

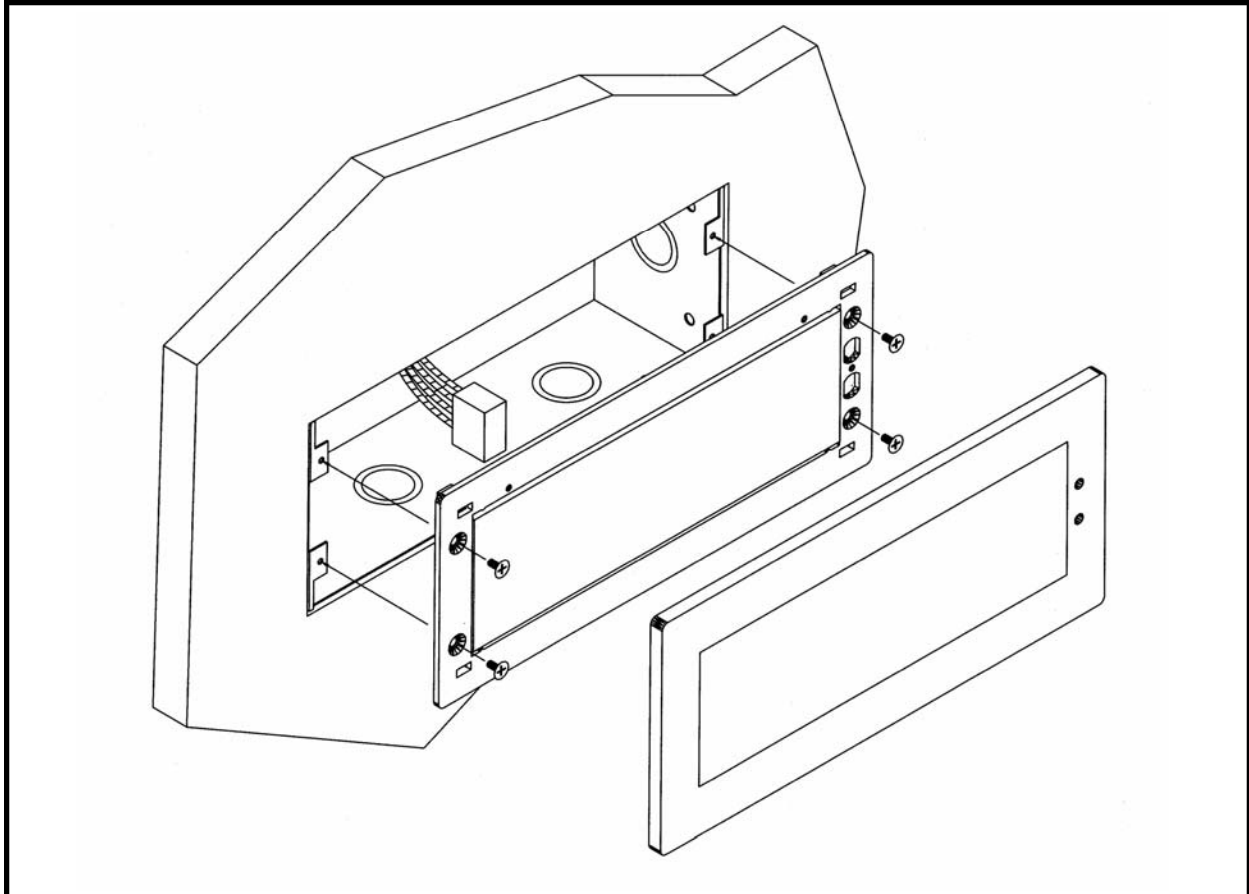


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Flush Mount Installation

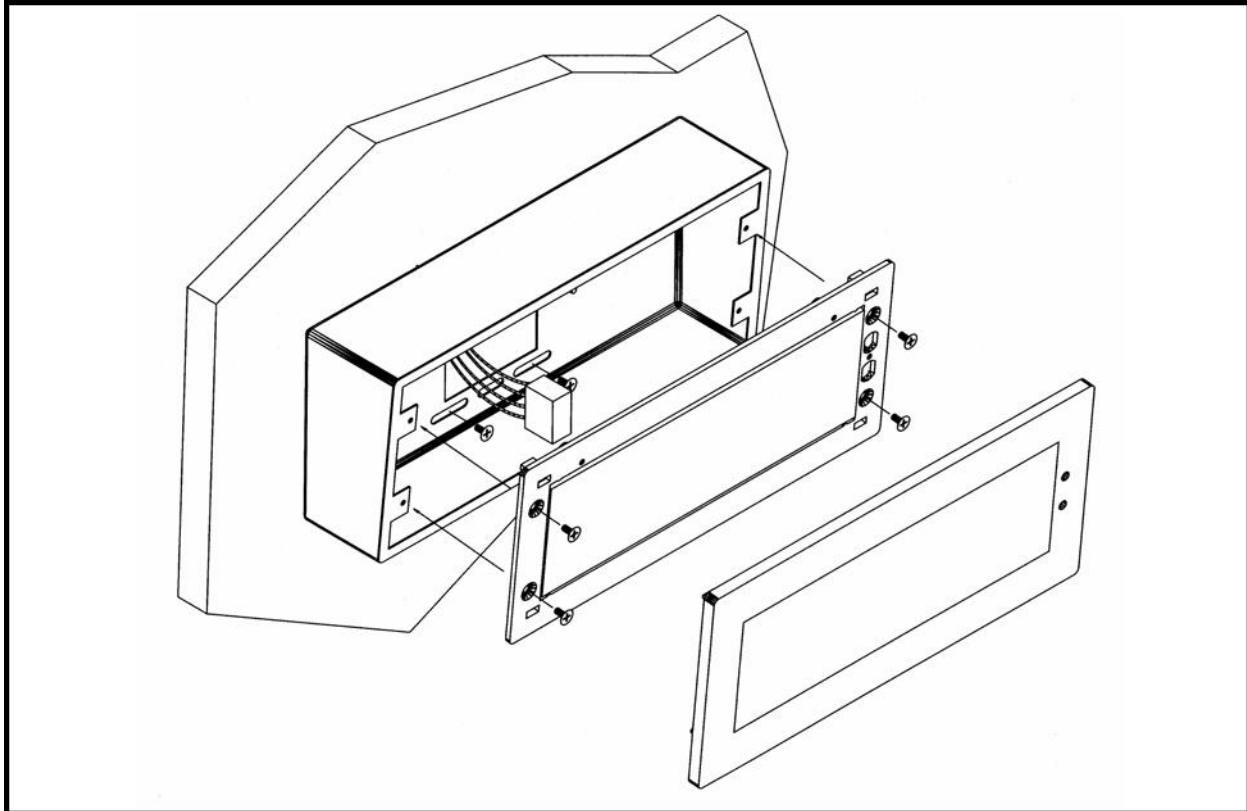


Instructions

1. Mount the flush mount box into the wall.
2. Connect the ground wire into the flush mount box using the tooth lockwasher and the machine screw nut (included in the kit).
3. Disconnect the red filter from the display panel.
4. Connect the wiring as shown on the wiring diagram.
5. **IMPORTANT:** If using a low voltage system (24 volt) make sure that the transformer is an **isolated** transformer.
6. Mount the display panel into the flush mount box using the four (4) black machine screws (#6, included in the kit). Make sure the switches are on the right side.
7. Snap the red filter into the display panel.



Wall Mount Installation

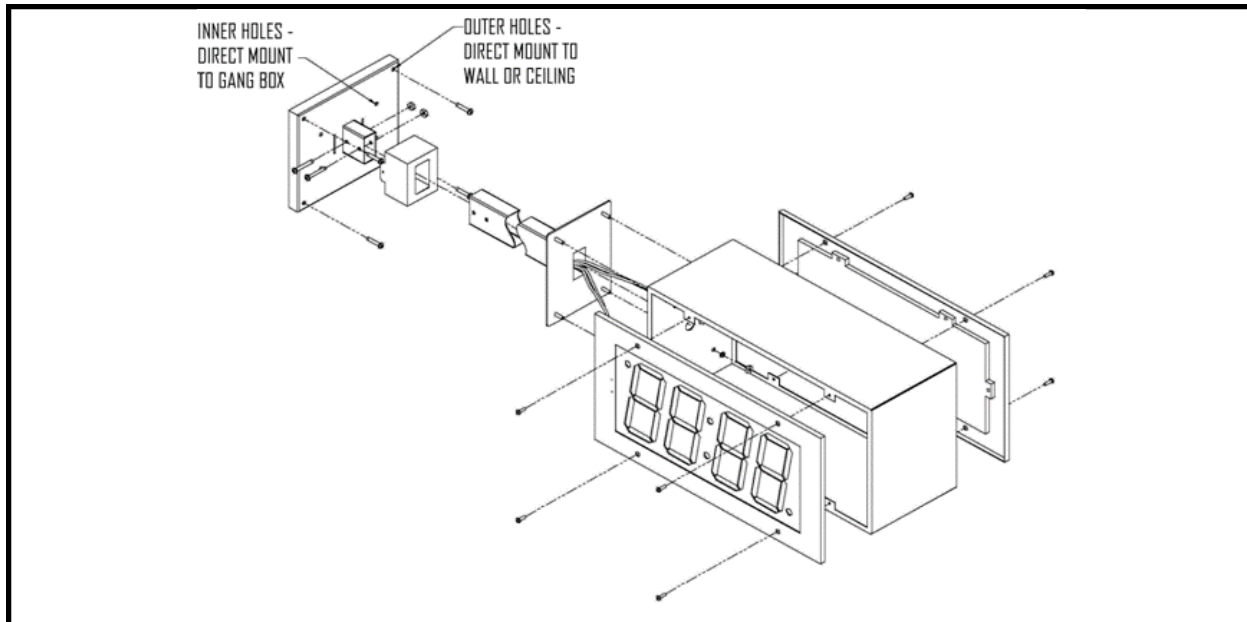


Instructions

1. Mount the wall mount box into the double gang box using four machine screws (#6-32) including in the kit.
2. Connect ground wire into flush mount box using tooth lockwasher and machine screw nut (included in the kit).
3. Disconnect the red filter from the display panel.
4. Connect the wiring as shown on the wiring diagram.
5. **IMPORTANT:** If using a low voltage system (24 volt) make sure that the transformer is an **isolated** transformer.
6. Mount the display panel into the flush mount box using four (4) black machine screws (#6, included in the kit). Make sure the switches are on the right side.
7. Snap the red filter into the display panel.



Double Mount Installation

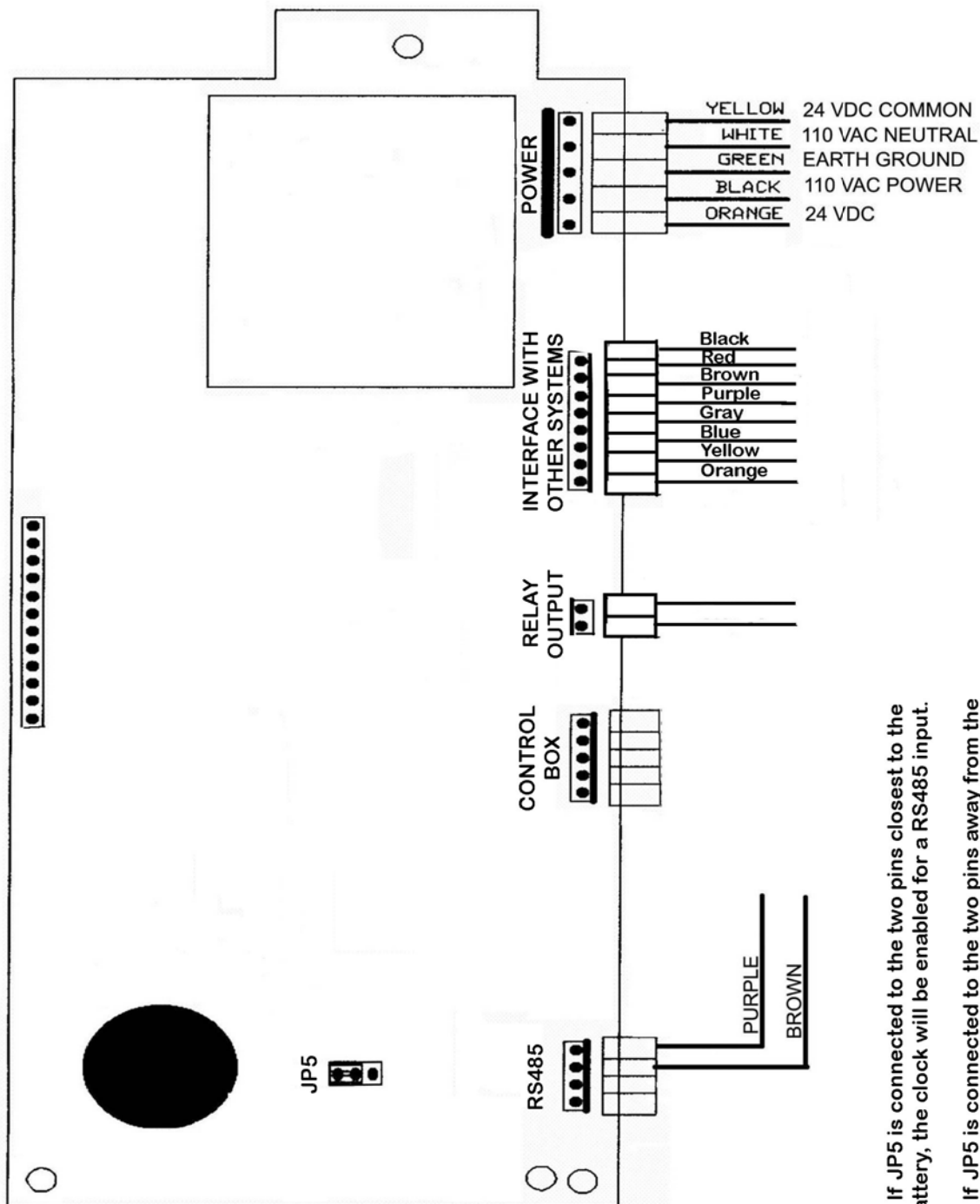


Instructions

1. Screw the hanger/mounting rod (included in the kit) into the crossbar (also included in the kit).
2. Insert the wires through the hanger/mounting rod.
3. Install the crossbar using two (2) #6-32 screws into the double gang box.
4. Mount the double mount box into the clock base using two (2) #6 nuts and tooth lockwasher #6. The double mount can be mounted either on the wall or on the ceiling.
5. Insert the two (2) locking hole plugs (0.187") and the locking hole plug (0.562") into the unused holes.
6. Insert the double mount case onto the hanger/mounting rod.
7. Insert the support bracket onto the hanger/mounting rod.
8. Screw the two (2) nuts (included in the kit) onto hanger/mounting rod and secure the clock base to wall.
9. Connect ground wire into double mount box using the tooth lockwasher and machine screw nut (included in the kit).
10. Disconnect the red filter from the display panel.
11. Connect the wiring as shown on the wiring diagram.
12. **IMPORTANT:** If using a low voltage system (24 volt) make sure that the transformer is an **isolated** transformer.
13. Mount the display panel on one side of the double mount box using four (4) black machine screws (#6, included in the kit). Make sure the switches are on the right side.
14. Snap the red filter into the display panel.
15. Repeat steps 9-13 for the second clock.



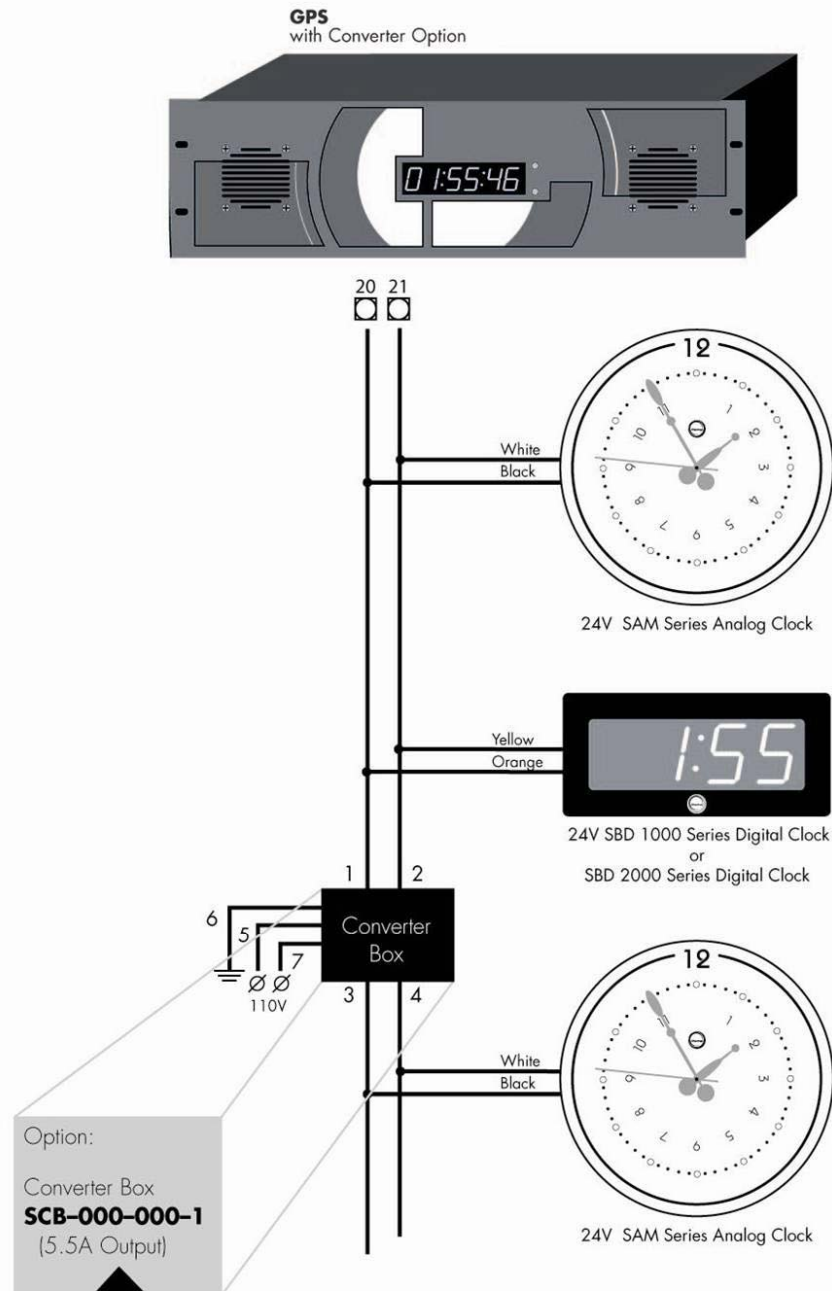
Wiring Information



- If JP5 is connected to the two pins closest to the battery, the clock will be enabled for a RS485 input.
- If JP5 is connected to the two pins away from the battery, the clock will be enabled for a 2 wire digital communication input.



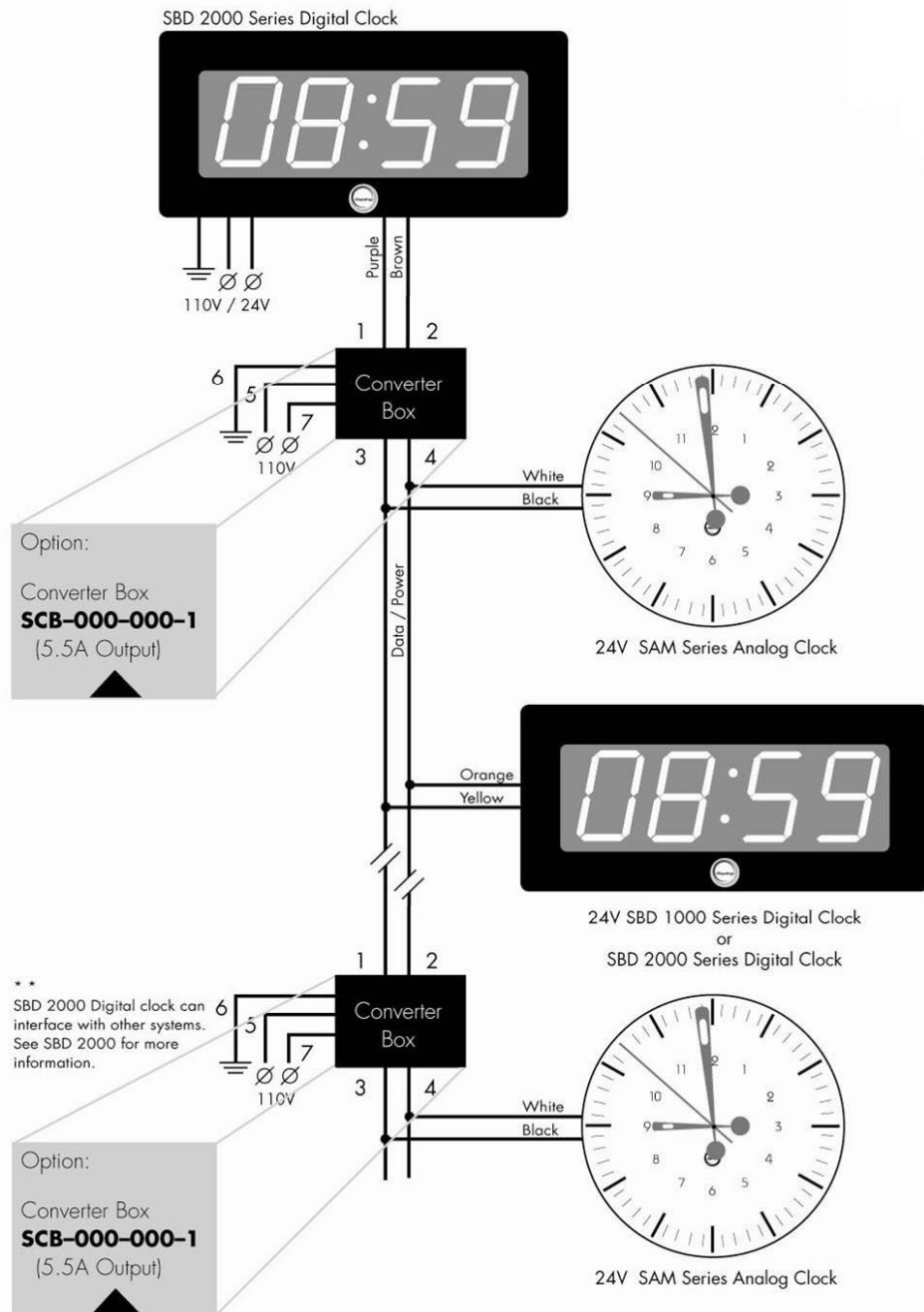
GPS MASTER CLOCK 2 WIRE DIGITAL COMMUNICATION



SBD 2000 Series Digital Clock Installation Manual (v5)



SBD 2000 MASTER CLOCK 2 WIRE DIGITAL COMMUNICATION



SMC Series Master Clock
Requires: SMC-000-010-1 2A output

The diagram illustrates the wiring for the SMC Series Master Clock. The master clock unit is shown at the top, featuring a digital display (09:00:45), a label 'The Sanyo Company 09:00:45', and a keypad. Below it, a circuit diagram shows the connection to three slave clocks: two 24V SAM Series Analog Clocks and one 24V SBD 1000 Series Digital Clock or SBD 2000 Series Digital Clock. The wiring includes a 'Power / Data' line from the master clock to the slave clocks, and a 'Neutral White' and 'Power Black' line. A 'Converter Box' is shown with terminals 1, 2, 3, 4, 5, 6, and 7. The 110V power source is connected to terminals 5, 6, and 7. The 24V power is connected to terminals 1 and 2. The 'Neutral White' and 'Power Black' lines are connected to terminals 3 and 4. The 'Option: Converter Box SCB-000-000-1 (5.5A Output)' is indicated.

Circuit 25 26

Power / Data

Neutral White
Power Black

24V SAM Series Analog Clock

Orange
Yellow

24V SBD 1000 Series Digital Clock
or
SBD 2000 Series Digital Clock

1 2
3 4
5 6 7
110V

Converter Box

Neutral White
Power Black

24V SAM Series Analog Clock

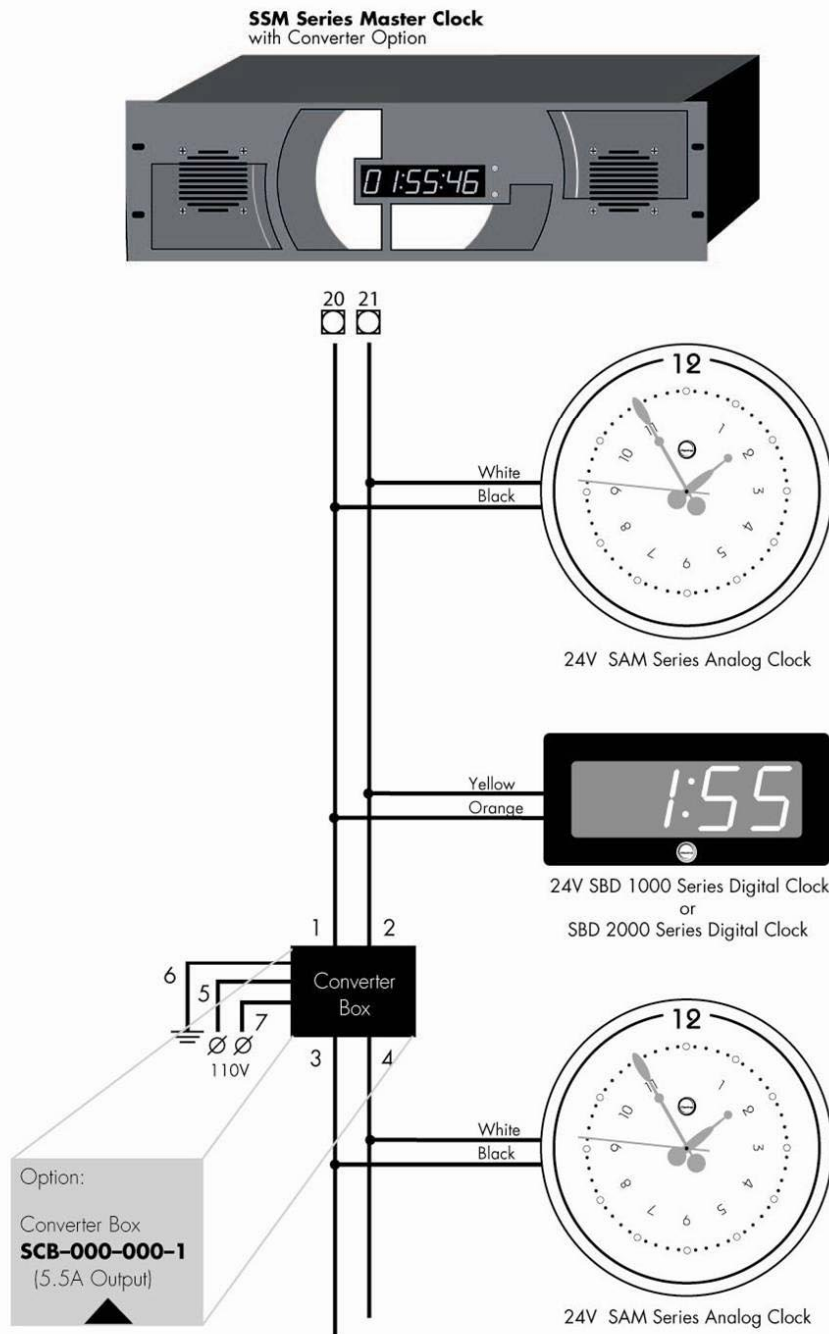
Option:
Converter Box
SCB-000-000-1
(5.5A Output)

*
If there is no need for auxiliary control, SBD 2000 digital clock can be used as a master.

**
SBD 2000 Digital clock can interface with other systems. See SBD 2000 for more information.



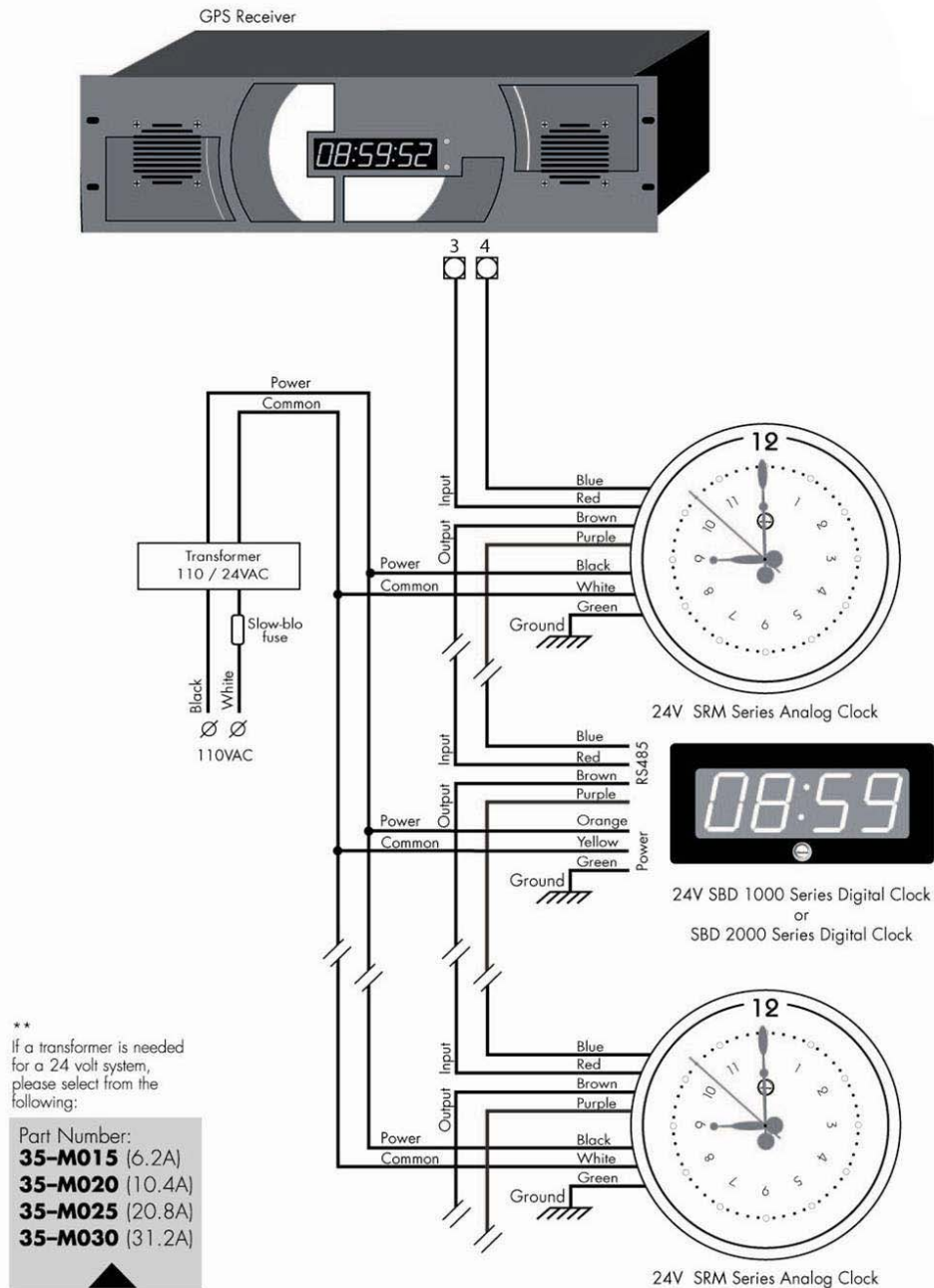
SSM SERIES MASTER CLOCK 2 WIRE DIGITAL COMMUNICATION



SBD 2000 Series Digital Clock Installation Manual (v5)



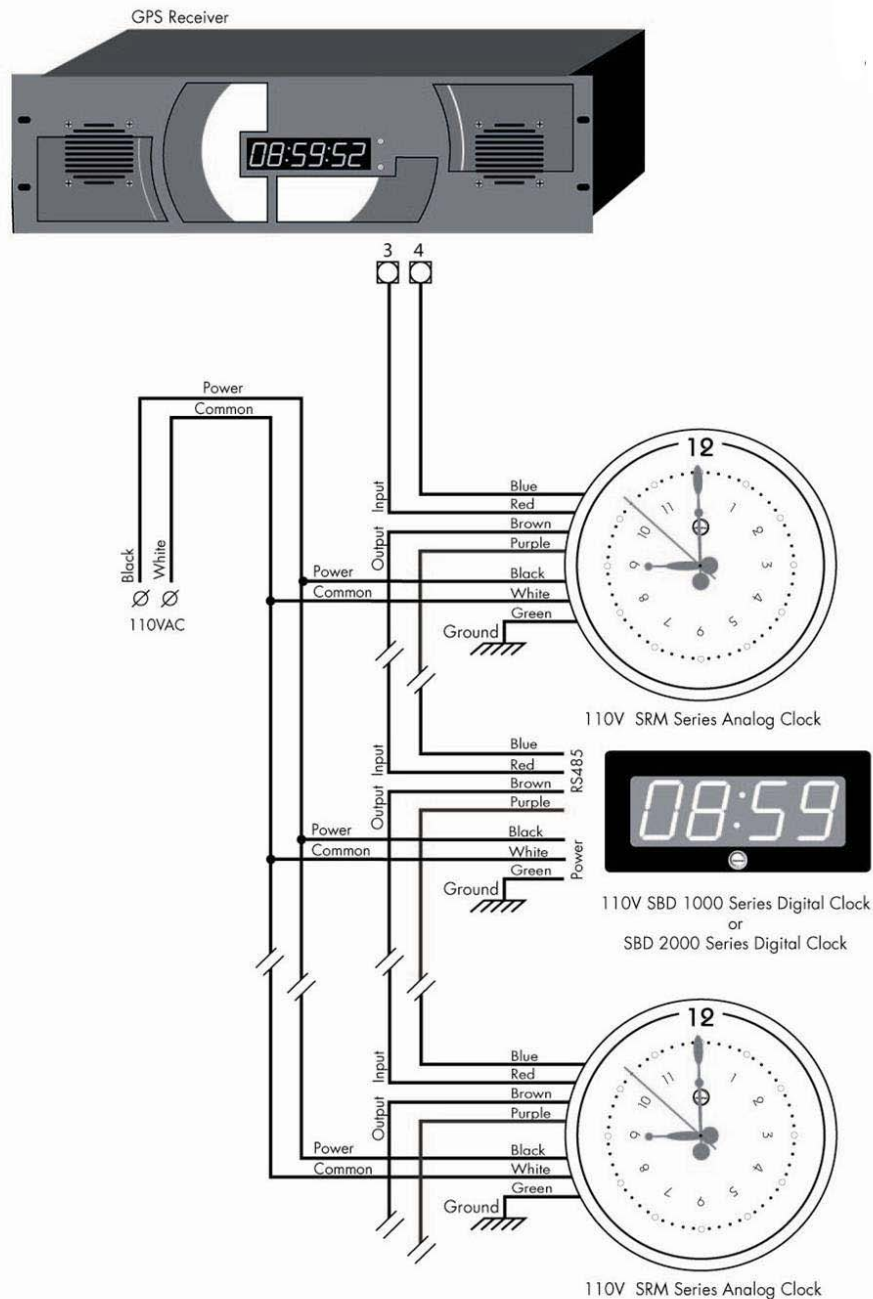
GPS RECEIVER MASTER CLOCK RS485 24 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)



GPS RECEIVER MASTER CLOCK RS485 110 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)

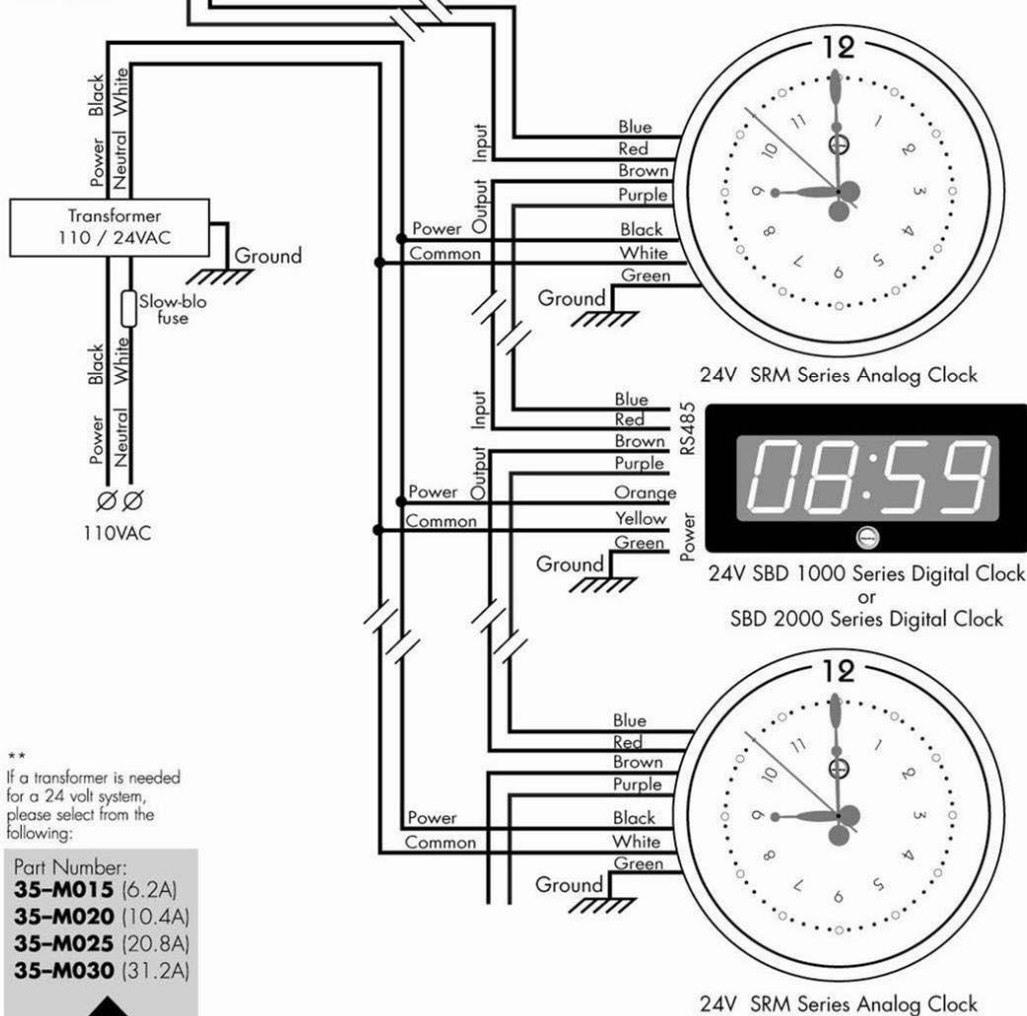


SBD 2000 MASTER CLOCK RS485 24 VOLT

SBD 2000 Series Digital Clock



110V / 24V



**
If a transformer is needed
for a 24 volt system,
please select from the
following:

Part Number:
35-M015 (6.2A)
35-M020 (10.4A)
35-M025 (20.8A)
35-M030 (31.2A)

SBD 2000 Series Digital Clock Installation Manual (v5)



SBD 2000 MASTER CLOCK RS485 110 VOLT

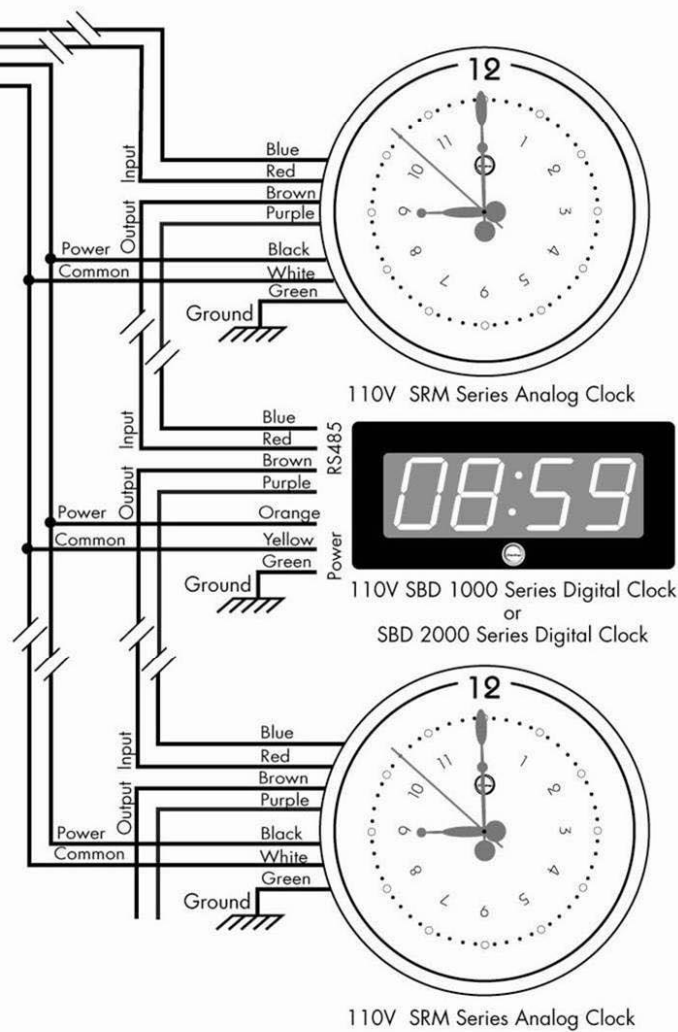
SBD 2000 Series Digital Clock



110V / 24V

Black
Power
White
Neutral
110VAC

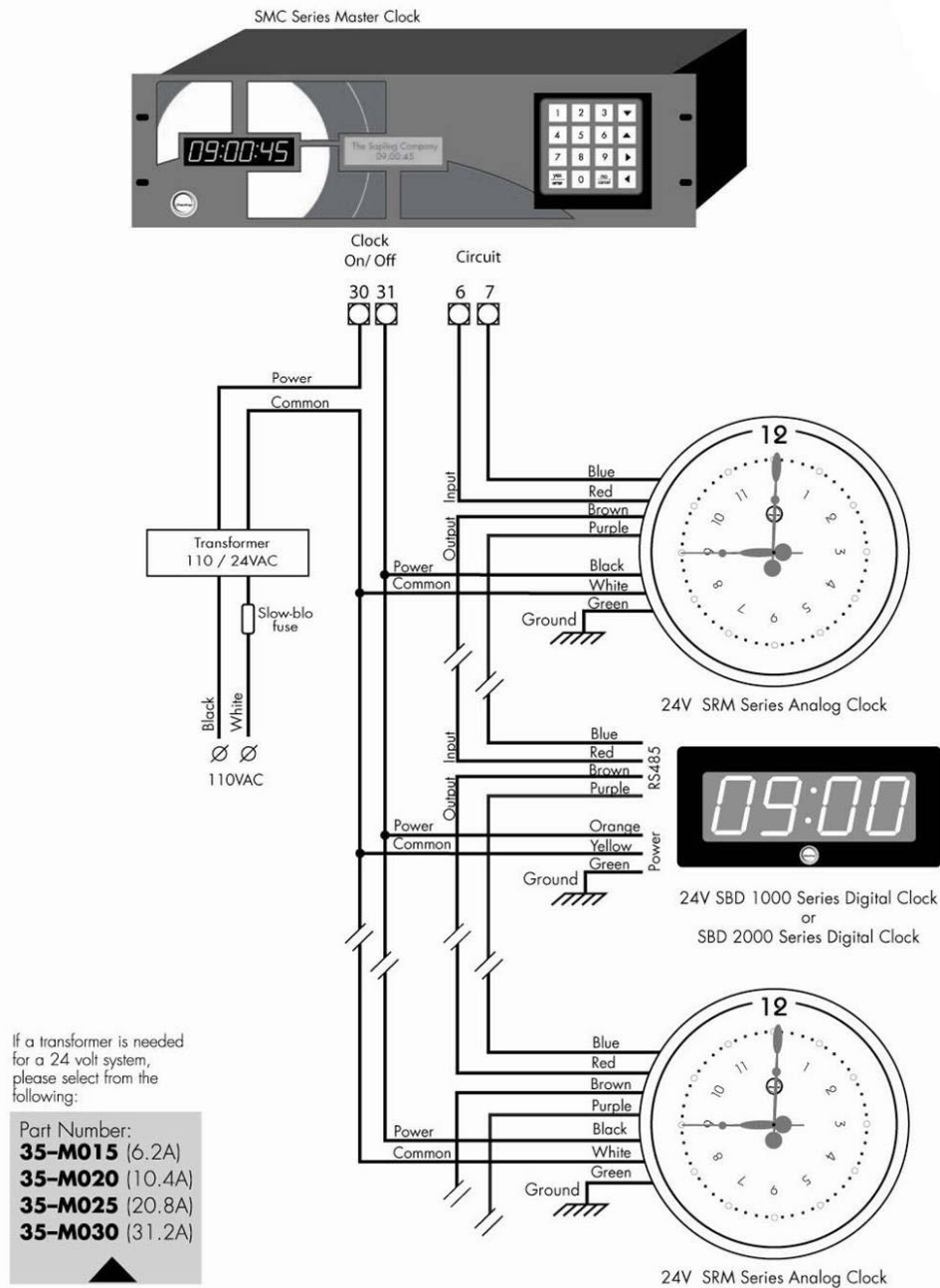
Brown
Purple



SBD 2000 Series Digital Clock Installation Manual (v5)



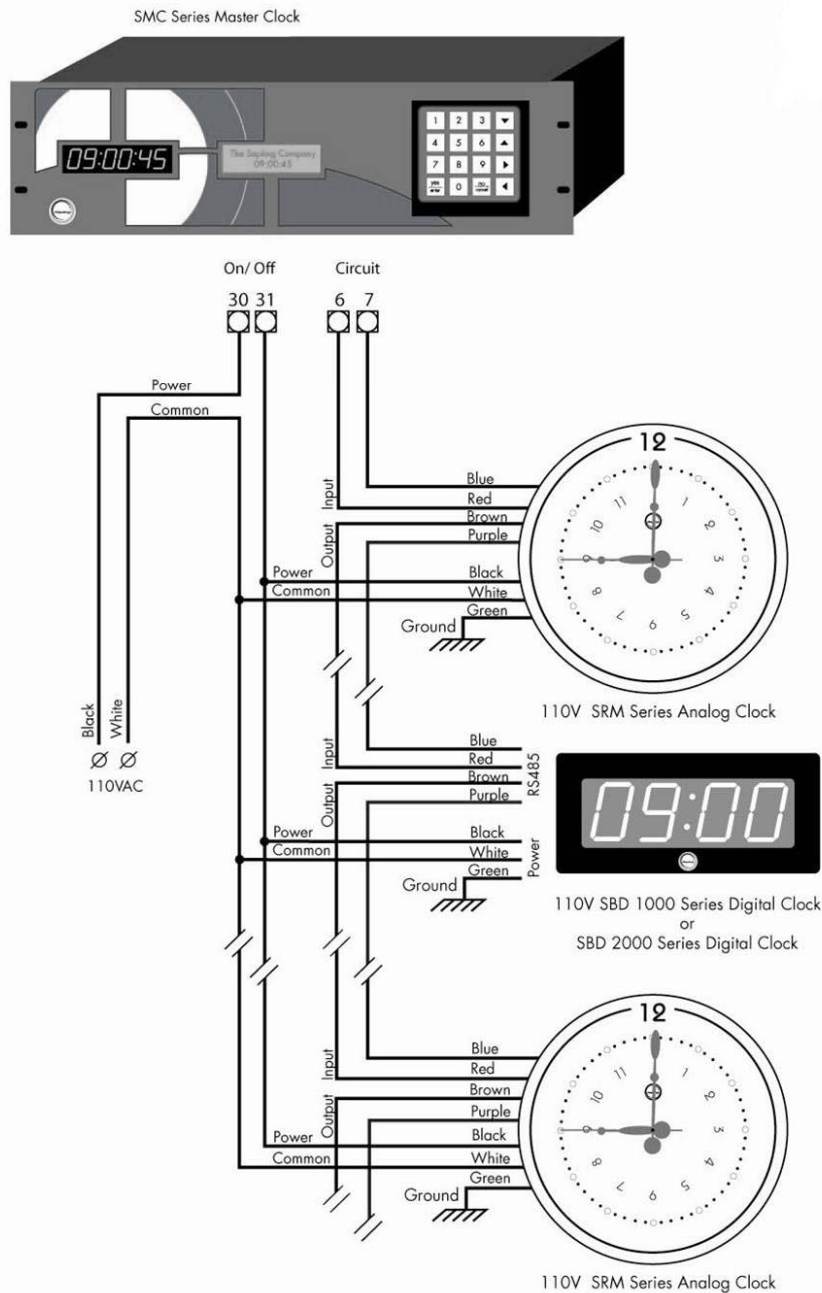
SMC SERIES MASTER CLOCK RS485 24 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)



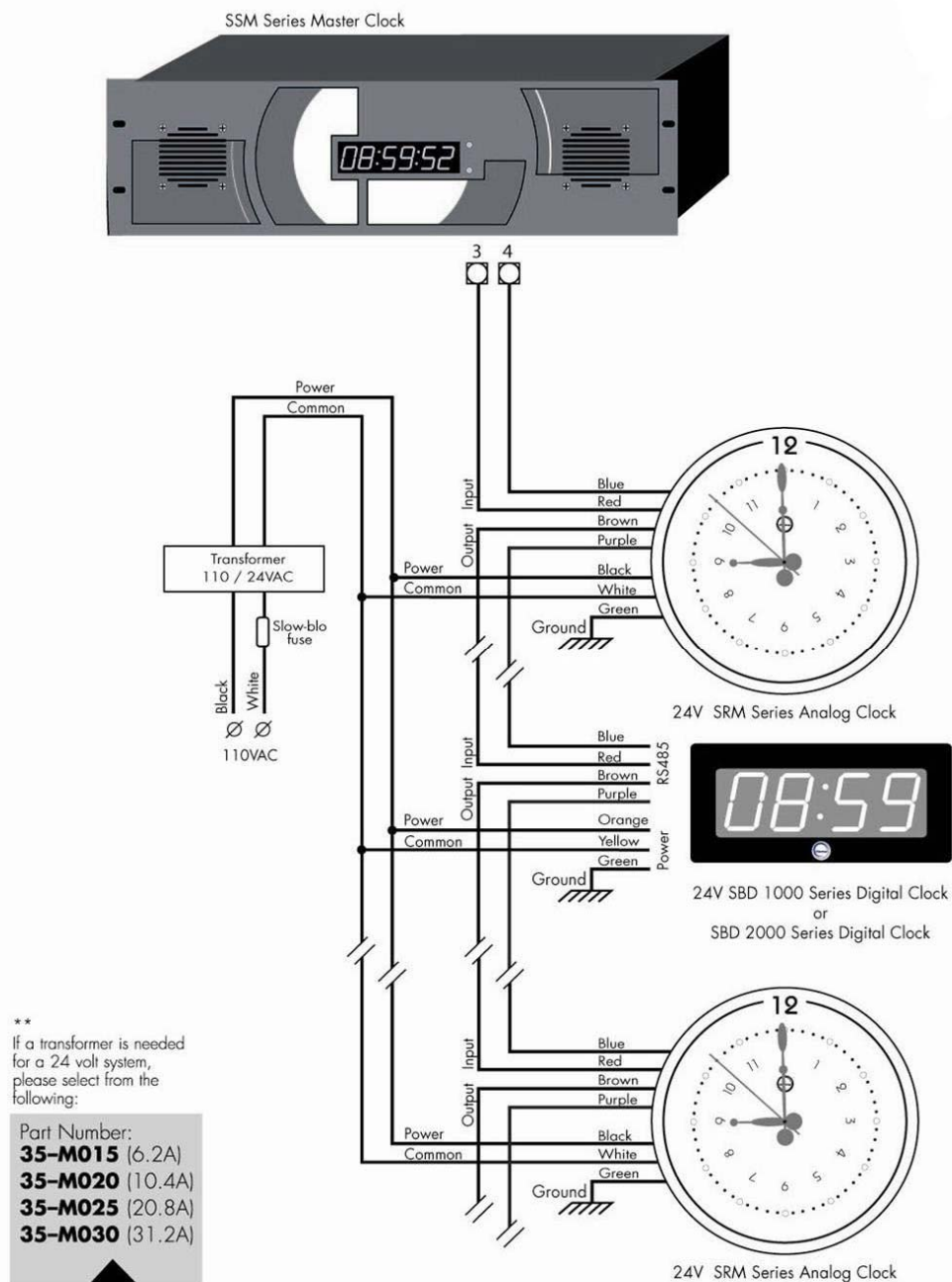
SMC SERIES MASTER CLOCK RS485 110 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)



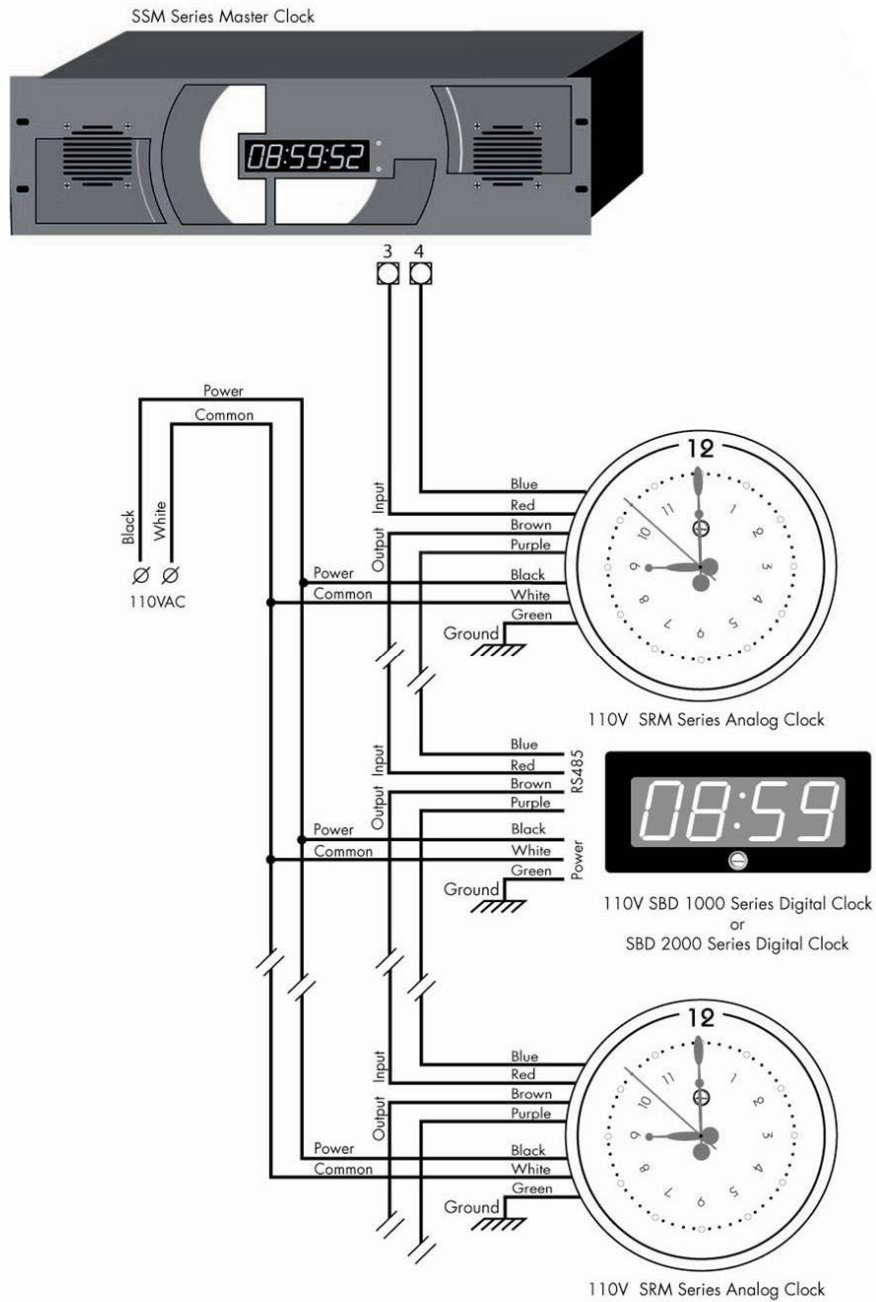
SSM SERIES MASTER CLOCK RS485 24 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)

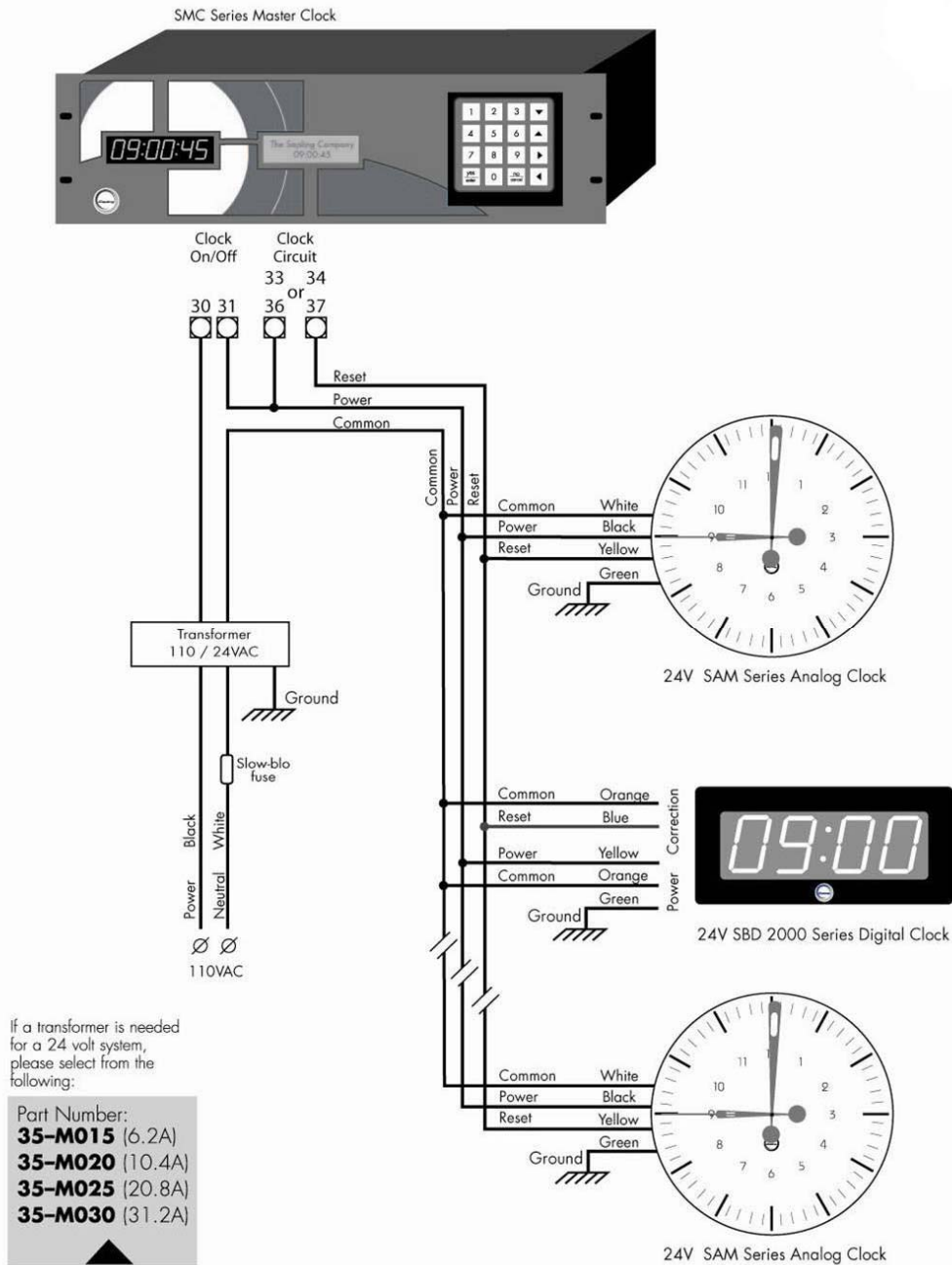


SSM SERIES MASTER CLOCK RS485 110 VOLT





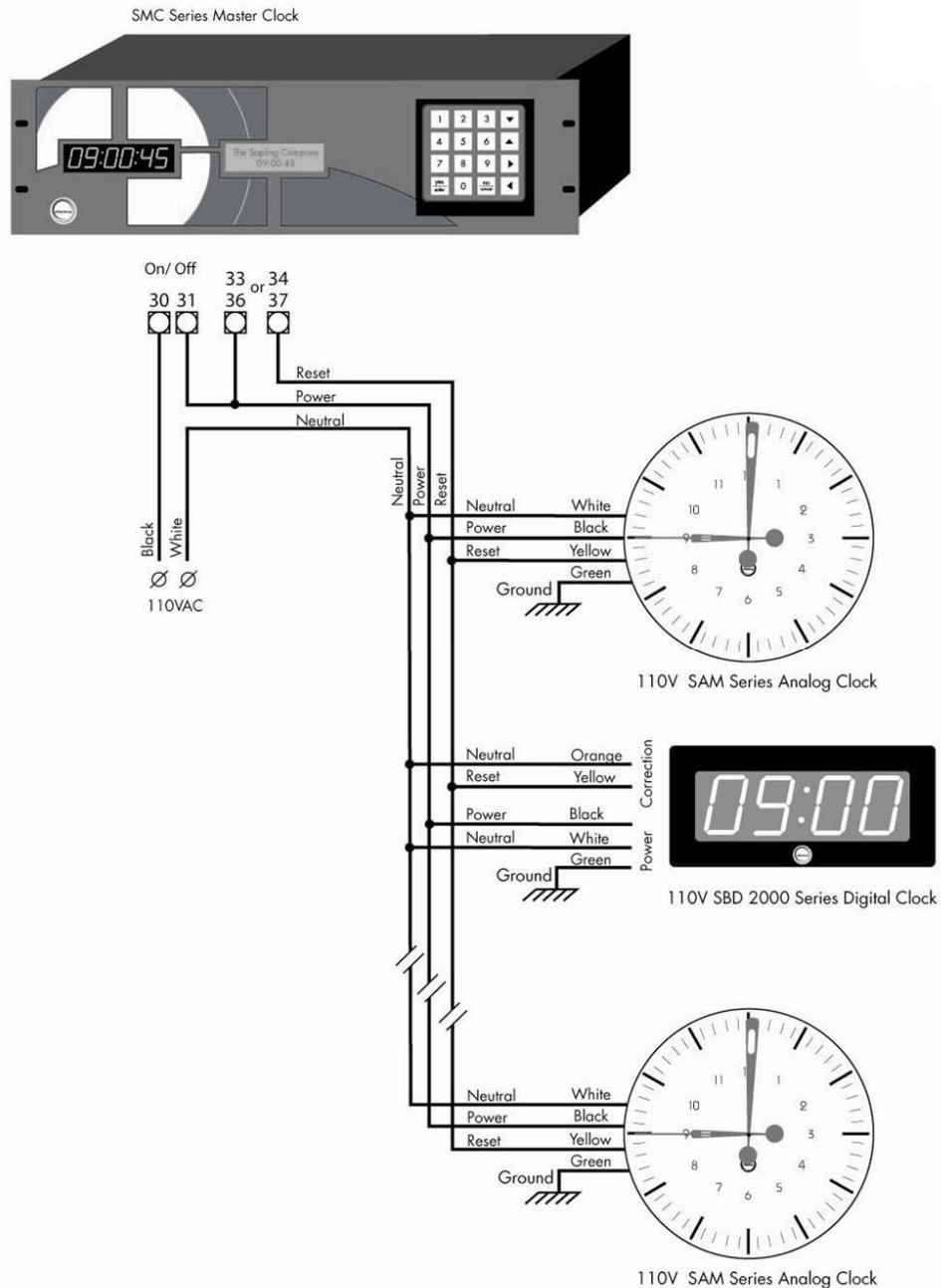
SMC SERIES MASTER CLOCK 3 WIRE SYNCHRONOUS 24 VOLT



SBD 2000 Series Digital Clock Installation Manual (v5)



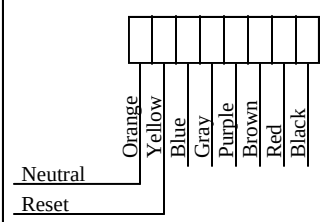
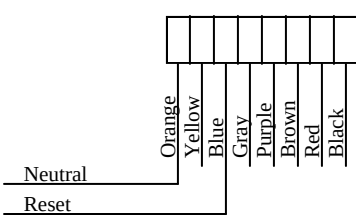
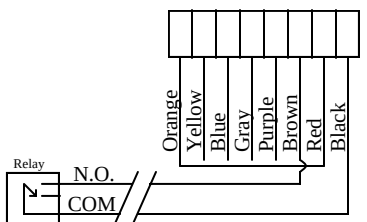
SMC SERIES MASTER CLOCK 3 WIRE SYNCHRONOUS 110 VOLT





Interfacing With Other Systems

59 Minute Correction

 110V Interface	 24VAC Interface	 Dry Contact Closure
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Description:

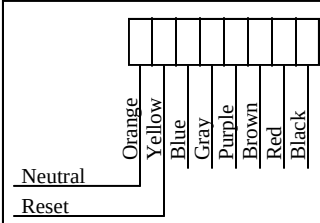
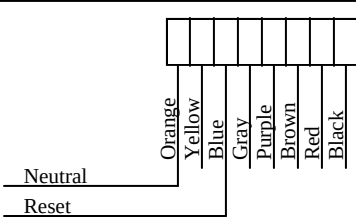
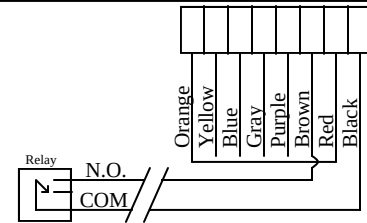
110 VAC/24 VAC 60 Hz is used to run the clock normally. Applying an eight (8) second reset signal from 57 minutes and 54 seconds will cause an hourly correction. Applying a fourteen (14) second reset signal from 5:57:54 will cause a daily correction.

Instructions:

- 1) In programming mode, set option 31 to 01.
- 2) Connect interface harness as shown in the diagram.

Note: Manually set the slave clock to the time from the master clock upon initial connection. After the slave clock receives its first daily correction, the clocks will be perfectly synchronized.

58 Minute Correction

 110V Interface	 24VAC Interface	 Dry Contact Closure
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Description:

110 VAC/24 VAC 60 Hz is used to run the clock normally. See the SBD 2000 Programming Manual for the four variations of 58 Minute Correction.

Instructions:

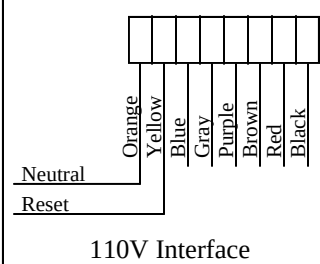
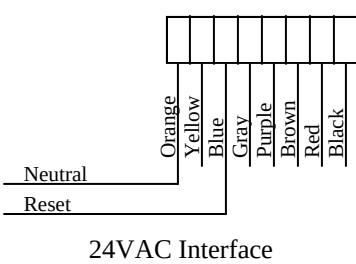
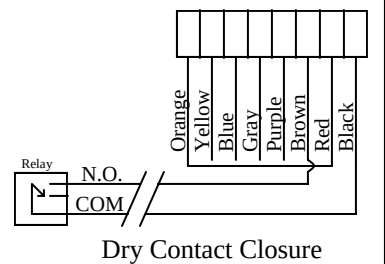
- 1) In programming mode, set option 31 to 02, 03, 04 or 05.
- 2) Connect interface harness as shown in the diagram.

Note: Manually set the slave clock to the time from the master clock upon initial connection. After the slave clock receives its first daily correction, the clocks will be perfectly synchronized.



Interfacing With Other Systems

National Time and Rauland

 110V Interface	 24VAC Interface	 Dry Contact Closure
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Description:

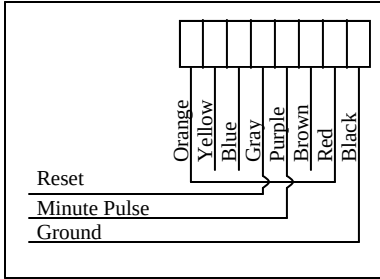
110 VAC/24 VAC 60 Hz is used to run the clock normally. Applying a 25 second reset signal when minutes equal 00 and seconds equal 00 will cause an hourly correction. Applying a 24 minute reset signal when hours equal 06 or 18 and minutes equal 00 and second equals 25 will cause a daily correction.

Instructions:

- 1) In programming mode, set option 31 to 06.
- 2) Connect interface harness as shown in the diagram.

Note: Manually set the slave clock to the time from the master clock upon initial connection. After the slave clock receives its first daily correction, the clocks will be perfectly synchronized.

Dukane Systems



Description:

Applying a 4-10 millisecond pulse on the minute line will increment the clock in one minute. Applying a 12-50 millisecond pulse on the reset line will bring the clock back to 12:00 a.m.

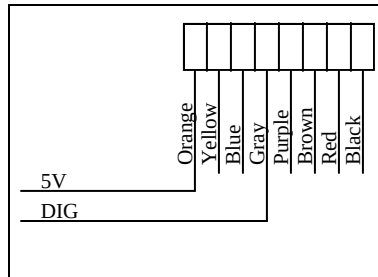
Instructions:

- 1) In programming mode, set option 31 to 07.
- 2) Connect interface harness as shown in the diagram.



Interfacing With Other Systems

Rauland Digital Systems



Description:

Applying a half second pulse for every minute to the Dig. Line will bring the clock to the correct time. The clock will jump to the correct time at the end of the correction pulse.

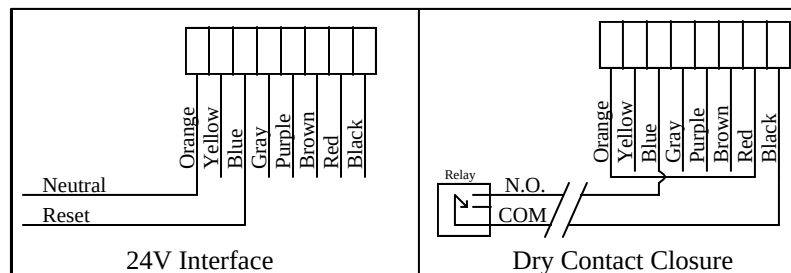
Note: For better synchronization, it is recommended to work on a 60 Hz time base.

Note: Use only an isolated transformer to run the clock in 24 volt mode.

Instructions:

- 1) In programming mode, set option 31 to 08
- 2) Connect the interface harness as shown in the diagram.

Midnight Reset (or) Once A Day Pulse



Description:

Applying a minimum of two (2) second pulse will bring the clock to the correct time.

Note: Please refer to the following page for directions on how to set the time of the pulse.

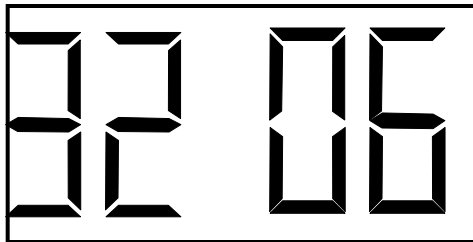
Instructions:

- 1) Set Option 31 to 09.
- 2) Connect the harness.

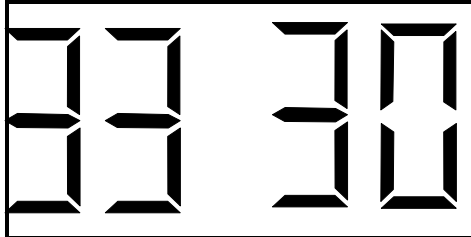


Interfacing With Other Systems

Enter the programming mode by pushing the set-hour and set-minute buttons at the same time. The AM/PM indicator in the upper left corner will start blinking, indicating that you are in programming mode.



Continuously press the set-hour button until the number 32 shows on the hour display. Next, push the set-minute button until you reach the desired hour at which the relay closure will take place. For example, set the number to 6 if you wish the interface to occur at 6:30:00 a.m.



Press set-hour again, the hour display should show 33. Then press the set-minute button again until you reach the desired minutes at which the relay closure will take place. For example, set the number to 30 if you wish the interface to occur at 6:30:00 a.m.



Press set-hour again. The hour display should show 34. Then press the set-minute button again until you reach the desired seconds at which the relay closure will take place. For example, set the number to 00 if you wish the interface to occur at 6:30:00 a.m.



Frequently Asked Questions

Can the SBD 2000 digital clock be used as an independent clock?

Yes, the SBD 2000 is capable of being used as an independent, slave, master or chronograph clock.

Some clocks require a 9 volt battery backup for timekeeping. What happens to the SBD 2000 if a power failure occurs?

The SBD 2000 comes equipped with a ten (10) year battery backup. Upon restoration of power, the SBD 2000 immediately corrects itself from its built-in time base. This occurs within seconds of "power-up". Some clocks which do require a 9 volt battery backup risk having the battery die during extended shut downs. Each individual clock must then be opened in order to replace the battery. Since the SBD 2000 includes a ten (10) year battery backup, the clock need never be opened.

What happens to the SBD 2000 system if its input is lost?

Since the SBD 2000 digital clock is able to act as a master clock, if the communication input is lost to the SBD 2000, the clock will continue to run on its own. The SBD 2000 will also continue sending communication to any clocks down the line that it is connected to.

How do I take advantage of the SBD 2000 chronograph functions?

The Sapling Control Box (part# SBD-009-000-0) controls all chronograph functions of the SBD 2000. The display can be programmed to show either HH:MM or MM:SS, and the readout can count up from 00:00:00 to 99:59:59 or count down with a programmable starting point from 99:59:59 to 00:00:00, with interrupt and resume capabilities.

How many clocks can be run on the same communication line? What is the maximum distance between clocks on the communication line?

Each SBD 2000 digital clock has a RS485 input and an output port. Each output port can drive up to 32 clocks in parallel, however daisy chaining is the recommended wiring configuration. When using a daisy chain method of communication you can run an unlimited number of clocks on the same communication line by connecting the clocks to each other individually where each clock drives the next clock in line. When using a daisy chain wiring configuration, the maximum distance between each clock can be up to 3,000 feet. When an output drives more than one clock in parallel, the combined length of all the lines emanating from one clock can not exceed 3,000 feet.

How can I display "BELL" and "FirE" on the clock?

"BELL" displays can be programmed by either the Sapling 2000 or 3000 Series master clocks. To display "FirE", a 3000 Series master clock, which receives a signal from an existing alarm system, must be used.



Troubleshooting

The clock is not running. What do I do?

- a) Measure the input voltage to the clock. The voltage should measure 85-135 volts in the 110 volt model or 10-28 volts in the 2.5"/24 volt model and 16-28 volt in the 4.0"/24 volt model.
- b) Make sure the transformer is an **isolated** transformer if using a 24 volt model.
- c) Make sure the ground wire is not touching other wires.

NOTE: If you fail to follow instructions b and c listed above, the fuses can be blown.

The clock is not receiving an input signal. What do I do?

- a) Make sure that the RS485 is connected properly when using in RS485 slave mode. Make sure that JP5 is in the proper position.
- b) Make sure that the polarity of the communication wire is correct when using the clock in 2 wire digital communication slave mode. Make sure that JP5 is in the proper position.
- c) If interfacing with other systems, make sure that the input voltage is zero (0) when not applying a correction signal. When taking this measurement, you must be sure that the clock is disconnected from the master clock. Also, measure both AC & DC voltage. (The current consumption needed is very low, about 3mA, and a leakage current from the master clock can be interpreted as a continuous reset signal. If you are experiencing such a problem, please install a bypass mechanical relay).

There is data noise bleeding into the intercom line. What do I do?

Reduce the transmission rate from the master clock to once a minute.