



Inova Solutions  
OnTime™ Clock  
Installation and User Guide





OnTime Clock  
Installation and User Guide

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## 1. OnTime Introduction

The Inova OnTime Clock brings all the advantages of Power over Ethernet (PoE) technology to the marketplace in a real-time synchronized system of clocks.

PoE is an exciting and relatively new technology that allows devices to get both power and data over standard network cabling. It is the same technology that powers Voice over Internet Protocol (VoIP) phones.

Delivering both data and power over one set of wires simplifies installation, saves space, and eliminates the need for electrical outlets at the clock mounting locations. Additionally, the option of centralized Uninterrupted Power Supply (UPS) backup allows PoE devices to continue running even in the event of a power failure.

**Note:** The local area network must support IEEE 802.3af PoE for the OnTime clocks to operate.

This document contains:

- Safety Instructions
- Technical Specifications
- Installation Instructions
- Configuration Procedures
- Troubleshooting Solutions
- Maintenance/Warranty

## 2. Safety Instructions

Read and understand all instructions before installing or operating an OnTime Clock. This product is safe when installed and operated as described in this user guide.

- To prevent injury, damage to the unit, or other harm, read this manual in its entirety before installing or operating the clock.
- Observe normal safety precautions and use appropriate safety equipment (safety glasses, gloves, ladders, etc.) when installing this product.
- Never install wiring during a lightning storm.
- Never install data jacks or electrical wiring in wet locations unless the equipment is specifically designed for that purpose.
- Be sure that mounting hardware is suitable for the mounting surface and sufficient to support the weight of the clock.
- Observe all local codes when installing the product.
- This product is not a toy! Please keep it out of the reach of children.
- Operation of this product in a manner inconsistent with the instructions in this manual may result in personal injury and damage to the product and will void the warranty.
- Do not use harsh cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing injury or damage.

### 3. Technical Specifications

The Inova OnTime Clock is currently available in three models with the specifications listed in Table 1.

Technical Specifications			
	Analog	Digital (hh:mm)	Digital (hh:mm:ss)
Display Face	Analog Clock Dial 12" (30 cm)	4-Digit Red or green 7-segment LED	6-Digit Red or green 7-segment LED
Viewing Distance	100 feet	150 feet	150 feet
Standard Cabinet	Black Injection Molded Plastic	Black Injection Molded Plastic	Black painted Aluminum
Optional Cabinet Colors	Not Available	Putty or Off-White	Putty or Off-White
Stainless Steel Cabinet	Not Available	Brushed Stainless Steel	Brushed Stainless Steel
Accuracy	+/- 1 Second	+0/-200 milliseconds	+0/-200 milliseconds
Power Consumption	PoE, IEEE 802.3af compliant, 3W actual consumption	PoE, IEEE 802.3af compliant, 8W actual consumption	PoE, IEEE 802.3af compliant, 9.5W actual consumption
Dimensions	13.4" diameter x 2"D (35.3 cm x 5.1 cm)	12"L x 6"H x 2.2"D (30.5 cm x 15.2 cm x 5.6 cm)	17.5"L x 6"H x 2.2"D (44.5 cm x 15.2 cm x 5.6 cm)
Weight	2 lbs (0.9 kg)	Plastic Cabinet: 2 lbs (0.9 kg) Steel Cabinet: 3.8 lbs (1.7 kg)	Aluminum Cabinet: 2.5 lbs (1.1 kg) Steel Cabinet: 5 lbs (2.3 kg)
Flush Mount Option	Not Available	Black or stainless steel	Black or stainless steel
Network Interface	10/100 BaseT		
Operating Temperature	32° to 104° F (0° to 40° C)		
Operating Humidity	95% maximum, non-condensing		
Certifications	UL/CSA 60950-1, ETL Listed, CE Marked, RoHS Compliant		
Warranty	One (1) year, returned to factory		

**Table 1: Technical Specifications**

## 4. Installation

### 4.1. Pre-Installation

Before installing any display, you should:

- Obtain all necessary permissions from facilities managers or property owners.
- Develop a LAN diagram showing the desired location of each display unit.
- Plan the Power over Ethernet (PoE) power solution.
- Select a mounting method for the clock.
- Acquire tools and materials including assorted screwdrivers, power drill, and other materials necessary to ensure that mounting brackets are installed in compliance with building codes and restrictions.

### 4.2. Unpack the Clock

When the clock shipment arrives, inspect all packing boxes for damage. Unpack all clocks and inspect them so that you can report any damage to Inova Solutions.

### 4.3. Power over Ethernet Cabling Plan

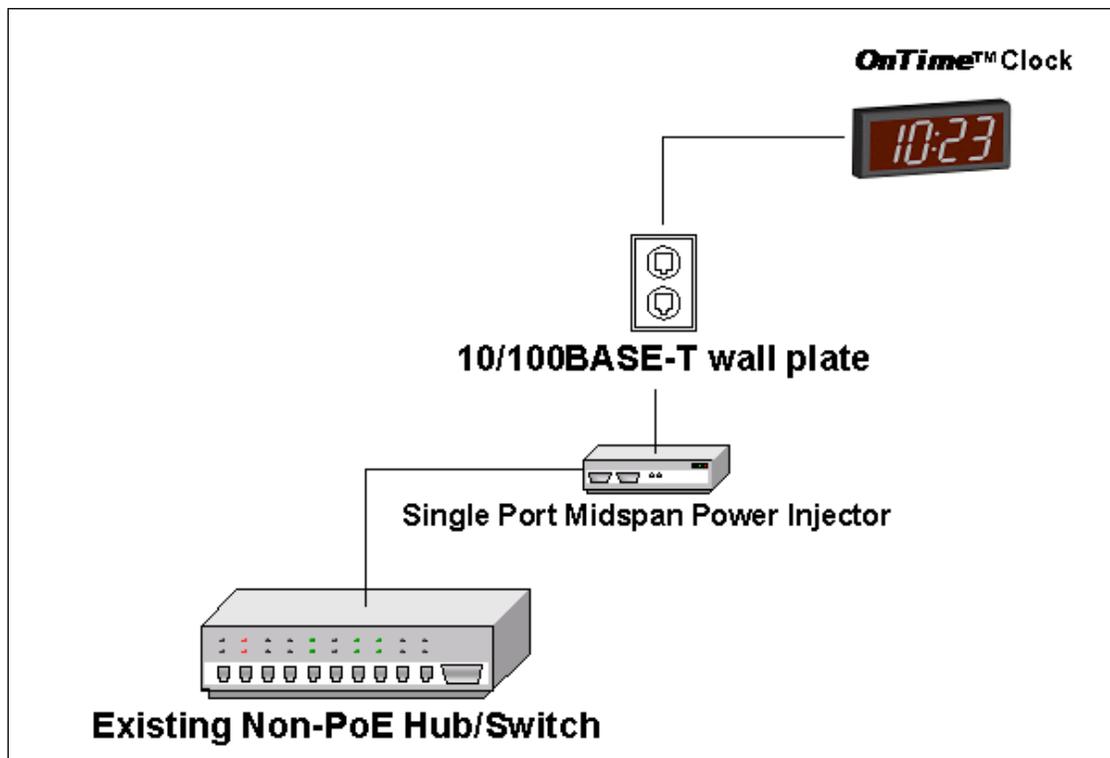
The OnTime clocks require connection to PoE enabled network equipment that can source power in compliance with IEEE 802.3af. PoE power is commonly used to power devices such as wireless Access Points and IP telephones; it is usually injected into the LAN using either PoE enabled Ethernet switches or Mid Span power injectors. Consult with your IT Group to make sure that the required PoE equipment is in place.

#### 4.3.1. Small Scale Installations

Single port PoE power injectors are the best means of powering PoE devices for a demonstration system or a small scale deployment. Inova Solutions offers a single port PoE injector for sale to support these systems (see Figure 1). Refer to [Inova OnTime™ Online Store](#) for more information on this part.

A power injector is typically installed in the communications room, and passes Ethernet communications through while also injecting power in accordance with the IEEE 802.3af standard. The 48 VDC power is only supplied to devices that request it through a handshake mechanism, so normal Ethernet devices are not

damaged if connected to a standard PoE port. Note that a power injector requires a connection to AC power, and may be connected to a battery backed uninterruptable power supply (UPS).



**Figure 1: PoE Cabling Plan**

#### 4.3.2. Sites with PoE Enabled Network Equipment

Sites that are already equipped with PoE enabled network equipment are most likely already compatible with the OnTime clock. The OnTime clock will automatically request and receive power from a PoE enabled switch that conforms to the IEEE 802.3af standard.

If the site plan calls for a significant number of clocks to be powered from a single piece of network equipment, it may be useful to verify that that piece of equipment can deliver the necessary power. Some PoE enabled switches cannot deliver the full IEEE 802.3af power of 15.4 Watts per port or may require certain power options to do so. Refer to the specifications in Table 1 for the actual power consumption of all of the units and to the manual for your particular PoE enabled power sourcing equipment.

#### 4.3.3. Sites with no Existing PoE Equipment

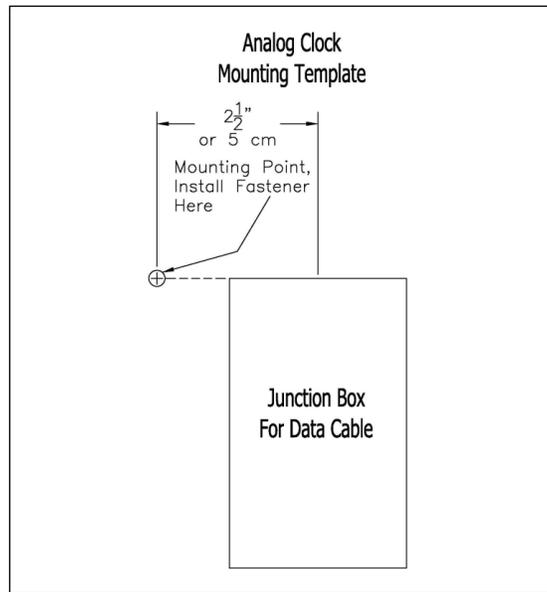
Sites that are not currently equipped with PoE enabled network equipment are typically best served by Midspan Power Injectors. The Midspan Power Injector is a multi-port rack mounted device that looks a lot like an Ethernet Switch. Typically it is installed in the rack near the existing Ethernet switch, and any ports that require PoE service are routed through the Midspan Power Injector. These units are typically available in 6 port, 12 port, 24 port, or 48 port configurations. The [Inova OnTime™ Online Store](#) offers a single port PoE injector for sale to support demonstration systems. *Note that Midspan Power Injectors can also be configured for battery backup.*

The OnTime clocks require connection to a PoE enabled LAN. PoE power is usually injected into the LAN using either PoE enabled Ethernet switches or Mid Span power injectors. Consult with your IT Group to make sure that the required PoE equipment is in place.

#### 4.4. Surface Mounting the Analog Clock

The following is a recommended procedure for surface mounting the analog clock:

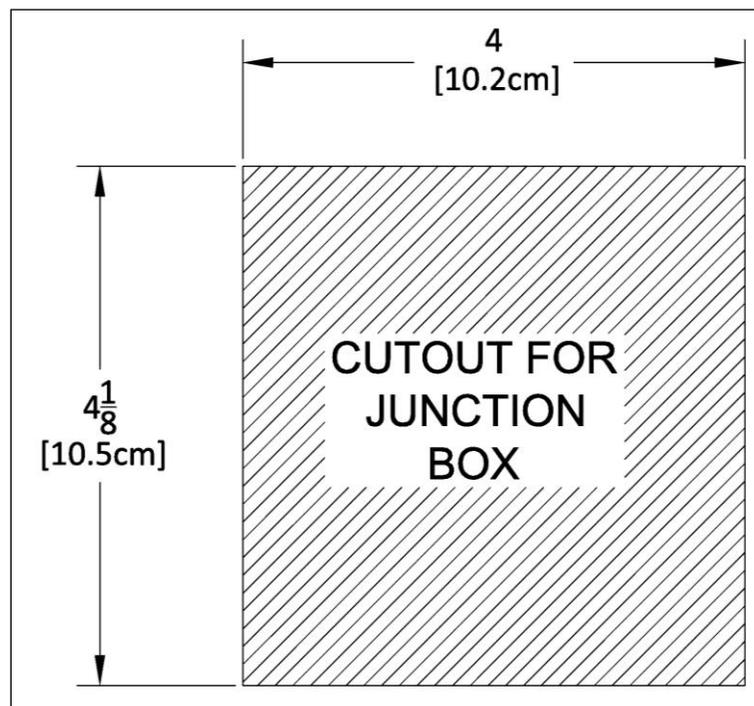
1. Determine the clock mounting location.
2. Mark the Mounting Point location.  
*Note that the Mounting Point is located 2½" (6.35 cm) below the top of the clock rim.*
3. Refer to Figure 2 to install the junction box for the data cable (if required) centered 2 ½" (5 cm) to the right of the Mounting Point.
4. Insert a flat-head fastener suitable for the wall surface at the marked point and tighten.
5. Withdraw the fastener until there is a ¼" (or a little more than ½ cm) gap between the mounting surface and the back of the fastener head.
6. Insert the data cable into the jack located at the back of the OnTime Clock.
7. Position the keyhole slot located on the rear of the clock over the fastener head.
8. Pull the clock slightly downward until the unit is seated securely.



**Figure 2: Analog Clock Mounting Template**

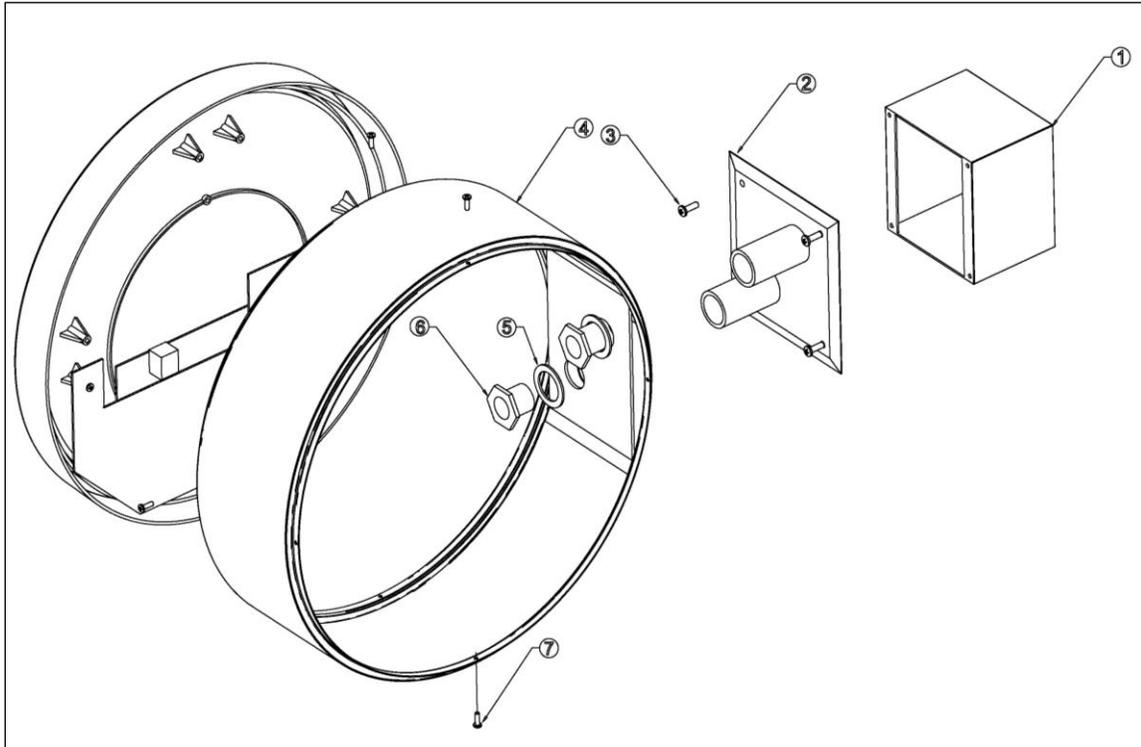
#### 4.5. Double Mounting the Analog Clock

1. Determine mounting location. There should be a solid stud or post for mounting the junction box.
2. Cut a  $4 \frac{1}{8}'' \times 4''$  (104.7mm x 101.6mm) hole in the drywall. (See Figure 3.)



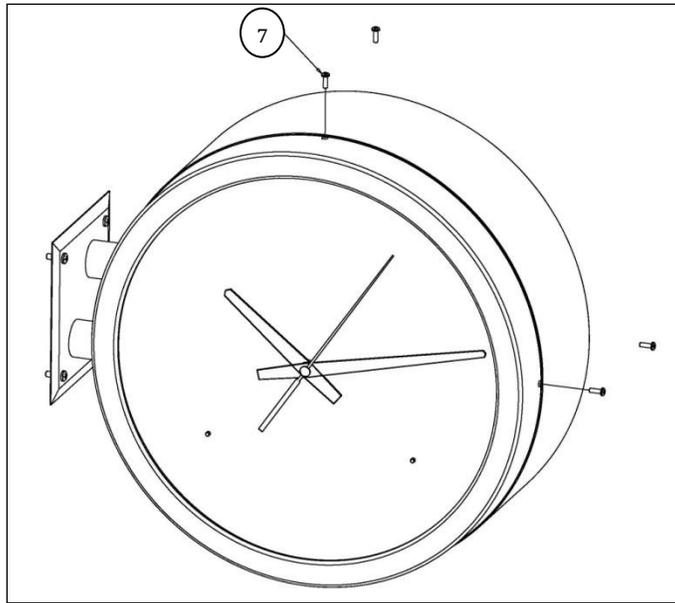
**Figure 3: Analog Clock Cutout Template**

3. Mount the junction box (part 1 in Figure 4) to the stud or post.



**Figure 4: Analog Clock Double Mount Assembly**

4. Route the cable to the junction box as desired.
5. Route the cables through the couplings of the junction box adapter plate (part 2 in Figure 4).
6. Attach the adapter plate to the junction box using the 4 screws (part 3 in Figure 4) provided.
7. Route the cable through the holes in the housing and then through the washers (part 5 in Figure 4) and retaining nuts (part 6 in Figure 4). Secure the housing with the retaining nuts and tighten.
8. Plug the cables into the jack located on the back of the clocks.
9. Attach the clocks to the housing using screws (part 7 in Figure 4 and Figure 5).



**Figure 5: Analog Clock Wall Mount**

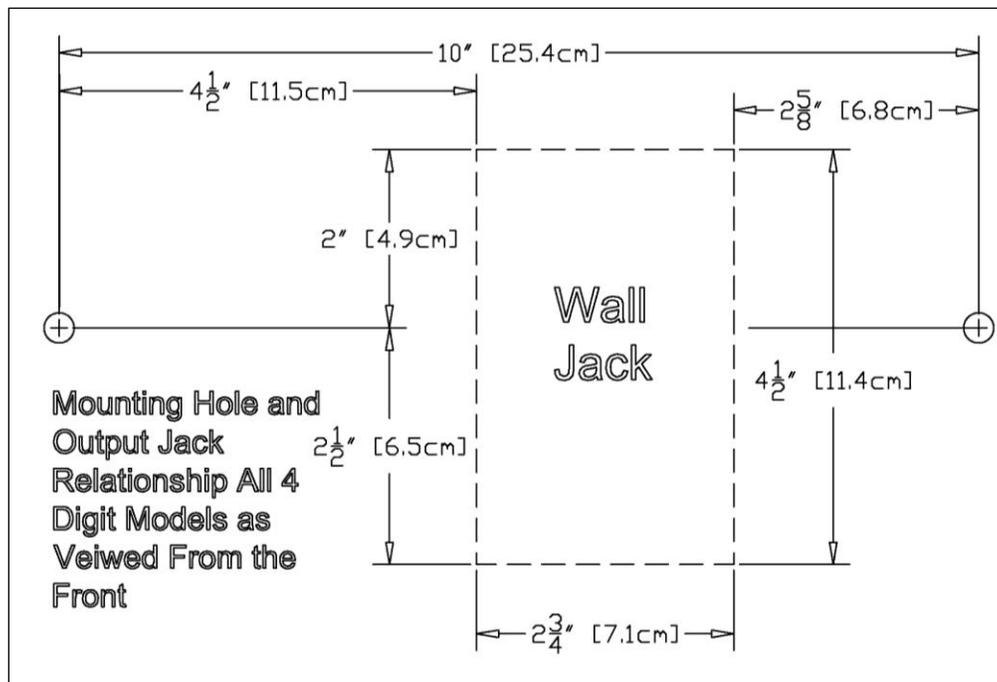
10. For ceiling mount applications, the orientation of the clock can be corrected by removing the screws that secure the clock to the housing and rotating the clock 90 degrees to the desired position.

#### **4.6. Surface Mounting the Digital Clock**

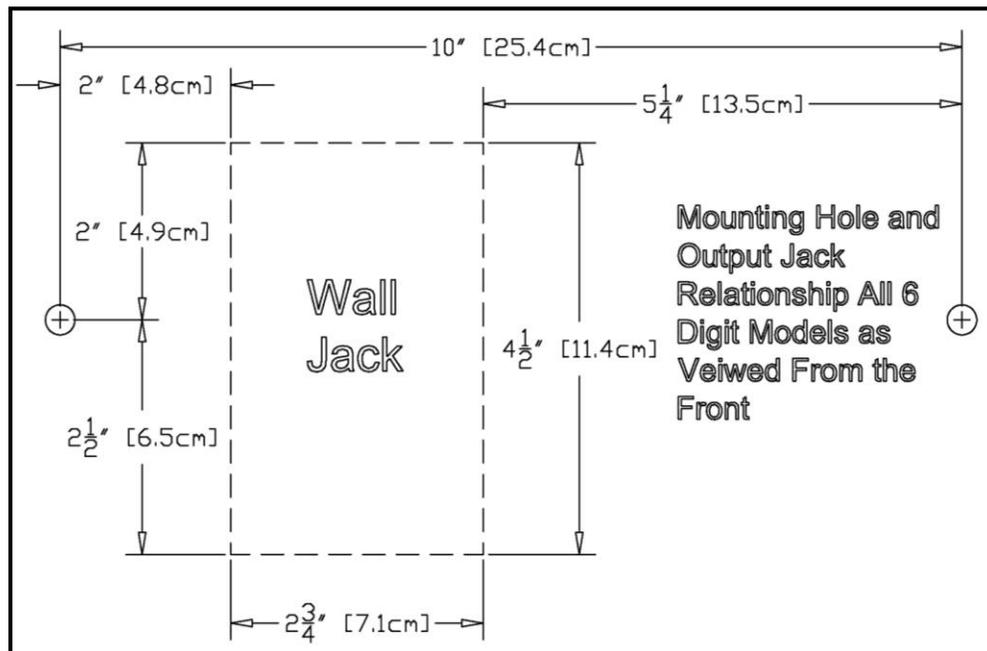
The following is a recommended procedure for surface mounting the digital clock. No mounting kit is required.

1. Determine the clock mounting location.
2. Mark two points 10" (25.4 cm) apart which are level and centered on the data cable outlet.

*Note that both models are mounted with a ten inch distance between screw hole centers; however, the best location for the wall jack varies. Refer to the templates in Figure 6 and Figure 7 to ensure that you line the wall jack up with the recess in the back of the unit.*



**Figure 6: Mounting Template for 4-Digit Clocks**



**Figure 7: Mounting Template for 6-Digit Clocks**

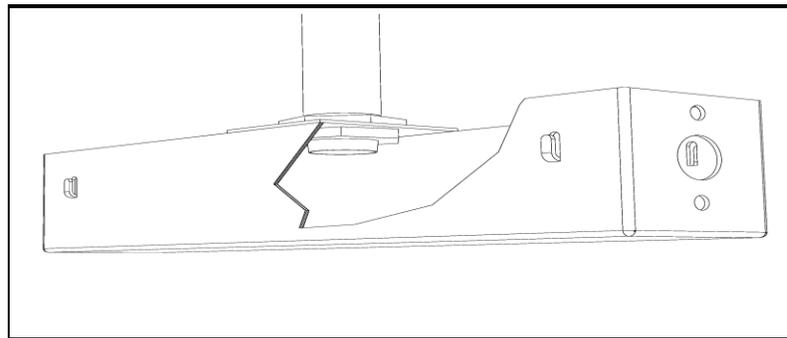
3. Insert two flat-head fasteners suitable for the wall surface at the marked points and tighten.
4. Withdraw the fasteners until there is a  $\frac{1}{16}$ " (.16cm) gap between the mounting surface and the back of the fastener head.

All claims based on information publicly available at time of printing. All other product or service names mentioned in this document may be trademarks of the companies with which they are associated.

5. Insert the data cable into the jack located at the back of the OnTime Clock.
6. Position the keyhole slots located on the rear of the clock over the fastener heads.
7. Pull the clock slightly downward until the unit is seated securely.

#### 4.7. Pendant Mounting the Digital Clock – Single or Double

The following is a recommended procedure for pendant mounting. This procedure requires a mounting kit (either ONT4KIT or ONT6KIT) and some additional hardware.



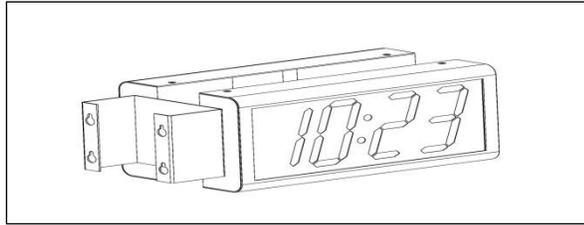
**Figure 8: Digital Clock Pendant Mounting**

1. Determine the clock mounting location.
 

*Note: The illustration above suggests a recommended mounting means for a pendant mount of one or more OnTime Clocks. Supplement the mounting kit with two suitable locknuts and a length of 3/4" (1.9 cm) pipe or conduit.*
2. Mark the location where the clock assembly is to be mounted, making sure that the mounting means is located beneath the data cable outlet.
3. Assemble and tighten the locknuts and pipe length as shown above.
4. Insert about 10 to 12 inches (30 cm) of data cable through the center hole of the mounting kit. Securely attach the mounting means, using fasteners suitable for the surface.
5. Lift an OnTime Clock into position and insert the data cable into the jack located on the back of the clock.
6. Position the keyhole slots located on the rear of the clock over the mounting tabs.
7. Pull the clock slightly downwards until the unit is seated.
8. Repeat for the second clock if two clocks are being installed back-to-back.

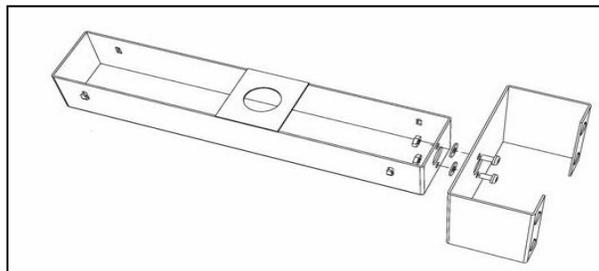
#### 4.8. Cantilever Mounting the Digital Clock – Single or Double

The following is a recommended procedure for cantilever mounting. This procedure requires a mounting kit (either ONT4KIT or ONT6KIT).



**Figure 9: Digital Clock Cantilever Mounting**

1. Determine the clock mounting location.
2. Using the template provided, mark the location where the clock is to be mounted, making sure the center is located over the data cable outlet.
3. Join the Ethernet Clock Mount and the Ethernet Clock Cantilever Wall Mount using a #2 Phillips screwdriver and a  $\frac{3}{8}$ " wrench. Make sure that the two washers are fitted between the Clock Mount and the Cantilever Wall Mount. Refer to Figure 10.



**Figure 10: Digital Clock Mounting Kits**

4. Insert 10 to 12 inches (30 cm) of data cable through the center hole of the mounting unit.
5. Attach the unit to the wall with fasteners suitable for the surface.
6. Lift the clock into place and insert the data cable into the jack located on the back of the clock.
7. Position the keyhole slots located on the rear of the clock over the mounting tabs on the clock mount.
8. Pull the clock slightly downwards until the unit is seated securely.
9. Repeat for the second clock if clocks are being installed back-to-back.

## 4.9. Flush Mounting the Digital Clock

The flush mounting feature of the OnTime clock provides an attractive, streamlined mounting that blends with all room decors. This simple system hides the clock body, while still giving full viewing access to the time face with no visible wiring.

The following is the recommended procedure for flush mounting.

1. Ensure that the location that is chosen for mounting is pre-wired with a data network feed.
2. Cut an appropriately-sized opening into the wall. Refer to Table 2 for appropriate dimensions for the opening.

Model	Vertical Dimension	Horizontal Dimension
4-Digit	12 <sup>3</sup> / <sub>8</sub> " or 31.4 cm	6 <sup>1</sup> / <sub>2</sub> " or 16.5 cm
6-Digit	17 <sup>7</sup> / <sub>8</sub> " or 45.4 cm	

Table 2: Dimensions for Mounting Digital Clock

Clearance within the wall should be at least 2 <sup>1</sup>/<sub>2</sub>" (6.4 cm) deep to allow for the clock body.

*When cutting the opening please use the template provided. This will help ensure that the opening is square as well as the proper size and in the correct location. For the template, refer to Figure 11 and Figure 12.*

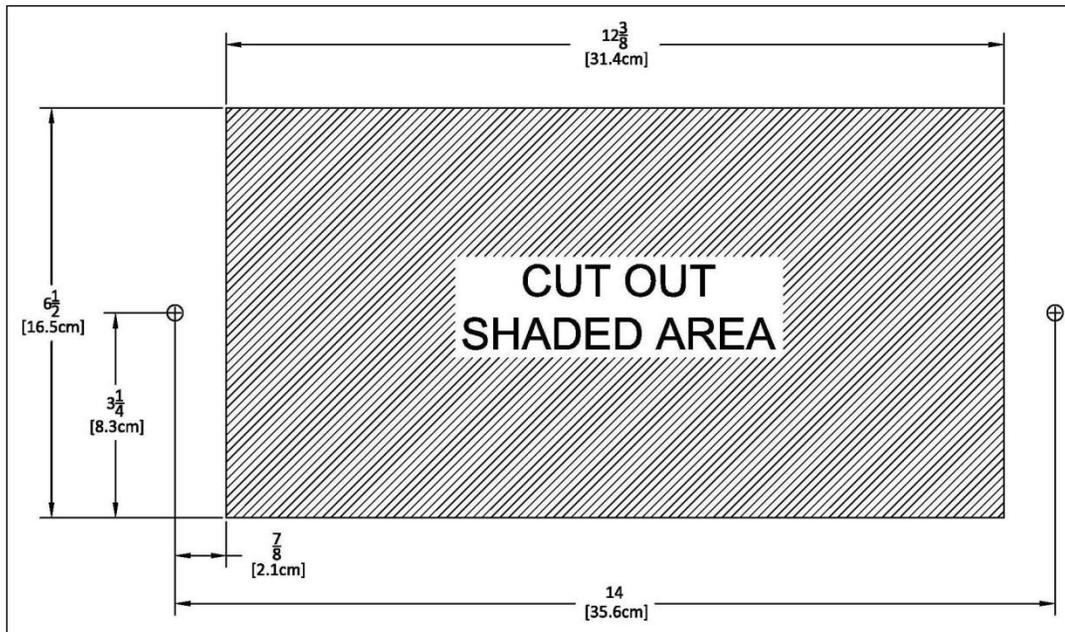
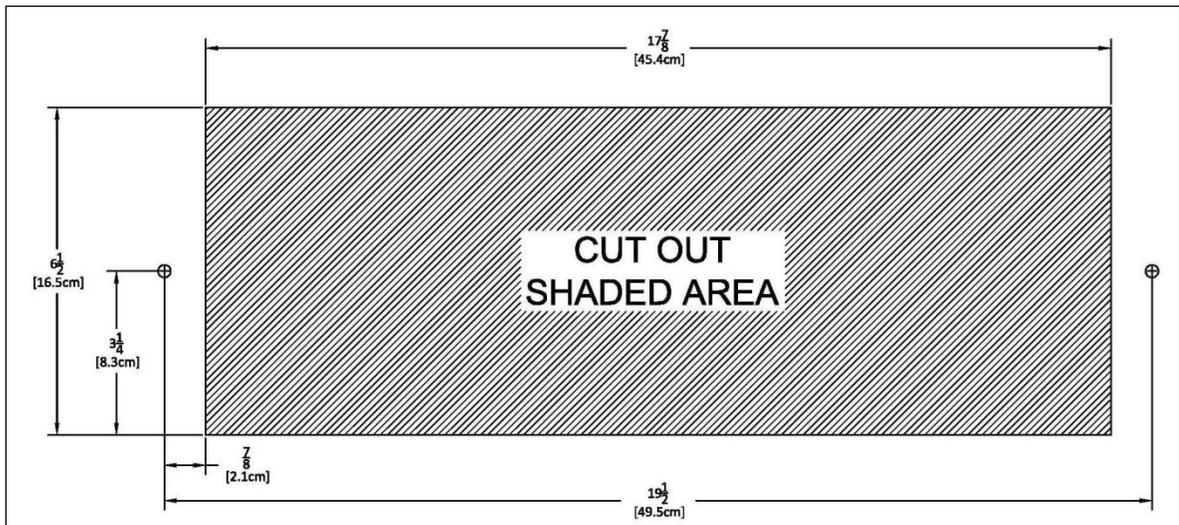
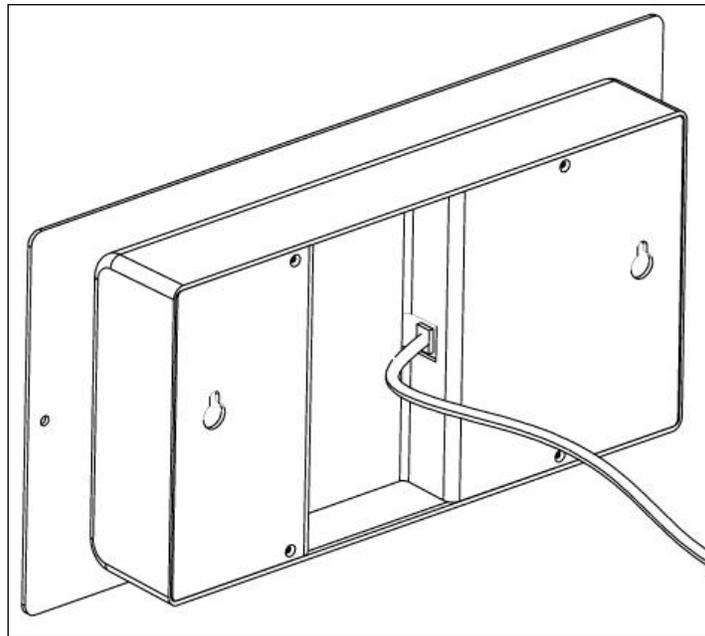


Figure 11: Cut-out Template for 4-Digit Clocks



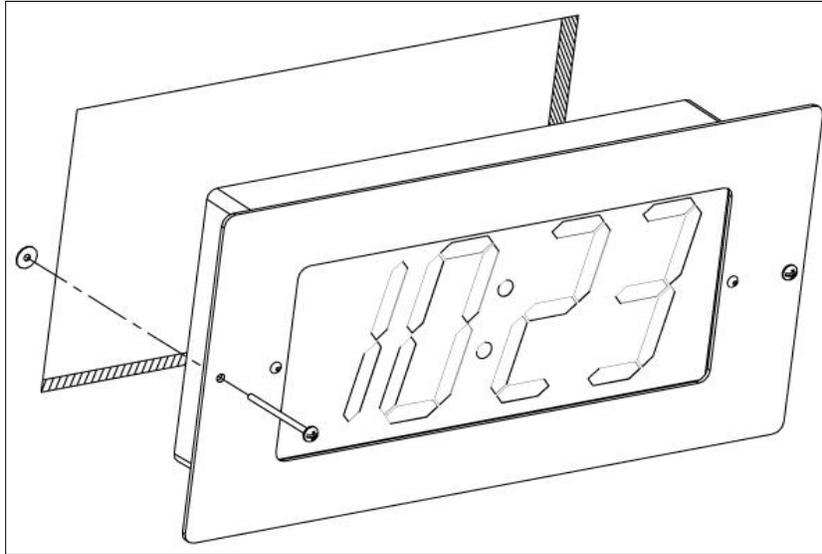
**Figure 12: Template for 6-Digit Clocks**

3. Using the template provided, locate the holes for the customer supplied hardware.
4. Drill two 5/16" holes.
5. Once holes for the bolts have been made, install #6 molly anchors in the holes, tighten until they expand, and then withdraw the screws.
6. Cut out the shaded area indicated on the template.
7. Install the data cable in the rear of the clock as shown in Figure 13. The clock is now ready for installation.



**Figure 13: Data Cable Installation**

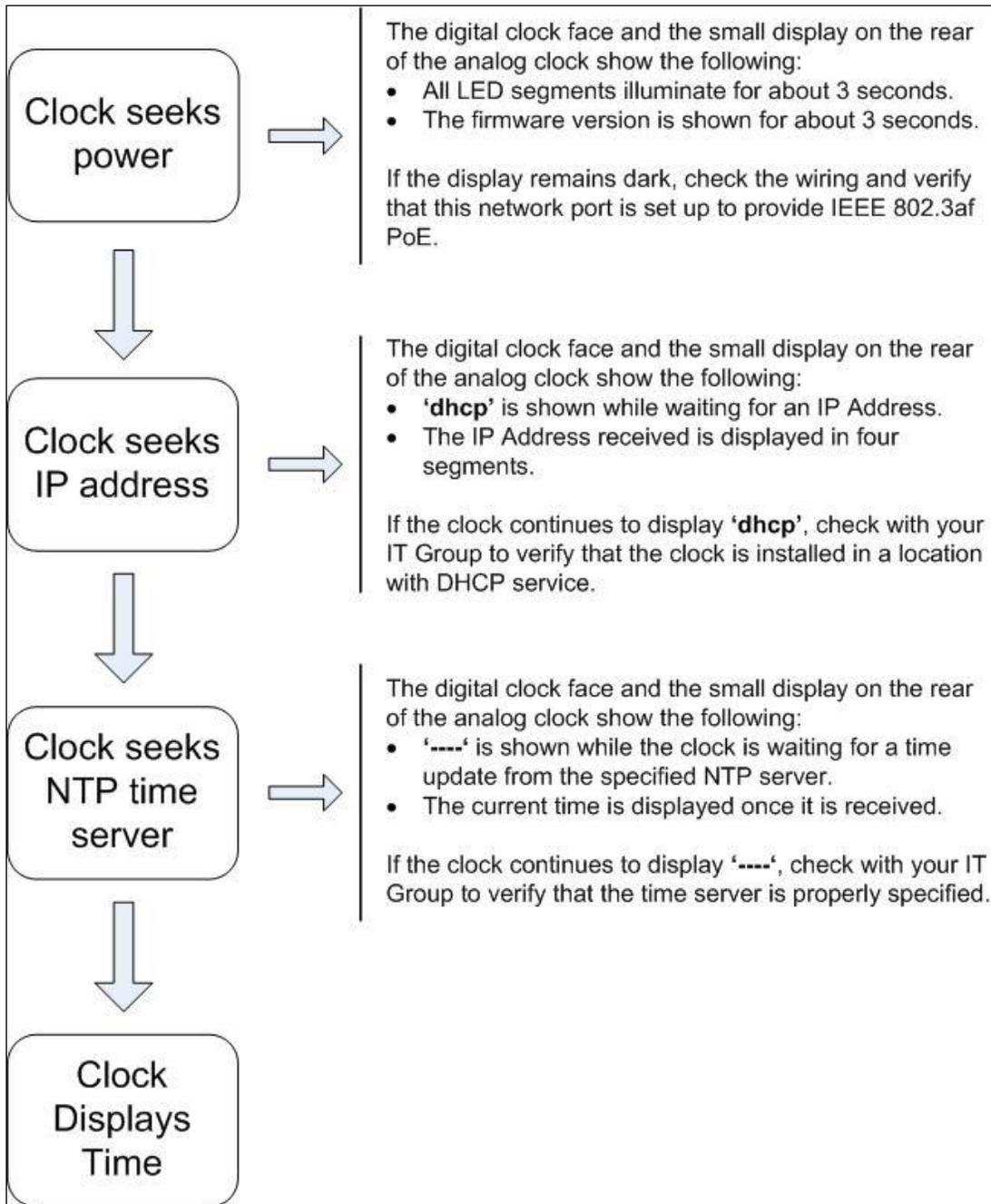
8. Place the clock/flush mount assembly in the hole and re-install the screws, as seen in Figure 14.

**Figure 14: Clock/Flush Mount Assembly**

#### **4.10. Power Up and Verification**

Once the installation is complete, power up the units by connecting them to a PoE enabled Ethernet LAN. Both the analog and digital clocks will follow the power up sequence described below.

*Note that the process shown assumes the factory default of DHCP addressing is in place.*



**Figure 15: Power Up Sequence**

## 5. Configuration

### 5.1. Introduction to SNTP

Simple Network Time Protocol (SNTP) is widely used to synchronize time on computers. The IT Group within an enterprise usually designates a local server or set of servers responsible for maintaining accurate time as a time standard for the network. These servers typically synchronize to a reliable external Internet time source.

The OnTime Clock must be configured with the network location of a time server. The default time server is an Internet time server operated by Inova Solutions, but this is intended for temporary use only because IT Groups prefer not to have individual clocks connecting to the Internet. Your IT Group should specify a local SNTP or NTP time server or router with which to synchronize the clocks.

### 5.2. Clock Configuration

Once a clock is installed, the next step is to confirm or set the configuration. Though there are a number of settings you can confirm or change on a clock, you should concentrate on four configuration items initially. These include:

- An **IP address** so that the clock can communicate on the network.
- A **network time server** so that the clock knows with which computer it should be synchronized.
- The **local time zone** so that the clock can display the correct local time.
- The **Daylight Saving Time (DST)** rule so that the clock can automatically adapt to local DST.

Before working with these settings, however, you have to consider which configuration method to use. You have three options:

Configuration Method	Description	Reference
The <b>recommended</b> method is to assign both the IP address and all options via a DHCP configuration string.	<p>This method is the only way to address and configure a group of clocks without requiring a telnet session into each clock. Clocks are factory set with DHCP enabled.</p> <p>Using this method, the DHCP Server is set up with a clock configuration string. Clocks will automatically request the configuration string when they request an IP address.</p>	Section 6

The second method is to assign an IP address via DHCP and set individual configuration options via a telnet session.	Clocks are factory set with DHCP enabled. The options may be set using telnet commands.	Section 7
The third method is to assign an IP address and individual configuration options via a telnet session.	Use telnet commands to assign both a static IP address and the appropriate configuration options.  Note: that if you have more than one OnTime clock, you will need to configure each one individually with this option.	Section 7

**Table 3: Clock Configuration Methods**

## 6. Using DHCP for Addressing and Configuration

### 6.1. DHCP Configuration

IT Groups that use DHCP to assign IP Addresses often use DHCP options to configure PCs and other devices on the network. Typical examples of these options are:

- DHCP Option 1 to specify the subnet mask.
- DHCP Option 3 to specify the router that is the default gateway.
- DHCP Option 6 to specify the DNS Server.

When PCs and other devices come up on the network, all of these parameters are set automatically if they are configured at the DHCP Server. In addition, any institutional changes will automatically convey to the devices when they restart.

DCHP options in the range of 224 to 254 are reserved for private use for site specific purposes by RFC 3942. This means that DHCP servers will not pre-assign them in the way that options in the range of 1 to 223 are pre-assigned (i.e., Option 3=Router). Private options are intended for whatever site specific use the controlling IT Group may have in mind.

The OnTime clock takes advantage of one of the private option slots to enable plug and play installation of clocks. The OnTime clock is preset to request its local configuration from the DHCP server using private option 230. If option 230 is set up on the DHCP Server with a valid configuration string, then the clock can configure itself automatically.

This option reduces the work required to configure multiple clocks, because rather than configuring each individual clock through a telnet session, the configuration is done one time at the DHCP server.

DHCP Server changes are typically made by the IT Group.

## 6.2. DHCP Configuration Settings

The OnTime clock requires these settings to properly display local time:

Setting	Description	Applies to...	
		Digital	Analog
Time Server	Establishes a network time server so that the clock knows with which computer to synchronize its time.	✓	✓
Time Zone	Sets the local time zone so that the clock can display the correct local time.	✓	✓
Daylight Savings Time (DST)	Sets the DST rule so that the clock can automatically adapt to local DST.	✓	✓
24-hour	Sets a 12- or 24-hour time display. The factory default is 12 hour time.	✓	<i>No effect</i>
Show/hide colon	Determines whether the colon is shown on the display. The factory default is to show a colon as a separator between hours and minutes.	✓	<i>No effect</i>

**Table 4: DHCP Configuration Options**

## 6.3. DHCP Configuration Test and Rollout

The recommended practice is to load the configuration string into the DHCP Server and then try it with one clock by re-booting the clock. Once you are confident that the one clock is properly configured using these settings, you can then plug in additional clocks to add them to the network, knowing that they will automatically receive the proper configuration settings as well.

**Note:** A clock must be re-booted to request a new configuration string from the DHCP Server. The clock *does not* automatically request a new configuration string at the expiration of the DHCP lease interval.

## 6.4. Creating a DHCP Configuration String

Table 5 describes the five options that can be used in a configuration string when establishing a private DHCP Server option for automatically configuring the clock. The format used is **option name=option value**, with the options separated by semicolons in the configuration string. This string is added to the DHCP

Server, as described in the next section. (See Table 4 for example configuration strings).

Option Name	Option Value	Configuration Setting	Description
timeserver	SNTP Time Server name or IP address	SNTP Time Server (sntp -h command)	Sets the SNTP Time server Host Name or IP address to use for time synchronization. If a Host Name is used, then the DHCP Server must also provide a DNS server to use to resolve the Host Name.
timezone	hh:mm time offset	Timezone offset (timezone command)	Sets the number of hours and minutes to offset from UTC time when displaying time. This can be negative. The minutes (:mm) are optional.
dst	none, [rule specification]	Daylight Saving Time (dst command)	Establishes the Daylight Saving Time rule. none - Disable the Daylight Saving Time adjustment. Other values are parsed based on the DST rule format. The format is 8 numbers in the order: startDOW startDay startMonth startTime endDOW endDay endMonth endTime
24hour	true, false, t, f	Clock hours display mode (display -t command)	Sets the time format for the digital clock (ignored by the analog clock). If <i>true</i> the clock uses 24hour (military) time format and disables the AM/PM light; otherwise it uses 12hour time format and enables the AM/PM light.
showcolon	true, false, t, f	Clock colon display mode (display -c command)	Sets the use of the colon on the digital clock (ignored by the analog clock). If <i>true</i> the colon separator between the hours and minutes is lit.

**Table 5: DHCP Private Option String Parameters**

Table 6 contains examples of the configuration strings.

Command	Description
<code>timeserver=ntp.inovasolutions.com; timezone=-5;dst=-1 8 2 2 1 1 10 2</code>	<ul style="list-style-type: none"> <li>• Sets the time server to ntp.inovasolutions.com</li> <li>• Sets the time zone to Eastern Standard Time (-5 hours from UTC)</li> <li>• Enables DST for US 2007 rules</li> </ul>
<code>timeserver=10.1.128.1; timezone=0; dst= 1 -1 2 1 1 -1 9 1</code>	<ul style="list-style-type: none"> <li>• Sets the time server to IP Address 10.1.128.1</li> <li>• Sets the time zone for Western European Time</li> <li>• Enables DST for EU 2007 rules</li> </ul>
<code>timeserver=10.1.128.1; showcolon=true ; 24hour = true ; timezone=-5;dst=-1 8 2 2 1 1 10 2</code>	<ul style="list-style-type: none"> <li>• Sets the time server to IP Address 10.1.128.1</li> <li>• Enables the colon display and sets the clock to 24 hour mode</li> <li>• Sets the time zone to Eastern Standard Time (-5)</li> <li>• Enables DST for US 2007 rules</li> </ul>

**Table 6: Examples of Common DHCP Configuration Strings**

## 6.5. Setting a Different DHCP Option Number on a Clock

You do not have to use DHCP configuration option 230 for the clocks. You can also create custom options using different option numbers. If private option 230 is already in use on your DHCP Server, you can configure your clock to use another private option instead (e.g., option 231). The **ipconfig** command can be used to set a different DHCP option number on the clock or to disable this feature altogether. The **ipconfig** command is defined in Appendix A.

## 6.6. Verifying the DHCP Configuration Settings on a Clock

The `dhcpconfig` telnet command lists all the configuration settings that were retrieved by the clock from the DHCP Server and that are currently in effect. If an error arises while parsing the DHCP options received from the server, the error will be shown in the command output.

The `dhcpconfig` command output below shows the settings that were received from the DHCP Server using the configuration string in the first row of Table 6.

```
dhcpconfig
Using Option Code 230 for DHCP based Clock
Configuration.
The following DHCP based configuration settings are in
use:
Time Server   : ntp.inovasolutions.com
Time Zone     : -5
DST Rule      : -1 8 2 2 1 1 10 2
```

### Notes:

- A clock must be re-booted to request a new configuration string from the DHCP Server. The clock does not automatically request a new configuration string at the expiration of the DHCP lease interval.
- If private option 230 is not configured on the DHCP Server, the clock will receive an IP address in the usual fashion but the clock's settings for Time Server, Time Zone, DST, etc. will come from the default internal configuration.

## 6.7. DHCP Configuration Example for Microsoft Server

Appendix C contains an example of how to configure private options on a Microsoft DHCP Server, such as the one that is bundled with Windows 2003 Server. It is for reference only. It is assumed that skilled IT personnel are the only people authorized to edit DHCP Server settings.

## 7. Telnet Configuration

Clocks can also be individually configured using a telnet session. Each clock needs to be set up with the following minimum configuration.

- An **IP address** so that the clock can communicate on the network. This can be either static or DHCP served.
- A **network time server** so that the clock knows with which computer it should be synchronized.
- The **local time zone** so that the clock can display the correct local time.
- The **Daylight Saving Time (DST)** rule so that the clock can automatically adapt to local DST.

Appendix A contains a complete list of telnet commands for reference. You can also refer to the OnTime FAQ located at [Inova OnTime Support](#) for more configuration assistance.

### 7.1. Establishing a Telnet Connection to the Clock

Connect the clock to a PoE enabled network and watch the digital display face or the rear digital display on the analog clock for the DHCP served IP Address. If an IP Address appears, use this address in the steps below. If the letters 'dhcp' remain on the display, then either temporarily move the clock to a network segment with DHCP service, or set up a 'bench' network composed of just the clock and a PC using a crossover cable. You may need to consult your IT department and use the default link-local IP Address to make a connection.

Once you have the clock's IP Address, you can then establish the telnet connection:

1. Choose Run from the Windows Start Menu.
2. When the Run window appears, type **cmd** and press Enter.
3. When the command line window appears, type the telnet command **telnet xxx.xxx.xxx.xxx**, where **xxx.xxx.xxx.xxx** is the known IP address of the clock.

**Note:** Windows Vista users may need to change the default windows configuration in order to use telnet. Contact your IT Group for assistance.

4. The clock's service light begins to blink and the clock login prompt appears:

```
Inova Solutions OnTime Clock Version xxx  
iclock login:
```

5. Enter the user name: **iclock**.
6. When the clock's password prompt appears (`iclock password:` ), enter the clock's password (the default is **timely**).
7. The clock's telnet prompt appears: `iclock />`
8. You are now ready to set configuration using the telnet commands.

For help with a specific telnet command, at the prompt, type **help** followed by the desired command. For example, to see help for the display option, type **help display**.

## 7.2. Assigning an IP Address

There are two options for assigning an IP Address to each OnTime Clock:

- DHCP [Factory Default]
- Static IP Address

### 7.2.1. DHCP

The factory default is DHCP. Refer to Section 6 for more information on DHCP. Refer to Appendix A for help changing from a Static IP Address to DHCP.

### 7.2.2. Static IP Address

**Note:** Your IT staff must authorize and provide a static IP address to prevent operational problems which might occur if that address is applied to another device on the network.

To enter a fixed IP address into your clock's firmware, start a telnet session with the clock and the use the following command option:

```
ipconfig -a xxx.xxx.xxx.xxx -m yyy.yyy.yyy.yyy -g  
zzz.zzz.zzz.zzz
```

where:

- `xxx.xxx.xxx.xxx` is the IP address
- `yyy.yyy.yyy.yyy` is the subnet mask
- `zzz.zzz.zzz.zzz` is the gateway address.

All fields must be provided.

In order to make the management of your system as easy as possible, Inova recommends that you record the IP Address for each clock in a table similar to the one below, particularly if you have elected to set a static IP Address.

Clock Name or Location	IP Address

**Table 7: IP Address Reference Table**

## 8. Specifying a Time Server

The network time server on the LAN, WAN, or Internet may be specified by IP Address or by Host Name.

- Specifying by IP Address is typically only safe if the address of the server is under your IT group's control. When specifying time servers on the Internet, use the Host Name.
- Specifying by Host Name requires that a DNS server is accessible to the clock:
  - If IP addressing is static, the DNS servers must be identified and configured as well.
  - If IP addressing is via DHCP, the DNS servers are typically already automatically configured (do not over configure!)

The process for specifying a time server is the same for both Host Name and IP Address.

1. Log into the OnTime Clock.
2. At the prompt, type: **sntp -h**.
3. Press the spacebar.
4. Enter the Host Name or IP Address of the time server.
5. Press the Enter key.

It is always a good idea to test the synchronization between the clock and the time server. To do that, perform these steps:

1. At the prompt, type: **sntp -s** (Be sure there is a space between sntp and -s)
2. Press the Enter key.

The clock displays SNTP settings and immediately attempts synchronization with the specified host (either the Host Name of the time server on your network or with an outside time standard).

The default time server is set to **ntp.inovasolutions.com**. In general, this setting should be changed to an internal time server under IT control. There is more information on NTP, SNTP and time server selection online at the OnTime FAQ.

### 8.1. Setting the Time Zone

Coordinated Universal Time (UTC) is a time standard based on the time at zero degrees longitude (also known as Greenwich Mean Time or GMT). Time zones around the world are expressed as positive or negative offsets from UTC. The

default time zone setting for the clock is UTC -5, which is the time zone for (GMT -5) Eastern Time (US & Canada). You can change this setting with the following command:

```
timezone -N [or] timezone N
```

where **N** is the time zone offset from UTC, -11 to 12.

**Note:** If you're not sure what time zone offset to use, check the time zone value used on a Windows PC on your network; double-click the time in the Windows service tray (in the lower-right corner of your screen) and choose the Time Zone tab.

## 8.2. Configuring Daylight Saving Time

The following table identifies the process for setting daylight saving time.

DST Setting	Command
No Daylight Saving Time	Type the command to disable DST: <b>dst -none</b> Press the Enter key.
In the U.S. and Canada	Type: <b>dst -rule -1 8 2 2 1 1 10 2</b> Press the Enter key.
For European Daylight Saving Time	Type: <b>dst -rule 1 -1 2 1 1 -1 9 1</b> Press the Enter key.
Other locations	The support web site at <a href="#">Inova OnTime Support</a> contains a DST calculator which can compute the correct DST configurations string for you location. Obtain the correct string and enter it with the <i>dst -rule</i> command.

**Table 8: Configuration for Daylight Saving Time**

Three additional time related configuration items should also be set initially. The commands for setting 12/24, AM/PM, and Colons On/Off are identified in Appendix A.

## 9. Troubleshooting

The following table contains several trouble conditions you may encounter with the OnTime Clock and the recommended actions to take to correct the problem. The up-to-date troubleshooting help is available in the FAQ at [Inova OnTime Support](#).

Condition	Solution
The Digital Clock face or Analog Clock rear display is dark.	Verify that the network port is capable of supplying PoE power. Reboot the clock by disconnecting the data cable, counting to five, and reconnecting the cable. It takes as long as 20 seconds for the display to go active.
Analog Clock hands are not moving.	If the hours and minutes hands are close to correct time, check the position of the second hand and refer to the stopped second hand item below. Remove the clock from the wall, check the digital display, and refer to the appropriate entry in the troubleshooting table. If the digital display is dark, verify that the network port has proper PoE power.
The clock shows incorrect time.	If the minutes past the hour are correct, verify the Time Zone and Daylight Saving Time settings. For Digital Clocks, check if the Service Light is illuminated (see below). For Analog Clocks, check the time on the small rear display.
The Analog Clock second hand has stopped moving.	The second hand on the analog clock will stop moving to indicate a failure of the time sync from the time server. It usually stops at 5 seconds past the top of the minute to indicate this problem. Cycle the power on the clock by disconnecting the network cable and reconnecting. Then watch the rear display to see if the proper time is received.
A 'dhcp' message shows on the Digital Clock face or Analog Clock rear display.	The clock has failed to receive an IP address from the DHCP Server. Contact your IT group responsible for DHCP service. <b>Note:</b> The clock is reachable through its fixed link-local address for diagnostic or re-configuration purposes. The link-local address is 169.254.0.100.
The service light is blinking.	The service light is located at the bottom right of the Digital Clock face. When the light is blinking, this means that there is an active telnet session in progress on the clock. <b>Note:</b> that this functionality may not be present on the Analog Clock.

The service light is on.	The service light is located at the bottom right of the Digital Clock face. When the light is on steady, it usually means that the time server can no longer be reached. <b>Note:</b> that this can also happen if the DHCP served IP Address cannot be renewed. Reboot the clock to verify that it properly receives a DHCP address. Verify that time appears on the display.
Determine the IP Address of a Clock	Lift up gently on the unit to free the keyholes at the rear of the clock from the mounting hardware. Disconnect the network cable and count to five. Replace the network cable and watch the Digital Clock face or the Analog Clock rear display for the IP Address. Record the IP Address and location.
Digital Clock Face or Analog Clock rear display showing '----'	The Time Server is either not properly specified or is unreachable.

**Table 9: Troubleshooting the OnTime Clock**

## 10. Warranty and Maintenance

### 10.1.Warranty

Inova Solutions warrants the OnTime clocks to be free from defects in material and workmanship during a one-year period. The Warranty begins on the date the unit is shipped from Inova Solutions. Extended warranties are available via an Inova Solutions Service Agreement (ISA).

Inova Solutions' liability under this Warranty is limited to repairing or replacing, at Inova Solutions' option, the defective equipment and providing upgrade version changes for firmware. In case of repair, the product must be returned to an authorized Inova Solutions Service Center.

This Warranty does not apply if repairs are required due to acts of nature beyond Inova Solutions' control such as, but not limited to, lightning strikes, power surges, misuse, damage, neglect, or if repairs/modifications have been made or attempted by anyone other than personnel authorized by Inova Solutions.

**In no event will Inova Solutions be liable for any indirect, special, incidental, or consequential damages from the sale or use of this product.**

**This disclaimer applies both during and after the term of the warranty. Inova Solutions disclaims liability for any implied warranties, including implied warranties of merchantability and fitness for a specific purpose.**

### 10.2.Repair and Returns

To obtain service under this Warranty, contact Inova Solutions at (434) 817-8000 or at the address below during the Warranty period to receive a Return Material Authorization (RMA) number and shipping instructions. Then ship the product, transportation prepaid, for inspection.

Ship to:            Inova Solutions  
                          Attn: RMA XXXXXXX  
                          110 Avon Street  
                          Charlottesville, VA 22902 USA

Typical equipment repair or replacement time is seven (7) business days, plus shipping times. One-way shipping is the Customer's responsibility. Inova Solutions will return ship the equipment by the same means it was received.

Inova Solutions will not be responsible for dismounting and remounting of the OnTime clock, for unauthorized returns or for returns that do not list the RMA number and quantity returned on a packing list attached in plain view on the outside of the shipping container.

## 11. Glossary of Terms

Terms	Definitions
Cantilever Mount	This is a wall mount to the left or right side of the OnTime Clock unit, illustrated in Section 4, requiring the Digital Clock Mounting Kit (Inova Part Number ONTKIT).
DHCP	Dynamic Host Configuration Protocol (DHCP) is a communications protocol that lets network administrators manage and automate the assignment of IP Addresses on an organization's network.
DNS	The Domain Name System (DNS) is the way that Internet domain names are located and translated into IP Addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.
Flush Inset	This model may be backplate-mounted to a customer-supplied enclosure.
GMT	Greenwich Mean Time; since replaced with UTC, the world time standard.
Host Name	Unique identifier for a device on a TCP/IP network. For example: 3rdFlrConfRm
IP Address	Unique identifier for a device on a TCP/IP network. For example: 11.15.55.233
NTP	Network Time Protocol; most NTP servers will respond to an SNTP time request
Pendant Mount	This is a ceiling mount, illustrated in Section 4, requiring the Digital Clock Mounting Kit, Inova Part Number ONTKIT.
PoE	Power over Ethernet, IEEE 802.3af
SNTP	Simple Network Time Protocol
Surface Mount	This is a simple flat wall mount identified in Section 4. No mounting kit is required.
Telnet	A network protocol and a software program that allows you to remotely access the command console of a computer over a network.
UTC or GMT	Universal Coordinated Time, formerly Greenwich Mean Time is the World Time Standard. UTC is, by definition, the same at every point on Earth. Local times are indicated by offsets from UTC.

**Table 10: Glossary of Terms**

## Appendix A: Clock Configuration

This section summarizes the configuration options available with the clock. For help setting up a telnet session, refer to Section 7- Telnet Configuration.

Condition	Solution
Get help for clock commands	<p><b>help</b> To see a list of all the telnet command options for which help is available.</p> <p>To see help for a particular command option, type the command option <b>help</b> followed by the command option. For example, to see help for the <b>display</b> option, type <b>help display</b></p>
Display the configuration settings for clock	<p><b>config</b> To display all configuration parameters except those sent by the DHCP Server. Use the DHCP config command to view these superseding options</p>
View or change the Daylight Saving Time (DST) setting	<p><b>No Daylight Saving Time</b> - Type the command to disable DST:  <b>dst -none</b>, then press the Enter key.</p> <p><b>US and Canada</b> - Type: <b>dst -rule -1 8 2 2 1 1 10 2</b>                  Press the Enter key.</p> <p><b>European</b> - Type: <b>dst -rule 1 -1 2 1 1 -1 9 1</b>                  Press the Enter key .</p> <p><b>Other Locations</b> - The support web site at <a href="#">Inova OnTime Support</a> contains a DST calculator which can compute the correct DST configurations string for your location. Obtain the correct string and enter it with the <i>dst -rule</i> command.</p>
View or Configure Clock's IP settings	<p><b>ipconfig</b> - To view clock's current IP settings</p> <p><b>ipconfig -o xxx</b> - Use DHCP to lease an IP address and request a configuration string where <i>xxx</i> is the private option number. Factory default is 230.</p> <p><b>ipconfig -o</b> - Disable the configuration portion of the DHCP process.</p> <p><b>ipconfig -d</b> - Use DCHP to lease an IP address and retrieve network settings</p> <p><b>ipconfig -a xxx.xxx.xxx.xxx -m yyy.yyy.yyy.yyy -g zzz.zzz.zzz.zzz</b>                  - To configure a static IP address, where <i>xxx.xxx.xxx.xxx</i> is the IP address, <i>yyy.yyy.yyy.yyy</i> is the subnet mask, and <i>zzz.zzz.zzz.zzz</i> is the gateway address. (All the information is ignored if DHCP is enabled.)</p> <p><b>ipconfig -h hostname</b> - To change the hostname of the clock, where <i>hostname</i> is the new hostname</p>

View current SNTP settings or Change Time Server setting	<p><b>sntp</b> To view the current time server and other SNTP settings</p> <p><b>sntp -h xxx.xxx.xxx.xxx</b> - To change the time server with which the the clock synchronizes, where <i>xxx.xxx.xxx.xxx</i> is the hostname or IP address of the desired time server</p> <p><b>sntp -s</b> To trigger an immediate SNTP time synchronization.</p>
Change the Time Zone	<p><b>timezone</b> - To view the clock's current time zone setting.</p> <p><b>timezone -N or timezone N</b> - To change the clock's time zone setting, (don't use a + sign for positive values) where N = the desired time zone offset in the range -11 to 12.</p> <p>For example, to set the time zone for (GMT -5) Eastern Time (US &amp; Canada), you would use: <b>timezone -5</b></p> <p><b>Note:</b> If you're not sure what time zone offset to use, check the time zone value used on a Windows PC on your network; double-click on the time in the Windows service tray (in the lower-right corner of your screen) and choose the Time Zone tab.</p>
Specifying a Time Server	<b>sntp -h hostname</b> where <i>hostname</i> is the hostname of the time server
Testing the Time Server Synchronization	<b>sntp -s</b>
Verifying DHCP Configuration settings	<b>dhcpcfg</b> - To list the option settings received from a DHCP Server (for verification purposes only).
Display all Address Resolution Protocol (ARP) cache entries	<b>arp</b>
View log on session screen or enable/disable logging	<p><b>Log</b> - To view the log on the session screen.</p> <p><b>log on   off</b> - To enable/disable logging.</p> <p>When logging is enabled by typing "log on", the idle session time out feature is disabled.</p>
List all TCP connections	<b>netstat</b>
Display info to diagnose DNS problem with SNTP server	<b>nslookup SNTPServerName</b> where <i>SNTPServerName</i> is the hostname or IP address of an SNTP server.
Configuring the 12/24 Time Format	<p><b>display -t 24</b> - Sets 24 hour display. <b>Note:</b> the space before and after -t</p> <p><b>display -t 12</b> - Sets 12 hour display. <b>Note:</b> the space before and after -t</p>
<b>Note:</b> These commands are ignored by the analog clock.	

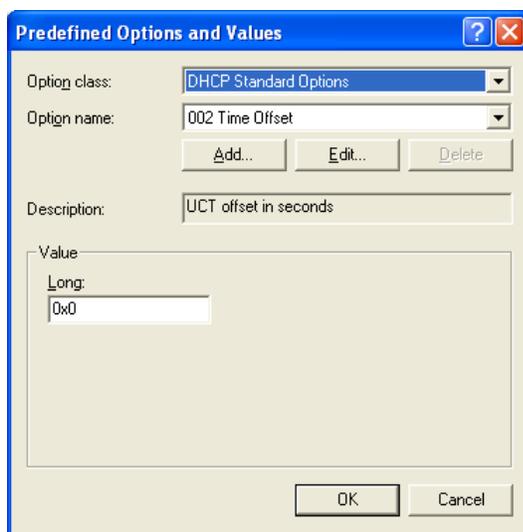
Configuring the AM/PM Indicator  <b>Note:</b> These commands are ignored by the analog clock.	<b>display -p off</b> Turns off pm indicator. <b>Note:</b> the space before and after -p  <b>display -p on</b> Turns on pm indicator. <b>Note:</b> the space before and after -p
Configuring Colons On/Off  <b>Note:</b> These commands are ignored by the analog clock.	<b>display -c off</b> Turns off colons. <b>Note:</b> the space before and after -c  <b>display -c on</b> Turns on colons. <b>Note:</b> the space before and after -c
Update clock firmware	Refer to the OnTime FAQ at <a href="#">Inova OnTime Support</a>
Reboot the clock	<b>reboot</b>

**Table 11: Configuration Commands**

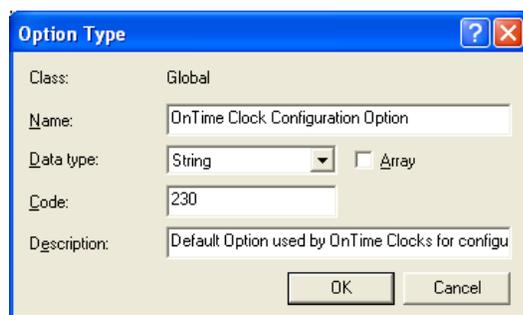
## Appendix B: Configuring DHCP Options for Microsoft Servers

This section details how to configure private options on a Microsoft DHCP Server, such as the one that is bundled with Windows 2003 Server. It is for reference only and may not represent the specific options that you may encounter.

1. Launch the DHCP Management Console.
2. Select the DHCP Server to configure.
3. Choose the Action “Set Predefined Options...”



4. Choose “Add...” a new option.



5. Set the Data type to ‘String’.
6. Use the option code that matches your clock configuration. The default option code is 230.
7. Select either the Server Options or Scope Options and choose “Configure Options...”.

8. Select the Option in the list and select the checkbox to enable it.
9. Enter the configuration string you've developed for your unique operating environment and geographic location.

