



Installation Manual V2.0

Valcom Wired Analog Clocks

V-A2412 / V-A2412B and V-A2416 / V-A2416B

V-A11012 / V-A11012B and V-A11016 / V-A11016B



Valcom Wired Analog Clocks

Table of Contents

Table of Contents	2
Important Safety Instructions	3
Identify Your Clock	4
Wall Mount Installation -	5 - 8
Flag Mount Installation -	9 - 15
Double Mount Installation -	16 - 20
Wiring Information - 2-Wire Digital Communication	21
- 3-Wire Synchronous (Sync-Wire) Communication 24V	22
- 3-Wire Synchronous (Sync-Wire) Communication 110VAC	23
Frequently Asked Questions	24
Questions about Protocols	25
Troubleshooting	26
Diagnostic #1 - Protocol Verification	27 - 28
Diagnostic #2 - Comprehensive Test	29 - 30
Diagnostic #3 - Manufacturing Default	31 - 32
Warranty	32

Important Safety Instructions

VERY IMPORTANT:

KNOW YOUR COMMUNICATION PROTOCOL

The Valcom Wired clock is designed to support the 2-Wire Digital Communication Protocol as well as 3-wire (sync-wire) communication protocols. To run either system properly, the clock requires the correct wiring format. It is very important that you only follow the wiring instructions appropriate to your clock's communication protocol. For example: if your system includes converter boxes which are only used for the 2-wire system, then you should only follow the instructions that relate to the 2-wire digital communication protocol wiring.

DANGER

SHOCK HAZARD

- Keep the electricity to this device turned OFF until the clock installation is complete.
- Do not expose the clock movement to water, or install the clock in a location where it may be exposed to water.

NOTICE

- Do not install the clock outdoors. Damage to the clock if placed outdoors voids the warranty.
- 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.

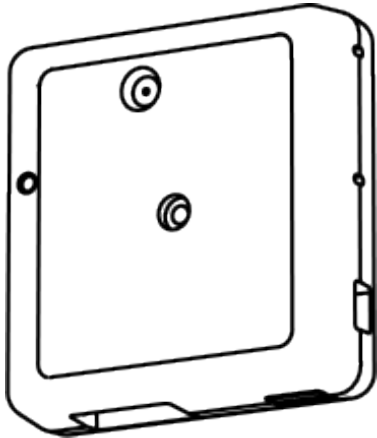


PHYSICAL INJURY HAZARD

- 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.

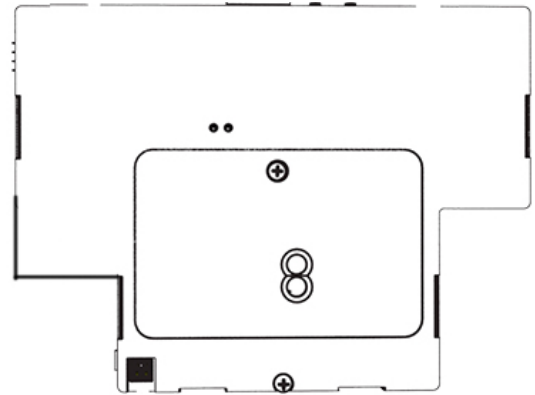
Identify Your Clock

A label containing the part number of your clock is attached to the clock movement.



ORIGINAL CLOCKS

V-A2412
V-A2416
V-A11012
V-A11016

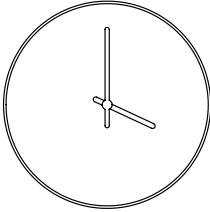


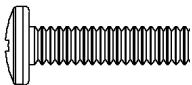


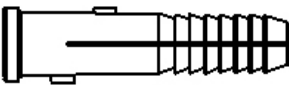



B-MODEL CLOCKS

V-A2412B
V-A2416B
V-A11012B
V-A11016B

Wall Mount Installation

Included in Package

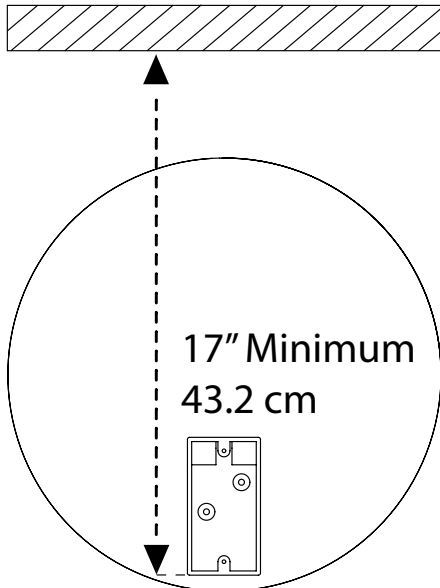
Description	Quantity	Picture
Valcom analog clock	1	
Mounting Bracket 12": M-MB-12-4 16": M-MB-16-2	1	
Included in Wiring Kit (A-PK-12-2A)		
Power/grounding wires and connector	1	
#6-32x1/2 screw	2	
M4-0.5x10	2	
#10x1.5 Self-tapping screw	1	
Wall anchor	1	
Additional grounding wire with connector	1	

PLEASE NOTE: A user will also have to provide a Phillips-head screwdriver, a small slot-head screwdriver, a drill with a 1/4 inch drill bit, a pencil, a single gang box, any equipment needed to install the gang box, and any additional wiring needed to extend the signal, power, or ground cables.

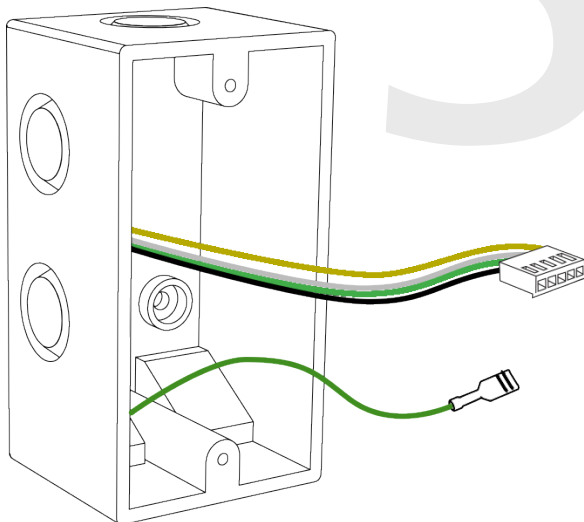
If any of the items listed in the wiring kit are missing, you may contact Valcom and order a replacement kit.

Wall Mount Installation

1) Install the single gang box in the wall. Leave at least 17 inches between the bottom of the gang box and ceiling. Confirm that the bottom of the gang box is level with the floor.



3) Attach the communication, power, and grounding wires from your kit to the communication and power wires in the gang box. See the Wiring Guide included later in this manual for additional details.



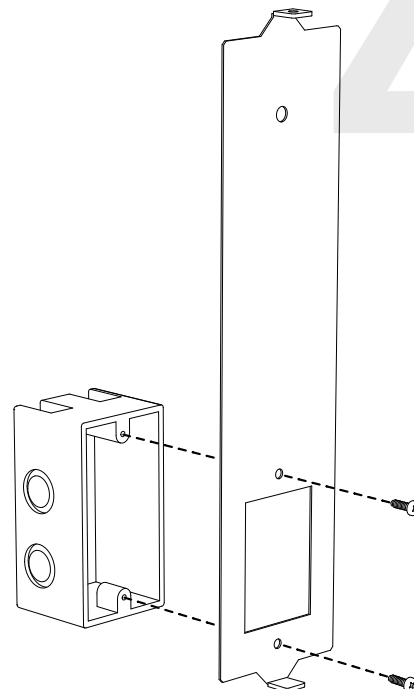
2) Run power and communication wiring to the gang box. See the sections of this manual labeled "Wiring Information" for additional details, depending on your system.

If you are using a 2-wire system, pull the YELLOW and GREEN wires out of the connector.

CHECK YOUR WIRING

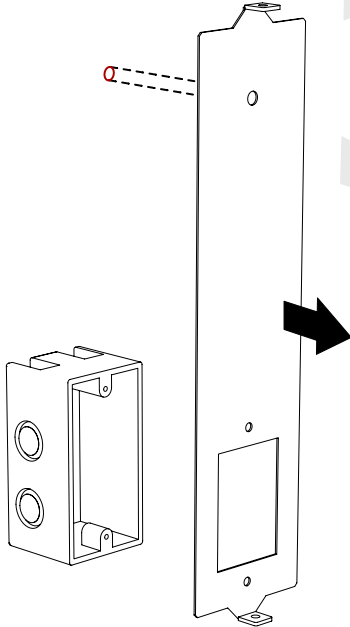
- The voltage between the white and black wires should measure 105-126 volts AC in the 110 volt model or 21.5-26.5 volts DC in the 24 volt model.
- If you are using the 24 volt model, make sure that the wiring leading to the clock is from a Valcom power supply or V-VCU.

4) Use the #6-32x1/2 screws to attach the mounting bracket to the gang box. The gang box should be at the bottom of the mounting piece.

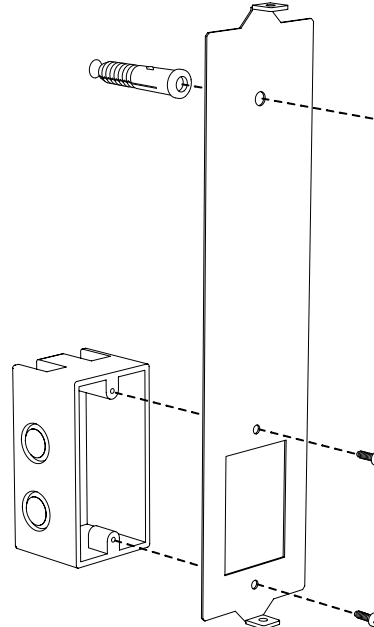


Wall Mount Installation

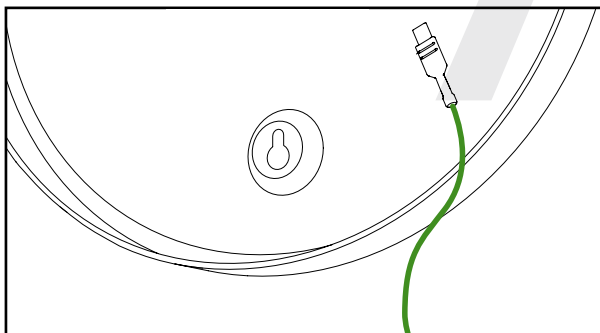
5) Use the pencil to mark the location of the large, circular hole at the top of the mounting bracket. Once finished, remove the mounting piece and drill a hole at the location you just marked.



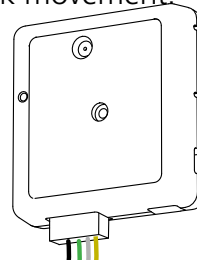
6) Insert the wall anchor into the hole, then reattach the mounting bracket. This time, also insert the #10x1.5 through the top of the mounting piece and into the wall anchor.



7) Remove the gearbox pin, then, if the case is made of metal, attach the grounding wire to the grounding tab below and to the right of the clock movement.

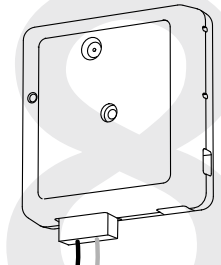


8) Attach the Power connector to the port on the clock movement.



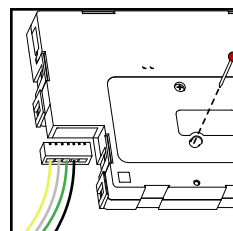
3-Wire Sync

Black Green White Yellow



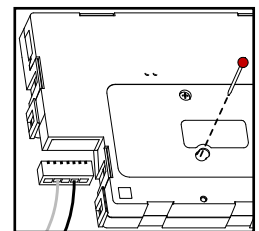
2-Wire Digital

Black White



3-Wire Sync

Yellow White Green Black

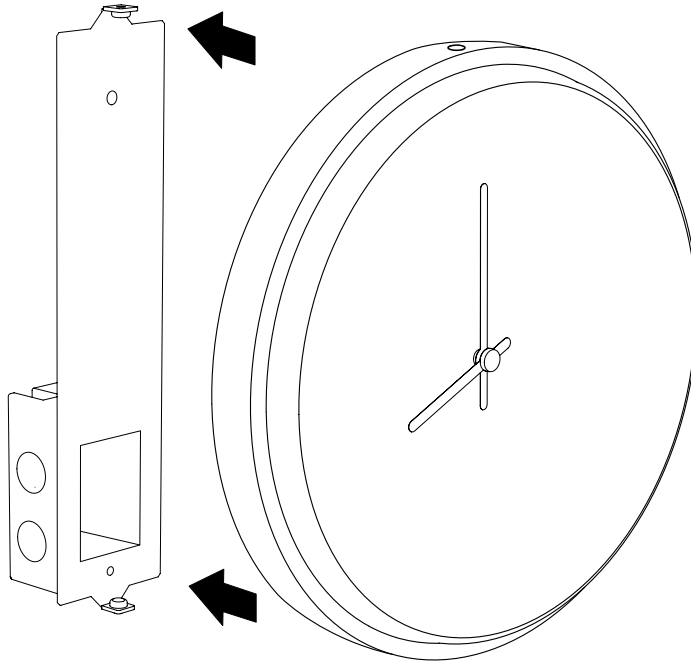


2-Wire Digital

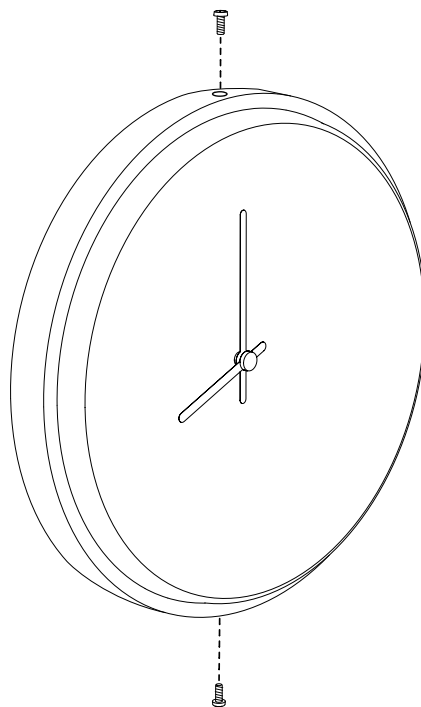
White Black

Wall Mount Installation

9) Attach the clock to the mounting piece so that the hole at the top of the clock lines up with the hole at the top of the mounting piece, and the hole at the bottom of the clock lines up with the hole at the bottom of the mounting piece.

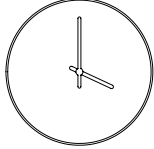




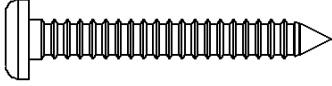
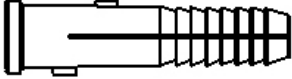



10) Use the two M4-0.5x10 screws to attach the clock to the mounting bracket. The screws should pass through the top and bottom holes on the clock, followed by the top and bottom holes of the mounting bracket.



Flag Mount Installation

Included in Package

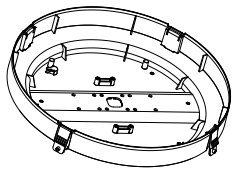


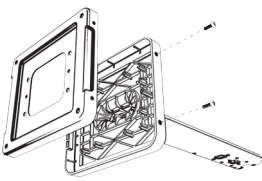
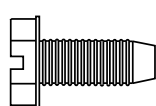
Description	Quantity	Picture
Valcom analog clock	1	
Mounting Bracket	1 (not used)	
Included in Wiring Kit (A-PK-12-2A)		
Power/grounding wires and connector	1	
#6-32x1/2 screw	2 (not used)	
M4-0.5x10	2 (not used)	
#8x1.5 Self-tapping screw	1 (not used)	
Wall anchor	1 (not used)	
Additional grounding wire with connector	1	

Continued on next page

If any of the items listed in the kits are missing, you may contact Valcom and order a replacement kit.

Flag Mount Installation

Included in Adapter Kit (V-SMR12A) or (V-SMR16A)

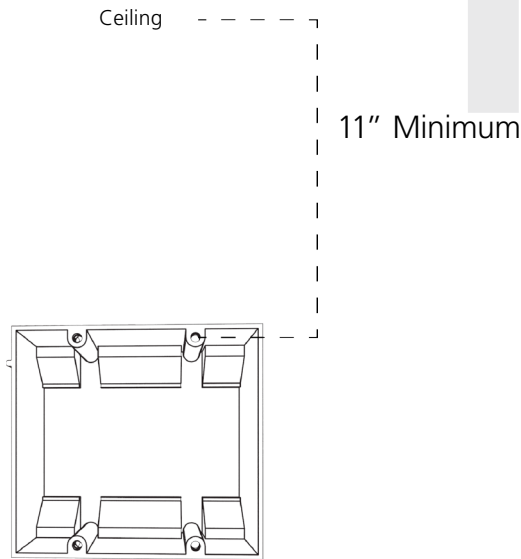
Description	Quantity	Picture
Round Clock Adapter	1	
Internal-tooth washer	4	
#8-32x7/16 screw	4	
Included in Pole Kit		
Dual-mount pole, including mounting plate	1	
#10-32x3/8 green screw	1	

PLEASE NOTE: A user will also have to provide a Phillips-head screwdriver, a small slot-head screwdriver, a drill with a 1/4 inch drill bit, a pencil, a double gang box, Four wall anchors that can support 50 lbs and a maximum screw size of 10x1.5", four #8 screws for the wall anchors, four #6-32x1 screws for attaching the mounting plate to the gang box, any equipment needed to install the gang box, and any additional wiring needed to extend the signal, power, or ground cables.

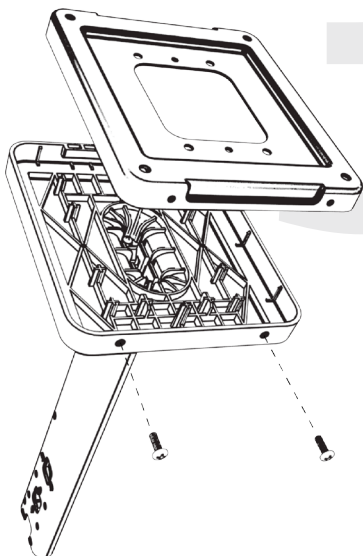
If any of the items listed in the kits are missing, you may contact Valcom and order a replacement kit.

Flag Mount Installation

1) Install the double gang box in the wall or ceiling. If you are installing the gang box in the wall, leave at least eleven inches between the top of the gang box and the ceiling. If you are installing the gang box in the ceiling, leave at least eleven inches between the gang box and the wall.



3) Detach the mounting plate from the mounting pole by unscrewing the two screws. Set the screws and pole aside for later.



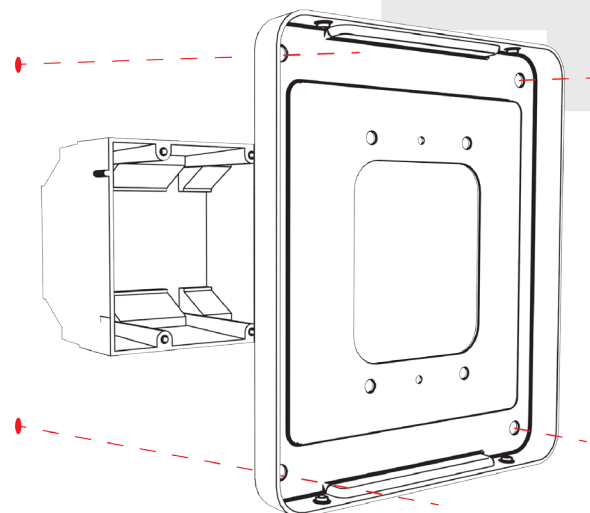
2) Run power and communication wiring to the gang box. See the sections of this manual labeled "Wiring Information" for additional details, depending on your system.

If you are using a 2-wire system, pull the YELLOW and GREEN wires out of the connector.

CHECK YOUR WIRING

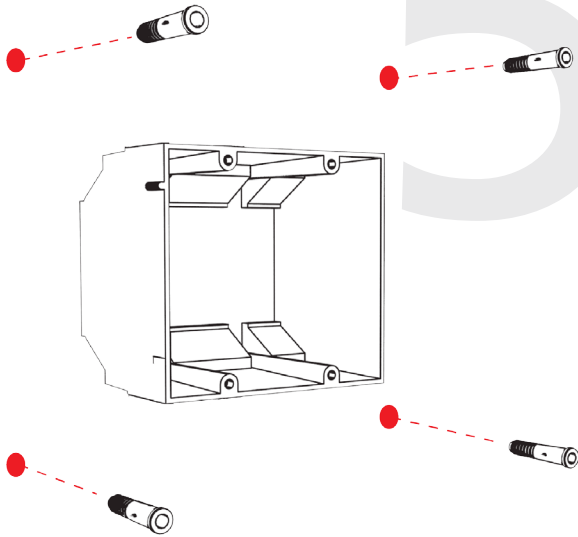
- The voltage between the white and black wires should measure 105-126 volts AC in the 110 volt model or 21.5-26.5 volts DC in the 24 volt model.
- If you are using the 24 volt model, make sure that the wiring leading to the clock is from a Valcom power supply or V-VCU.

4) Attach the mounting plate to the gang box using only two of the four long silver #6-32x1 screws. With the mounting plate as a guide, use the pencil to trace the locations of the four larger holes at the outer corners.

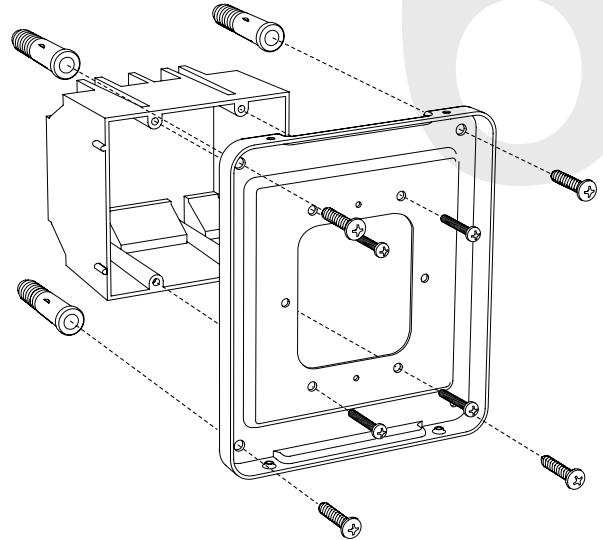


Flag Mount Installation

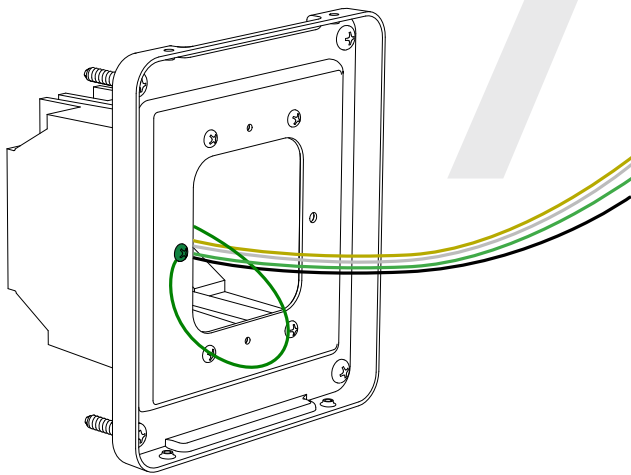
5) Remove the mounting plate and drill the four holes that were just traced. Insert the four wall anchors into the holes.



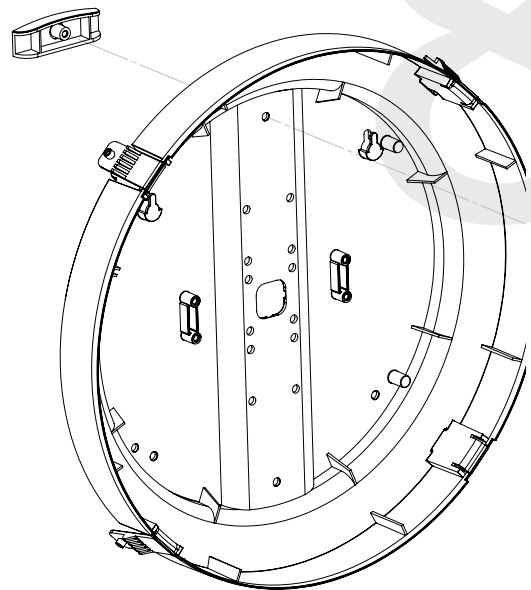
6) Reattach the mounting plate, this time using all four long, silver #8 screws, then insert the four #6-32x1 screws through the mounting plate and into the anchors.



7) Thread any wiring through the mounting plate, and attach a grounding wire to the mounting plate using one of the larger centered holes and the #10-32x3/8 screw.

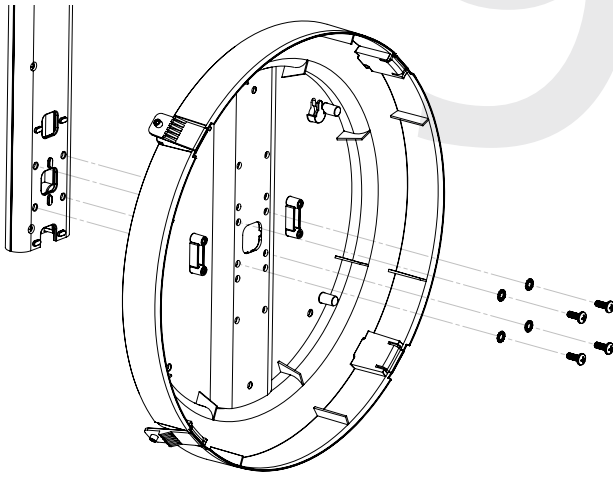


8) Use a screwdriver to remove one of the end caps. The end cap and screw that was used to secure it will not be needed again during this installation.

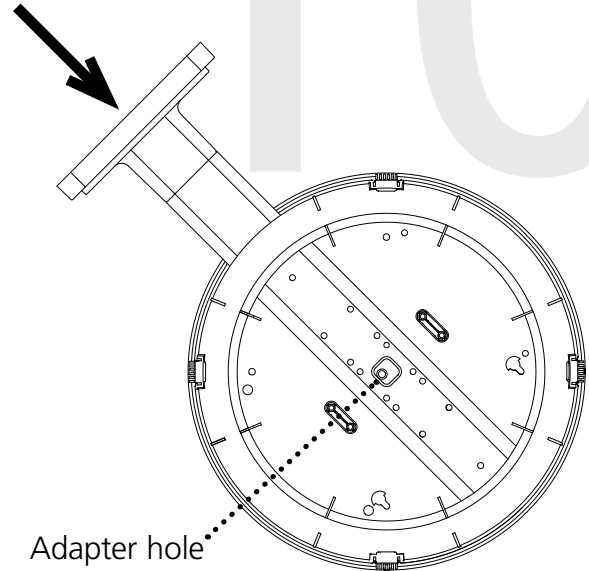


Flag Mount Installation

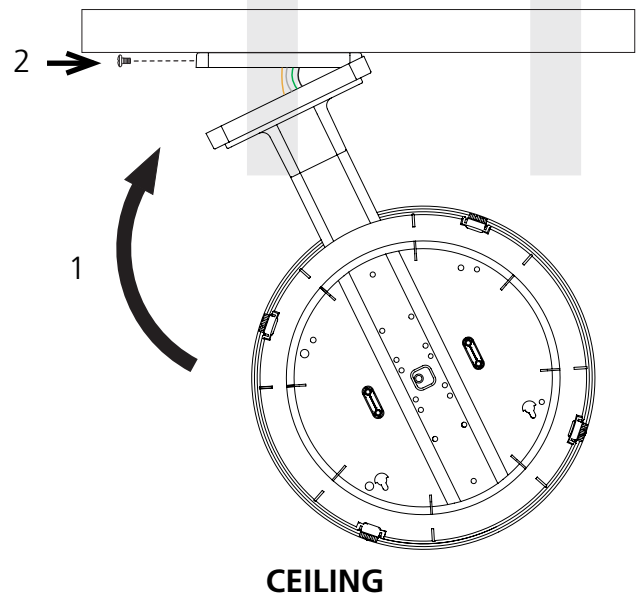
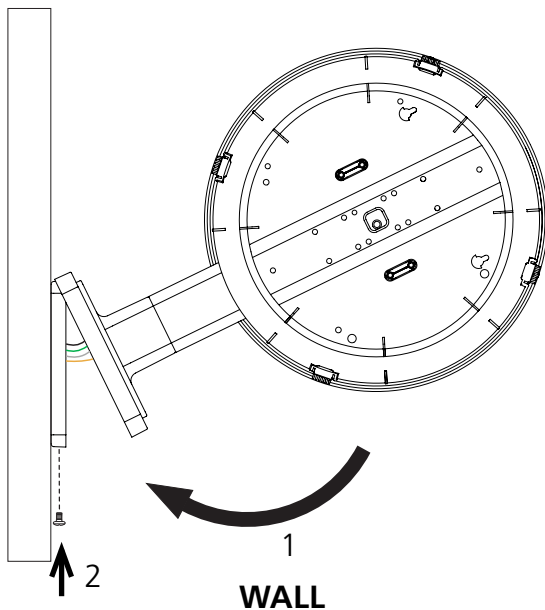
9) Insert the four #8-32x7/16 screws through the internal-tooth washers, then through the adapter, and finally into the pole. Use a screwdriver to tighten the screws so that the adapter does not move.



10) Thread at least fifteen inches (38.1cm) of wiring from the gang box through the bottom of the pole until each wire exits through the hole in the adapter.

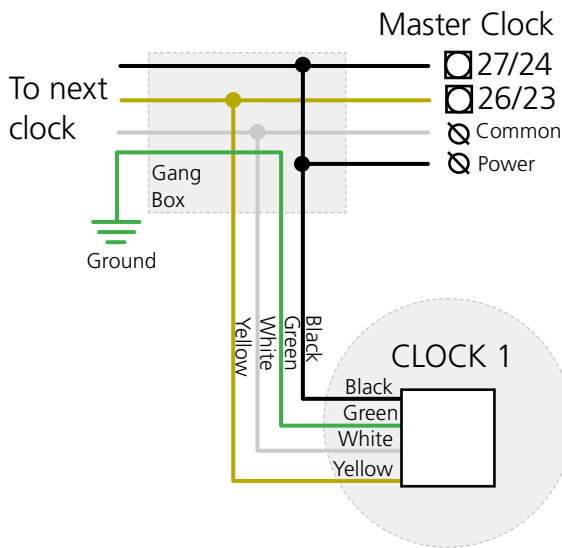


11) Attach the base of the pole to the mounting plate so that the lip is on the top of the base, and the holes for the screws are on the bottom of the base. Hang the base on the mounting plate, attach the wires from the bottom of the pole to the wires in the gang box, then screw the other side of the base onto the mounting plate using the two black screws you set aside before.



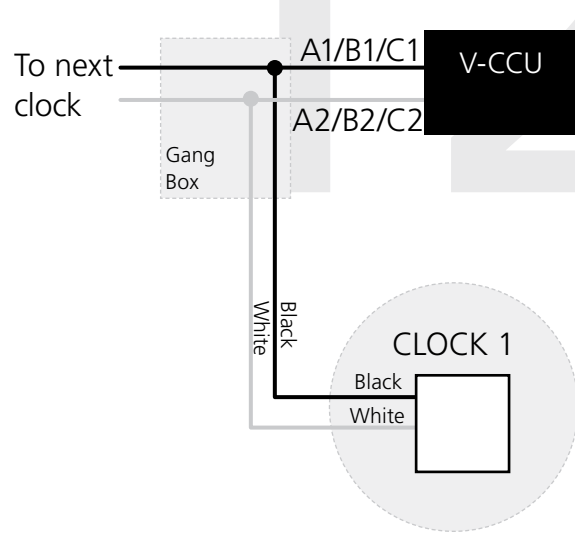
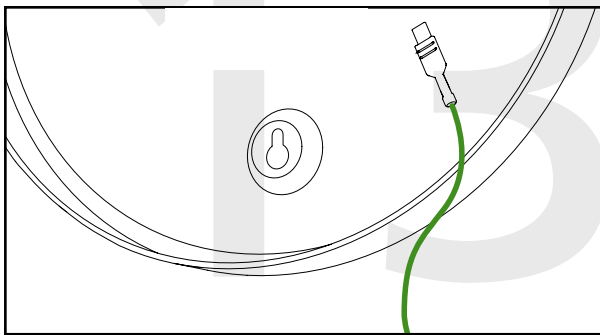
Flag Mount Installation

12) Attach the power connector to the wires you threaded through the pole. Consult the diagrams below for additional help, or see the sections of this manual labeled "3-Wire Synchronous (Sync-Wire) Communication Wiring Information" or "2-Wire Digital Communication Wiring Information" for additional details, depending on your system.



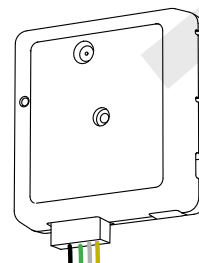
3-Wire Sync

13) Remove the gearbox pin, then, if the case is made of metal, attach the grounding wire to the grounding tab below and to the right of the clock movement.

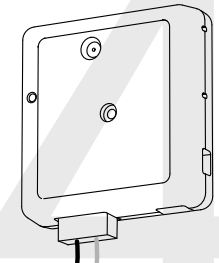


2-Wire Digital

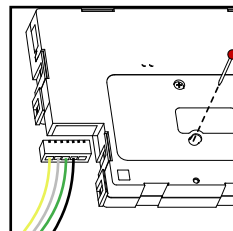
14) Attach a power connector to the port on the bottom of the movement.



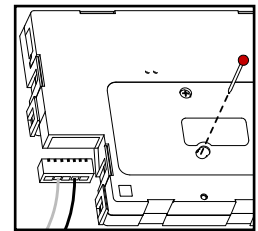
3-Wire Sync
Black Green White Yellow



2-Wire Digital
Black White



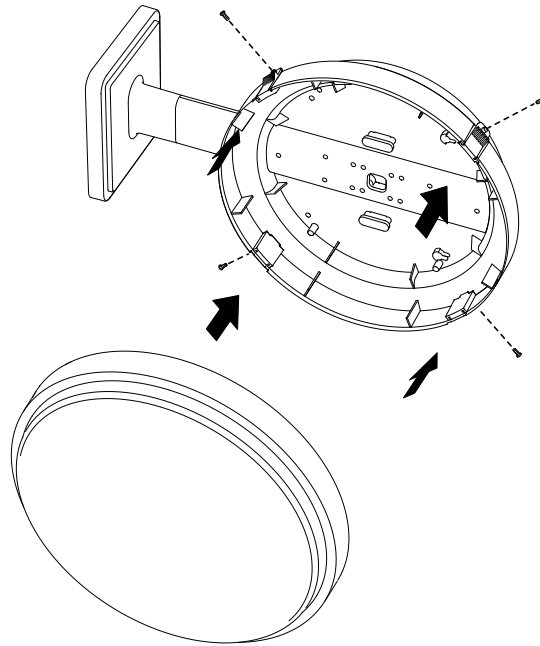
3-Wire Sync
Yellow White Green Black



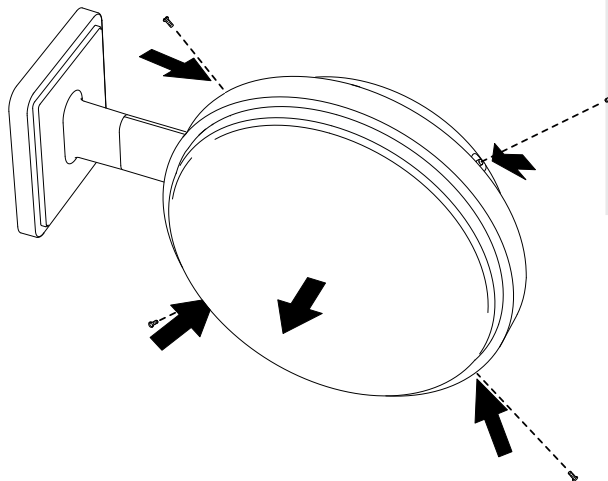
2-Wire Digital
White Black

Flag Mount Installation

15) Remove the outer adapter screws, then slide the clock onto the adapter in the rotation that you wish it to be viewed. You should hear a snapping noise as the four clips on the adapter secure the clock in place. Insert the screws again to complete the installation.

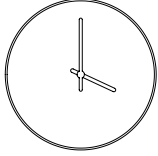



16) If you feel the need to detach the clock from the housing after the installation has been completed, remove the outer adapter screws, press down on the latches, and gently pull on the rim of the clock until the clock detaches.

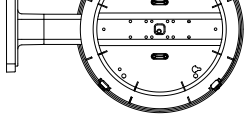
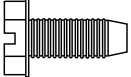


Double Mount Installation




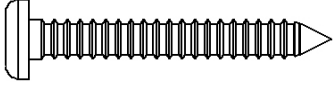
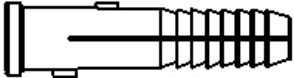

Included in Package

Description	Quantity	Picture
Valcom analog clock	2	
Mounting Bracket	2 (not used)	

Included in Double Mount Kit

Dual-mount pole, including mounting plate and adapters	1	
#10-32x3/8 green screw	1	

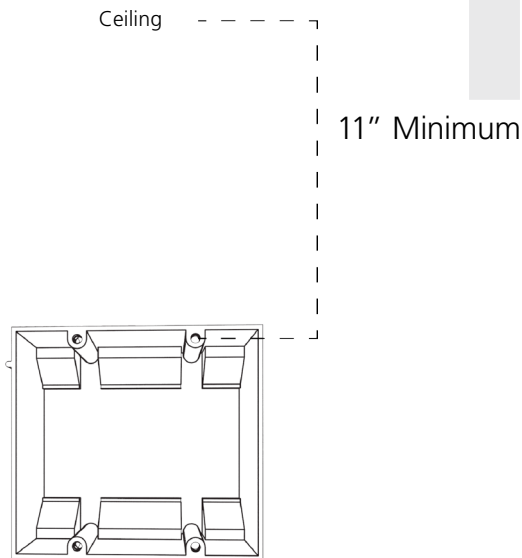
Included in Wiring Kit (A-PK-12-2A)

Power/grounding wires and connector	2	
#6-32x1/2 screw	4 (not used)	
M4-0.5x10	4 (not used)	
#8x1.5 Self-tapping screw	2 (not used)	
Wall anchor	2 (not used)	
Additional grounding wire with connector	2	

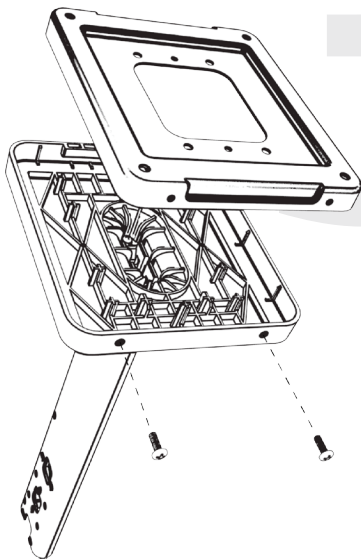
PLEASE NOTE: A user will also have to provide a Phillips-head screwdriver, a small slot-head screwdriver, a drill with a 1/4 inch drill bit, a pencil, a double gang box, Four wall anchors that can support 50 lbs and a maximum screw size of 10x1.5", four #8 screws for the wall anchors, four #6-32x1 screws for attaching the mounting plate to the gang box, any equipment needed to install the gang box, and any additional wiring needed to extend the signal, power, or ground cables.

Double Mount Installation

1) Install the double gang box in the wall or ceiling. If you are installing the gang box in the wall, leave at least eleven inches between the top of the gang box and the ceiling. If you are installing the gang box in the ceiling, leave at least eleven inches between the gang box and the wall.



3) Detach the mounting plate from the mounting pole by unscrewing the two screws. Set the screws and pole aside for later.



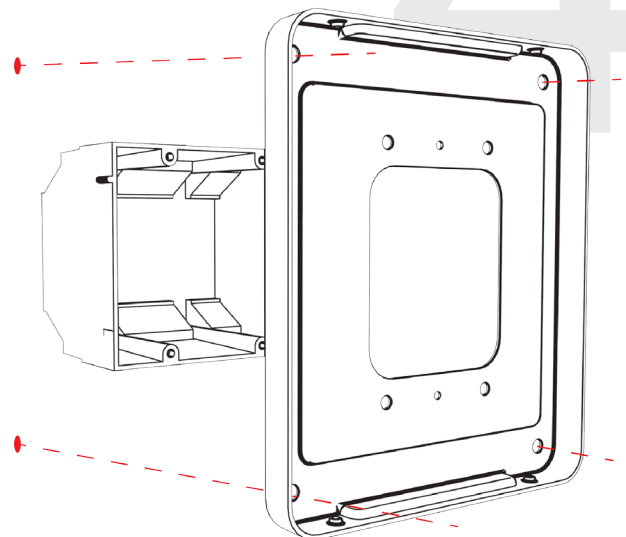
2) Run power and communication wiring to the gang box. See the sections of this manual labeled "Wiring Information" for additional details, depending on your system.

If you are using a 2-wire system, pull the YELLOW and GREEN wires out of the connectors.

CHECK YOUR WIRING

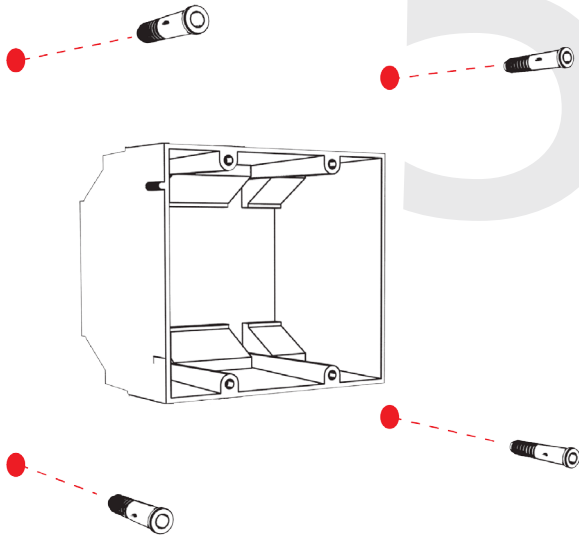
- The voltage between the white and black wires should measure 105-126 volts AC in the 110 volt model or 21.5-26.5 volts DC in the 24 volt model.
- If you are using the 24 volt model, make sure that the wiring leading to the clock is from a Valcom power supply or V-VCU.

4) Attach the mounting plate to the gang box using only two of the four long silver #6-32x1 screws. With the mounting plate as a guide, use the pencil to trace the locations of the four larger holes at the outer corners.

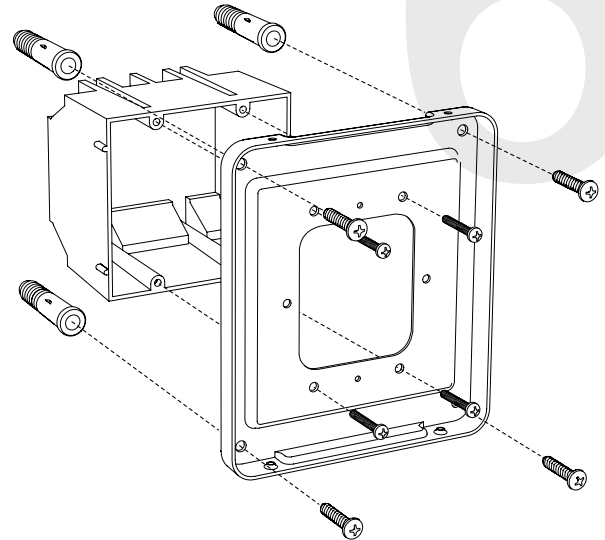


Double Mount Installation

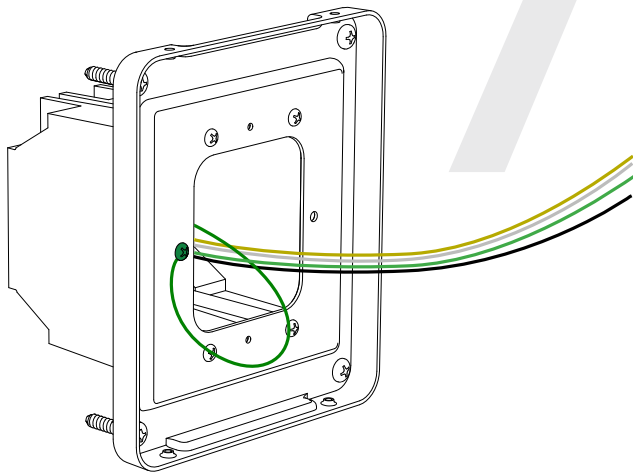
5) Remove the mounting plate and drill the four holes that were just traced. Insert the four wall anchors into the holes.



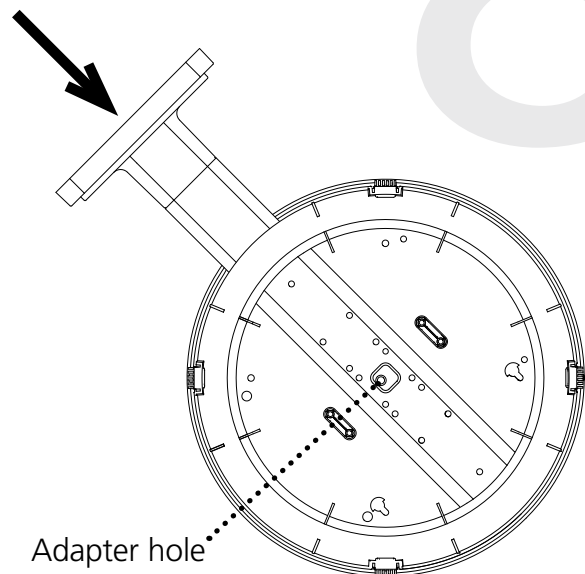
6) Reattach the mounting plate, this time using four long, silver #8 screws, then insert the four #6-32x1 screws through the mounting plate and into the anchors.



7) Thread any wiring through the mounting plate, and attach a grounding wire to the mounting plate using one of the larger centered holes and the #10-32x3/8 screw.

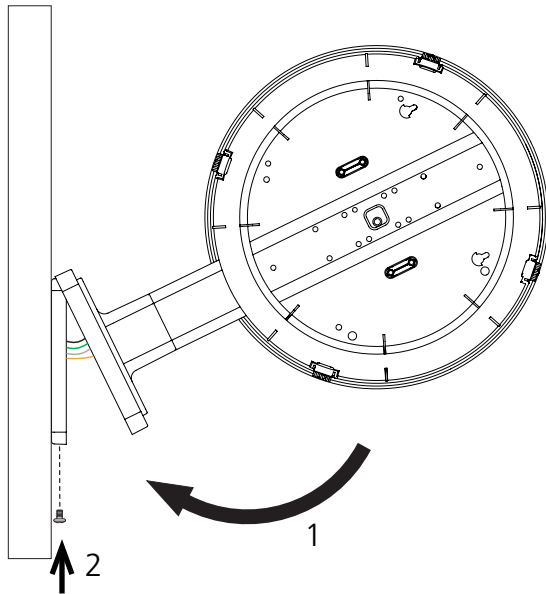


8) Thread at least fifteen inches (38.1cm) of wiring from the gang box through the bottom of the pole until each wire exits through the hole in the adapter.

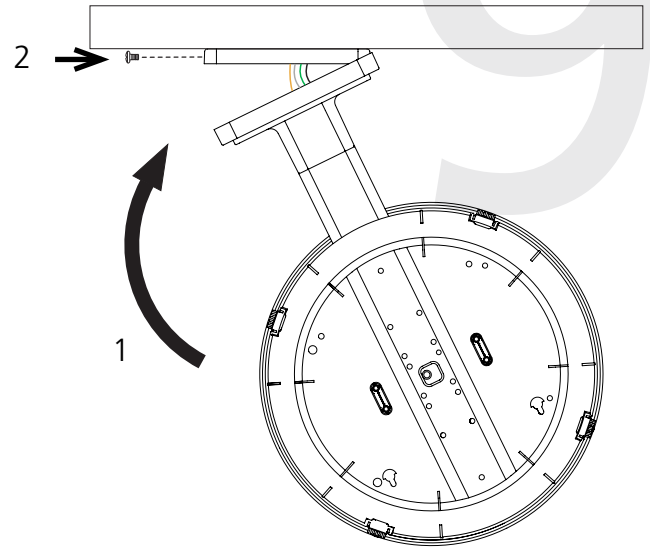


Double Mount Installation

9) Attach the base of the pole to the mounting plate so that the lip is on the top of the base, and the holes for the screws are on the bottom of the base. Hang the base on the mounting plate, attach the wires from the bottom of the pole to the wires in the gang box, then screw the other side of the base onto the mounting plate using the two black screws you set aside before.

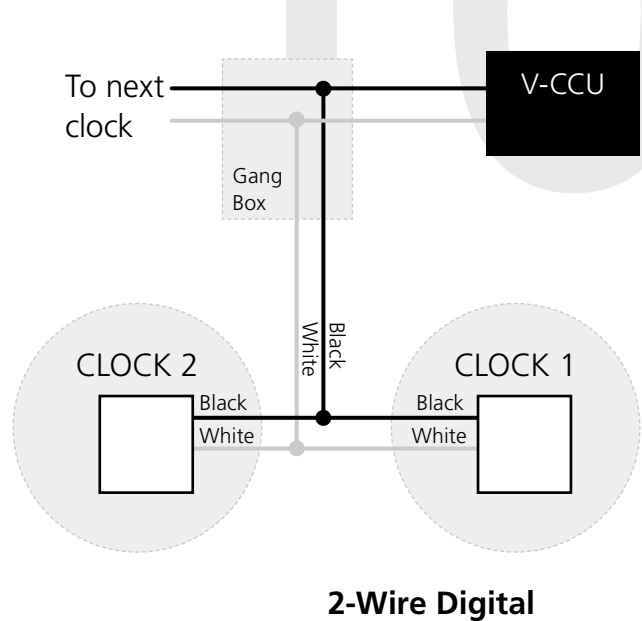
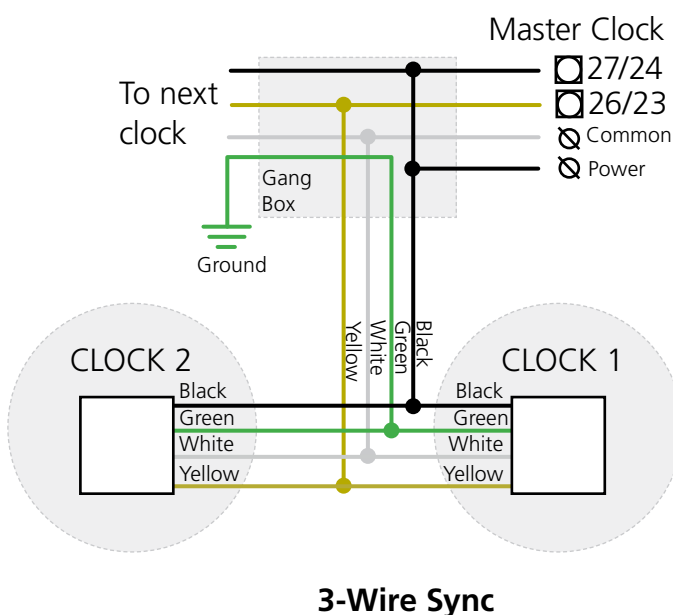


WALL



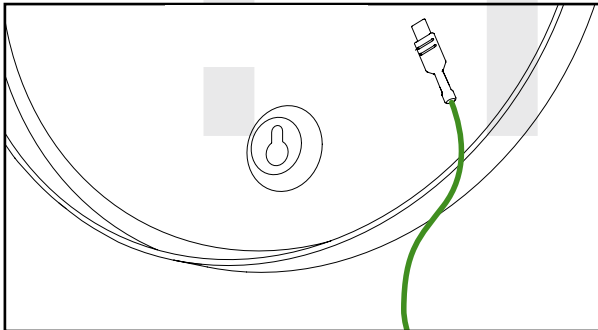
CEILING

10) Attach the power connectors to the wires you threaded through the pole. Consult the diagrams below for additional help, or see the sections of this manual labeled "3-Wire Synchronous (Sync-Wire) Communication Wiring Information" or "2-Wire Digital Communication Wiring Information" for additional details, depending on your system.

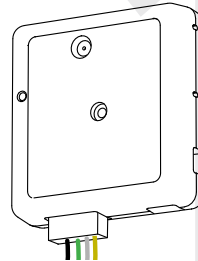


Double Mount Installation

11) Remove the gearbox pin, then, if the case is made of metal, attach the grounding wire to the grounding tab below and to the right of the clock movement.

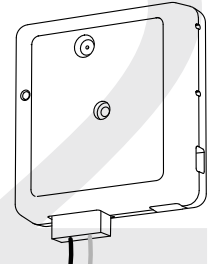


12) Attach a power connector to the ports on the bottom of each movement.



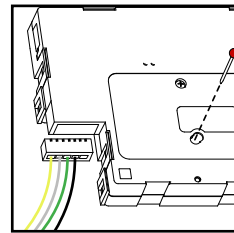
3-Wire Sync

Black
Green
White
Yellow



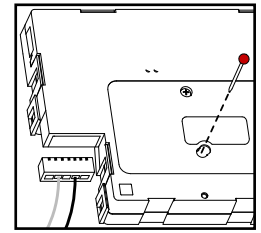
2-Wire Digital

Black
White



3-Wire Sync

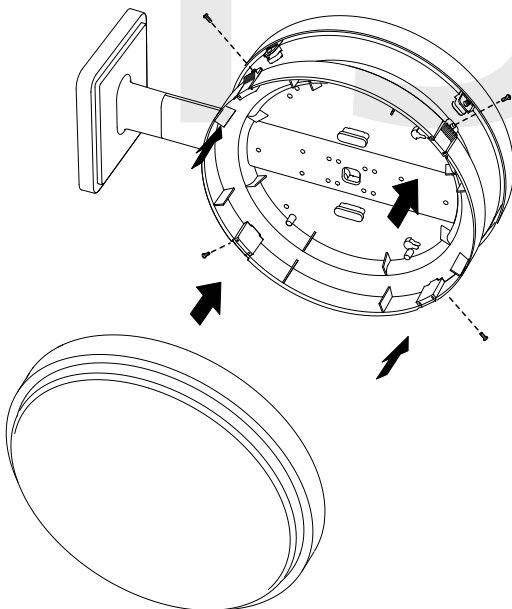
Yellow
White
Green
Black



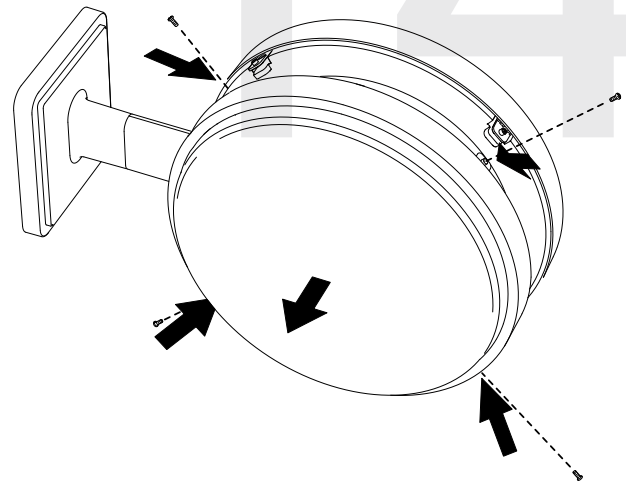
2-Wire Digital

White
Black

13) Remove the outer adapter screws, then slide each clock onto the adapter in the rotation that you wish it to be viewed. You should hear a snapping noise as the four clips on the adapter secure the clock in place. Insert the screws again to complete the installation.

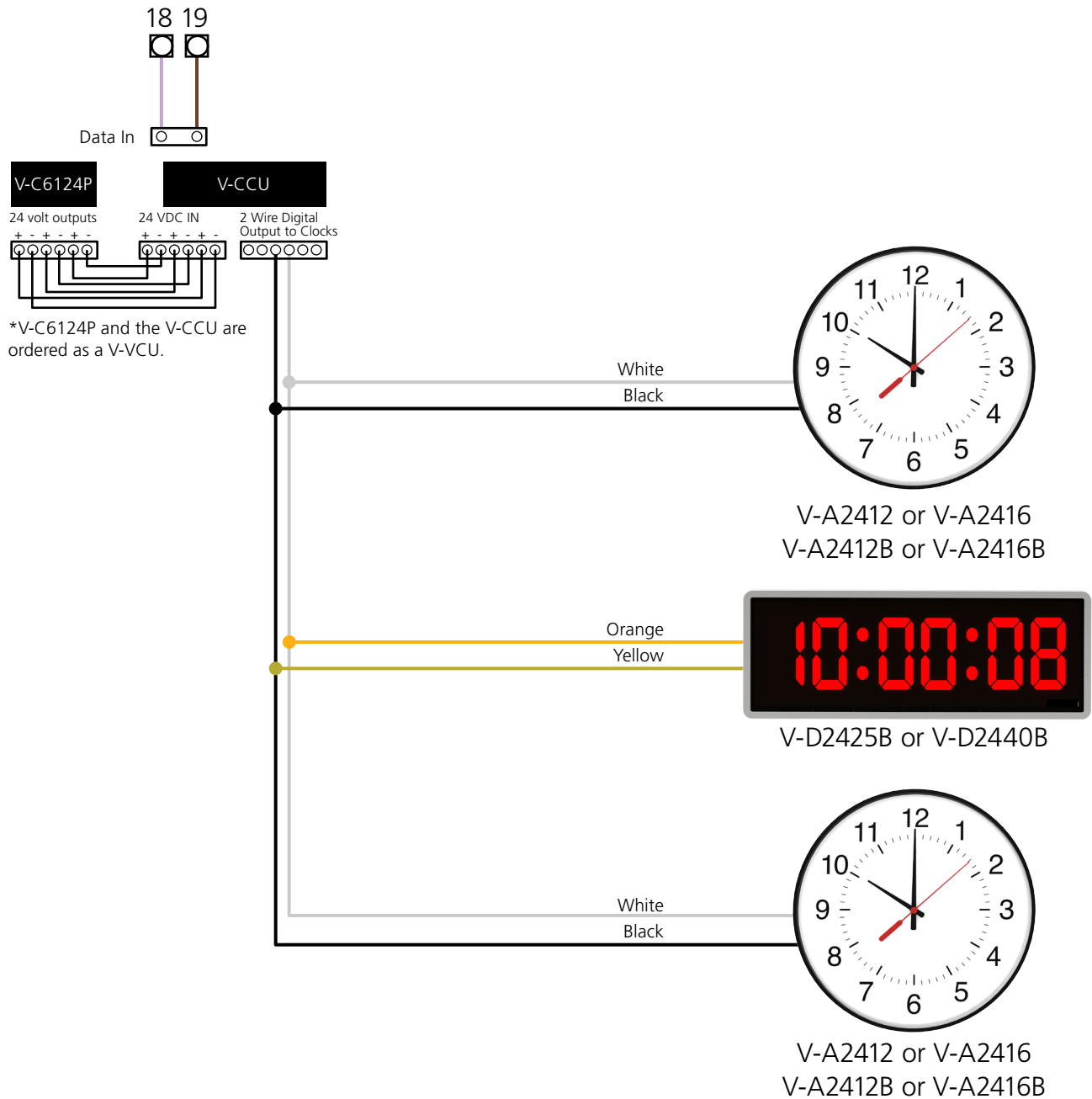


14) If you feel the need to detach the clock from the housing after the installation has been completed, remove the outer adapter screws, press down on the latches, and gently pull on the rim of the clock until the clock detaches.



Wiring Information - 2-Wire Digital Communication

Valcom Master Clock



Warranty

Valcom, Inc. warrants its products only to the original purchaser, for its own use, to be free from defects in materials and workmanship under conditions of normal use and service for a period of one year from the date of shipment. This Limited Warranty obligation shall be limited to the replacement, repair or refund of any such defective device within the warranty period, provided that:

1. Inspection by Valcom, Inc. indicates the validity of the claim;
2. The defect is not the result of damage, misuse or negligence after the original shipment;
3. The product has not been altered in any way or repaired by others and that factory sealed units are unopened (a service charge plus parts and labor will be applied to units defaced or physically damaged);
4. Freight charges for the return of products to Valcom are prepaid;
5. All units 'out of warranty' are subject to a service charge. The service charge will cover minor repairs (major repairs will be subject to additional charges for parts and labor).

This Limited Warranty is in lieu of and excludes all other warranties, expressed or implied and in no event shall Valcom, Inc. be liable for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer in connection with the purchase, operation, maintenance, installation, removal or use of the product. The maximum liability of Valcom under this warranty is limited to the purchase price of the specific Product covered by the warranty.

Disclaimer. Except for the Limited Warranty provided herein, the product is provided "as-is" without any warranty of any kind whatsoever including, without limitation, any WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT.

This warranty specifically excludes damage incurred in shipment. In the event a product is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved in accordance with the F.O.B. point.

Headquarters:

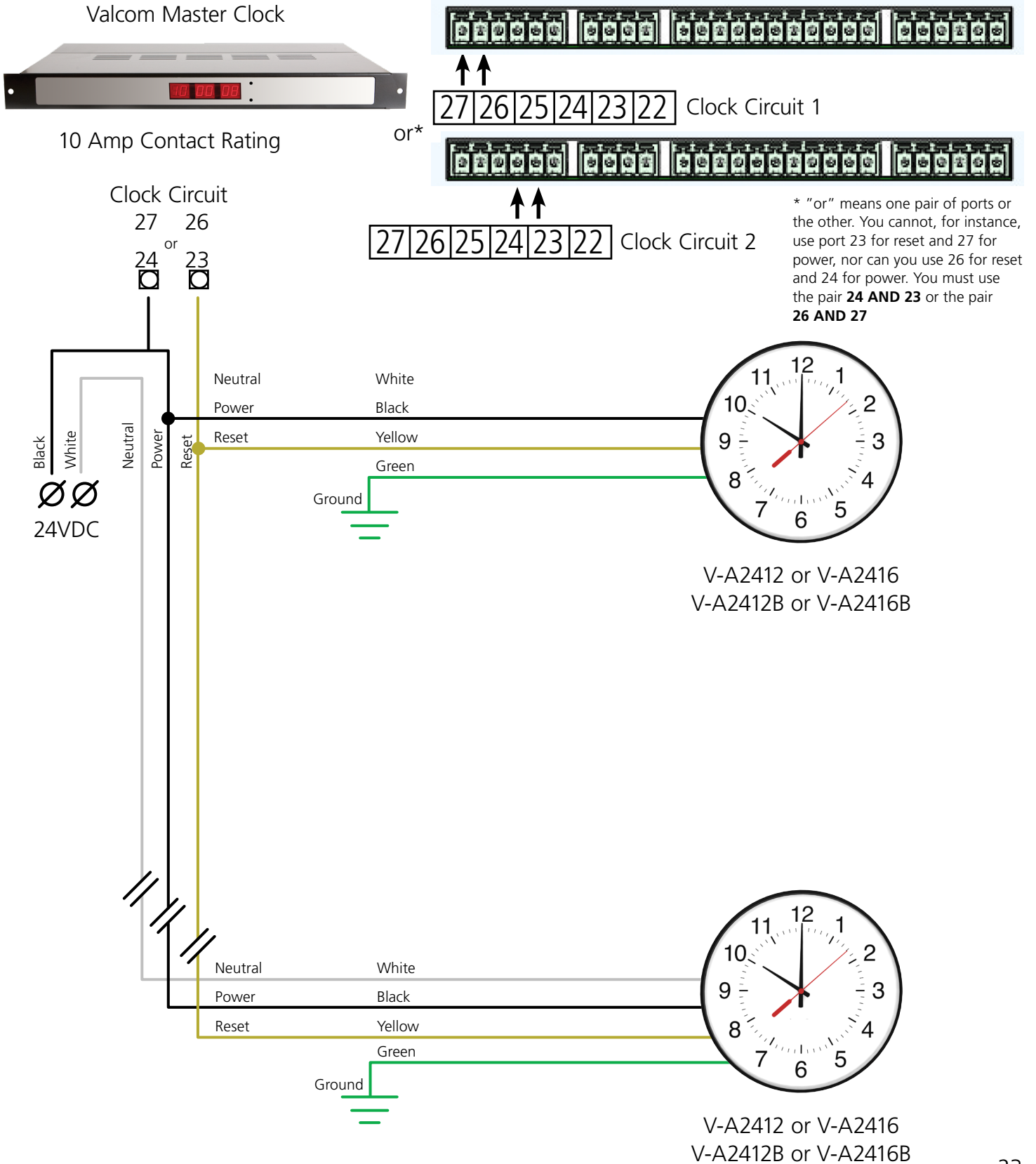
Valcom, Inc.

5614 Hollins Road

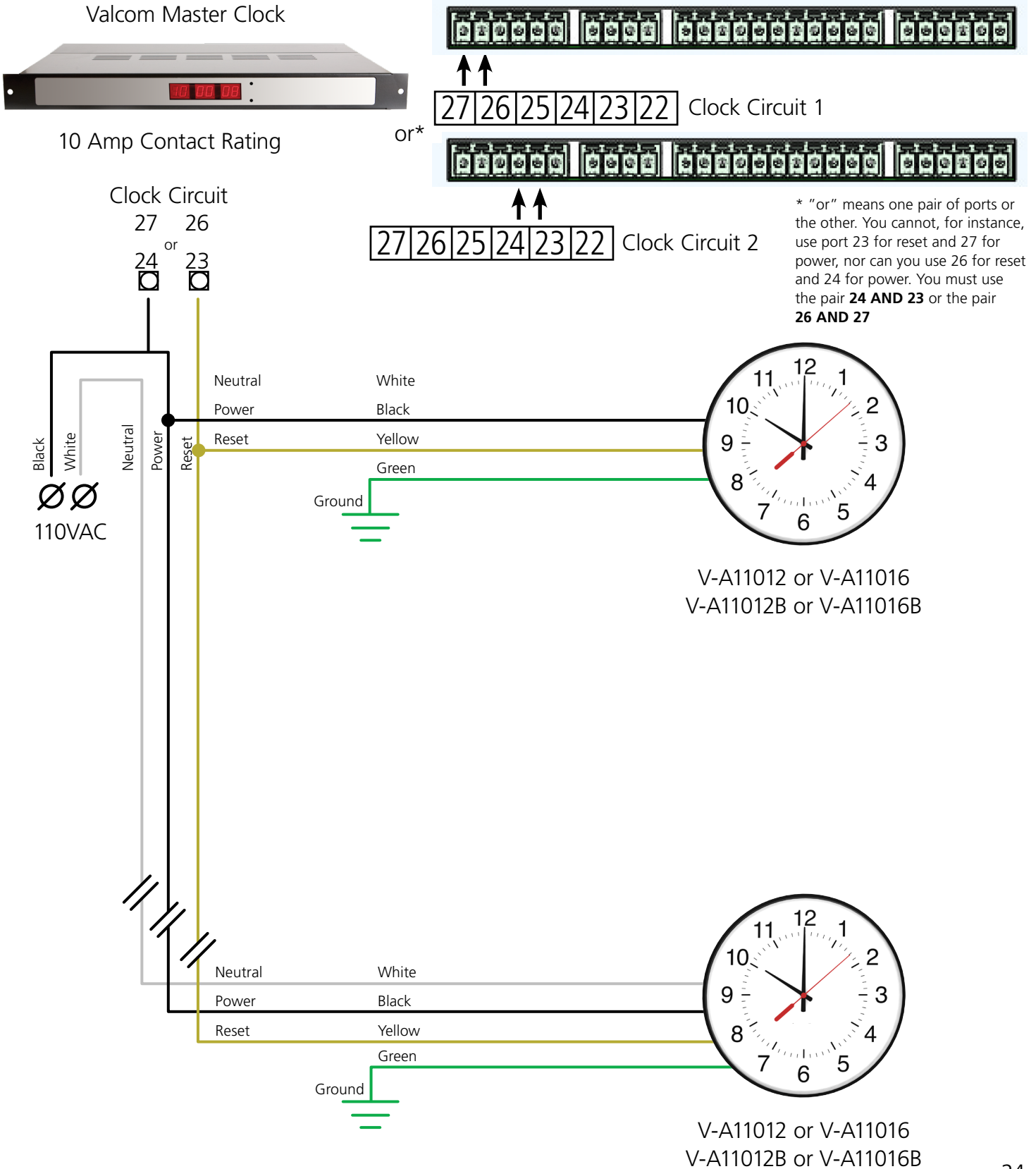
Roanoke VA 24019-5056

Phone: (540) 563-2000 FAX: (540) 362-9800

Wiring Information - 3-Wire Synchronous (Sync-Wire) Communication 24VDC



Wiring Information - 3-Wire Synchronous (Sync-Wire) Communication 110VAC



Frequently Asked Questions

How do I know if the clock is receiving data?

Perform Diagnostic 2. See the section labeled “Diagnostic Test #2 - Comprehensive Test”. The result should correspond to your system’s synchronization settings.

Example 1: The two-wire digital system should result in the clock receiving communication within the last hour.

Example 2: Once-a-day sync systems may return a result of 11 hours or more, depending on when you conduct the test. In this case, the test should be conducted less than nine hours after the synchronization signal is sent.

What size utility/gang box is needed?

A standard single gang box is required for wall mounting a clock. However, if you are installing a double mount or flag-mount clock, then a standard double gang box is required.

Do I need to power up all the clocks at the same time?

No. Clocks that are added to the system after power up will begin running and wait for correction signals from the master clock. Sync-wire systems may take up to 24 hours to receive a correction signal.

Do I have to reset the clock if it suffers a power outage?

No. The clock will resume operation after the power outage, and will adjust to the correct time as soon as it receives a signal from the master clock.

What happens if I power the Valcom Wired Clock before connecting the master clock?

The clock will begin to run, but the time displayed will be incorrect. As soon as signal wires from the master clock are connected and a synchronization signal is sent, the Valcom Wired Clock will correct itself to display the correct time.

Can I manually set the time on the clock?

No. Furthermore, attempting to open the front crystal or moving the hands manually will damage the clock and void your warranty.

Questions about Protocols

How do I set up the Valcom Wired Clock to accept synchronization protocols from Rauland, Dukane, and other systems?

If you are receiving the protocol directly from the master clock, your Valcom Wired Clock will automatically detect the sync-wire protocol being used when it first powers up; no action on your part is required.

If you wish to use Valcom's 2-wire digital protocol to carry synchronization data from a system that uses an unsupported protocol, a Valcom Master Clock must be used as an adapter between the two wiring systems. Consult the wiring guide in your Master Clock manual for more information.

How do I select which protocol I want my Valcom Wired Clock to use?

When you power up the clock, your Valcom Wired Clock will automatically recognize the protocol being used as soon as it receives data.

Can I change protocols if the system is running?

Yes. There are two ways of doing this:

- 1) Do nothing. Within three days of being plugged into the new protocol, the Valcom Wired Clock will automatically notice the change in protocol and correct itself.
- 2) Reset the clock to manufacturer's default. Perform Diagnostic #3, then, after Diagnostic #3 is complete, power cycle the clock.

How do I check to confirm that the Valcom Wired Clock is receiving the correct protocol?

Perform Diagnostic #1

How do I perform diagnostic tests on the clock system?

See the sections on the pages labeled "Diagnostic Test #1 - Protocol Verification", "Diagnostic Test #2 - Comprehensive Test", or "Diagnostic Test #3 - Manufacturing Default", depending on your needs.

I am adding a new clock into an existing Valcom Wired Clock System. Do I have to set my entire system back to 12:00?

No. The new Valcom Wired clock will automatically correct itself upon receiving the data signal from the master clock.

Troubleshooting

The clock is plugged into the power, but it is not running. What should I do?

- a) Make sure that the movement's gearbox pin is removed.
- b) Make sure that the ground wire is not touching other wires.
- c) Make sure that the transformer is an isolated transformer if using a 24 volt model.
- d) 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 110 volt model or 21.5-26.5 volts DC in the 24 volt model.

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

The clock is not receiving a communication signal from the master clock. What should I do?

Follow these steps in order:

- 1) In order to check the last time the clock received communication from the master clock, perform Diagnostic #2. See the section labeled "Diagnostic Test #2 - Comprehensive Test"
- 2) Compare the time that the last signal was received to the parameters of your protocol. If the amount of time since the last signal was received is more than the amount of time since the clock last received time data, then there is a fault with the system.
- 3) Check your master clock and confirm that it is sending time data at the correct protocol and at the correct time. Consult your master clock manual for more information.
- 4) If your master clock has been properly configured, take the clock off the wall and test it at a location close to the master clock's signal output (or the converter box signal output, if a 2-Wire Digital System is being used). Use the master clock to send time data to the clocks.

If the clock corrects itself, then there was a problem with the wiring to the clock's original installation point, and the wiring must be repaired or replaced.

If the clock still fails to correct itself, contact tech support.

I can hear data noise bleeding into the intercom line. What should I do?

Reduce the transmission rate from the master clock to once a minute. Please refer to the master clock manual for information on how to change the transmission rate.

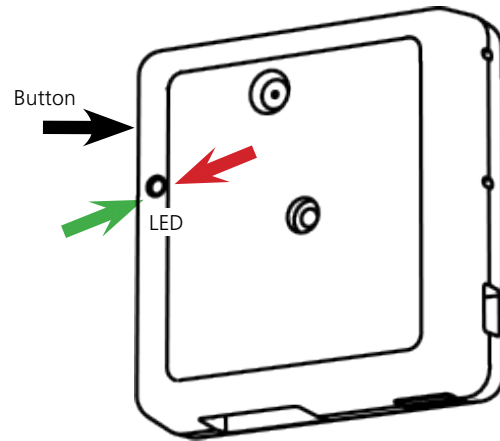
Diagnostic Test #1 - Protocol Verification (Original Only)

The purpose of Diagnostic #1 is to tell the user which protocol the master clock is using to communicate with the secondary clock.

Diagnostic #1 may be enabled by pressing the diagnostic button for one second. If the clock is performing this diagnostic, the Diagnostic LED will flash green once every three seconds. It will continue to flash once every three seconds until the diagnostic is complete. The clock will confirm that the diagnostic is complete when the LED shines a different color.

If the LED is shining a solid green:

The Diagnostic was completed successfully. The second hand on the clock will move to a specific second on the dial. Each second corresponds to a particular protocol and polarity:



Second Hand Position

Protocol and Polarity Detected

2 seconds	2-Wire Digital Communication, Polarity 1
4 seconds	2-Wire Digital Communication, Polarity 2
6 seconds	3-Wire Digital Communication, Polarity 1
8 seconds	3-Wire Digital Communication, Polarity 2
10 seconds	RS485 Communication, Polarity 1
12 seconds	RS485 Communication, Polarity 2
14 seconds	59 Minute Correction, Correct Polarity
16 seconds	59 Minute Correction, Reverse Polarity
18 seconds	58 Minute Correction, Correct Polarity
20 seconds	58 Minute Correction, Reverse Polarity
22 seconds	National Time/Rauland Correction, Correct Polarity
24 seconds	National Time/Rauland Correction, Reverse Polarity

The second hand will remain on this number for 3 minutes, and then the clock will revert to displaying the accurate time.

If the LED is flashing red:

A comprehensive test is required. Please perform Diagnostic #2

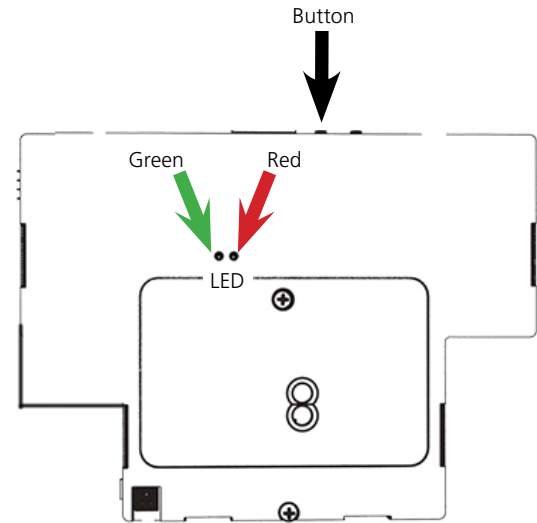
Diagnostic Test #1 - Protocol Verification (B-Model Only)

The purpose of Diagnostic #1 is to tell the user which protocol the master clock is using to communicate with the secondary clock.

Diagnostic #1 may be enabled by pressing the diagnostic button once. If the clock is performing this diagnostic, the Diagnostic LED will flash green once every three seconds. It will continue to flash once every three seconds until the diagnostic is complete. The clock will confirm that the diagnostic is complete when the LED shines a different color.

If the LED is shining a solid green:

The Diagnostic was completed successfully. The second hand on the clock will move to a specific second on the dial. Each second corresponds to a particular protocol and polarity:



Second Hand Position

Protocol and Polarity Detected

2 seconds	2-Wire Digital Communication, Polarity 1
4 seconds	2-Wire Digital Communication, Polarity 2
6 seconds	3-Wire Digital Communication, Polarity 1
8 seconds	3-Wire Digital Communication, Polarity 2
10 seconds	RS485 Communication, Polarity 1
12 seconds	RS485 Communication, Polarity 2
14 seconds	59 Minute Correction, Correct Polarity
16 seconds	59 Minute Correction, Reverse Polarity
18 seconds	58 Minute Correction, Correct Polarity
20 seconds	58 Minute Correction, Reverse Polarity
22 seconds	National Time/Rauland Correction, Correct Polarity
24 seconds	National Time/Rauland Correction, Reverse Polarity

The second hand will remain on this number for 3 minutes, and then the clock will revert to displaying the accurate time.

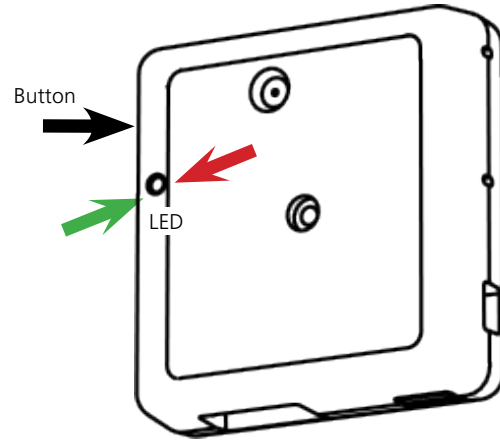
If the LED is flashing red:

A comprehensive test is required. Please perform Diagnostic #2

Diagnostic Test #2 - Comprehensive Test (Original Only)

The purpose of Diagnostic #2 is to test the Movement gearbox and electrical components of your clock.

Diagnostic #2 may be enabled by holding down the diagnostic button for three seconds. If the Valcom Wired clock is performing this diagnostic, then a green LED on the movement will flash twice every three seconds. It will continue to flash twice every three seconds until the diagnostic is complete. The clock will confirm that the diagnostic is complete when the LED shines a different color:



If the LED is shining a solid green:

The second hand will display the protocol and polarity that was detected. See the table on the previous page for details.

The minute hand will display the software version number.

If the LED is flashing red:

The hour hand will display how much time has passed since the clock last received a communication signal:

Hour Hand Position	Time Since Clock Last Received Communication
12	Clock received communication within the last hour.
1	Clock received communication between 1 and 2 hours ago.
2	Clock received communication between 2 and 3 hours ago.
3	Clock received communication between 3 and 4 hours ago.
4	Clock received communication between 4 and 5 hours ago.
5	Clock received communication between 5 and 6 hours ago.
6	Clock received communication between 6 and 7 hours ago.
7	Clock received communication between 7 and 8 hours ago.
8	Clock received communication between 8 and 9 hours ago.
9	Clock received communication between 9 and 10 hours ago.
10	Clock received communication between 10 and 11 hours ago.
11	Clock received communication more than 11 hours ago.

--May signify a manufacturer default.

The clock hands will remain on these numbers for three minutes, and then the clock will revert to displaying the accurate time.

Diagnostic Test #2 - Comprehensive Test (B-Model Only)

The purpose of Diagnostic #2 is to test the Movement gearbox and electrical components of your clock.

Diagnostic #2 may be enabled by pressing the diagnostic button twice. If the clock is performing this diagnostic, then a green LED on the movement will flash twice every three seconds. It will continue to flash twice every three seconds until the diagnostic is complete.

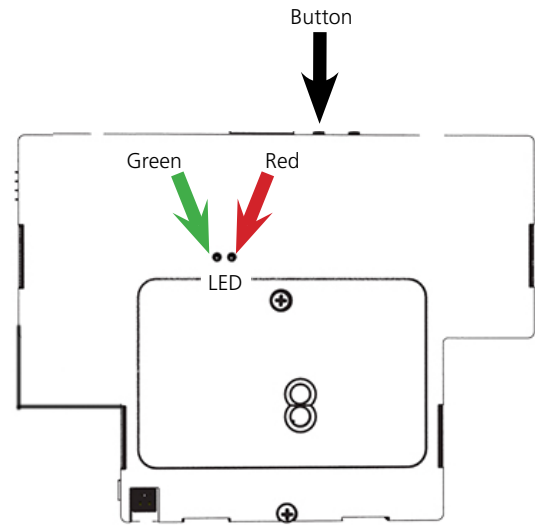
If the LED is lit a solid green:

The second hand will display the protocol and polarity that was detected. See the table on the previous page for details.

The minute hand will display the software version number.

If the LED is flashing red:

The hour hand will display how much time has passed since the clock last received a communication signal:



Hour Hand Position

Time Since Clock Last Received Communication

12	Clock received communication within the last hour.
1	Clock received communication between 1 and 2 hours ago.
2	Clock received communication between 2 and 3 hours ago.
3	Clock received communication between 3 and 4 hours ago.
4	Clock received communication between 4 and 5 hours ago.
5	Clock received communication between 5 and 6 hours ago.
6	Clock received communication between 6 and 7 hours ago.
7	Clock received communication between 7 and 8 hours ago.
8	Clock received communication between 8 and 9 hours ago.
9	Clock received communication between 9 and 10 hours ago.
10	Clock received communication between 10 and 11 hours ago.
11	Clock received communication more than 11 hours ago.

--May signify a manufacturer default.

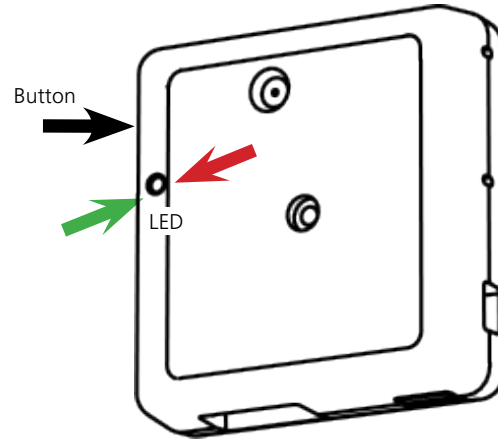
The clock hands will remain on these numbers for three minutes, and then the clock will revert to displaying the accurate time.

Diagnostic Test #3 - Manufacturing Default (Original Only)

The purpose of Diagnostic #3 is to bring the clock back to 12:00:00 and reset to the manufacturer's default.

Diagnostic #3 may be enabled by holding down the diagnostic button for five seconds. If the Valcom Wired clock is performing this diagnostic, then a green LED on the back will flash three times with a five second break between each flash. The LED will continue to flash green until the diagnostic is complete. The clock will confirm that the diagnostic is complete when the LED shines a different color.

If the LED is flashing red:



Number of Red Flashes

1,2

3,4,5

6,7,8

Error Message

Error detected in second hand. Confirm that hands are not hitting each other, then repeat the test.

Error detected in the minute or hour hand. Confirm that hands are not hitting each other, then repeat the test.

Call tech support.

If the LED is a solid green and all of the clock hands are pointing to 12, the test was completed successfully.

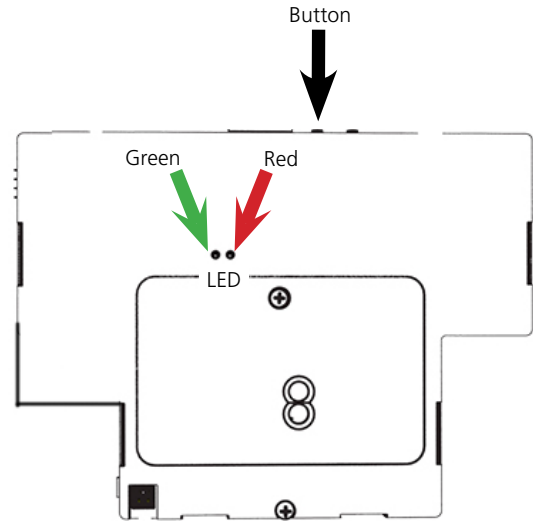
At the end of Diagnostic three, the clock hands will be set to 12:00:00. The clock will not resume normal operation until the power has been recycled.

Diagnostic Test #3 - Manufacturing Default (B-Model Only)

The purpose of Diagnostic #3 is to bring the clock back to 12:00:00 and reset to the manufacturer's default.

Diagnostic #3 may be enabled by pressing the diagnostic button three times. If the clock is performing this diagnostic, then a green LED on the back will flash three times with a five second break between each flash. The LED will continue to flash green until the diagnostic is complete.

If the LED is flashing red:



Number of Red Flashes

1,2

3,4,5

6,7,8

Error Message

Error detected in second hand. Confirm that hands are not hitting each other, then repeat the test.

Error detected in the minute or hour hand. Confirm that hands are not hitting each other, then repeat the test.

Call tech support.

If the LED is a solid green and all of the clock hands are pointing to 12, the test was completed successfully. At the end of Diagnostic three, the clock hands will be set to 12:00:00. The clock will not resume normal operation until the power has been recycled.