Low or Off. Auto, the default setting, will automatically adjust the display brightness when external light levels change.

5. **Seconds Time Displayed* -** The clock will display the time for the number of seconds entered in the box. After the selected amount of time passes, the clock will change to show Date or Temperature. If a time of 0 is selected, the clock will not display the time. If Date and Temp Displayed are set to 0, the clock will only display the time.

6. **Seconds Date Displayed* -** The clock will display the date for the number of seconds entered in the box. After the selected amount of time passes, the clock will change to show the Time or Temperature. If a time of 0 is selected, the clock will not display the date. If Time and Temp Displayed are set to 0, the clock will only display the date.

*Note: If the Time, Date, and Temp Displayed are ALL set to 0, the display will turn completely blank. It will turn on for count down/up, and off again once the counting has been cleared.

CONTINUES ON NEXT PAGE

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Web Interface - Display Settings (ctd.)

DISPLAY SETTINGS

Time Format:	12 Hour ▼
Date Format:	MM:DD:YY ▼
Temperature Format:	Fahrenheit ▼
Brightness:	Low ▼
Seconds Time Displayed:	8
Seconds Date Displayed:	2
7 **Seconds Temp Displayed:**	2
8 **Character Set:**	2
9 **Blink Colon After:**	60 Minutes
	0 Seconds

10 Submit

7. **Seconds Temp Displayed*** - If a temperature sensor was installed on the clock, the clock will display the temperature for the number of seconds entered in the box. After the selected amount of time passes, the clock will change to show the Time or Date. If a time of 0 is selected, the clock will not display the temperature. If Time and Date Displayed are set to 0, the clock will only display the temperature.

8. **Character Set** - Allows the user to select a text font for the numbers on the display. Enter a number from 0 through 3 to choose one of four character sets.

9. **Blink Colon After** - If the clock does not receive new time data in the entered time span (minutes and seconds) the colon will blink.

10. **Submit** - Applies any changes to the previous options when pressed.

*Note: If the Time, Date, and Temp Displayed are ALL set to 0, the display will turn completely blank. It will turn on for count down/up, and off again once the counting has been cleared.

Web Interface - Login Settings

LOGIN SETTINGS

1 Viewer Password: [   ]

2 Confirm Password: [   ]

3 Select User Level [Viewer   ▾]

4 [Submit]

5 Hide Network: ☐

4 [Submit]

1. **Viewer/Technician/Administrator Password** - Allows the Administrator to set up a new password to the web interface.

2. **Confirm Password** - The new password must also be entered here for a change to be made.

3. **Select User Level** - Allows the Administrator to select an access level for the new password to be applied to. The user levels have the following permissions:

   Viewer - Allows the user to view all of the settings in the clock Web Interface, but does not allow the user to add, remove, or change any setting. The default Viewer password is 1111

   Technician - Allows the user to view all of the settings in the clock Web Interface and allows the user to change any setting except for those listed on the Login Settings page. The default Technician password is 6063.

   Administrator - Allows the user to view and change any setting in the clock Web Interface, including the passwords on the Login Settings page. The default Administrator password is 8085.

4. **Submit** - Applies any changes to the previous options when pressed.

5. **Hide Network** - Hides the network SSID. Users who want to access the clock in Direct Connect mode will not be able to see the network name of the clock, and will need to enter it manually. The network will always be named **Wifi-Large-Digital-####** (where #### is the serial number of the clock). Hiding the Network does not deactivate the clocks' Wi-Fi access point, it merely hides the name. **This option only appears if Wi-Fi synchronization is not a feature of the clock.**

Web Interface - Diagnostics

DIAGNOSTICS

1 **Firmware Version:** 1.0.2
2 **Web Page Version:** 1.0.2
3 **Firmware SVN Revision:** 3404
4 **Web Page SVN Revision:** 3408
5 **Run Time From Last Power Up [d h:m:s]:** 123 8:08:54
6 **Total Run Time [d h:m]:** 1 18:42
   Module 1: Not Used
7 **Module 2:** WiFi
   Miscellaneous Input: Sync Wire
8 **Last Received Signal at [m-d-y h:m:s]:** 04-16-18 13:52:50
9 **Network Sync Every [m]:** 5
10 **Worst Server:** ca.pool.ntp.org
11 **WiFi Signal Strength [dBm]:** -24 (Excellent)

Wi-Fi & Wired LAN Sync Only

Wi-Fi Sync Only

12 **Troubleshooting**
13 **Home**

1. **Firmware Version** - Lists the firmware version for the main processing board of the clock.

2. **Web Page Version** - Lists the software version for the clock's web interface and network card.

3. **Firmware SVN Revision** - Lists the Software Version Number for the Firmware. Used by Tech Support.

4. **Web Page SVN Revision** - Lists the Software Version Number for the Web Page. Used by Tech Support.

5. **Run Time From Last Power Up** - Lists the amount of time that has passed since the clock started receiving power.

6. **Total Run Time** - Lists the total amount time that the clock has been powered since it was built.

7. **Module 1, 2, and Miscellaneous Input** - Lists the Synchronization modules included with the clock. Modules include WiFi, RF, and GPS. Miscellaneous input can include IP, Sync wire, or "2-wire" (RS485).

8. **Last Received Signal at (Wi-Fi and Wired LAN only)** - Lists the time and date when the clock last received time data.

9. **Network Sync Every (Wi-Fi and Wired LAN only)** - Lists the number of minutes that pass between each time that the clock powers its transmitter to get NTP data.

10. **Worst Server (Wi-Fi and Wired LAN only)** - Lists the number of the NTP server that has responded the least often when contacted for NTP data. See "Web Interface - Servers" to see the server address/ domain associated with each number. *Not present in clocks that do not synchronize over a Wi-Fi or Cabled LAN.*

11. **Wi-Fi Signal Strength (Wi-Fi only)** - Lists the signal strength between the clock and wireless access point or wireless router in dBm. The closer the number is to 0, the stronger the signal is. *Not present when connecting to the clock with a physical network cable.*

12. **Troubleshooting** - Takes the user to the Troubleshooting page. On this page, the user can have the clock check the display for errors, force a time synchronization update, or restore the clock to the factory default settings.

13. **Home** - Returns the user to the Home Page.

Web Interface - Troubleshooting

TROUBLESHOOTING

1 **Force Time Update**

2 **Force Restart**

3 **Restore Default settings**

1. **Force Time Update** - When clicked, this button causes the clock to immediately poll an NTP server and adjust its time accordingly. **This Button will only work for Wi-Fi and Cabled LAN clocks. It will not work for Wireless, GPS, Talkback, or traditionally Wired clocks.**

2. **Force Restart** - Restarts the clock. Performs the same software function as disconnecting the clock from power, then reconnecting it.

3. **Restore Default settings** - When clicked, this button causes the clock to revert to the factory default settings. All data entered by the user will be lost.

Web Interface - Input and Relay Settings

INPUT AND RELAY SETTINGS

1   Elapsed Timer

2   Inputs

3   Outputs

4   End Countdown

1. **Elapsed Timer** - Takes the user to the Elapsed Timer page. This button will only appear if the Elapsed timer is attached to the clock.

2. **Inputs** - Takes the user to the Inputs page. This page controls what actions the clock will take when an input is activated.

3. **Outputs** - Takes the user to the Outputs page. This page controls signals outputted by the clock relays.

4. **End Countdown** - Takes the user to the End Countdown page. This page controls the actions that the clock will take whenever a countdown ends.

Web Interface - Elapsed Timer

ELAPSED TIMER SETTINGS

Button	Lights	Action	Seconds
1	Lights	Go to CountUp and Start ▾	0
2	Lights	Start/Stop ▾	0
3	Lights	Return to Time Display ▾	0
4	Lights	Go to CountDown and Start ▾	600

Submit

REFER TO THE ELAPSED TIMER MANUAL FOR ADDITIONAL SETUP INSTRUCTIONS

A user may set up and configure the Elapsed Timer control panel through this page. For detailed instructions on the many functions and uses of the Elapsed Timer, refer to the Elapsed Timer Manual.

Web Interface - Inputs

INPUT SETTINGS

Input	Action	Seconds
1	Relay 1 ▼	0
2	Relay 2 ▼	0
3	Relay 1 ▼	0
4	Relay 2 ▼	0

Submit

Input Sync Relay None ▼

Submit

The 'Inputs' tab allows a user to program the clock to perform a certain function through a switch or relay contact closure from an outside device such as Code Blue, Nurses Call, etc. Program the first Input on the clock by selecting one of the options in the drop down list next to Input 1. Listed below are the options and the function of each one:

No Action - This function does nothing if the input is activated.

Return to Time Display - Activating the input causes the clock to display the time. If a countdown or count up is in progress, the function is reset when the input is activated.

Briefly Display Date - Activating the input causes the clock to briefly display the date. This only works if the clock is displaying the time, not a countdown.

Go to Count Up and Hold - Activating the input causes the clock to display and hold at zero.

Go to Count Up and Start - Activating the input causes the clock to switch from its current display and begin a count up from zero.

Go to Count Down and Hold - Activating the input causes the clock to display and hold at a start time specified by the user in the Seconds box.

Go to Count Down and Start - Activating the input causes the clock display to begin counting down from a time specified by the user in the Seconds box.

Reset - Activating the input restarts whichever countdown/count up is in progress.

Start/Stop - Activating the input causes the timer to pause or resume its counting functions.

Shift Digits - Activating the input causes the digits to shift from displaying Hour/Minutes to Minutes/Seconds (Applies to 4 digit clocks only).

Flash Time - Activating the input causes the clock to briefly display the time while another function, such as count up or count down, is occurring. Activating the input does not pause, stop, or reset whichever function is occurring at the same time.

Relay 1 - Activating the input toggles Output Relay 1. Activating it a second time toggles it back to its original state.

Relay 2 - Activating the input toggles Output Relay 2. Activating it a second time toggles it back to its original state.

Code Blue - Performs a special-purpose count up. Refer to the section on the next page labeled "Code Blue 1"

Code Blue 2 - Performs a special-purpose count up. Refer to the section on the next page labeled "Code Blue 2."

Elapsed Timer 1/2/3/4 - If an Elapsed Timer Control Panel was connected to the clock, this function, when triggered, will perform whatever action was programmed for the selected Elapsed Timer Button.

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Web Interface - Inputs (ctd.)

Input Sync Relay None ▼

Submit

Input Sync Relay - Configures the clock to receive synchronization data from the selected Sync-wire protocol. Any of the following protocols may be selected by the user: Refer to your master clock manual for more information on each protocol.

58 Minute Sync_1	58 Minute Sync_2	58 Minute Sync_3
58 Minute Sync_4	National Time_Rauland	Dukane Digital
Rauland Digital	59 Minute Sync	Once a Day Pulse**

**If Once a Day Pulse is selected, fields for Hours, Minutes, and Seconds will appear. Enter the time (in 24 hour format; 1:00 PM = 13:00) when the Once a Day pulse is present. The pulse must last for longer than one second.

Submit - Applies any changes to the previous options when pressed.

Code Blue is a special-purpose count up designed for use in hospitals and other medical facilities. This function overrides the control panel LED settings. The lights are green while the timer is running and red when the timer has been paused.

Code Blue 1:

When an input programmed with Code Blue is activated for the first time, the count up starts.

When the input is activated a second time, the count up pauses. If the input is activated a third time, the count up will resume.

If a button programmed with the Start/Stop function is pressed while Code Blue is running, the count up will pause. If Start/Stop is pressed again, the count up will resume.

Code Blue 2:

When an input programmed with Code Blue is activated for the first time, the count up starts.

When the input is activated a second time, the count up pauses. If the input is activated a third time, the count up will resume.

If a button programmed with the Start/Stop function is pressed while Code Blue is running, the count up will pause. If Start/Stop is pressed again, the count up will resume.

Web Interface - Outputs

OUTPUT SETTINGS

1 **RS485 Data Rate:** OFF ▼

2 **Relay 1 Output:** None ▼

3 **Relay 2 Output:** None ▼

Submit

4

1. **RS485 Data Rate** - Allows the user to select the rate that the clock's RS485 output sends time data updates.

2. **Relay 1 Output** - Allows the user to select which time protocol will be sent by the clock through Relay 1. Refer to the next page for output options.

3. **Relay 2 Output** - Allows the user to select which time protocol will be sent by the clock through Relay 2. Refer to the next page for output options.

4. **Submit** - Applies any changes to the previous options when pressed.

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Web Interface - Outputs

None - The relay is disabled. This is the default value for this function.

59th Minute (1) - The clock performs an hourly correction that takes 8 seconds and occurs between XX:57:54 and XX:58:02. It also performs two daily corrections: one at 5:00AM and one at 5:00PM. Each daily correction is a single 14 second pulse which lasts from 5:57:54 to 5:58:08.

58th Minute (1) - The clock performs an hourly correction that takes 55 seconds and occurs between XX:58:05 and XX:59:00 of every hour. It also performs two daily corrections: one at 5:00AM and another at 5:00PM. Each daily correction is ten relay cycles, each cycle is 95 seconds long, and the cycles begin at 5:05AM/PM, 5:07, 5:09, 5:11, 5:13, 5:15, 5:17, 5:19, 5:21, and 5:23 respectively.

58th Minute (2) - The clock performs an hourly correction that takes 60 seconds and occurs between XX:58:00 and XX:59:00. It also performs two daily corrections: one at 5:00AM and one at 5:00PM. Each daily correction is made of twelve relay cycles, and each cycle consists of 65 seconds on and 25 seconds off

58th Minute (3) - The clock performs an hourly correction that takes 60 seconds and occurs between XX:58:00 and XX:59:00. It also performs two daily corrections: one at 5:00AM and one at 5:00PM. Each daily correction is made of twelve relay cycles, and each cycle consists of 60 seconds on and 120 seconds off.

58th Minute (4) - The clock performs an hourly correction that takes 55 seconds and occurs between XX:59:05 and XX:59:00. It also performs two daily corrections: one at 5:00AM and one at 5:00PM. Each daily correction is made of twelve relay cycles, each cycle is 55 seconds long, and the cycles begin at 5:03:05AM/PM, 5:07:05, 5:11:05, 5:15:05, 5:19:05, 5:23:05, 5:27:05, 5:31:05, 5:35:05, 5:39:05, 5:43:05, and 5:47:05 respectively.

National Time & Rauland (1) - The clock performs an hourly correction that takes 25 seconds and occurs between XX:00:00 and XX:00:25. It also performs two daily corrections: one at 6:00AM and one at 6:00PM. Each daily correction is made of twenty four relay cycles consisting of 25 seconds on, followed by 35 seconds off.

National Time & Rauland (2) - The clock performs an hourly correction that takes 25 seconds and occurs between XX:00:00 and XX:00:25. It also performs two daily corrections at 6:00:25AM and 6:00:25PM. Each daily correction is a single 24 minute pulse which lasts from 6:00:25AM/PM to 6:24:25.

Rauland Digital - The clock will reset the secondary clock to 12:00:00AM, then advance the time on the secondary clock by one minute for every 0.5 seconds that the Digital line is shorted to ground.

Once a Day Pulse - The clock relay will close at a specific time and for an amount of time decided by the clock circuit settings If this is selected, boxes for Hours, Minutes, Seconds, and Duration will appear.

Web Interface - End Countdown

COUNTDOWN COMPLETION

On Countdown Complete:

A Close [Neither ▼] for [0]   Seconds

B   Go To ● Time   ○ CountUp

C Flash Zeros ☐ for [0] Seconds

[Submit]
D

A. When a user schedules a countdown, they may also command a relay to close after a countdown is complete. This is configured through the configuration window or web interface. Listed below are the options for this function:

- Neither - When the countdown completes, neither relay will close.
- Relay 1 – When the countdown completes, Relay 1 will close for the number of seconds* entered into the box to the right.
- Relay 2 – When the countdown completes, Relay 2 will close for the number of seconds* entered into the box to the right.

  * Relays may close for 60 seconds or less. They may not close for more than 60 seconds.

B. A user can select what the clock will do after reaching at the end of a countdown by selecting the circle next to either **Time** or **Count Up**. If Time is selected, the clock will display the time at the end of the countdown. If Count Up is selected, then the timer will begin to count up from 0 after the countdown reaches 0.

C. If the box next to **Flash Zeros at the end of Countdown** is selected, the digits on the clock will blink on and off once the timer reaches 00:00:00. The zeros will flash for the number of seconds entered into the box to the right.

D. Click Submit in order to save and apply the selected options.

Relay Contact Rating:
- 0.3A at 110 VAC
- 1A at 24 VDC

Web Interface - Software Update

FIRMWARE UPDATE

| No Webpage Updates Avail | 1 |

Choose File   No file chosen   2

Update Webpages From File   3

No Firmware Updates Avail   4

FIRMWARE UPDATE

Update Web Pages From Sapling

Choose File   No file chosen

Update Webpages From File

Update Firmware From Sapling
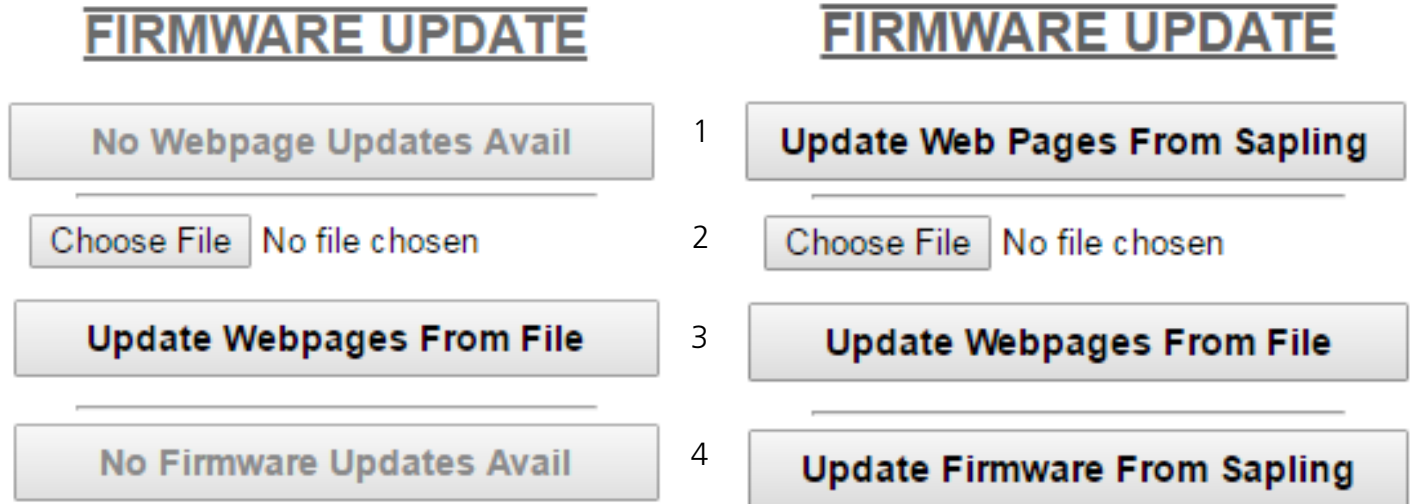
1. **Update Web Pages From Sapling** -** Updates software on the clock's network card and web interface by downloading the latest version from Sapling's servers.

2. **Choose File -** Allows the user to select a new copy of the network card and web interface software to be uploaded to the Wi-Fi clock. This does not upload the file, it only selects the file.

3. **Update Web Pages From File -** Takes whichever file was selected with the Choose File button and applies the update file to the clock.

4. **Update Firmware From Sapling** -** Updates software on the clock by downloading the latest version from Sapling's servers.

**Not present in clocks that do not use Wi-Fi for synchronization.

Manual Controls

Some functions of the clock can be controlled through the two push-buttons on the main board of the clock. That said, it is ALWAYS preferable to use the Web Interface and Network Monitor software when commanding the clock, as these buttons become difficult to access after the clock has been installed on a wall or ceiling.

Display IP Address

The easiest way to display the clock IP address is to disconnect and reconnect power to the clock. However, if you have access to the buttons, you may also use this method

When the two buttons are pressed at the same time, clocks that operate on a computer network will display the number groups of the IP address. For example, if the IP address of the clock is 192.168.0.80, then the following groups will appear:

SW1 SW2

[192]   [168]   [000]   [080]

The clock will cycle through the groups twice, then automatically return to displaying the time.

If the clock uses Wi-Fi synchronization, this will be the address of the Wi-Fi network adapter. If synchronizes over a LAN network cable, then this will be address of the cable network adapter.

Simple Count Up

A user can set the clock to simple count-up mode by pressing and releasing SW2. When activated, the clock will switch to 00:00:00 (or 00:00 on a 4-digit clock) and the count up will begin.
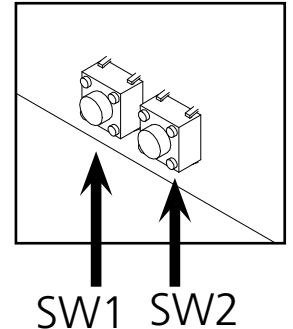
Pressing SW2 again will start or resume count up if the count-up is not running, or pause the count-up if the count up is running.

To exit this mode, quickly press and release SW1 and the clock will show the time again.

Direct Mode

It is possible to connect to the Web Interface without connecting the clock to a network. To enable direct mode, press and release SW1 twice. If successful, the message "DIRECT" will appear on the clock display. On a 4-digit clock, only the first four letters will be displayed.

In this mode, the clock's setup 'network' can be accessed the same way that you would any other wireless router or access point. On a Wi-Fi enabled computer, check the available Wireless Networks. Refresh the available networks until a network named **Wifi-Large-Digital-####** appears (where #### is the serial number of the clock). This may take up to 30 seconds. Once it appears, connect to this network.

To access the clock in this mode, open a web browser and enter the following web address into the URL field: **192.168.240.1/login.html**

Reset

The option exists to reset the clock to its factory default settings. Pressing and holding both buttons at the same time for more than ten seconds will cause the reset function to activate. The user will know that the reset has been activated, as "RESET" will appear on the clock display. On a 4-digit clock, only the first four letters will be displayed.

Reading the Display

The digital clock is designed to display time in either a 12-hour or 24-hour format. When the display is set to the 12-hour format, a circular light will appear in the top left corner of the display to indicate PM, or disappear to indicate AM. When the display is set to the 24 hour format, the full 24-hour time will appear on the display; no other lights should appear.

Some examples:

5:30 AM (12-hour format)

PM ➤

5:30 PM (12-hour format)

5:30 AM (24-hour format)

5:30 PM (24-hour format)

The factory default setting for all digital clocks is the 12-hour format. If you wish to set the clock to display time in a 24-hour format, see the section labeled "Web Interface - Display Settings", included earlier in this manual.

Frequently Asked Questions

VERY IMPORTANT:

CONFIGURE YOUR CLOCK BEFORE MOUNTING IT TO A WALL OR CEILING. REFER TO THE SYNCHRONIZATION SYSTEM SETUP SECTION OF THIS MANUAL FOR INSTRUCTIONS.

All network equipment must be powered and configured before you install the clock. If the network equipment is not properly installed and powered, and if the clocks have not been configured to communicate with the network equipment, the secondary clocks will not synchronize.

Will the wireless clock cause interference with other wireless devices?

No. The Wi-Fi clock operates a low-power transmitter on the 2.4GHz spectrum, and does not broadcast often enough or powerfully enough to cause interference.

The Wireless Synchronization module, if installed, runs on either 900Mhz or 2.4GHz, depending on the part that was ordered. This will not affect other wireless devices.

How long does it take for a clock to receive correction data?

Wi-Fi

If the clock and network are configured correctly, the clock should receive a time update within five seconds of power up. After this, the clock will resynchronize once every five minutes by default.

IP

If the clock and network are configured correctly, the clock should receive a time update within five seconds of power up, and once every five minutes by default after that.

Wireless

If everything is installed correctly and the transponder is open, the clock should get the signal within five minutes. Once the clock has been synchronized, it will attempt to acquire a time signal once every minute.

Whether or not a clock actually receives a signal is dependent on the settings of the signal source. For instance, a receiver on a locally-powered digital clock that uses a battery-powered analog clock on economy mode as a signal source will only receive time data when the signal source transmits it—once every four hours—even though the receiver on the digital clock listens for a signal once every minute.

GPS

If the GPS module has clear signal reception from the satellites, it will resynchronize once every minute. It may take up to a minute to perform the initial synchronization, or longer if atmospheric conditions are bad or if the satellites are inconveniently positioned relative to the clock.

Wired

Refer to your master clock's manual for information pertaining to you synchronization

If the clock has more than one synchronization input (example: GPS and RS485) which one takes priority?

The clock will update based on the most recent synchronization data it receives, regardless of the source. If you are using more than one data input source, confirm that the sources are synchronized with each other.

Can I manually set the time on the clock?

Wired and standard Wireless clocks cannot be manually set.

Wi-Fi and cabled LAN clocks allow the user to adjust the time displayed on an individual clock through the Web Interface. A combination of the GMT Offset and Bias Seconds options can be adjusted to set the clock to the user's preferred time. These options are available through the Time Settings page of the General Settings category.

Troubleshooting

VERY IMPORTANT:

CONFIGURE YOUR CLOCK BEFORE MOUNTING IT TO A WALL OR CEILING. REFER TO THE SYNCHRONIZATION SYSTEM SETUP SECTION OF THIS MANUAL FOR INSTRUCTIONS.

All network equipment must be powered and configured before you install the clock. If the network equipment is not properly installed and powered, and if the clocks have not been configured to communicate with the network equipment, the secondary clocks will not synchronize.

The clock is attached to the power source, but it is not running. What should I do?

a. Check to make sure that the wiring in the connector complies with the installation instructions. This information is usually included in step #2.

b. Make sure that the transformer is an isolated transformer if using a 24 volt model.

c. Measure the voltage between the power (black) wire and the neutral (white) wire. The voltage between the white and black wires should measure 105-126 volts AC in the 115 volt model, 207-253 volts AC in the 230 volt model, or 21.5-26.5 volts AC/DC in the 24 volt model.

Failure to follow instructions b and c can result in a blown fuse.

The clock is not showing the right time. What should I do?

For Wi-Fi and IP systems, enter the web interface and confirm that the GMT Offset, Bias Seconds section, DST Selection have been properly set in accordance with your nation and time zone. If you have an in-house NTP server, confirm that the NTP server has been set as a time source, and that the server is distributing the correct time.

I configured my IP clock through the Wi-Fi connection, but the settings are absent when I connect with a wired LAN cable. Where did they go?

The Wi-Fi and IP cable adapters are different web pages, and information does not transfer from one to the other. When configuring cabled IP clocks, please enter your desired settings through the IP connection, not through the Wi-Fi configuration.

I am trying to power my clock using Power over Ethernet, but it isn't powering up.

To power your clock with a PoE connection, the clock must satisfy the following conditions:

• Has an RJ45 Port • Part number ends with "0"

If any of these conditions are not met, PoE cannot be used with the clock.

If all of these conditions have been met, but the clock is not receiving power, confirm that the PoE switch or PoE injector is properly powered, verify that the port on the PoE switch supports PoE (some ports on a PoE switch may be data-only), and that PoE has not been disabled if the PoE switch is a Managed Switch. Finally, use a cable tester to confirm that signals are getting through all eight wires of the cable.

Can I disable the Wi-Fi access point on this clock?

You cannot disable the Wi-Fi access point on this clock, but all models that don't use Wi-Fi for synchronization may hide the access point name through the Login settings page. If the network administrator is trying to reduce Wi-Fi congestion, the clock broadcasts on Channel 1, which should be avoided by other nearby access points in the facility.

CONTINUES ON NEXT PAGE

Troubleshooting

How can it be determined if the clock is receiving a good signal?

Refer to the Diagnostics page on the Web Interface.

Where do I plug in the GPS antenna?

Clocks that are ordered with a GPS module rely on an internal antenna for acquiring time from GPS satellites. No further components or actions by the user are required.

The Wi-Fi/Wireless clock is in a location with a poor signal or no signal at all. What do I do?

You have two options:

1. Install a Wireless Access Point (Wi-Fi) or Wireless Repeater (Wireless) closer to the clock.
2. For Wi-Fi clocks, you may also be able to boost the transmitter power output of the closest Wireless Router or Wireless Access Point. Consult the Access Point's manual for details.

I am uncertain if my clock is accessing my LAN. How do I check this?

If the clock is disconnected from the network, the colon(s) on the clock will blink.

The clock is not receiving data from the NTP server, despite the fact that other nearby clocks are receiving data and properly adjusting. What should I do?

Enter the clock's Web Interface and confirm that the network and server settings are configured correctly. Ask your network administrator to help you confirm the settings.

If the clock still does not correct, call technical support.

The clock is on the computer network, so why isn't the Wi-Fi or cabled LAN clock showing up on my Monitor software?

Perform these steps in order until a step causes the clock to appear on the Network Monitor:

1. Wait about two minutes. Some clocks take a few minutes before they appear on the monitor.
2. Confirm that the viewing filters on the Network Monitor are set to display Wi-Fi Clocks.
3. Confirm that you have the latest version of the Network Monitor software, as older versions are not able to detect Large Digiatl Clocks. Older versions will not have Large Digital Clocks available as an option on the viewing filter. Your version should be 1.3.1 or newer.
4. Log on to the Clock and, on the Network Settings page, set Broadcast to Monitors to OFF, set Send Specific Monitor IP to ON, enter your computer's IP address into the Monitor IP Address field, then press Submit followed by Log Out. Wait about two minutes for a result.
5. Confirm that the computer or network firewall is not blocking ports 80, 123, or 1777. On Windows machines,the user may receive a prompt the first time that the Network Monitor is used inquiring about network access. Ensure that the monitor software has unrestricted access.
6. Confirm that the computer running the Network Monitor software is on the same subnet as the Wi-Fi clocks. If the clock and computer are on different subnets, one will not see the other. For instance, assuming that a computer has IP address 192.168.1.3, a clock has IP address 192.168.0.4, and both devices have subnet masks of 255.255.255.0, then an Network Monitor on the computer will not be able to see the clock. Consult your network administrator for further help with subnet identification.
7. If the clock has a recorded Static IP, log into the clock's Web Interface and confirm under Network Settings that the clock is broadcasting to all monitors on the network.
8. If all else fails, reconfigure the clock by following the instructions written in the section of this manual named "Synchronization System Setup." Once finished, repeat steps 1 and 2.
9. If the clock is still not communicating with the Network Monitor, contact tech support.

Warranty

Sapling Limited Warranty and Disclaimer

The Sapling Company, Inc. warrants only that at the time of delivery and for a period of 24 calendar months after delivery or the period stated in this invoice, if different, the Goods shall be free of defects in workmanship and materials, PROVIDED that this warranty shall not apply:

To damage caused by Buyer's or any third party's act, default or misuse of the Goods or by failure to follow any instructions supplied with the Goods.

Where the Goods have been used in connection with or incorporated into equipment or materials the specification of which has not been approved in writing by The Sapling Company, Inc.;

To Goods which are altered, modified or repaired in any place other than a Sapling Company, Inc. factory or by persons not expressly authorized or approved in writing by The Sapling Company, Inc.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WITH RESPECT TO GOODS DELIVERED UNDER THIS CONTRACT, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The foregoing warranty runs only to Buyer. There are no oral or written promises, representations or warranties collateral to or affecting this contract. Representatives of The Sapling Company, Inc. may have made oral statements about products described in this contract. Such statements do not constitute warranties, shall not be relied on by Buyer and are not part of the contract.

Note: An extended 5 year (60 month) warranty is also available at the time of the system purchase with a surcharge.

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FCC Statements

The Federal Communications Commission (FCC) wants you to know:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protraction against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

FCC Warnings:

Changes or modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 5.78 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Wi-Fi FCC ID Number: YOPGS2011MIZ

900 MHz FCC ID Number: R73LPA1

2.4 GHz FCC ID Number: R73MOD-24G-1